TIMO SAARI

# Mind-Based Media and Communications Technologies

## How the Form of Symbolical Information Influences Felt Meaning

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# Abstract

The problem of the study is the design of modern, computerized media- and communication technologies which systematically influence subjective experiences and knowledge of the perceivers.

The interaction of mind and the information embedded in modern media and communications technologies is complex. The result of this interaction is the making of meaning for information. There are sources of variability of meaning in the perceiver and media and communications technologies. These sources of variability partly determine the resulting meanings which are made. Meaning may instantly change subjective experience, such as emotion, and change knowledge. By semi-systematically controlling the making of meaning, one may indirectly influence subjective experience and change the knowledge of a certain perceiver. This happens by manipulating the information embedded in a particular media and communications technology to reach a certain goal, such as to produce a subjective experience or change knowledge via influencing meanings in a certain way. This study focuses on the influence of the way of designing and presenting information on non-linguistic, presentational and image-schematic meanings and the consequent changes in subjective experience and/or knowledge of the perceiver. As a result of theoretical and conceptual elaborations the study presents an approach to the design of mind-based media and communications technologies.

To describe the problem area the study constructs models of making meaning. Making meaning in a real, physical environment is influenced by complex interactions of the perceiver, the object of perception and the context of perception. An object of perception is perceived via attention, which relegates the other objects of perception to the background, or context. Meaning is made in unconscious processes via three interacting loops of processing. In the perception-action loop, the sensory mechanisms resonate with the features of the object of perception, reflecting the embeddedness of the perceiver in the context. In the attention loop some sensory representations produced in the perception-action loop are identified and quickly categorized by projecting non-linguistic symbolic models, such as primary metaphors, onto the sensory representations. This results in non-linguistic, image-schematic and presentational felt meaning. It may also be the basis of personal meaning, which is based on the unconscious evaluation of the immediate relevance of the object of perception to personal values, ego, goals and well-being. Felt and personal meaning may directly influence subjective experiences, such as emotion, due to the close link of emotion and cognition. Partly similar mechanisms of change may apply to other types of subjective experience, such as daydreaming or flow. In a further-processing loop, meaning is made via more elaborated comparisons of mental representations and previous knowledge. This may lead to knowledge construction, accumulative and mechanistic change in knowledge. It may also lead to knowledge creation, which implies the change of levels of meaning in knowledge. Also, subjective experiences may be altered.

When perceiving information via media and communications technologies, the mind is psychologically transported into a quasi-natural experience of the events described. This is called presence. In presence, information becomes the focused object of perception, while the immediate, external context, including the technological device, fades into the background. Various empirical studies show that information experienced in presence has real psychological effects on perceivers and

meaning is made in unconscious processes similar to making meaning in the immediate, physical environment.

Information in media- and communication technologies is symbolical, i.e. language and other types of symbol systems are used by the authors of information to describe events of the world. Symbolical information as multimodal representation can be divided into form and substance. Substance includes the descriptions of events of the world made by authors. Form is the aesthetic and creative way of organizing substance to be suitable for human sensory perception. The form of symbolical information is related to connotative meanings. Connotative meanings are subjective, presentational, immediate and non-linguistic. As such, they are very similar to felt meanings. Consequently, the form of symbolical information influences felt meaning.

The form of symbolical information in modern media- and communication technologies may be personalized. This allows for an individual-centric influence of the form of symbolical information on felt meaning. The form of symbolical information in modern media and communications technologies consists of spatial and temporal layout and the use of modalities. Spatial layout refers to visual elements and the layouts of computer screens. Temporal layout refers to linear and non-linear structures of integrating layouts and modalities. Modalities refer to spatio-temporal multimodal representations, such as text, audio, video, graphics and animation. Modern media and communications technologies allow different ways of interaction, such as narrative and dialogical ways of interaction with computer and perceiver. The visual-functional user interface is the stage in which symbolical information is embedded. The form of symbolical information is in interaction with these dimensions. Various influences on meaning constitute meaning units in symbolical information and media and communications technologies. They may be varied in time and space in creative ways to influence meanings of a certain perceiver, such as felt meaning. Meanings, such as felt meaning may then change the subjective experience and/or the knowledge of a certain perceiver.

New types of media and communications technologies may then be based on indirectly influencing subjective experience, like emotion, daydreaming or flow in a complex manner. Technologies which indirectly influence and facilitate knowledge creation may be conceptualized as Knowledge Media. Consequently, there may be mind-based media and communications technologies. These may be based on an indirect capability to influence meaning made for symbolical information for a particular perceiver, such as felt and personal meaning and the capability to influence subjective experience and/or knowledge.

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# 1. Introduction

## 1. 1. Problem area

### Perceiving through modern media and communications technologies

This study argues that media and communications technologies could be designed in a way which would create an individualized, elastic interface between mind and world which may semi-systematically colour and change the experiences and knowledge of the perceiver. The design of such an interface of mind and world would be based on understanding the interaction of i) an individual perceiver and ii) the information embedded in media and communications technologies and iii) the resulting effect on how people experience and know about the world.

Media and communications technologies have already created a situation where human beings are living in a sphere of information sent from all over the world. This flow of information may be seen as a new sphere of experience, a source of perceiving, experiencing and knowing about the events of the world. It enables perception over time and space vs. the natural sensory envelope in the immediate environment. However, media and communications technologies have not evolved to be truly mind-based at the level of the individual. Rather, they reflect technical and mass-oriented approaches to the design of information and media and communications technologies. Mass communication technology as a delivery technology of information is based on sending the same message to a large number of people. This makes the design of messages uniform, as similar messages are received by everyone regardless of their individual needs. This study presents a conceptual and theoretical approach to the design of modern, computerized media and communications technologies based on understanding the change of subjective experience and knowledge of an individual perceiver.

The study introduces a concrete example of perception through modern, computerized media and communications technologies. When perceiving through media and communications technologies people are mentally engaged with information inside a technological device, like a computer containing a screenful of text, a still picture and another still picture linked to a video file. The information is part of a website which carries commentary on timely world events. The information is embedded in a graphical user interface, which allows the user to interact with information using a mouse. The information has content or a central message. The text describes an event which has recently happened in a faraway country and contains the comments of the author of the significance of the event. The picture and the video file also describe the event.

The information is organized, presented and designed in a certain manner. The text has a certain typography and it is divided into paragraphs. There is a light yellow background colour to the text. The still picture has been manipulated so that it appears more dramatic. The video file has an intense visual rhythm. Dramatic music is used in the background of some parts of the audio track of the video file. The user interface consists of graphical buttons which help the navigation of the perceiver in the information. The graphical buttons have been designed with bright colours and simple, harmonious shapes. The text, picture and the link to a video file have been placed on a rectangular computer screen so that they create a layout which pleases the eye.

The perceiver is in a neutral mood, perhaps a bit bored. He decides to spend some time browsing the internet just for the fun of it. He opens the browser and heads for the site he had in mind to explore. When entering the site, the perceiver selects one article to be read from the main menu. The perceiver browses the text in the article. The perceiver more or less intensively focuses on the information on the screen and the immediate external surroundings fade into the background. With a mouse he manipulates the screenful of information and scrolls the text when reading it. With rapid reading of the text he notices that it is not personally relevant, but remotely interesting. Most interesting are the comments of the author on the significance of the event. The perceiver briefly imagines in his mind the events of a faraway place, including people he does not personally know who are described in the text. The text brings about a mild positive mindset to the reader. The perceiver likes the design of the page and looks at the manipulated picture, which appears dramatic. He observes the picture and connects it with the message of the text in a freely associative manner. More mental images come to his mind as he observes the picture. He then clicks on the other picture, which opens a video file. A pop-up window appears and the video starts playing. The perceiver focuses on the video for a few moments and is mildly excited about the video. Especially the music feels nice as does the rhythm of the visual flow of images. The perceiver then decides that he has had enough and it is time to do something else. As he stops focusing on the information embedded in the technological device, he starts paying attention to his external surroundings again. He notices that 5 minutes has passed quickly while he has been observing the information. He still has a mild positive mood, which the interaction with the information has brought about. He stands up from his chair and goes on to do something else in his apartment, leaving the computer on his desk.

This type of interaction of a perceiver with media and communications technologies is common in everyday life. When immersed in information the perceiver psychologically leaves his external environment and focuses on the message of the information while also semi-actively himself imagining and reflecting on the events described. The key in this interaction is the making of meaning. The way the author has constructed the message of the information may influence how the perceiver makes sense of it. Also the layout, colours, rhythms, modalities and other elements of the design or information may influence how the perceiver makes sense of the information.

This phenomenon is important to study, as people are increasingly influenced by media and communications technologies which mediate the relationship of mind and world over time and space. Also, it may be that there are both intentional and unintentional designs of information which may influence the way messages are understood and the way people feel about messages. For instance, if the way of presenting information has consequences toward the formation of opinions, feelings or attitudes for some event described in information, it is important to understand what the possible sources of such influence may be. Further, developments in modern, computerized media and communications technologies such as the ability to produce individualized packages of information for individual perceivers have opened the possibilities to manipulate the message and design of information.

This study argues that by better understanding the mechanisms of change of subjective experience and knowledge resulting from the manipulation of information embedded in modern media and communications technologies it is possible to construct new types of media and communications technologies.

The interaction of mind and information embedded in media and communications technologies is complex. The result of the interaction is the making of meaning. From the point of view of making meaning, there are sources of variability of meaning in the properties of the perceiver and the information embedded in the technologies themselves. Meaning may instantly change subjective experience and lead to changes in knowledge. Hence, by controlling the making of meaning, it is possible to some degree to control the change of subjective experiences and knowledge of a particular perceiver. The design-related aspects of information may influence the meanings of the perceiver. The design may consist of shapes, colours, modalities and layouts of information, for instance. These may interact with the way sensations are formed in the perceiver at the low-level. These types of meanings may influence emotion, feeling of engagement and subjective fantasies based on the interaction of mind and media and communications technologies. Knowledge may also be changed. By systematically manipulating the design of information embedded in a particular media and communications technologies it may be possible to influence non-linguistic, presentational and image-schematic meanings and consequent changes in subjective experience and knowledge.

## Complexities and key problems

When looking at the interaction of the perceiver and the information embedded in modern media and communications technologies from the point of view of designing new types of technologies there are eight key issues. First, the psychological mechanism of focusing on information inside a technological device vs. focusing on the external immediate environment is important. It enables the perceiver to experience events of faraway places easily without personally going there. Second, the content of the information or the message is influenced by an author. How and why the author selects information from the world to be presented matters. Third, the design of the information and the user interface may influence or colour how the perceiver feels or how he experiences the information. Fourth, when engaged with the information, the perceiver has immediate experiences, such as emotions and moods and subjective fantasies. These may vary in a fluid manner. Fifth, the perceiver may also learn something from the information. Perhaps his existing knowledge of the event described in the information is confirmed as the information matches his expectations. Conversely, a perceiver may feel challenged by the information and actively reflect on it.

Sixth, the perceiver is simultaneously mentally engaged with the content of information, the design of information, the design and functionalities of the user interface and the technological device at various levels of mind. His focused and conscious attention may only cover a small part of the sensory input he gains from the situation. It may be that he unconsciously and automatically processes the meaning of the information and tries to make sense of it. When doing so, he may or may

not be consciously aware of how he has processed the meanings of the information or how they indirectly brought about a positive mood. Seventh, when using a computer or similar device to view information, the perceiver has lots of control over what information to select for his attention and what not. He may operate within the limits of the user interface offered and actively browse the information. This means that the author does not exactly determine the sequence of how the perceiver perceives the information. Eighth, the perceiver may differ from other perceivers. It may be that he possesses qualities that make him like the design of the information more than another person would. He also has his personal life experiences and attitudes and hence may have a more positive response to the content of the information than another person would. When engaged with the information the perceiver may have various types of private and unique mental images which may add to the way he understands or feels about the content of the information. One perceiver may have a motivation to be entertained by media while another may be searching for information to solve a specific problem. A perceiver may be in a good mood when starting the engagement with media or then be in a negative mood, for instance.

Based on the dimensions of the phenomenon there are two key problems in its description and explanation. First, the interaction of the perceiver, the information and the device is complex. It is difficult to separate different layers of the interaction and the variables involved. For instance, the perceiver may differ from other perceivers. The content of the information may be designed in various ways. There may be various technological devices to receive the same information. Second, the main process of the interaction of the perceiver and information is making sense of the information from the point of view of the perceiver. As the perceiver can not personally observe the event he must rely on what is available in the information embedded in a technological device and what he personally knows of the world. There may be gaps in the information which the perceiver fills with his own knowledge. Hence, meaning-making is creative and dependent also on the perceiver. The process of sense-making, or, the making of meaning, may not be fully conscious. It may be that various mechanisms and processes at the unconscious level of mind influence how meaning is made for the information as a whole. Also, it may be that the design of information influences meaning as does the content of information or the message. Further, the type of device, such as the large size of the screen, may make some information appear to be more dramatic than would be the same information presented on a smaller screen.

## Focus of the study

This study focuses on the immediate influence of i) the design of information, ii) the technological device, iii) the semi-free browsing and interaction capabilities of the perceiver with modern, computerized media and communications technologies and iv) the properties of a single perceiver on the meanings made and the consequent and rapid effects on change of subjective experiences and knowledge. This is reflected in Figure 1.
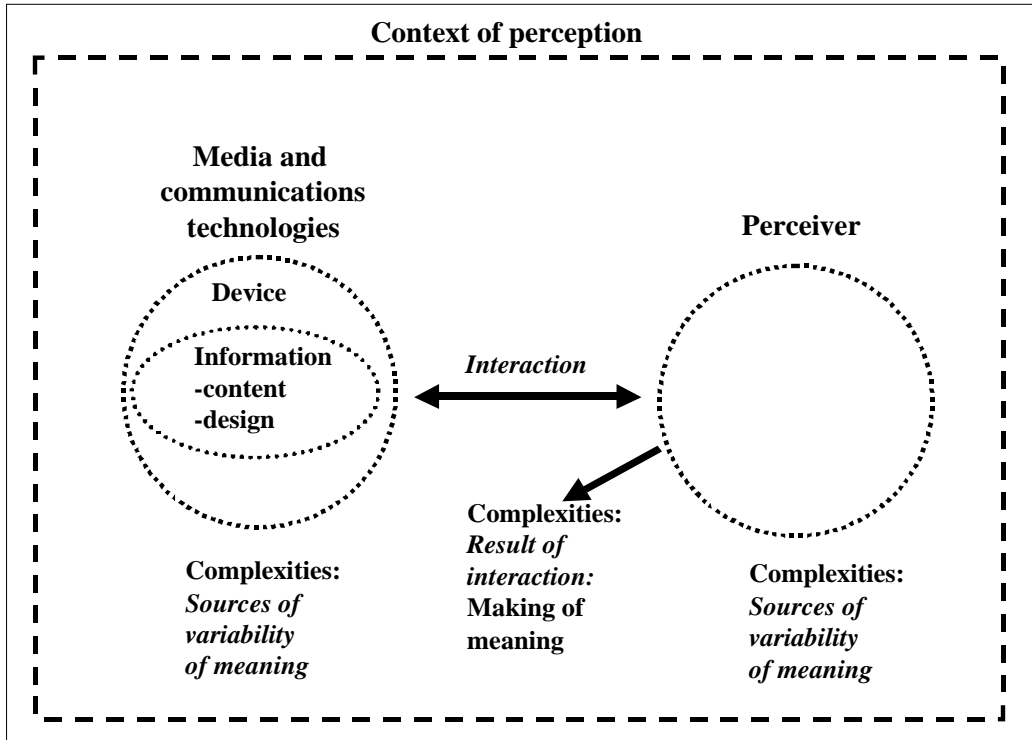
**Figure 1. Media and communications technologies and the perceiver as sources of variability of meaning.**

In Figure 1 the perceiver perceives information embedded in a technological device, such as a computer with a visual screen in a certain physical, external context. The information has content and design and certain ways of interaction with the device. The perceiver makes sense of the information. This is influenced by the dimensions of the technology and the perceiver. Meaning is then a result of the creative interaction of the perceiver and the technology. There are complexities in the information and device, in the perceiver and in their interaction. From the point of making meaning, the complexities of the media and communications technologies and the perceiver are then sources of variability of meaning inherent in both interactants. Meaning may further be related to the change of subjective experience or knowledge. This study describes the sources of variability of meaning in media and communications technologies and in the perceiver and their complex interactions. Also, the study will describe how meaning may change subjective experience and/or knowledge.

The conception of variability is of key importance in the study. By variability of meaning in the perceiver the study means that there are elements and processes in the mind in making meaning, which may vary and which may influence meanings. Variability of meaning in media and communications technologies means the influence of the content and design of information embedded in a particular technological device on meaning. It implies that when one changes the content and/or design of information, the meanings made may change. Also, depending on the nature of perceivers,

some people may make meaning differently from others. Further, the type of situation may influence the meanings made. The variability of meanings made for a particular piece of information with a particular design mediated by a particular device for a certain perceiver is then complex, as many sources of variability of meaning are in interaction. Hence, one may look at variability also at a more general level as the complex interaction of all the sources of variability of meaning in the phenomenon described. The individual sources of variability lie within the content and design of the information, the technological devices and the nature of the perceiver in a given situation. The composite sources of variability lie in the interaction of the individual sources of variability.

Individual sources of variability of meaning and their complex interactions are important to understand from the point of view of the phenomenon. This is because by understanding the key sources of variability, one may systematically change the dimensions of content and design of information in order to indirectly influence the meanings made. This is also the basis for designing mind-based media and communications technologies.

The study reasons as follows. First, the study will address the complexities of making of meaning in perception at a general level. This includes an examination of the basic elements of mind and the immediate external context. It also entails the observation of unconscious mechanisms and processes when making meaning and their influence on how people have subjective experiences and how their knowledge changes. Second, the study develops an approach to the sources of variability of meaning, specifically non-linguistic, image-schematic and presentational meaning, inherent in the perceiver at the low-level of sensation and perception. This enables a focus on the fundamental processes and mechanisms of perception which underlie the meanings made later on in processing. These meanings may then be reflected in how a person experiences or learns about a certain object of perception. The study will also model the sources of variability of meaning inherent in the mind, the object of perception and the context of perception as a complex, intertwined field of variables. This model of variability acts as a theoretical conceptualization which can be used to approach the sources of variability of meaning in media and communications technologies.

Third, based on the development of the model of variability of meaning, the study then observes the design of information in media and communications technologies as an object of perception. This means looking at the psychological engagement with technology and how information may give similar experiences to observing objects in the immediate, physical environment. Also, the design of information and the content of information are conceptually separated. The focus is kept on the design-related aspects of information and media and communications technologies. Fourth, the study observes variability of meaning, specifically the non-linguistic, presentational and image-schematic meaning inherent in media and communications technologies. Emphasis is placed on the design of information as a source of variability of non-linguistic, presentational and image-schematic meaning and its consequent immediate influences on the experiences and/or knowledge of the perceiver. Information is conceptualized as consisting of meaning units. When manipulating meaning units in information the meanings of a certain perceiver may be influenced. Certain types of meaning units are related to the design of information and hence influence non-linguistic, presentational and image-schematic meanings. Fifth, the study conceptualizes the possibilities of

modern, computerized media and communications technologies to semi-systematically control the variability of meaning inherent in information within a particular device at the level of the individual perceiver. This may lead to new types of concepts for designing computerized systems of manipulating information at the individual level. The study conceptualizes some principles to build technologies which are based on understanding how experiences and knowledge are changed in perception as a result of making meaning. Based on the elaboration of these five issues the study constructs theoretical definitions and conceptualizations of mind-based media and communications technologies, including technologies which deal with the effect of the design of information. This is the main contribution of the study.

## Felt meaning in influencing subjective experience and knowledge

The study will now introduce essential elements of its approach in more detail. These will also act as a brief summary of the argumentation used in the study. In perception within the natural sensory envelope the mind makes sense of objects of perception based on sensations and previous knowledge. This sense making is the making of meaning. It is influenced by complex interactions of the object of perception, the properties of the perceiver and the context of perception. Meaning may be tacit and explicit, mostly made at the unconscious level of mind. Tacit meaning is meaning that one is not consciously aware of and which cannot be easily communicated. Conversely, one is consciously aware of explicit meaning. This refers to the objective, linguistic and easily communicable meaning of an object of perception. (see Fiske, 1990; Niiniluoto, 1989; Alasuutari, 1993; Nonaka and Takeuchi, 1995). Tacit meaning may be felt meaning, which refers to the immediate, non-linguistic and image-schematic meaning of an object of perception (see Hunt, 1995). Tacit meaning may also be personal meaning, which refers to the immediate judgement of the relevance of an object of perception to one´s goals, self-concept and personal values (see Lazarus, 1999). Felt and personal meaning may be intertwined in the unconscious. Personal meaning may instantly change states of consciousness, such as subjective experience of emotion (see Lazarus, 1999). It may also change knowledge in further processing. Felt meaning may have similar effects on mind as personal meaning. Explicit meaning may also change states of consciousness and knowledge, but via more elaborated processing (see Mezirow, 1994). The study mostly discusses the influence of felt meaning on rapid changes of subjective experience and/or knowledge, when perceiving through media and communications technologies.

## Sources of variability of meaning in media and communications technologies

Media and communications technology is a i) tool for extending perception over time and space and consequently a ii) way to know of the world and iii) a combination of a technological device and symbolical information (see Olsen, 1974; McLuhan, 1964; Porat, 1977; Rogers, 1986; Thompson, 1995; Miller, 1978; Chesebro and Bertelsen, 1996; Ong, 1982; Fiske, 1990). Information in media and communications technologies is symbolical, i.e. certain types of external symbol

systems such as language are used to describe spatio-temporally distant events of the world by human authors (see Thompson, 1995; Ong, 1982). Perception via media and communications technologies is possible within the natural sensory envelope in the immediate context of the perceiver via interpreting or decoding symbolical information (see Fiske, 1990). These qualities of media and communications technologies create a ´way of being´ as technology penetrates all aspects of modern life, thus creating a sphere of experience.

Tacit and explicit meaning is made in complex interaction with the object of perception, the perceiver and context. Hence, there are sources of variability of meaning in each interactant. Consequently, there are several sources of variability of meaning in traditional media and communications technologies, such as radio, television and newspapers. First, such technologies broaden perceptual capacity over time and space (see Thompson, 1995). Historically, the means to know was tied with moving about and perceiving the immediate surroundings. As the means of physical transportation developed; one could perceive more distant places. Ways of storing symbolical information, such as writing, also created a permanence of symbolical information over time and space (see Ong, 1982). When media and communications technologies developed, they created a way to very quickly transmit symbolical information suitable to the human sensory system from one place to another. Hence, communication technologies are able to bring the events of the world close to anyone who has access to a device for displaying symbolical information. Media and communications technologies are then time-space bridges for perception.

Second, symbolical information in media and communications technologies is selected and produced by human authors and centralized organizations. (see Altheide, 1985). This information may be factual or imaginary (see Thompson, 1995). Using language and other types of tools a complex phenomenon of the world may be packaged into a sentence of a few words and pictures, for instance (see Ong, 1982). This symbolical abstraction or ´compression´ capacity enables the description of various types of events. Symbolical information then also enables the creation of new types of experiences, for instance via imagination of the authors when producing fictional symbolical information. Third, certain types of technological devices may enable different aesthetic forms and ways of expression as well as different modes of interaction with technology which may influence meanings (see McLuhan, 1964; Ong, 1982).

All these sources of variability of meaning are embedded in the influence of symbolical information in a particular media and communications technology on a particular perceiver. This is because there is a special psychological mechanism of engagement - presence - with media and communications technologies. Presence gives the illusion of real experience when making sense of symbolical information (see Lombard and Ditton, 2000). Also, the technological device may give rise to social responses as if in interaction with another human being (see Reeves and Nass, 1996). During presence people are then subjectively and psychologically ´transported´ into the world of symbolical information, while the physical surroundings, including the hardware of media and communications technologies fade into the background (see Thompson, 1995). This makes media and communications technologies mediated psychological contexts within which symbolical information is perceived and from which meaning is made.

## The form of symbolical information as the key influence on felt meaning

Symbolical information may be seen as multimodal representation, such as text, pictures, video and sound. Multimodal representation may be divided into form and substance (see Billmann, 1998). Substance refers to the ´message´ or the content of information. Form refers to the ways of organizing and presenting the substance of information, such as aesthetic forms, visual layouts and other means of expression. There are three main influences on the form of symbolical information as multimodal representation on the meanings made. First, human authors may have habitual or creative ways of expression when producing symbolical information. Second, the substance of symbolical information may be quite closely reflected in the form. Third, the type of media and communications technology hardware may enable certain ways of expression for authors and certain ways of interaction for perceivers with different technological devices.

The form of symbolical information as multimodal representation influences connotative meanings (see Fiske, 1990; Barthes, 1977). These immediate, subjective and unconscious connotative meanings may be seen as similar to felt meanings. Consequently, felt meaning in media and communications technologies is influenced by the form of symbolical information as a multimodal representation. When looking at symbolical information as part of the hardware in media and communications technologies, ways of interaction with technological devices and the type of technological device itself may also be seen as related to the form of symbolical information. Hence, the form of symbolical information embedded in a particular media and communications technology influences felt meaning. Felt meaning may then rapidly change subjective experience and/or knowledge.

This implies an indirect approach for authors of symbolical information on influencing meaning. Also, it means that the substance of symbolical information is to a degree separated from form. This separation is partly based on the nature of perceptual processing. In perceptual processing, it is possible that both semantic, linguistic meaning for an object of perception is made as well as abstract and non-linguistic meanings, such as felt meaning. Sensations produce mental, sensory representations, which are processed to i) make meaning unconsciously for these representations in a parallel manner by automatic and rapid processes ii) via the complex interactions of non-linguistic, presentational and image-schematic representations and linguistic, propositional representations (see Leeuwen, 1998; Mezirow, 1994). Non-linguistic, presentational and image-schematic representations may carry tacit meanings, such as felt meanings. Consequently, some of the parallel processes of making meaning based on mental representations lead to immediate, tacit, presentational, felt meaning, where the linguistic, propositional processing of the substance of symbolical information does not play a significant role (see Hunt, 1995). Similarly, some parallel processes of making meaning may be more oriented towards the unconscious construction of semantic, linguistic meaning, which may give rise to consciously experienced objective and linguistic meanings. Different types of meanings may co-exist in the mind. However, the immediate effect of felt meaning is that it may rapidly change subjective experiences. This may be more evident when there is less need for the semantic processing of an object of perception, for instance.

## Mind-based media and communications technologies

Changes in media and communications technologies have brought about different types of sources of variability of meaning compared to traditional media and communications technologies. For instance, modern computers and software have created the possibility to automatically manipulate symbolical information and construct personalized packages of information with adaptive systems (see Riecken, 2000; Ericksson, 1995). Ways of interaction with hardware and software have also changed as the perceiver has more possibility to select, control and access symbolical information via the user interface (see Schneidermann, 1998). Further, there is also more symbolical information easily available than what was previously possible via communication networks and the internet (see Manovich, 2001; Saari, 2000). Also, ways of organizing symbolical information as digitized objects in databases have created many degrees of freedom to combine the substance and form of symbolical information, for instance via non-linear hypermedia links (see Manovich, 2001).

This means that the substance and form of symbolical information have become more disconnected from each other than what was previously technically possible. Also, the role of the visual-functional user interface has added more dimension to the form of symbolical information. This implies that one may vary the form of symbolical information partly independently from the substance of such information. Hence, one can i) automatically create many different packages of symbolical information, concentrating on ii) the manipulation of the form of symbolical information together with ways of interaction and the user interface iii) for a particular substance of symbolical information, iv) embedded in a particular device v) to be perceived by a particular perceiver. Consequently, it is possible to a degree to systematically vary the form of symbolical information per a certain type of substance of symbolical information. This may lead to a possibility to indirectly vary the meanings, such as felt meanings, of particular perceivers via varying forms of symbolical information, user interface and ways of interaction with certain technological devices. This may indirectly change subjective experiences in individual perceivers. It may also change knowledge. These are some of the key principles of the mind-based media and communications technologies, which are defined as a result of the study.

## 1.2. Research design

## The research problem and research questions

The aim of the study is to illustrate the mechanisms and sources of variability of meaning, specifically felt meaning inherent in the perceiver and a particular media and communications technology and the consequent changes in subjective experience and/or knowledge. The results of conceptual and theoretical developments are used to i) argue for the mechanisms of influence of the form of symbolical information on felt meaning and subjective experience and/or knowledge and ii) as a basis for semi-systematically controlling meanings by manipulating some elements of symbolical information, especially form, to construct mind-based media and communications technologies. The study then has to deal with such issues as mechanisms of perception in the natural environ-

ment, sources of variability of meaning and felt meaning in the perceiver, the nature of modern media and communications technologies as objects of perception, and the central elements of symbolical information influencing meanings.

Consequently, the study describes i) the complex interaction of mind, object of perception and context of perception in making meaning, ii) the sources of variability of meaning, specifically felt meaning in the mind, iii) the immediate consequences of making meaning, specifically felt meaning on subjective experience and knowledge, iv) the nature of media and communications technologies as objects of perception, v) the sources of variability of meaning, especially felt meaning, inherent in media and communications technologies and vi) the possibilities of modern media and communications technologies, such as computers, in influencing meaning, specifically felt meaning. This is the core of the research problem. Reflecting the problem area and focus of the study, the following research questions emerge:

**RQ1. What are the sources of variability of meaning, specifically felt meaning, in the perceiver and in modern media and communications technologies?**

**RQ2. How does meaning, specifically felt meaning, change subjective experience and/or knowledge?**

**RQ3. How does the form of symbolical information embedded in modern media and communications technologies influence felt meaning, subjective experience and knowledge?**

**RQ4. Based on the effects of interaction of mind and modern media and communications technologies on meaning, what are the possibilities of building technologies which may instantly change subjective experience and/or knowledge?**

## Method, validity and reliability

The study constructs conceptions and theoretical frameworks in an explorative, descriptive manner. The source of ´data´ for the study is current theoretical and empirical research literature. The study reviews, analyzes, generalizes and combines these sources of ´data´. The aim of the study is to describe the phenomenon related to the research problem in a way which enables the construction of a preliminary theoretical framework as a result of the study. This theoretical framework may be used as a basis of further empirical research.

Since the study is not empirical it may not be suitable to discuss validity or reliability as the basis of the quality of the study. These are often used as an indicator of the accuracy of measurement of some concept which has originated from a theory (Gilbert, 2001, 23). This means some other types of measures of quality of the study need to be found.

In social theory building one may say that a theory may provide an explanation of a phenomenon as well as provide predictions. Basic ways of formulating theories are induction and deduction. A

basic principle is also falsification, looking at the awkward cases to challenge the theory. Often theories consist of concepts and describe the relationships of conceps. (Gilbert, 2001, 17-21).

Building theories may be called theorizing. This entails conceiving and intuiting ideas and concepts and formulating them into a systematic, logical and explanatory scheme. Theories often consider a phenomenon from many different angles or perspectives. Theories may be more or less abstract and extensive in scope. Regardless of how a theory is constructed, they may be considered unique. (Strauss and Corbin, 1998, 21-23)

Since the study is explorative and descriptive, it does not provide full explanations nor predictions of the phenomena it discusses. This means that the study operates mostly at the level of building and describing the fundamentals of what may in further studies become a better formulated theory.

One may discuss metatheorizing in sociology as grounds for the approach of the study. Metatheorizing is the systematic study of sociological theory as an independent and significant endeavor which is grounded in sound theoretical and empirical work. A metatheorist is one who studies theories of the social world while a theorist studies the social world more directly. Metatheorists often analyze documents produced by other theorists. Substantial metatheorizing often preceeds and helps advance social theory. (Ritzer, 2001, 14)

Metatheorizing may be seen partly as a source of overarching theoretical perspectives. It is oriented to produce a perspective, or a metatheory, which overarches some parts of sociological theory. This does not imply a general theory of everything, but rather a type of metatheorizing which occurs after various sociological theories have been developed. It means that an overarching theoretical perspective is derived from sociological theory rather than imposing itself on it. (Ritzer, 2001, 18)

This study may be seen as an attempt to create some fundamentals of a metatheory by producing overarching theoretical perspectives based on already developed theories. The explorative and desriptive approach of the study means that the study will i) construct qualitative descriptions of the problem area based on existing theories and empirical evidence, ii) separate the problem area into smaller segments, iii) conduct conceptual analysis within these segments and iv) synthesize the results of conceptual analysis of the smaller segments into new, preliminary theoretical frameworks and concepts.

Different types of literature have been used in the study depending on the suitability of a particular theory or empirical evidence to the issue at hand. However, the selected sources have also been partly incompatible as similar concepts have been used in different meanings across disciplines and some concepts are discipline specific. Hence, the study has had to combine differing conceptual spheres between different disciplines as it proceeds. This happens partly by utilizing a number of tables and figures as conceptual conclusions of the stages of reasoning and theorizing.

The study now argues for the particular selection of literature it uses to build its theoretical models and concepts. The study uses literature from i) experimental psychology, ii) humanistic psychology, iii) social psychology, iv) mass communication studies, v) educational studies, vi) philosophy, vii)

art theory, viii) organizational studies and ix) computer science. The main reason for using such a heterogenic selection of literature is that no single area of study alone was sufficient to build the conclusions, concepts and theoretical models of the study. There are several points to consider in the particular selection of sources of study. First, experimental psychology as a science is often reductionistic. This means that what is known is reflected by empirical evidence. Usually no speculations are made outside the scope of empirical evidence. However, experimental psychology is useful as a source of precise microlevel data and microlevel theories on how perception and perceptual mechanisms may work. Also, it can be used to strengthen the conceptual conclusions made at various stages of reasoning. Second, humanistic psychology is usually wholistic, and enables the construction of theoretical models quite easily. Social psychology as humanistic psychology is also useful to the study. Social psychology is often semi-empirical. Hence, sources of humanistic psychology are used to be able to gain larger perspectives of the problem area while empirical results are used to provide indirect evidence for some of the perspectives which are developed.

Third, mass communication studies is used to be able to describe certain dimensions of media and communications technologies. The mass communication studies sources used in the study are conceptual and philosophical, rather than empirical. However, they often lack the dimension of individual-related psychological perspectives as they concentrate on mass communication. Fourth, philosophy is used to argue for the ontological and epistemological dimensions of the study. Specifically, the nature of objects of perception and context aas described is based on philosophy. Also, theories of art as part of philosophy are used to argue for aesthetic forms of media and communications technologies.

Fifth, humanistic educational studies are used to argue for the mechanisms of perception, making meaning and knowing. These sources are mainly used to construct a model for perceptual processing and making of meaning. This model is partly based on the interaction of experimental and humanistic psychology sources, combining both conceptual and empirical aspects. Sixth, computer science is used to argue for the nature of technology as a continuously evolving object of perception via adaptation and as a way to define the dimensions of hardware and software more clearly. Seventh, sources of organizational studies are used to understand the complex interactions of context and individual. These have been researched as related to knowledge creation. Some of the principles of the complexity of levels of context are used in the study.

If one observes some other criteria of the quality of the study, one may argue that the quality of the study is also reflected in its internal consistency and quality of the argumentation logic. It is also related to the degree to which the study is capable of describing its problem area. Hence, the study may be considered as an effort to metatheorize on its problem area via using a certain kind of internal argumentation logic.

## Key concepts

The key concepts of the study are perception, mind, knowledge, making of meaning and media and communications technologies. These are now briefly described.

Perception is seen as the gaining of sensory information of external objects of perception. Perception is the basis of knowing about the world. Perception is influenced by features of the perceiver, such as properties of sensory mechanisms and previous knowledge and features of the object of perception, as well as dimensions of the context of perception. Perception is then interactive. (see Gibson, 1979; Gregory, 1990; Sternberg, 1995; Severin and Tankard, 1997)

Mind is seen as divided into unconscious and conscious levels. The unconscious level of mind may be seen from the point of view of ease of conscious access to perceptual mechanisms or previous knowledge. The more difficult it is to consciously bring into mind a certain element of mind, the more unconscious the element is. This makes knowledge both tacit and explicit, for instance, as it may not be possible to retrieve some knowledge into the conscious mind. In the conscious mind a person may have subjective experiences, such as emotions. (see James, 1890/1983; Nonaka and Takeuchi, 1995; Farthing, 1992; Cheeseman and Merikle, 1986)

Making of meaning in the study is seen as based on perception. Perception leads to mental representations, which are processed in the mind to make meaning. Depending on the nature of representations created for the objects of perception and levels and elements of mind involved, various meanings may be created. Meaning may be tacit or explicit. Tacit meanings are made by automatic unconscious processes. These tacit meanings may be then reflected in one´s consciousness via their ability to change states of consciousness and knowledge. For instance, a certain tacit meaning may instantly influence a conscious experience of an emotion. It also may lead to changes in knowledge. Knowledge construction refers to predictable, accumulative changes of knowledge. Knowledge creation is the sudden and fundamental change of levels of meaning in knowledge. Explicit meanings are seen as linguistic and semantic meanings of an object of perception made in the conscious mind, but based on preceding unconscious processing. There may be conflicting tacit and explicit meanings in the mind at any given time for the same object of perception. This reflects the polysemy of meaning in the mind. (see Billmann, 1998; Mezirow, 1994, Hunt, 1995; Lazarus, 1999; Alasuutari, 1993; Niiniluoto, 1989; Fiske, 1990)

Media and communications technologies consist of technological devices, such as televisions and the information which is displayed through them. There are certain ways of interaction with a technological device and the information, such as changing channels. The conception of media and communications technologies is used to refer to traditional types of human made objects carrying information over time and space, such as mass media (television, radio, newspapers, magazines). The conception of modern media and communications technologies is used to refer to computers and internet-based communication applications (online newspapers, news services, other information) mainly using visual screens for presenting information. (see Ong, 1982; Thompson, 1995; Rogers, 1986; Manovich, 2001)

## 1.3. The structure of the study

First, the study defines the basic elements of mind and context. The basic elements of mind can be regarded to be perception, consciousness, subjective experience, knowledge, and unconscious processes as well as needs, goals and motivation. Perception is seen as a combination of direct and indirect approaches, which means that perception is an interaction of sensations and previous knowledge (see Gibson, 1979; Sternberg, 1995; Rookes and Willson, 2000; Gregory, 1990; Severin and Tankard, 1997). Mind is seen as divided into unconscious and conscious levels, with a dominant role for unconscious processes of various kinds (see Farthing, 1992; Cheesman and Merikle, 1986). Knowledge is seen as tacit and explicit (Nonaka and Takeuchi, 1995). Unconscious motivation, needs and goals are seen as related to basic motivation and orientation of the perceiver in various situations (see Wagner, 1999; Fiske and Taylor, 1991).

The basic elements of context are viewed through ontological categories, such as mind, physical world and information (see Popper and Eccles, 1979). These constitute ontological structures, which via their interactions produce events. Events are the sources of objects of perception in context (see Sayer, 1996). Objects of perception are part of the context and they ´arise´ for perception from the point of view of a particular perceiver via attention (see Fiske and Taylor, 1991; Sternberg, 1995). Also, objects of perception may have interactions with each other regardless of the perceiver. The relationship of mind and context is seen as a complex and creative open system, in which continuous tensions tend to colour the making of meaning (see Hurrelmann, 1988; Kulkki, 1996).

Second, the study discusses the making of meaning at a general level to gain a broader view of the making of felt meaning. In making meaning for objects of perception, there are tacit and explicit meanings. Tacit meanings refer to meanings made unconsciously, such as personal and felt meanings. These may be quite direct and instantly influence subjective experience and/or knowledge (see Hunt, 1995; Lazarus, 1991). Explicit meanings may be more semantic and conscious, based on the objective, linguistic meaning of an object of perception (see Fiske, 1990; Alasuutari, 1993; Niiniluoto, 1989).

Making meaning is based on internal, mental representations which are processed at various levels of the mind. These representations then mediate meaning in the mind. There are various sources of influence on representations and meanings, such as the properties of sensory mechanisms, the use of symbolic models in the recognition of sensory representations, and quick ways of reasoning at the level of the unconscious. Processing representations may lead to unconscious problem solving and changes in knowledge. Also, at the level of the conscious mind, one may critically reflect on the premises of a problem, and start an act of problem solving. Depending on the type of reflection and consequent processing, knowledge may be changed accumulatively and predictably in knowledge construction or then via sudden changes in the levels of meaning in knowledge creation. (see Mezirow, 1994; Bargh, 1996; Fiske and Taylor, 1991; Velmans, 2000; Kulkki, 1996)

Third, the study investigates the sources of variability of meaning, especially felt meaning. However, as felt and personal meaning may be intertwined, the whole area of tacit meaning is investigated. Then the sources of influence for felt meaning are identified as compared to personal mean-

ing. Felt meaning is influenced primarily by the properties of sensory mechanisms, such as ways of organizing sensory information, interactions of sensory modalities and modality specific features as they influence sensory representations. Also, primary metaphors may influence felt meaning as symbolic models projected on sensory representations to make meaning. (see Fiske and Taylor, 1991; Billmann, 1998; Mezirow, 1994; Leeuwen, 1998; Hunt, 1995)

Fourth, the study constructs a general model of making meaning and the sources of variability of meaning originating from objects of perception, context of perception and elements and levels of the mind. This is conceptualized as Meaning Interfaces, which combines the key sources of variability for meaning. The general approach to meaning is needed in order to be able to concentrate on the aspects of meaning specifically related to felt meaning. Meaning Interfaces consists partly of the mind, which is a condensation of sources of variability on meaning inherent in the mind. The object of perception in context in interaction with the mind then creates a complex, fluid field of interaction, which influences meaning as one entity. Meaning Interfaces also include the sources of influence for felt meaning, and it is further used to relate properties of media and communications technologies as sources of the variability of felt meaning to the properties of mind.

Fifth, the study defines the nature of media and communications technologies as objects of perception. This has the dimensions of broadening perception over time and space and the dimension of including factual and imaginary descriptions of events of the world (see Thompson, 1995). These descriptions are embedded in symbolical information (see Fiske, 1990). Symbolical information may be seen as representation which has both substance and form (see Billmann, 1998). With symbolical information, an author is able to compress events of the world and describe them, creating multimodal representations (see Billmann, 1998; Schwartz, 1996). It is argued that people experience their encounters with symbolical information via media and communications technologies as subjectively real; they can have similar subjective experiences as in real life (see Lombard and Ditton, 2000; Reeves and Nass, 1996; Durkin, 1998; Hoffman and Novak, 1996; Dietz and Lang, 1999). They may also unconsciously project expectations of being in interaction with a social and/or dialogical human partner (see Reeves and Nass, 1996). Consequently, symbolical information may have real psychological effects on perceivers and meaning may be made with similar mechanisms as in real life. This also applies to the form of symbolical information.

Sixth, the study investigates sources of variability of meaning inherent in media and communications technologies. At a more general level, it may be said that the properties of media and communications technologies as objects of perception influence meanings made in patterned ways, i.e. they frame meaning (see McLuhan, 1964; Chesebro and Bertelsen, 1996). This framing is a source of variability of meaning made. It may include the type of technological device used, ways of interaction with it, the substance and form of symbolical information and the aesthetic-expressive capabilities of a particular technology as well as the more general, underlying properties of time-space bridges as broadening perception spatio-temporally and symbolically. (see Sobchack, 1994; Reeves and Nass, 1996; McLuhan, 1964; Ong, 1982). The more general level of the influence of media and communications technologies on meaning is elaborated as concentrating on the level of form of symbolical information in a larger context.

Connotative meaning as an immediate, subjective and unconscious meaning is then discussed as related to the form of symbolical information (see Fiske, 1990; Barthes, 1977). Connotative meaning is seen as similar to felt meaning. Consequently, the study focuses on the interaction of the form of symbolical information and ways of interaction with a particular media and communications technology. These may then influence connotative, felt meaning.

Seventh, modern media and communications technologies, such as computers, are discussed to see how they influence meaning differently from more traditional media and communications technologies (see Ong, 1982; Manovich, 2001; Chesebro and Bertelsen, 1996). Modern media and communications technologies are posed as flexible objects of perception, with the capability of automatic personalization and adaptation of symbolical information to the needs of a particular perceiver, offering a variety of ways of interaction via their user interfaces (see Ericksson, 1997; Manovich, 2001). Consequently, modern media and communications technologies are seen as capable of varying the form of symbolical information and ways of interaction for a particular substance of symbolical information at the level of a particular perceiver, to a certain degree. This brings into focus the interactive relationship of properties of a particular perceiver and the form of symbolical information in influencing felt meaning.

Psychological effects of the aesthetics of works of art are then discussed as a more general approach to the form of symbolical information. The conception of significant form is used to refer to the psychological effects of a particular multimodal representation on a particular perceiver (see Langer, 1957; Langer, 1953; Addis, 1999; Koffka, 1923/1963; Carroll, 1999). Significant form in art is then seen as related to meaning units, i.e. certain patterns of multimodal representations inherent in symbolical information and properties of media and communications technologies (see Mitry, 1963/2000). These meaning units are then the aspects of symbolical information embedded in a particular media and communications technology which act as sources of variability of meaning. The expressive and aesthetic properties of the visual computer screen are then discussed in relation to the dimensions of symbolical information as multimodal representation, such as narrative techniques as well as ways of interaction with computers (see Berger, 1997; Iser, 1972; Manovich, 2001). Based on the approach of meaning units, psychological effects and felt meaning at the level of an individual perceiver, the study presents a list of factors influencing meaning units. They also contain the elements of form of symbolical information as embedded in a particular media and communications technologies with certain ways of interaction. These meaning units may then be manipulated to indirectly produce felt meaning based on the form of symbolical information. Meaning units and their interactions consequently act as the key sources of variability of meaning, including felt meaning.

Eighth, the study concludes its developments in discussing the interaction of mind and modern media and communications technologies in perception in two parts. First, the study concentrates on the making of felt meaning. The principle of psychological resolution based on meaning units and significant form is conceptualized. It refers to multilevel relationships of the properties of the object of perception and mind, which in interaction may create various psychological effects. This happens via a possible influence on meaning, which may in turn indirectly change subjective expe-

rience quite rapidly and/or change knowledge. Based on the principle of psychological resolution and the list of factors influencing meaning units, the influence of the form of symbolical information as embedded in modern media and communications technologies on felt meaning is described. Second, the study conceptualizes possibilities for modern media and communications technologies to influence meanings and consequently indirectly change subjective experience and knowledge. Basic relationships of mind and technology are discussed as confirmative or challenging. Mind-based media and communications technologies are then introduced and conceptualized briefly. Technologies indirectly influencing subjective experience are discussed. Knowledge Media (see Saari, 1998a) as a special case of mind-based media and communications technologies which focus on knowledge creation are also presented. Finally, the study discusses implications of its results. One such implication for systems design is the creation of "breathing interfaces" of mind and world via designing user-centering systems. These emphasize the creative tensions of the system and the perceiver when making meaning.

# 2. The process of perception

## 2.1. Interactive perception

### 2.1.1. Direct and indirect perception

Perception is based on the interaction of the features of the object of perception, ways of gaining sensory information of the object of perception and previous knowledge of the perceiver. Direct and indirect perception, levels of mind, knowledge, subjective experience, needs, motivation and goals are discussed as the basis of the interactive view of perception. This is done in order to be able to construct a basic view of the complexities of the mind in perception, which can be used for later elaborations of the study.

The study will now discuss direct and indirect approaches to perception. These approaches emphasize either the influence of the context on perception or the influence of the mind evaluating perceptions. The aim is to be able to preliminarily fuse these opposing views together and elaborate more on them later on in the study. Perception may be directed inwards or outwards. Perception most often refers to perceiving external objects via human senses, such as hearing, vision, taste, touch and smell. The perception of internal objects refers to:

> *"…the perception of body states and events, such as kinesthesis (sense of movement), preprioception (sense of body and limb position), and feelings of pain, internal pressure… and other discomforts." (Farthing, 1992, 30)*

The study discusses perception as the perception of external objects within a certain immediate, physical context. There are two competing views on perception: the direct and indirect view. In the theory of direct perception there is no need for conceptual mediation between mind and context. Perceptual systems are seen from an evolutionary perspective and it is claimed that perception 'fits' into the context directly without any need for interpretation. The main problem of this type of view is that it gives no significant role to conscious interference in the process. People merely react to what they 'see' in objects. (Leeuwen, 1998, 267; see Gibson, 1979)

Gibson (1979) has created the ecological theory of perception which heavily focuses on visual perception. This theory is the basis of many theories of direct perception. The functions of perception are foremost for navigation in the environment; hence perception is intimately linked to action. Perception is the detection of invariants, or patterns in the flow of different gradients. The detection of patterns then allows an organism to determine its possibilities of movement in the environment. This detection of patterns gives the organism direct information of the environment and its possibilities:

> *"The optical information to specify the self, including the head, body, arms and hands, accompanies the optical information to specify the environment. The two sources of information coexist. The one could not exist without the other…The dualism of observer and environment is unnecessary. The information for the perception of "here" is the*

> *same kind as the information for the perception of "there", and a continuous layout of surfaces extends from one to the other." (Gibson, 1979, 116)*

Perception in this manner creates a 'visual cone' which includes the position and path of action of the organism in the environment. This cone extends to the horizon. The cone is the basis for an organism to perceive its possibilities of action in the environment via perceiving itself as a part of an environment. This implies that perception is a continuous flow: ".. perception, in fact, does not have an end. Perceiving goes on." (Gibson, 1979, 253). Consequently, Gibson does not separate between mind and context:

> *"The mutuality of animal and environment is not implied by physics and the physical sciences. The basic concepts of space, time, matter, and energy do not lead naturally to the organism-environment concept or to the concept of the species and its habitat. Instead they seem to lead to the idea of an animal as an extremely complex object of the physical world...This way of thinking neglects the fact that the animal-object is surrounded in a special way from the way that a set of objects is ambient for a physical object." (Gibson, 1979, 8)*

Conversely, the indirect view of perception claims that people use their past experiences and knowledge when evaluating objects of perception. Indirect theories of perception argue that perception is a process of inference. Based on sensations, one draws conclusions about the nature of the object or event the sensations are most likely to represent. The making of inferences is quick and does require conscious awareness. (Rookes and Willson, 2000, 24; Gregory, 1990)

> *"...the stimuli we receive from the environment are frequently ambiguous and have no clear-cut interpretation. This means that the observer has to solve the problem (or construct a best guess) as to the identity of the stimulus. In other words, the observer has to use indirect, top-down processes to make sense of the sensory input." (Rookes and Willson, 2000, 24)*

Hence, previous knowledge is used to 'fill in' the gaps created by imperfect sensory mechanisms. Gregory (1990, 219) argues similarly that:

> *"The sense organs receive patterns of energy, but we seldom see merely patterns: we see objects. A pattern is a relatively meaningless arrangement of marks, but objects have a host of characteristics beyond their sensory features. They have pasts and futures; they change and influence each other, and have hidden aspects which emerge under different conditions."*

This implies that perception may be not very accurate, or that it may be sketchy. It may be that people do not need a lot of sensory information to make best guesses of an object of perception due to the large scope of previous knowledge available to fill in the gaps. There are several variations of the influence of direct and indirect views of perception in psychology. In experimental psychology perception has usually been seen from the point of view of the characteristics of sensory mecha-

nisms, i.e. sensing external objects via senses. Hence, perception is recognition and interpretation of the events of the world one senses (Kantowitz, Roediger and Elmes, 1997, 191), or the process by which one interprets sensory data (Severin and Tankard, 1997, 73). In cognitive psychology theories of perception are divided into two types according to the direct/indirect dualism. The bottom-up view emphazises the role of sensory data in forming perception while the top-down view argues for the important role of previous concepts in guiding perception. These two may also be called data-driven processing (bottom-up) and conceptually driven processing (top-down) (Kantowitz, Roediger and Elmes, 1997, 192). The conceptually-driven theory of perception, i.e. the top-down theory, may also be labeled as constructive - following theories of unconscious inferences or intelligence - because this view holds that higher order thinking has an important role in perception (Sternberg, 1995, 170). In cognitive psychology the opposing views of perception have also often been synthesized together. According to Sternberg (1995, 171): "It seems likely that we use a combination of information from the sensory receptors and our past knowledge to make sense of what we perceive."

The study tries to develop a preliminary synthesis of bottom-up and top-down theories, as it seems most fruitful for further inquiry. However, it is unclear, exactly how these two views on perception work together. Some help comes from communication studies, where perception has been seen as an interactive process between the perceiver and the context. According to Berelson and Steiner (1964, 88) perception is a "complex process by which people select, organize, and interpret sensory information into a meaningful and coherent picture of the world." This implies that perception is a process involving the input of information, the processing of that information and the interpretation of the information to form an image of the environment. This process is continuous. Bennett, Hoffmann and Prakash (1989, 3) state that perception is: "...notably active: It involves learning, updating perspective, and interacting with the observed phenomenon."

Some philosophical theories of perception also emphasize the interactive nature of perception. The phenomenal character of experience based on perception can be seen as an interaction between sensations of objects and ways of thinking about those objects (Hamlyn, 1996, 463). The workings of imagination or a 'certain way of seeing' are highlighted by Hamlyn (1996, 463):

> *"In imagination we may bring to bear a way of thinking about an object which may not be the immediately obvious one, and being visually imaginative, as an artist may have to be, is at least a special case of our general ability to see things as such and suches. But that general ability is central to the faculty of visual perception, and mutatis mutandis of the faculty of perception in general."*

This reflects the creativity of perception based on complex interactions of mind and context. Similarly, selective perception means that people's perception tends to be influenced by their wants, needs, desires and attitudes. (Severin and Tankard, 1997, 73). It implies that different people may perceive and react to the same situation in different ways. This speaks for individual differences in perception. Severin and Tankard (1997, 74) summarize their view:

> *"…perception is influenced by a number of psychological factors, including assumptions based on past experiences (that often operate at an almost unconscious level), cultural expectations, motivation (needs), moods, and attitudes."*

Hence, perceptions of external objects and internal knowledge blend in a complex manner. The study adopts the view of the interaction of bottom-up and top-down, or direct and indirect, theories of perception. Perception is then both an interpretation of sensory data as such and also based on previous knowledge, influenced by beliefs, attitudes, moods and expectations. Perception may be seen as partly similar to stages of information processing: acquiring information and processing it further. Perception may then be thought of as the evaluation of objects of perception. This evaluation is directly influenced by context, as the mind is embedded in context via direct perception. The evaluation is also influenced by the previous knowledge formed in previous interactions with the context and the creativity of the mind.

One implication of adopting the direct view of perception is that mind and context are not separated, but the mind is embodied in the context. This means that perception may tie together mind and context. One implication of adopting the indirect view of perception is that knowledge is 'between' mind and context as it mediates perceptions. A more detailed analysis of the microgenesis of perception and interactions of elements of perception, as well as the ontology of mind, objects of perception and context of perception, will be elaborated later in the study.

## 2.1.2. Consciousness

Mind and consciousness are now defined and the complex and fluid nature of consciousness will be discussed. This fluid nature helps in dealing with the complexities of the perceiver in the process of perception. From the point of view of information processing and action, mind may be defined as: "… the functioning of the brain to process information and control action in a flexible and adaptive manner." (Farthing, 1992, 5). Also Hebb (1974, 74) emphasizes the dimension of action based on the functioning of the mind:

> *"Mind is the capacity for thought, and thought is the integrative activity of the brain - that activity up in the control tower that, during waking hours, overrides reflex response and frees behavior from sense dominance."*

Both of these definitions are materialistic, since they connect the mind with the activities of the brain. They are also functionalistic in a sense that they define mind in terms of what it does: "….it processes information (including perception, memory and thinking) and controls action." (Farthing, 1992, 5).

The conception of mind is broader than the conception of consciousness. Farthing (1992, 6) defines consciousness as: "…the subjective state of being currently aware of something, either within oneself or outside of oneself." Consciousness has five higher-order characteristics which help the definition of consciousness from the point of view of the study. First, subjectivity means a conscious

awareness of the objects of perception. James (1890/1983, 220-221) describes subjectivity as follows: "Every thought is part of a personal consciousness...The universal conscious fact is not "feelings and thoughts exist", but "I think" and "I feel"." Second, consciousness is dynamic and in continuous change. "Within each personal consciousness thought is always changing." (James, 1890/1983, 221). We perceive one thing after another, either external objects or internal thoughts. This may sound like chaos:

> *"Our inner speech drifts from one topic to another, like a rambling conversation. Even when we try to focus our attention on a particular topic, we are soon distracted by external stimuli or daydreams." (Farthing, 1992, 26).*

The other way to describe the constant change of consciousness is the principle of uniqueness of the contents of the consciousness: "No state once gone can recur and be identical with what it was before." (James, 1890/1983, 226). Like seeing a movie for a second time vs. the first time, one experiences it differently. Third, consciousness is continuous. James (1890/1983) has discussed the stream of consciousness as a way to describe the continuous flow of changes of consciousness:

> *"Consciousness, then, does not appear to itself chopped up in bits. Such words as "chain" or "train" do not describe it fitly...It is nothing jointed: it flows. A "river" or "stream" are the metaphors by which it is most naturally described. In talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life." (James, 1890/1983, 226)."*

Farthing (1992, 27) states that the continuity of consciousness is based on retaining the events of the past few minutes in short term memory or by recalling past events from long-term memory. The feeling of continuity of consciousness is also the basis of personal identity. If one could not recall past events, depersonalization would result as is the case with some brain-damaged patients. Hence, temporal gaps in consciousness are not common. However, sometimes, when involved in some activity, such as driving a car, one may feel one has lost the subjective sense of consciousness for a while when driving in 'autopilot' mode without much conscious effort.

Fourth, consciousness is intentional. It means it is about something or has contents, such as sensations of an object of perception: "Human thought appears to deal with objects independent of itself; that is, it is cognitive, or possesses the function of knowing." (James, 1890/1983, 262). Fifth, consciousness is selective. At any moment one may be consciously aware of only a few things internally or externally. Even though consciousness is a wholistic stream, there are factors which influence the direction of  consciousness continuously. James (1890/1983) states that consciousness:

> *"...is always interested more in one part of its object than in another, and welcomes, rejects, or chooses, all while it thinks...We find it quite impossible to disperse our attention impartially over a number of impressions...But we do far more than emphasize things, and unite some, and keep others apart. We actually ignore most of the things before us." (James, 1890/1983, 273).*

The principle of selectivity of consciousness is related to the interactive approach to perception. It may be that conscious experience is constructed. One may say that reality is constructed in consciousness, rather than being merely reflected in consciousness (Farthing, 1992, 29). This way of constructing reality in perception also differs across different people: [1]

> "A man's empirical thought depends on the things he has experienced, but what these shall be is to a large extent determined by his habits of attention...Let four men make a tour in Europe. One will bring home only picturesque impressions-costumes and colours, parks and views and works of architecture, pictures and statues. To another all this will be non-existent; and distances and prices, populations, drainage arrangements, door-and window-fastenings, and other useful statistics will take their place. A third will give a rich account of the theaters, restaurants and public balls, and naught beside; whilst the fourth will perhaps have been so wrapped in his own subjective broodings as to tell little more than a few names of places through which he passed. Each has selected, out of the same mass of presented objects, those which suited his private interest and has made his experience thereby." (James, 1890/1983, 275-276).

What are then the dimensions of conscious, subjective experience? External stimuli or sensory perception often have priority in waking consciousness, due to being such important factors in guiding our interactions with the environment. Sensory perception also may lead to higher order thinking based on the perceptions. (Farthing, 1992, 30)

Mental imagery is a part of a conscious experience, based on perceiving an internal object, such as a memory: "A mental image is a quasi-perceptual experience that exists in the absence of the stimuli that are known to produce its genuine perceptual counterpart." (Richardson, 1969, 2). This means memories enter thinking via mental imagery. Mental imagery often involves the representation of positions of objects in space and their shapes. Visual mental images may have several functions, such as being a representative presentation of an object in memory, like as a car. Mental images also may help in solving spatial problems or planning one's own bodily actions, like in sport before the performance starts. Often mental imagery is also a vehicle of fantasy, imagination and entertainment. Mental images may differ in their degree of vividness (the clarity of the image) and spontaneity of the image (how automatically images change). (Farthing, 1992, 32) [2]

Inner speech is one characteristic of conscious experience. This means that people literally talk to themselves internally. A large part of conscious thinking happens either via inner speech or mental imagery. Inner speech may be seen as self-narration:

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[1] *Farthing (1992) further suggests that people´s psychological problems may often be based on the way they construct their personal reality; selecting and emphasizing the negative aspects rather than the positive aspects of their lives.*

[2] *There are also individual differences in mental imagery capabilities. Thinking in mental images requires some processing resources from the mind, particularly in working memory. There also seem to be some modality-specific dimensions of processing mental images. For instance two tasks in the same modality may distort processing, whereas different modalities may be processed more easily. (Farthing, 1992, 32)*

> *"Narratization includes interpreting our present experience and behavior in our terms of its causes and expected effects, and fitting it into the story of our lives. Whenever you ask yourself: "Why is this happening to me?" or "What am I going to do?", you are narratizing. Narratizing may also include mental imagery and spatialization." (Farthing, 1992, 34).*

Further, conceptual thought is also a dimension of conscious experience. This means generalizing about objects of perception in terms of categories according to for instance, similarities, appearance or function. The capacity of conceptual thought is very developed in humans, due to our capacity to use language, which allows the representation of complex categories in single words. Some types of conceptual thought may also be in the form of nonverbal mental images. Also, remembering is an important factor in consciousness. Memory may be seen as one of the inputs of consciousness, the other source being sensory systems. Remembering involves internal speech and mental imagery that together represent knowledge from memory. (Farthing, 1992, 34-35)

Subjectively feeling emotion is another key aspect of conscious experience. Emotions may be thought of as always present in consciousness. Izard (1980, 193) suggests that emotions are "...motivational phenomena that give impetus and directedness to perceptual and cognitive processes and to motor acts"; and further, emotion: "...is always present in ordinary consciousness, giving it particular experiential quality and maintaining its purposeful flow." The unity of consciousness is also an important aspect of conscious experience. This means that despite the large number of potential stimuli to be perceived and processed in our internal and external environment as well as the fluid nature of thoughts and various forms of representation of thoughts, one feels that conscious experience is unified and not fragmented. [3]

> *"At one moment, or in a rapid succession of moments, you may be looking out the window, listening to a lecture, writing notes, feeling a headache, recalling yesterday's picnic, and imagining what you hope to do next weekend. Subjectively, it does not seem that each of these experiences represents a different consciousness. Rather, they all seem to go together in a single unified, invisible consciousness - your own." (Farthing, 1992, 41-42)*

Finally, volition may be thought of as the 'free will' of the individual. This means that environmental factors may not thoroughly define what an individual feels or thinks. Acts of volition may be such choices as deciding not to watch television, but to read a book instead. Volitions are accompanied by feelings of volition:

> *"...a conscious feeling or belief that our actions are the result of a personal choice between viable alternatives, in which we are consciously aware of those alternatives. The choice*

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[3] *O´Keefe (1985) proposes three possible reasons for the feeling of conscious unity. First, there is usually a short-term stability in the background or context of experience. This means that one can separate the central object of consciousness - the figure - and between the background- the physical or mental context of an experience. Second, temporal gaps between experiences are bridged by memory. It may be that if memory is incomplete, one bridges the gaps by plausible explanations for the gaps in the form of scripts - typical sequence of events related to a particular situation. Third, people have a sense of ownership of their experiences. They are felt as one´s private experiences.*

*may involve what to do, when to do it, or both. Once the choice is made, there is a feeling that it could have been otherwise." (Farthing, 1992, 38)*

Reflexive responses, such as withdrawing one's limb from a fire to keep it from burning, may not include volition. However, when one inhibits a reflexive response, it includes volition. Similarly, not all acts are conscious objects of explicit volitions: "....many automatic or habitual behaviors occur without a conscious decision." (Farthing, 1992, 38). Next, the study will deal with different levels of mind.

## 2.1.3. Conscious and unconscious levels of mind

The conscious and unconscious levels of mind will now be discussed and defined. This is done in order to be able to understand the complex processes involved in perception and their relationship to consciousness, specifically conscious experience.

Often people can not introspectively report why they have done a particular thing (Farthing, 1992, 38). To understand this phenomenon, one may resort to a basic method of experimental psychology where the traditional 'black box' is human subjective consciousness. This is reflected  as follows:

*"A substantial amount of research is being undertaken to determine the relation between conscious awareness and perception. As you might expect, studying private processes such as consciousness...is fraught with numerous methodological problems." (Kantowitz, Roediger and Elmes, 1997, 198).*

For instance, a number of typical dependent variables in experimental psychology seem to provide an explanation of one's experience. This may be studied with a verbal report. The problem is that it is difficult to determine whether the verbal report is a valid indicator of the observer's experience. Hence, a model of thresholds has been developed to better understand and justify the methods used to study perception. This has been applied to the subjective and objective thresholds of recognition of stimulus. Below the objective threshold on the bottom, people are not aware of stimuli presented and their measurable behavior does not reliably predict the meaning of stimuli. Below the subjective threshold but above the objective threshold unconscious processing takes place. People are not verbally aware of the meaning of the stimulus, but their measurable behavior shows predictory responses to stimuli. Above the subjective threshold, the area of conscious processing of stimuli, people are verbally aware of stimuli and their behavior indicates response to the meaning of the stimulus. (Kantowitz, Roediger and Elmes, 1997, 210) [4]

Hence, there may be a number of mechanisms involved: below the objective threshold (mechanisms that can not be consciously controlled), below the subjective threshold (unconscious processes and

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[4] *There are two methodological implications of the threshold theory in perception research as regards verbal reports. First, it provides a way of thinking about how to treat verbal reports of seeing, for instance. Second, there may not be anything special about a verbal report vs. other methods of inquiry in perception. (Kantowitz, Roediger and Elmes, 1997, 209-210)*

mechanisms which may be controlled to a degree) and above the subjective threshold (conscious processing controllable at will). This is described by Cheesman and Merikle (1986, 344):

*"Given that perceptual awareness or consciousness is a subjective state, we propose that the subjective threshold, or the threshold for claimed awareness, better captures the phenomenological distinction between conscious and unconscious perceptual experiences and that the subjective threshold, therefore, provides a better definition of the boundary between conscious and unconscious processes that is provided by the objective threshold."*

The possible dominant nature of unconscious processing raises the question of who is the actor in the human being or who makes the decisions? For instance, can it be that unconscious mechanisms of perception and evaluation of objects of perception literally 'make decisions?' A decision may be internal, such as an explicit volition to do something. A decision may also be externally seen as observable behavior: what one can observe in one's behavior, may have been 'decided' somehow. However, it may be that:

*"Decisions may be made largely, or entirely, by nonconscious computational processes. This is not to deny that consciousness plays an important role in decision making...the exact role of consciousness is still a matter of research and debate...If consciousness is more of a monitoring system than a decision-making system, then probably the role of consciousness has to do with perception, selection and organization of some data relevant to decision making." (Farthing, 1992, 39)*

This monitoring-based view may not be the only way to view consciousness. One may also argue that regardless of what exactly is the system for making decisions, a decision entails consciousness of the reasons to act, the decision to act and the implications of the act: "To act intentionally means to be consciously aware of the decision before the action is initiated. The feeling of volition is an aspect of conscious experience." (Farthing, 1992, 39). However, it may be that many everyday decisions are made more or less automatically by unconscious processes. The matter of free will addresses the essential relationship of a human being as an organism in his environment. This will be elaborated later. The study proposes a multilevel model of consciousness applied from Farthing (1992) in Figure 2.

In Figure 2 consciousness is seen as embedded in the mind. Mind is the totality controlling perception and action in an environment. Mind has various elements and levels, such as conscious and unconscious levels of mind. Levels of mind may be defined based on ease of access to perceptual mechanisms and processes (direct perception) or mechanisms and processes of long-term memory (indirect perception) by the conscious level of mind. Some of the knowledge in long-term memory may not be accessible. Nor can one easily reflect on various processes of the mind. Also, perceptual processing may to a degree not be accessible. The unconscious level of mind is then relative to the areas where it is difficult or impossible to access various elements of mind, such as perceptual processes and mechanisms and previous knowledge in long-term memory. (see Farthing, 1992, 13-14)
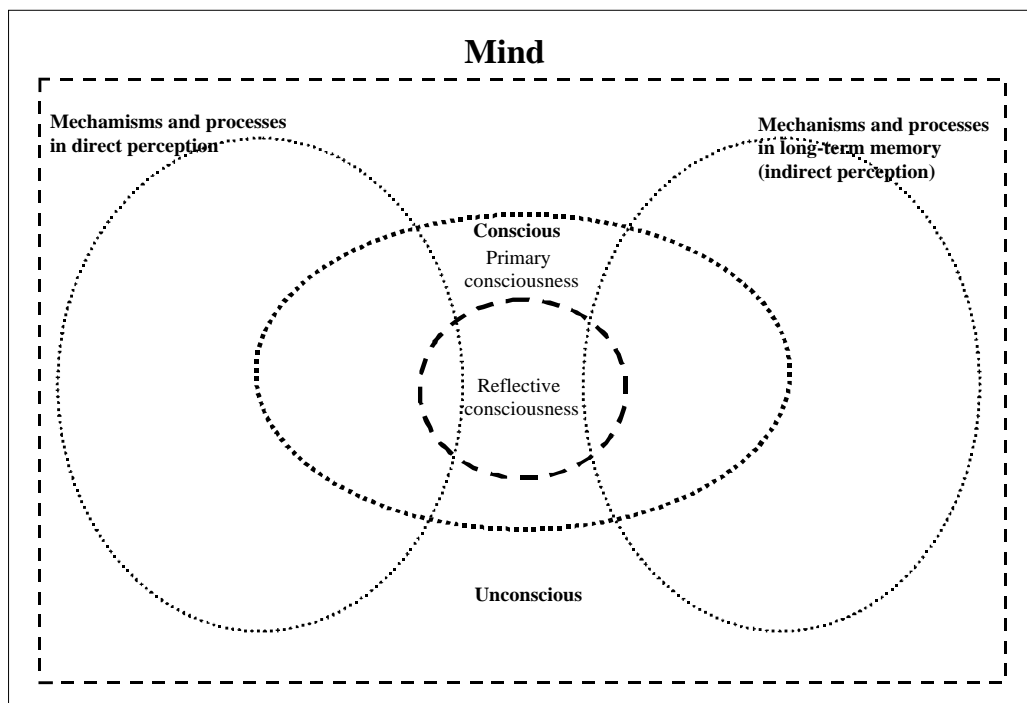
**Figure 2. The multilevel model of consciousness. Applied from Farthing (1992).**

The conscious mind is seen as consisting of conscious experience. It consists of the contents of reflective and primary consciousness. Reflective consciousness may be thought of as the thoughts of one's conscious experiences as such. Reflective consciousness includes the feeling of subjectivity - being an actor with conscious experiences and actions. Primary consciousness consists of the direct and unreflective experience of percepts, feelings, and thoughts arising in response to objects of perception. It may also include spontaneous memories and thoughts. However, it may be difficult to clearly distinguish between primary and reflective consciousness at any given moment as they are interwoven. One reason for this is that when one is concentrating on the nature of one's conscious experience, one may necessarily be in the domain of reflective consciousness. Overlying primary and reflective consciousness there is a mechanism of changing focus between them: focal and peripheral awareness. This renders consciousness temporal. Focal awareness shifts between primary consciousness and reflective consciousness; hence making either primary or reflective consciousness appear as peripheral in relation to the sequential 'beam' of conscious attention. (see Farthing, 1992, 13-14)

Figure 2 is descriptive, not necessarily an exact explanation of how the levels of mind may be seen as related to all possible elements of mind. It does not specifically elaborate on the dynamics of all elements or levels of mind. It is used mainly to argue that there may be different levels of mind regarding the internal or external objects of perception. There is also a difficult question of the relationships of types of consciousness. Klinget (1975) has described reflective consciousness as:

> *"...the ability not only to know but to know that one knows - hence, the ability to engage in imagination, self-scrutiny, scientific hypothesizing, philosophical speculation, the evolution of a self-concept, and similar internal behaviors without which the existence of countless observable behaviors and products (e.g. literature, biography, ritual and commemoration) could not be accounted for." (Klinget, 1975, 3)*

May (1967) has defined the relationship of primary and reflective consciousness as people's capacity to be both objects and subjects to ourselves:

> *"We are not simply describing two alternate ways of behaving. Nor is it quite accurate to speak of our being subject and object simultaneously. The important point is that our consciousness is a process of oscillation between the two. Indeed, is not this dialectical relationship between experiencing myself as subject and object just what consciousness consists of? The process of oscillation gives me potentiality - I can choose between them, I can throw my weight on one side or the other...It is the gap between the two ways of responding that is important. My freedom, in any genuine sense, lies not in my capacity to live as "pure subject", but rather in my capacity to experience both modes, to live in the dialectical relationship." (May, 1967, 9)*

An interactive relationship is also found between focal and peripheral awareness. Focal awareness is something one is immediately aware of and perhaps actively processing in the mind. Peripheral awareness is mental contents which are just at the fringe of awareness, in the background, but still present in processing or thinking. The contents of peripheral awareness may be brought into the focal awareness quickly and things in the focal awareness may quickly become objects in the peripheral awareness. There may be two types of content in peripheral awareness. One example is stimuli which one is only vaguely aware of and which are being processed automatically, while focal awareness is being directed elsewhere. Also, events that have been in the focal awareness very recently and which are still stored in short-term memory are the contents of peripheral awareness. (Farthing, 1992, 15-16) [5]

When looking at the dynamics of levels of mind, the contents of the unconscious level may be defined as something not currently being processed in conscious mode, although they may be processed in a unconscious mode. The unconscious level may be defined as the degree of availability of certain processes of the mind to the conscious level. Hence, the unconscious level of mind may be seen as a continuum. There are four major types of unconscious contents and processes. First, there are sensory inputs which are registered but not attended to. For instance, due to capacity limitations of the working memory it may be that selective attention filters certain stimuli from being

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[5]*This suggests a time-dimension for the contents of peripheral and focal awareness at any given time. In relation to time, it may be interesting to investigate how long things which have been processed stay in the mind inside peripheral awareness. This may bring understanding on the subjective feeling of time in any given situation. For instance, if a stimulus was processed in focal awareness regarding either reflective or primary consciousness two minutes ago and it is now fading away into peripheral awareness, does the individual feel as if the now-moment of perception in time and place is still at hand? Another type of investigation would be on the influence of the ease of access to previous states of mind to future processing of information.*

processed. (Farthing, 1992, 14). However, prior to perceptual input these stimuli are recognized at the low level unconsciously. This is important from the point of view of the study, as: "Sometimes nonconsciously recognized events influence our thinking and behavior even though they never reach consciousness (Farthing, 1992, 17)." This speaks partly for the direct view of perception as a continuous flow of sensation.

The second type of unconscious content is knowledge in long-term memory. All this knowledge is not readily available: "At any moment, almost all of the thousands of things you know…are nonconscious." (Farthing, 1992, 17). Third, automatic cognitive and sensory-motor programs may be operating at all times without our awareness of them. The knowledge of how to perform a particular task may be stored in memory.

> *"The skill-control programs of procedural memory operate automatically and non-consciously. Such automatic processes are at the lowest level of nonconscious mind in that we cannot be directly aware of the processes themselves, though we may be aware of their final results or outputs (and often of results of intermediate stages, too)." (Farthing, 1992, 18)*

The fourth category of unconscious processes is motives. A motive may be seen as a need, interest or desire which activates an organism to behave in a certain way in an environment (Farthing, 1992, 19). There may also be other types of unconscious processes. The nature of unconscious processes and their influence on perception are later elaborated in more detail.

The study wishes to add two extra dimensions to the model based on Farthing (1992) in Figure 2, related to the dynamics of the model. First, the study hypothesizes based on the interactive approaches to perception, that previous knowledge and perceptual processes, mechanisms and contents are in constant and complex interaction. For instance, beliefs may influence what and how is perceived, how information is processed and how it appears to the conscious level of mind. Some mechanisms of perception and processing of information may never be conscious. Also, some previous knowledge may be unconscious. Further, one may not be consciously aware of the interactions of one's previous knowledge and perceptual processes, contents of perception or perceptual mechanisms. It is also difficult to know in a given situation whether external perception or previous knowledge 'drives' conscious experience. It is then not easy to identify causalities between perception and previous knowledge, as they both influence the conscious level of the mind.

Hence, the study sees perception as the low-level mechanisms of sensory input into the mind at the unconscious level of the mind and as the automatic and continuous evaluation of the objects of perception. Perception is a continuous process which interacts with previous knowledge in automatic evaluations. Conscious experience is then a place for these continuous processes of evaluation to be reflected in, but not necessarily.

Second, the study defines conscious experience as the contents of primary and reflective consciousness at any given time. The beam of focal awareness constantly moves between primary and reflective consciousness, rendering other areas of consciousness to be in the sphere of peripheral aware-

ness. This means there is a temporal dimension to conscious experience as well as spatial 'resolution'. However, closer elaboration is still needed to the different types of unconscious processes in the mind, such as those of perception, which may influence conscious experience. The study will next investigate different archetypes of conscious experience, which may repeatedly occur in everyday life.

## 2.1.4. Subjective experience

Regarding subjective experience dimensions of primary and reflective consciousness, volition, mental imagery, remembering, inner speech, conceptual thought and unity have been discussed already. Some special cases of conscious experience, such as daydreaming, flow, or emotional experience are now introduced. The reason for selecting these types of subjective experience is that they can also take place as a result of interaction of mind and media and communications technologies. Hence, they are convenient to use in later elaborations of the study. First, the conception of subjective experience is defined.

Usually consciousness is discussed as a phenomenal consciousness, i.e. what is it like to be a person, how is it like to have experiences, and so on. A good synonym for consciousness could be subjective experience. Examples of subjective experiences could be visual perceptual experiences, sensations of pain or pleasure, needs and wants and thinking in general. (Block, 1996, 211).[6] The study adopts a view of conscious experience as being a subjective, phenomenal, 'felt' experience. This means that it is possible to have an experience which is subjective, or personal and individual, when being in a particular situation. The essence of experience is what it feels like to the experiencer; i.e. it is deeply subjective. The study then adopts the conception of subjective experience as reflecting the key ideas of conscious experience. There are various types of everyday subjective experiences.

Out of all possible, everyday subjective experiences the study concentrates on flow, daydreaming and emotional experience. The study will first introduce the conception of flow. Flow is characterized as an optimal experience, including experiencing high involvement and enjoyment. Csikszentmihalyi and Csikszentmihalyi (1988) describe the phenomenon of flow:

> *"…as an intrinsically enjoyable experience, [it] is similar to both peak experience and peak performance, as it shares the enjoyment of valuing of peak experience and the behavior*

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*1 According to Pendlebury (1996, 125-127) the essential element of experience is how it feels to the experiencer. This may be described as the character of experience. An experience can also have content. A common example of experience is a sensation involved in perception, like seeing a tree. Hence an experience may have a modality (vision) and content (a green tree). Content is often the representative element of experience, but an experience can also represent a property which it possesses, like a smelling sensation. Another view is that sense experiences represent characteristics and properties of the world wider than those of common sensory qualities. For example, instead of seeing just black, grey and white we see cars, houses and people. In that sense character and content are intertwined in experience. In a way, the character of experience may be thought of roughly as the pleasantness or unpleasantness of experience, or the intensity of experience. The content of experience may be seen as a representation of an external object of perception.*

*of peak performance. Flow per se does not imply optimal joy or performance but may include either or both." (Csikszentmihalyi and Csikszentmihalyi, 1988, 316)*

When being totally engaged in a certain activity, an individual may experience a sense of discovery, enjoyment and exploration. Usually flow is seen as emerging when there is a balance between skills required to perform a task and the level of challenge of the task: "The flow experience begins only when challenges and skills are above a certain level, and are in balance." (Csikszentmihalyi and Csikszentmihalyi, 1988, 260). Often the type of activity involves nine types of requirements, according to Csikszentmihalyi and Csikszentmihalyi (1988):

*i) Clear goals of the activity*
*ii) Immediate feedback*
    *-when one acts, one can immediatelly see the result of action*
*iii) Personal skills are suited to the challenges of the task*
*iv) Action and awareness merge*
    *-involvement with the activity*
*v) Concentration on the task at hand*
*vi) A sense of control of the situation*
*vii) Loss of self-consciousness*
    *-involvement, and 'fusion' with the activity*
*viii) Altered sense of time*
    *-for instance time passes 'quickly'*
*ix) Experience becomes autotelic.*
    *-experience becomes self-directed and a goal in itself due to enjoyment*

Flow is a question of balance or harmony between what one is capable of and the challenge of the task. In a way it is about the balance of perception and action. The effects of flow may be thought of as the altered sense of time and more positive experiences when doing tasks with flow vs. tasks with no flow.

Another everyday experience is daydreaming. This refers to the way one's consciousness is always changing and shifting focus between internal thoughts and perceptions of external objects. A central attribute of daydreaming is exactly dreaming, the creation of spontaneous, dreamlike thoughts which may not be a direct result of perception of external objects (Farthing, 1992, 170-172). Klinger (1978) has distinguished between operant and respondent thoughts. Operant thoughts are directed to the accomplishment of a particular task which may require concentration and attention. Respondent thoughts are created by other stimuli, and may not be directed to the task. Operant thinking differs from respondent thinking:

*"... in that it is accompanied by a sense of volition, is checked against feedback concerning its effects, is evaluated according to its effectiveness in advancing particular goals, and is protected from drift and distraction by the thinker's deliberately controlling his or her own attention." (Klinger, 1978, 235)*

Another division of thinking is whether they are stimulus bound or stimulus-independent. Stimulus bound thoughts are related to a particular task at hand, while stimulus-independent thoughts are not. One may also create a matrix describing the flow of everyday thoughts as seen in Table 1.

| Type of thinking | Task | Subjective experience of daydreaming |
|---|---|---|
| **A. Stimulus-bound** Operant | 1. Driving a car 2. Reading a book | 1. Thinking about changing lanes soon 2. Thinking about the contents of the book and reflecting on it |
| Respondent | 1. Driving a car 2. Reading a book | 1. Thinking about an accident which happened on this road earlier 2. Thinking about one´s coming summer vacation when reading of summer in the book |
| **B. Stimulus independent** | 1. Driving a car 2. Reading a book | 1. Thinking about how to fix one´s roof 2. Thinking about going to the sauna |

Table 1. Types of everyday thoughts.

One may also divide thoughts into fanciful vs. realistic thoughts. Realistic thoughts may have a possibility of happening or are currently happening, while fanciful thoughts may be imaginative or extremely unlikely to happen (Farthing, 1992, 173). Well-integrated vs. degenerated thoughts may also be seen as one way to conceptualize everyday thoughts. According to Klinger (1978):

> *"Ordinary waking thought more often than not has about it a certain quality of intactness that sets it off from dreamlike thought: Particular thoughts tend to have a coherent quality, things that are separate topics retain their separateness, and images of different things retain their individual character; whereas dream images often flow without respect to beginnings or endings, shift gears drastically in the middle, interweave different concerns with one another, and offer images that seem to be fused representatives of different basic ideas or forms." (Klinger, 1978, 241)*

Thoughts can also contain mental images. Mental images may be seen as quasi-perceptual experiences of various objects of perception. They may occur in the absence of actual objects which they are a representation of. These images may vary in vividness:

> *"Mental images (visual, tactile, auditory) are common in fanciful, respondent daydreams, and they tend to be more vivid under relaxed or drowsy conditions. But images can occur in operant thought, too, such as when you visualize how you want to arrange your furniture, or how to build a brick-and-board bookcase." (Farthing, 1992, 175)*

Daydreaming as such may be seen as thoughts which are not directly related to a task at hand in the social or physical environment in a stimulus-bound operant manner. This means that there is creative and independent daydreaming and fantasizing regardless of external context. Also, daydreaming may be partly initiated by an external object of perception via operant thinking. Consequently, there may be daydreaming related to some stimulus in a respondent, freely associative manner:

> *"...daydreaming represents a shift of attention away from some primary physical or mental task we have set for ourselves, or away from directly looking at or listening to something in the external environment, toward an unfolding sequence of private responses made to some internal stimulus. The inner processes usually considered are "pictures in the mind's eye", the unrolling of a sequence of events, memories or creatively constructed images of future events which have varying degrees of probability of taking place. Also included as objects of daydreaming are our awareness of our bodily sensations, our emotions and those little inner voices we hear talking to us somewhere in our heads." (Singer, 1975, 3-4)*

It seems that daydreaming may be functional: "Through daydreams we plan how to achieve our intermediate and long-term goals, and assess our progress toward our goals." (Farthing, 1992, 189). The temporal dimension of daydreaming is interesting. This means that one may imagine events of the past or future when continuously daydreaming. One may also 'rehearse' some possible future events, such as a sports performance, for instance.

There are a number of factors which may influence the decision to pay focused attention to external objects vs. daydreams. First, external stimuli has priority over daydreams in general. External stimuli may compete with daydreams for the resources of the brain for processing information. However, attention shifts rapidly to external stimuli when needed. This may have evolutionary value in avoiding threat, for instance. Second, shifting to daydreaming is predictable in dull or unstimulating environments. Daydreaming occurs almost continuously if external stimuli are removed from a person in an experiment, for instance. Also, if one is performing routine tasks which do not require full attention and which are boring, one daydreams often. Third, the level of arousal, or feeling energetic and alert, may be related to daydreaming. When arousal is high, one is more likely to respond to external stimuli than when arousal is low. Fourth, there are individual differences in preferences for the amount of external attention to stimuli vs. daydreaming. (Farthing, 1992, 195-196)

The contents of daydreams are in turn affected by four factors. First, current concerns may influence the contents of daydreams. One may dream of what concerns oneself. Second, stress level may produce a tendency to daydream or relax. Third, emotions may be important in influencing daydreams in the context of imagining oneself functioning in an environment. One may imagine for instance that one is successful in carrying out a task and hence feel fulfillment and positive emotions. Fourth, there may be long-term individual personality and temperament-related differences with daydreaming. [7] (Farthing, 197-198).

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[7] *There are individual differences in daydreaming which constitute daydreaming styles. For instance, there are positive-vivid daydreamers, who tend to daydream often and have positive reactions to the dreams and have vivid images. They may develop elaborate fantasies and be very interested in their inner experiences. A guilty*

Daydreaming seems inherently complex. Klinger (1978) has formulated the idea of the induction principle as a way to better understand how thoughts are sequenced in relatively unstructured situations of everyday life:

> *"At any given moment, the next thematic content of thought is induced by the combination of current concern and a cue related to that concern. The "cue" is either a cognitively meaningful stimulus in the external environment, or a symbolic event in the stream of the individual's own consciousness." (Klinger, 1978, 250)*

This induction principle is still very general, but it implies that the sequence of daydream thoughts may not be just a random chaos of thinking. Rather, there may be associations and causations between the environment and the content of daydreams at some moment.

Another typical everyday subjective experience is emotion. Emotions are complex assortments of affects beyond simple good or bad feelings. Emotions are often related to a particular object of perception (Cornelius, 1996, 186-187). Emotional experience refers to the intrapersonal, internal reaction one has to an emotion-eliciting stimulus (Guerrero, Andersen and Trost, 1998, 9). There are various kinds of emotion. For instance, one may experience joy, fear, anger, sadness, disgust, shame and guilt (Guerrero, Andersen and Trost, 1998, 12). Moods, on the other hand, may have less specific targets or objects:

> *"Moods affect a wide range of social cognitions and behaviors. Like preferences and evaluations, moods are primarily considered as simply positive or negative… moods…typically…have some duration." (Fiske and Taylor, 1991, 411)*

Emotional experience has many dimensions, of which the most dominant may be affective valence. This may mean the goodness or badness of certain stimuli as experienced emotionally and subjectively. There may be four main components of emotional experiences. First, there is affect, which is the contents of a particular single emotion. Second, an unconscious evaluation of an object of perception may also be subjectively experienced as an emotion. Third, a state of action readiness may be experienced as felt tendency to engage or not engage in a certain behavior. Fourth, bodily change may be felt, which may include arousal changes and changes in heartbeat, muscle tension and facial expressions. (Frijda, 1993, 383-384)

Various types of subjective experiences are present simultaneously in the flow of consciousness. Consequently, it may be difficult to categorize subjective experiences in great detail:

> *"Subjective experiences in the normal waking stream of consciousness are highly varied, ranging, for example, from alert attention to external tasks to relaxed daydream fantasies. However, under some conditions our subjective experiences seem to go beyond the*

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*dysphoric style of daydreaming may be characterized by people reflecting guilt, hostility, fear of failure and achievement-orientation, heroism, hallucinatory vividness, and frightened reactions. An anxious-distractable style of daydreaming may mean a lot of mindwandering during daydreaming, being bored, distracted easily and worrying a lot. Such people may be absorbed in daydreaming, but not able to focus on a single topic; hopping from one topic to another. (Farthing, 1992, 179)*

*normal range of waking consciousness. If the overall pattern of subjective experiences seems to differ markedly from normal, we may conclude that we are in an altered state of consciousness, where our mind seems to be functioning differently from normal." (Farthing, 1992, 198-199)*

This means that subjective experience may be seen as one elastic totality which continuously goes on. Within normal waking consciousness, daydreaming, flow and emotion may be typical everyday experiences. Altered states of consciousness, such as trances, hypnosis, sleep and other possible states are not dealt with within the limits of this study. Next, the nature of unconscious knowledge will be discussed.

## 2.1.5. Tacit and explicit knowledge

One of the consequenses of perceiving objects and having subjective experiences is knowledge. The study here describes the types of knowledge in long-term memory. This is done in order to be able to later elaborate on the change of knowledge in perception and the interaction of sensations and previous knowledge.

Nonaka and Takeuchi (1995, 60) discuss the distinction between tacit knowledge and explicit knowledge. They state that the amount of knowledge that can be expressed in explicit form is minimal compared with the amount of knowledge that is tacit, or non-articulable. Further:

> *"Tacit knowledge is personal, context-specific, and therefore hard to formalize and communicate. Explicit or "codified" knowledge, on the other hand, refers to knowledge that is transmittable in formal, systematic language." (Nonaka and Takeuchi, 1995, 59)*

Tacit knowledge also entails skill, a sort of embodied knowledge. Intellectual knowledge and skillful knowledge are in interaction: a skillful handling of things depends on understanding them and intellectual understanding can be achieved by the skillful scrutiny of a situation. (Polanyi and Prosch, 1975, 37-45). The conception of tacit and explicit knowledge is adopted in the study to conceptualize the nature of conscious and unconscious knowledge.

Knowledge and its patterns are stored in long-term memory. The central content of memory is schemas. According to Rumelhart (1980, 34-40) a schema is like a game, a theory, a program or a part of a propositional clause. The internal structure of the schema is much like the manuscript of a play or a game, a guiding set of principles with which the action described by the schema can be repeated. Schemata are informal, individual and unclearly articulated theories of the events and processes of the world. This is apparent in two dimensions. First, a schema works like a hypothesis that is continuingly being tested. If the empirical evidence does not fit into the hypothesis, it will be changed. Second, schemas produce forecasts of events which are not yet perceived**.**

According to Höijer (1992) schemas are future-oriented structures, creating expectations or guidelines for action in future experiences. Schemas are the structure of past experiences, and form the

past into compact frames of references. They serve three functions within the mind. First, they influence new experiences and their interpretations. Second, they influence memories from past experiences. Third, they make 'gap filling' possible. This means roughly the understanding of how different objects of perception are related to one another. Schemas are 'fuzzy concepts': approximations of the world that have a fluid internal structure. Höijer sees this as a prerequisite for the flexible use of the schemas. Further, she emphasizes the advantages of schema theory to other theories of mental models as lying in the fact that schemas are both structurally and processually oriented. (Höijer, 1992, 287-289)

The conception of schemas is compatible with the conception of tacit and explicit knowledge. Hence, schemas are used as the basis of conceptualizing long term memory as well as the basis for understanding change in knowledge. The contents of short-term memory are seen as the results of previous active processing in reflective consciousness, which are on their way to fading outside peripheral awareness. It is also noticed that schemas have a temporal dimension: the past and the future. Some cognitive models or schemas may be seen as embodied:

> *"A concept is embodied when its content or other properties are motivated by bodily or social experience. This does not necessarily mean that the concept is predictable from the experience, but rather that it makes sense that it has the content (or other properties) that is has, given the nature of the corresponding experience. Embodiment thus provides a nonarbitrary link between cognition and experience." (Lakoff, 1987, 154)*

Consequently, mind is not separated from context, but is linked to it via the common, universal link of the existence of similar bodies in similar environments. Of course, there may be other types of cognitive models or schemas, such as imaginary ones, which are not 'directly' part of the physical environment. Mezirow (1994) argues for an emphasis on the dynamic aspect of knowledge and schemas. He discusses the dynamics of the meaning related aspect of cognitive models and schemas by introducing a conception of meaning schemes that:

> *"…selectively determine the scope of our attention and hence perception and arbitrarily determine the way we categorize objects and events, make associations, and attribute causality within a value system. They provide the basis for reducing complex inferential tasks to simple judgments." (Mezirow, 1994, 50)*

Meaning is preliminarily defined here as linguistic and non-linguistic. Linguistic meaning is based on the arbitrary relationships of elements of language systems which can be used to categorize objects of perception and to exchange ideas with other people (see Fiske, 1990). Non-linguistic meaning is based on non-linguistic aspects of objects of perception and knowledge, such as image-schematic and analogue aspects (see Lazarus, 1999). A more elaborated definition of meaning is introduced later in the study.

A meaning scheme is similar to a schema. Meaning schemes may be seen as located in tacit knowledge, but one may also be consciously aware of them. It is evident that certain schemas may be located even more within tacit knowledge than others, depending on the degree of ease of access to

the conscious mind. Meaning perspectives is one construct which may be deeply tacit. According to Mezirow (1994, 42) meaning perspectives integrate cognitive, conative and affective dimensions as well as the psychological and cultural dimensions of change in schemas. Meaning perspectives are then also related to the dynamics of schemas.

A meaning perspective is a habitual set of expectations and a belief system that serves as an orientating frame of reference. These perspectives play a key role in 'in-depth' sense-making of the objects of perception as they guide the types of mental models or schemas used in processing. There are three types of meaning perspectives: epistemic, sociolinguistic and psychological. Epistemic meaning perspectives include such factors as cognitive or learning styles, sensory learning preferences, global/local detail focus and concrete/abstract thinking. Sociolinguistic perspectives may include social norms and roles, cultural/language games and cultural prototypes or scripts. Psychological perspectives may include such features as locus of control, approach/avoidance, characterological preferences, tolerance of ambiguity and self-concept. (Mezirow, 1994, 43)

It seems that meaning perspectives may be a fruitful conceptualization for the purposes of the study to explain the deepest knowledge in long term memory which may influence perceptions. Mezirow (1994) further describes meaning perspectives as influencing the conditions for construing meaning from an experience. More explicitly this is done via meaning schemes: "By defining our expectations a meaning perspective selectively orders what we learn and the way we learn it. Each meaning perspective contains a number of meaning schemes." (Mezirow, 1994, 44)

What, then, may be the general structure of large collections of tacit and explicit schemas? Boulding (1956, 25-26) argues that it is the special property of humans to be able to receive and organize information into large, complex images. These images are temporal: "He has an image of the past which extends back far beyond the limits of his own life and experience, and he likewise has an image of the future." (Boulding, 1956, 25). This view of knowledge may be called organic. According to Karvonen (1997, 156), the key factor in the organic theory of knowledge is the metaphor of organism, not a container. This means that knowledge has grown into an organic structure, and the growth of this structure follows the dynamics of the growth of any organic structure. Also Saari (1998a, 145) argues that: "...mental models in the form of knowledge can be described as complex, subjective, organic and almost semi-autonomous emotional-cognitive structures." The conception of tacit and explicit knowledge and meaning schemes and meaning perspectives are combined in Figure 3 based on Kulkki (1998).

In Figure 3 long-term memory is posed as a complex and dynamic entity. Knowledge of the mind has been placed on a continuum between the explicit and tacit spheres. Tacit knowledge and explicit knowledge are in constant interaction. Within tacit knowledge, at the level of meaning perspectives, there are many other mental models. The deepest values and beliefs are at the level of tacit knowledge condensed in meaning perspectives. A meaning perspective can have a number of meaning schemes which are also connected to each other. Meaning schemes are made of more explicit knowledge than meaning perspectives, due to their stereotypical and partly linguistic nature. They are at the 'border' of tacit and explicit knowledge.
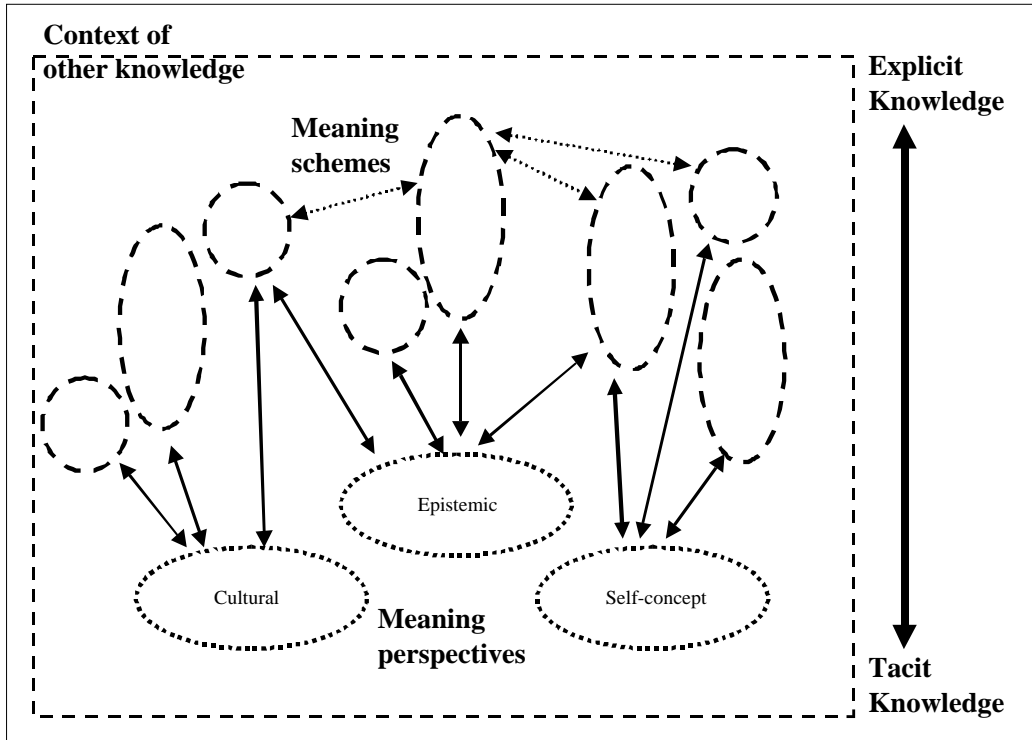
**Figure 3. The multidimensional nature of knowledge. Applied from Kulkki (1998).**

Now, the study elaborates on the nature of some of the most central tacit schemas related to meaning perspectives. Three types of mental models are discussed: attitudes, values and self-schemas. This is done in order to gain a more in-depth view on the nature of meaning perspectives as it is used in perceptual processing.

In previous knowledge there may be different kinds of attitudes. An attitude may be seen as a categorization of previous knowledge along an evaluative dimension based on cognitive, behavioral and affective information. Attitudes may be defined hierarchically, as a general tendency to respond positively or negatively to a certain situation based on the fusion of more specific cognitive, affective and behavioral responses. (Fiske and Taylor, 1991, 463). Attitudes may also be thought as linked to values. Values may then be seen as encapsulating the:

> *"…aspirations of individuals and societies: They pertain to what is desirable, to deeply engrained standards that determine future directions and justify past actions. Values have been postulated as key constructs in the socialization process…Other intellectual traditions see values also as having an individual function shaped by the biological and psychological needs of each person. This perspective has fostered research linking values to the attitudes and personality of individuals and to the maintenance and enhancement of self-esteem." (Braithwaite and Scott, 1991, 661)*

A general problem with defining values has been whether they point to the value as a desirable state one wishes to achieve or to a guideline one is already using in real-life to influence one's actions and thinking. Kluckhohn (1951, 395) defined values as follows, reflecting the general consensus on seeing values at the theoretical level: "A value is a conception, explicit or implicit, distinctive of an individual or a characteristic of a group, of the desirable which influences the selection from available modes, means and ends of action." Values have been measured in various ways. Perhaps the most known work is that of Rokeach (1973). He has defined values in his experiments as: "...an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence." (Rokeach, 1973, 5).

Hence, values may be seen as systems which create often functionally integrated cognitive systems. The basic units of values are beliefs. Clusters of beliefs form attitudes which are connected to value systems. The difference of values and beliefs may be seen as beliefs being: "...the innermost core of the total belief system, and all remaining beliefs, attitudes and values can be conceived of as functionally organized around this innermost core." (Rokeach, 1973, 216). Further, values are more central concepts than attitudes, due to values being more resistant to change than attitudes (Braithwaite and Scott, 1991, 663). Also, a link has been established between an individual's self-esteem and values, acting as: "...components of super-ego or ego-ideal...if violated, there is guilt, shame, ego-deflation, intropunitive reaction." (Kluckhohn, 1951, 398).

Another fundamental aspect of meaning perspectives is peoples' conception of themselves, the self-schema. How people see themselves may have powerful influences on their behavior. Self-schemas as part of meaning perspectives include cognitive and affective structures of knowledge which represent one's knowledge in a certain domain and organize and direct the processing of information relevant to self-concept. Self-schemas enable people to quickly identify what they are and what they are not and hence guide their behavior. Self-schemas include temporal versions of self:

> *"Representations of the self include not only beliefs about what one is currently like, but beliefs about what one may become in the future. These possible selves can help people to set goals and increase motivation and activity in pursuit of those goals." (Fiske and Taylor, 1991, 241)*

Different types of value systems and groups of mental models may then be seen as one of the central superstructures in previous knowledge. The influence of values to evaluating objects of perception may be mediated via meaning perspectives, which may be seen as the condensation of tacit belief systems in long-term knowledge. However, the study has not introduced a more general structure which may capture the whole of the networks of beliefs and values in long-term memory at any given time which are specifically about the general nature of the world, of oneself and of one's place in the world. Subjective reality may be seen as such a tacit superstructure of networks of beliefs and values:

> *"...subjective reality is the "sum" of all the holistic relationships of our knowledge, and as such a "result" of all previous learning...Subjective reality is the image of the "external world" and our place within it." (Saari, 1998a, 151)*

Hence, meaning schemes and meaning perspectives, as well as attitudes, values and beliefs, may be organized into one, tacit, general and theoretical superstructure of meaning, Subjective Reality. Collections of meaning perspectives may constitute the core structure of Subjective Reality. Clusters of meaning perspectives may then influence the processing of perceptions. These networks may not be considered absolute or clear-cut; rather they may be seen as possible examples of meaning-related schemas in the mind which may influence evaluations of objects of perception. Next, the study will discuss key unconscious processes in perception, such as motivation and goals.

## 2.1.6. Motivation, needs and goals

Motivation will now be discussed, as it may influence perceptual evaluations. Motivation may be seen as partly an automatic process in the area of the unconscious when making sense of the world. All human behavior may be thought of as motivated. Motivation: "…controls behavior and is usually regarded as having two aspects: it energizes behavior and directs it towards some goal." (Wagner, 1999, 2). [8]

Some of the motivational influences can be thought of as biological or unconscious, and some may be conscious. One possible division of non-conscious motives is into homeostatic and non-homeostatic motives and needs. Homeostatic needs are bodily and include such basic drives as thirst, hunger, sleep and sex.[9] Homeostatic means the inherent need to maintain equilibrium of some state of consciousness. Wagner (1999, 3) lists a number of non-homeostatic needs such as social, self-integrative and cognitive needs, curiosity, aggression and altruism. Social motives may include self-presentation and cooperation. Self-integrative motives may include self esteem and achievement. Cognitive motives may include cognitive consistency. Especially interesting is the need for curiosity: "Curiosity might be based on a need to be aware of the environment so as to be able to respond efficiently, for example to a threat. So, whenever an aspect of the environment changes it needs to be explored." (Wagner, 1999, 139).

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[8] *Motivation has been described by Maslow (1954) as a hierarchy of needs. The lowest level includes physiological needs, such as comfort, fatigue, sex, hunger and thirst. The second level includes needs for safety and security. The third level includes needs for love, free expression and a sense of warmth. The fourth level includes self-esteem, including confidence and self-respect. The highest level is about self-actualization, which includes curiosity, the need for peak experiences and creative, fulfilling work.*

[9] *Sleep is driven by cyclical biological rhythms such as circadian daily rhythms. This means that cognitive capacities are highest for humans in the mid-afternoon and lowest at night. There is also the rhythm of the basic rest-activity cycle, which occurs every 90 minutes, and which may influence the intensity of human behavior. When sleeping the brain is engaged in different modes of electrical waves. Using electroencephalography (EEG) it has been shown that waking consciousness is about 13-30 Hz in frequency, called beta activity. When one closes his eyes and relaxes, but does not sleep yet, the brain shows alpha rhythm, about 8-12 Hz. Sleep progresses in states, from theta activity (3,5-7,5 Hz) to K-complex with irregular slow activity to high amplitude delta activity (less than 3,5 Hz) followed by REM sleep with increase in frequency. REM sleep is most similar to awakened state frequencies. Sleep goes on in 90 minute cycles between the stages during the night. (Wagner, 1999, 42)*

This implies that there may be an inherent need to do surveillance in the environment for any changes, and the need to attend to changes. Curiosity has also been thought of as related to seeking optimal states of arousal. This means that people would seek out more stimuli to compensate for a sub-optimal level of arousal, such as avoiding boredom. Some have also argued that the need for arousal is not strictly the explaining factor, but is related to minimizing the level of arousal, rather than keeping it higher:

> *"The aim of motivated behavior, then, is not to seek an optimal level of arousal, but to seek situations that provide the minimum of arousal and such situations are moderate in complexity and novelty." (Wagner, 1999, 141)*

This may then be one of the bases of stimuli-seeking behavior; creating a balance between the stimuli and moderate or low levels of arousal. Another unconscious motivation may be reward and addiction. In the brain there may be central reward circuits which activate pleasure for a stimulus. As humans can be seen from one point of view as seeking for pleasure, this brain system would then produce rewards for seeking pleasure. Pleasure does not mean addiction to a certain stimuli. Addiction may be thought of as the use of some stimulus, like a drug, without which one can not function normally. Addiction may not strictly be based on pleasure only, but on a system of reward for using the stimulus and the punishment of giving up the stimulus, which creates withdrawal symptoms. (Wagner, 122-134) [10]

The need for self-integration may be seen as one of the most basic cognitive unconscious motives. It is important to note the conception of cognitive consistency, which means that: "...a major source of human motivation is the need to maintain consistency amongst our cognitions (beliefs, attitudes, feelings and knowledge)." (Wagner, 1999, 143). [11] This implies that there is a tendency to keep one's beliefs, values, subjective reality and attitudes consistent. When any of these do not 'match' a particular stimuli there is a resulting arousal or discomfort, which creates the drive to reduce this arousal or discomfort. If the external stimulus can not be changed, one can always change one's cognitions in ways which may reduce arousal. Whenever people experience a mismatch amongst their cognitions they enter into a state of dissonance. Dissonance then motivates the individual to seek out behaviors that reduce the dissonance. (Wagner, 1999, 143-144)

There are some implications of dissonance. First, in selective perception one seeks for stimuli and pays attention to stimuli which are consistent with one's attitudes. Second, one may interpret information consistently with one's attitudes, especially when the information is ambiguous. (Fiske and Taylor, 1991, 468-467, 507). How do dissonances then influence behavior?

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[10] *Addiction is not limited to drugs, but to a wide range of behaviors: "...including gambling, sex, shopping, exercise, computer games and recently surfing the Internet." (Wagner, 1999, 132)*

[11] *Festinger (1957) proposed a theory of cognitive dissonance which proposes that whenever people experience a mismatch amongst their cognitions they enter into a state of dissonance. Dissonance then motivates the individual to seek out behaviors that reduce the dissonance; hence there is an inherent tendency to avoid a mismatch. Dissonance has also been connected to levels of arousal, where dissonance produces a higher level of arousal and a match reduces arousal. (Wagner, 1999, 143-144)*

Self-regulation is used as an example. This means that people control and orient their actions in an environment. Self-focus helps people concentrate on the relationship of their behavior in an environment and their conception of their ideal selves. Discrepancies between what people would like to be and what they actually are may lead to strong affective reactions such as depression and anxiety. If there is discrepancy, it may be corrected with altering behavior. Self-regulation is guided by three fundamental goals. First, there is the need to get accurate information about oneself and one's abilities. Second, self-enhancement means that there is a need to maintain the most favorable self-conception possible. Third, consistency is about self-verification, meaning the process by which people behave in order to maintain the best possible picture of themselves (see Fiske and Taylor, 1991, 241-242). These sources of motivation: [12]

> *"... have been found to have powerful effects on behavior and each may be predominant under different situational circumstances. Despite the fact that people use their self-knowledge to guide their behavior, this process is often preconscious, that is, people are not always fully aware of the aspects of the self that exert a directive influence on behavior."* *(Fiske and Taylor, 1991, 242)*

Cognitive dissonance and social impression management may be related to self-regulation. These self-related goals discussed in self-regulation influence:

> *"...how people take in, interpret, and represent information in memory, and they also influence which situations people select and which companions they choose for social interactions."* *(Fiske and Taylor, 1991, 242)*

This type of behavior is reflected in selective exposure, which means that people seek out continuously new consistent information with themselves. Selective attention means that people tend to pay more attention to self-consistent information in general. Selective interpretation means that people tend to interpret information to be consistent with themselves. (Fiske and Taylor, 1991, 469)

This discussion leaves open the question of conscious motives, where one consciously selects a goal and pursues it. Goals may be seen as specific knowledge structures in long-term memory. (Kruglanski, 1996, 603-604). A goal may be differentiated from a motive in that it refers to representations of future states which are accompanied by some desire or affect. This means people may project on possible future worlds and one's place within it. Motivations may also influence how people set conscious goals:

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[12] *Social motivation may also orient people in their behaviors. This means social interaction provides sources of motivation. It seems that people have evolved to live in groups of about 50, which may explain social motivation as one basic need. One type of social motivation is social facilitation. This means that when people are competing with each other, like in sports, there are increased states of drive involved vs. when they would compete alone. Self-presentation needs are also related to social motivation. People may have the inherent need to manage their impressions on other people, for instance. From the point of view of evolution, good self-presentation may then promote group membership. Group membership may also motivate people for cooperation, such as sharing food, or other types of cooperation, and for altruism, doing selfless deeds for the good of the group. (Wagner, 1999, 145-147)*

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> *"...deciding that a given entity (object, activity or event) is worthy of being adopted as a goal, the individual may consider two categories of evidence: its "desirability" and "attainability". (Kruglanski, 1996, 603)*

Desirability may be defined as influenced by self-actualization motives or the need for consistency. Also, if there is a possibility to remove a specific negative affect, this may influence goals. Attainability refers to how realistic the goal is. Once a goal has been set, there is an implementation phase. The implementation happens via action and needs to be planned. There may be two main kinds of goals. First, there is a fairly simple, routinized goal and a set of procedures for its attainment, like getting one's hair cut. Second, there are more vague and complex goals, perhaps due to the novelty of the situation or goal. These may be goals like becoming a millionaire or learning to speak French. The goal in this case may be attained after quite a while and it is not perfectly clear how to go about it. (Kruglanski, 1996, 607)

Goals are linked to emotion and mood states. If mood and emotion are seen as signaling something important of the state of the environment they may result in two types of actions: to escape or change the current situation or to stay and enjoy the current environment. In the case of escape or change of environment, more negative emotions are activated. This may lead to a greater amount of systematic, effortful thinking. Staying in the environment as is may lead to positive emotion and to a less effortful, heuristic form of information processing. (Schwartz and Bohner, 1996, 119-121) [13]

Gollwitzer (1990) has analyzed the relationship of goals and action as consisting of four phases. First, there is the predecisional phase, in which people make deliberate wishes and attempt to set priorities for their future actions. The second phase is called preactional, which is characterized by efforts to plan how the goal may be achieved. The third phase is that of action, in which people focus on achieving the goal. The fourth phase is postactional, in which people compare what has been achieved to what their goal was. (Gollwitzer, 1990, 149) [14]

In the area of motivation, the study concludes that most interesting sources of unconscious motivation may be i) self-regulation and ii) cognitive consistency. These may reflect the inherent need of an individual to use himself as a 'benchmark' in evaluating objects of perception. This also means there is a 'mirroring' relationship between objects of perception and the individual; and the individual is trying to make his image in this 'mirror' as much as possible similar to self or desired self.

In the area of goals the study concludes that future goals in the form of i) all possible futures in

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[13] *Frijda (1988, 349) argues that:*

> *"...emotions arise in response to the meaning structures of given situations...different emotions arise in response to different meaning structures...events that satisfy the individual´s goals, or promise to do so, yield positive emotions; events that harm or threaten the individual´s concerns lead to negative emotions."*

[14] *The influence of emotional states on goals depends on the particular stage of action. For instance during the predecisional phase and when in a good mood, people may set goals more easily and be more optimistic about attaining them. During action the mood state may tell them whether they are succeeding or not; bad mood tells of nonsuccess and good mood indicates success, for instance. (Schwartz and Bohner, 1996, 138-139)*

general and ii) possible futures in a certain context are the most interesting. All possible futures reflects the tendency of the individual to view the whole world in a certain manner, constituting part of his Subjective Reality (see Saari, 1998a). The 'microlevel' futures in a certain, immediate external context may help explain the behavior of an individual in a particular situation and the balance of mind and context in 'driving' the evaluations of objects of perception. Consequently, conscious and unconscious motives, needs and goals may have significant influence on evaluations of objects of perception. Next, the study will discuss the basic relationships of mind and context.

## 2.2. The relativist point of view of the perceiver

### 2.2.1. Mind and context as open system

This study argues that interactive perception may be seen as taking place in an external, physical context from the relativist and subjective point of view of a single perceiver. From this standpoint mind and context may be seen as an open, complex system which brings about creativity of making meaning and action in context. The relativist and subjective point of view of a single perceiver is used as the basic standing of the study on the time and space of perception. Consequently, mind is defined as consisting of subjective time-space and context is defined as consisting of objective time-space. The definition of the time and space of perception in the immediate, external context is important later in the study when investigating media and communications technologies as objects of perception, or as a bridge over time and space. Also, the conception of subjective time-space is used as a basic spatio-temporal basis of mind when making meaning.

The study introduces the basic relationships of objects of perception to the perceiver and discusses the complex relationships of mind and context. The relationships of different types of external objects of perception may be various. One principle is that the different abstract and concrete objects mostly form open systems, i.e. their complex interactions may produce emergent causal powers (Sayer, 1997, 119). This means that if social systems are seen as mostly open systems, the investigations of such systems:

> *"…do not lead directly to prediction but seek out the generative mechanisms and conditions which produce the events we want to change. By providing information on the necessary conditions both for the existence and the activation of a mechanism, and in some cases on the way conditions mediate its effects, we increase the chances of either removing or changing the mechanism, preventing its activation or suppressing the damaging effects of its excercise." (Sayer, 1997, 135)*

Hence, interactions of the elements of the system may produce emergent powers for an individual to think radically differently of the world, or to change the world in a novel way with his behavior and action. However, it may be difficult to exactly predict and explain the inner workings of the mind or such hypothesized open systems. The idea of social systems as having emergent powers may be to a degree also applied to a single human mind as part of that social system.

Georgoudi and Rosnow (1985) discuss the conception of communicative context. They emphasize that human activity does not happen in a social vacuum but is always situated within a socio-historical context of meanings and relationships. It is within this context that the action of the individual unfolds, guided by three contextual dimensions:

> *"This 'context' is viewed as having a temporal and directional behavior, that is, pointing to the past (or where the act was initiated), to the present (or to conditions that sustain its present quality), and to the future (to the possibilities and consequences yet unrealized)" (Georgoudi and Rosnow, 1985, 82).*

Applying similar conceptions in this study, it has been stated that the context of the past is mental models, such as meaning perspectives that paradoxically are also the future, i.e. they are inherently future-oriented, creating a horizon of expectations (see Kulkki, 1996). If one sees meaning schemes and meaning perspectives as internal contexts of the mind, then for instance culture or the social environment are mediated to the present time via schematic structures that have been formed in the past as the results of mind-world interactions. The future orientation of schemas is realized through the projection of previous experiences and knowledge via the consciousness into a view of the future, or expected future. Thus it is proposed that schemas are related to (i) the expectations towards a certain spatio-temporal situation via future projections, and (ii) the expectations created by socio-cultural socialization in general. Then the use of schemas to forecast the future is emphasized, even though they also mediate the past. [15]

The external context of perception may be seen at two levels. First, it is the objective properties of the external context and its processes. Second, one may investigate how the external context is experienced by a perceiver in a certain situation. The objective properties of the external context are first elaborated on. The special focus is on the tension between an individual and his context.

Argyris, Putman and McLain Smith (1985, 8) describe social processes as processes of action where there is a continuous search for equilibrium between driving and restraining forces, or between transformative forces and those of continuity. According to Kulkki (1996, 58), to understand these processes of the tension and interaction between the individual and the external context one should examine the interfaces between the individuals and social contexts and the psychological, linguistic, cultural, social, problem-solving and other constructs and ongoing processes inside the context. A central concept in understanding this point is permeability. This refers to: "… the relationship between individual mind(s) and the context and…qualities of the context itself… which conditions are defined as contextual permeability." (Kulkki, 1996, 58)

Permeability means that something is fluidly and easily, even smoothly, penetrating the whole of a certain process. Within this intertwined process its ingredients or actors may fluidly interact with-

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[15] *Schemas can be seen as the context of evaluation of information. Höijer (1992, 290) suggests three experience spheres, the media sphere, the private sphere and the occupational sphere, based on her view of how individuals spend their time on different activities. Within these spheres of experience, different schemas are constructed in interaction with the social context.*

out any clear borders to separate them. This is similar to the conceptions of the study of the inter-active relationship of the perceiver and the object of perception.

According to Tsoukas (1989), individuals may be internally linked within a social context. Individual identities and linkages in that context rise out of certain powers that are irreducible of their constituent parts. These emergent powers are created and manifested when individuals are internally linked to each other (Tsoukas, 1989, 553-554).

This may mean that individuals in a certain culture or society are internally linked by at least (i) their common values or by (ii) common human form (body and consciousness) (see Saari, 1998a, 1999). The powers arising out of these interlinkages may affect evaluations of objects of perception of people with interlinked contexts. This supports the views of the study in seeing social systems as complex and open systems. What, then, may be the basic types of relationships between the external immediate, social and cultural environment and the perceiver? Hurrelmann (1988, 6-8) argues that there are four basic models of the relation between person and environment.

(i) Mechanistic model: The environment is as given and a cause of a person's behavior. Changes in behavior are responses to specific environmental conditions.

(ii) Organismic model: The impulses for human development lie within the organism. Development of the human being proceeds according to a goal inherent in the organism; the aim is to reach the qualitatively highest stage of development.

(iii) Systemic model: Impulses for human development are a result of the mutual interaction of person and environment. Individuals are seen as psychological and social systems. There is no fixed goal of development; the relation of the person and the environment strives towards balance.

This first model is rejected due to its mechanistic nature. It reflects the classic views of behaviorism. Models (ii) and (iii) are 'computational models' of the individual. In them the individual is seen simply as a complex system (perhaps even a closed system), aiming towards systemic equilibrium. These models then would explain the nature of creativity as 'arising' out of a complex set of innumerable calculations as the result of the interactions of the objects. The task of the researcher would be just to find the 'equation' of a complex enough system to describe human behavior. Then the essence of the individual seems to be located in the investigation of all the factors influencing the situation, and the understanding of those factors then 'produce' the individual. This is a mechanistic view and is not accepted in the study. There are a number of differences between humans and other objects of the world.

First, people intentionally influence the environment. Second, a social stimulus may change upon being a target of cognition. Third, people's traits are non-observable attributes that are vital to thinking about them. Fourth, people change over time and circumstance more than objects in the environment typically do. Fifth, people are unavoidably complex; one cannot simplify a social stimulus without eliminating much of the inherent richness of the target. (see Fiske and Taylor, 1991)

From this it follows that this study does partly accept the nature of the human being as an open-ended, complex system and a unique 'human object'. On the one hand, an individual can be inherently creative and change the environment. On the other hand, the environment poses certain limitations to the powers of the individual. Similarly, Hurrelmann (1988, 8) proposes a view of the individual that is of interest to this study.

(iv) Contextualistic model: Human development is a lifelong process of interaction between the social and material environment and the human organism. The individual actively seeks certain situations and rejects others, within the limits of social and individual constraints. There is no inherent goal of human development. The acquisition of social and cultural action that helps a person act autonomously in the social environment and form his own identity could be seen as a criterion of successful development.

The contextualistic model offers a creative and active position for the individual in one's actions, but places the actions within a certain framework of the context. In this sense the conception of the interaction of the individual and environment is ecological. This means that one views the human organism as an open system whose interactions with the environment are investigated as such at the moment they are appearing. The essence of this ecological approach is that it includes the context of a certain phenomena within the investigation and focuses especially on the interaction of the phenomena and context as a transactional process, not as a process of dependency. (Valsiner and Benigni, 1986, 211-212).

Hurrelmann (1988) proposes a heuristic model of the individual as a productive processor and manager of reality. By this he means to emphasize the interactive relations of the individual and society within the social and ecological context. This is an epistemological and phenomenological standing of human development in general. The individual is seen in this conception as follows:

> *"…an individual who perceives environmental facts and relates them to the conceptual structures that are already present, and who is involved in a continual balancing of environmental demands and personal needs, interests and abilities." (Hurrelmann, 1988, 38)*

Hurrelmann's (1988, 38-39) model includes a concept of the material and social environment which calls for a continual reshaping and change due to the activity of individual persons. In this way he summarizes the central units of analysis when dealing with the interaction between an individual and his environment. Similarly, Saari (1998a, 185) has argued for the nature of the individual as a "…creative and open complex system."

The study concludes that the relationship of mind and environment creates a complex, interactive and creative system with emergent powers. Hence, the mind in perception is involved with the objects of perception in context in creative, emergent and non-determined ways and may act creatively. The role of action has been discussed as action and perception are seen being intertwined. However, as the study focuses more on perception than action, the dimension of creativity of action is not a key area. Rather, the study concentrates on perception within a certain, immediate, physical context from the subjective point of view of the perceiver. This is elaborated next.

## 2.2.2. Subjective and objective time-space

The study now presents its view on the nature of context and mind in time-space. The nature of objects of perception is first elaborated. This is done via discussing ontological categories: human knowledge, information and physical objects (see Popper and Eccles, 1979, 36). These ontological categories are in interaction with each other and none of them is necessarily primary to the others. Hence, the study adopts a realist and relativist approach to reality. The study makes the following suppositions based on its view on ontology.

First, the world exists independently of knowledge of it. Second, knowledge of the world based on perception is partly fallible and theory-laden. Third, knowledge develops both continuously as the accumulation of facts and discontinuously as sudden and universal changes in concepts. Fourth, the objects in the world have causal powers and ways of interacting with each other. Fifth, the world is differentiated into objects and structures, which have powers of interaction with each other, thus generating events. Sixth, social phenomena, such as texts and actions, are concept- dependent. This means interpretations of them are to a degree subjective. (see Sayer, 1997, 5-6)

Seventh, the study takes the point of view of an individual mind as a relativist position in ontology. That means that the individual mind as an ontological entity is the central unit of analysis of the study. Eighth, the study sees that mind is not separated from context. It may be that perception as embodied in the world may give direct knowledge of context as perceptions interact with previous knowledge.

There are many levels of external objects of perception. First, there are concrete objects of perception: events. Second, there are abstract objects of perception, such as mechanisms and structures. Structures are abstract categories of existence which have mechanisms to produce events. (Sayer, 1997, 117). The study will now elaborate the dimension of time and space as related to perceived events from the relativist, subjective point of view of the perceiver. Lakoff and Johnson (1999, 138) state that time has the following properties:

> *i) Directionality and irreversibility, because events are directional and irreversible, i.e. they can not be made not to happen*
> *ii) Continuous because a human experiences events as being continuous*
> *iii) Segmentable because periodic events have beginnings and ends*
> *iv) Measurable because iterations of events can be counted*

Hence, it seems that the conception of time is closely related to changes in states of spatial matter. For instance, when a pendulum swings in an old clock from one side to another, one may measure how long it takes for the pendulum to swing. Then time actually measures different positions of matter in space. From this point of view it may be thought that time is an extension of the three-dimensional, spatial universe. Further, since time is based on observing events change, subjective experience of time is based on a 'direct' and conceptual understanding of seen changes in events, i.e. as different states of matter.

According to Lakoff and Johnson (1999, 153) subjective time perception may be seen as based on three basic metaphors which help understand time when one perceives it. First, time orientation means that the future is in front of the perceiver. The present is thought to be where one physically is at that very moment. The past is behind the perceiver. Second, moving time means that one perceives oneself as observing time moving while one is standing still. The future is moving towards the perceiver. The moment one perceives as now is moving by the perceiver. The past has moved past the perceiver already. Third, a moving observer means that one moves while time stands still. For instance, one is moving towards the future. The now-moment is what is just being passed at this very moment. The past is something already passed on the way towards the future. Moving time and moving observer is a dualism based on figure-ground-separation. In the moving time metaphor the figure is a flow of events which pass the perceiver as the perceiver observes them. In the moving observer metaphor the perceiver is the figure and the events are waiting to be passed by a certain perceiver. Objects of perception in the context then have spatio-temporal dimensions relative to the subjective perspective of the perceiver. For instance, social processes may be seen as emerging paths in space-time:

> *"What happens to objects, whether people or things, depends on contacts and connections made within space-time; where are we in relation to others? Whom are we likely to come in contact with? What happens depends on the content and form of the social and physical environment constituting space-time." (Sayer, 1997, 146)*

One may discuss the conception of space at the concrete and abstract level. To say that space is abstract may mean that there may be space regardless of any objects in it, i.e. empty space (Sayer, 1997, 146-149). While this may be useful in formal theories, the study supposes that space consists of objects within it. The question of time then becomes how the positions of matter change. The subjective experience of time-space is then the feeling of being in an environment with objects of perception available to oneself in which one may act more or less voluntarily.

One may think that some of the basic categories of external objects of perception are humans, animals, plants and physical matter, such as rocks or information printed on paper (see Popper and Eccles, 1979). The conception of an event may be thought of from the objective or subjective point of view. From the objective point of view, the event may be a result of the interactions of mechanisms and structures of existence. In an objective sense, then, the event has a cause and an explanation of some kind. From the subjective point of view perceptions and evaluations may influence how events are evaluated and understood. Consequently, the study poses the relationship of mind and world from a relativist, subjectivist point of view of a single perceiver. Based on this approach, the study now elaborates on the relationship of context and mind in time-space.

Based on the view of the study on the interactive nature of perception, there are two types of influences on making sense of perceptions. First, the 'match' of perceptual mechanisms and the world may be producing certain types of influences. This implies the ontological nature of the mind as embedded in the context via direct perception. Second, previous knowledge used in making sense of the perceptions may also have influences on perception. Consciousness and unconscious proc-

esses may mediate between the mind and world as they integrate 'external influences' on perception as well as 'internal influences', such as previous knowledge. The study will now summarize its approach to nature of perception, memory and consciousness as distributed over time and levels of mind from the subjective and relativist point of view of a single perceiver in Table 2.

| Past | Now | Future projections |
|---|---|---|
| **Unconscious**<br><br>1. Tacit knowledge<br>-meaning perspectives, meaning schemes, other knowledge (values, self-concept, other)<br><br>2. Previous contents of mind<br>-information which has been recently processed in the unconscious | 1. Automatic unconscious processes and mechanisms<br>-sensory motor programs<br>-needs, motivation (self-regulation, cognitive consistency, other)<br>-perceptual mechanisms and processes (ways of 'matching' perception with the context) | 1. Unconscious future goals and expectations (general, immediate) |
| **Conscious**<br><br>1. Peripheral awareness<br>-information which has been recently processed<br><br>2. Recalling past events, explicit knowledge; daydreaming of past events | Subjective experience:<br>Here and now<br><br>Elements:<br>-primary/reflective consciousness<br>-focal/peripheral awareness<br><br>Qualities:<br>-flow, emotion, daydreaming<br>-volition, mental imagery, remembering, inner speech, conceptual thought, unity | 1. Thinking about future goals and expectations (general, immediate) |

Table 2. The spatio-temporal elements of mind.

In Table 2 the levels of unconscious and conscious mind are seen as distributed over subjectively experienced time. At the conscious level of mind in the subjective past there is explicit knowledge of past events. Also, peripheral awareness as it is sliding into the unconscious may carry with it the contents of what has been recently processed at the conscious level of the mind. One may consciously daydream of the past or recall past events. At the level of nonconscious mind in the subjective past, one has tacit knowledge and the contents of recent unconscious processing.

Perception happens in the here-and-now of material existence. At the unconscious level there are automatic unconscious processes operating, such as perception, and various sensory motor pro-

grams as well as other types of processes. Also, perceptual mechanisms as a way of fitting together mind and world are located at the unconscious level of mind as well as motivation and needs. At the conscious level of mind in the now-moment there is subjective experience, consisting of primary and reflective consciousness in which focal and peripheral awareness varies. The qualities of subjective experience are complex and fluid. In the future at the level of the unconscious there are projections of expectations and goals based on previous knowledge, motives and needs. These are not literally in the future; rather they are merely projections of possible future states based on intentions and past experiences. At the conscious level of the mind one may have conscious expectations and goals.

One may think that people experience external events as one whole, in which focal points of attention may be voluntarily or involuntarily changing from one object of perception to another. Attention is then one key point in mediating the relationship of objects of perception and mind, as some objects are selected for perception and some not.

Attention helps people deal with the enormous amount of information in the environment by selecting and filtering. A central theory of attention holds that attention resources are limited. This means that attention may be divided among competing tasks, and allocating attention to one task is taking it away from another task. However, this is very complex: for instance some attention resources may be specific to the modality of the task, such as a visual or auditory task. It is more likely that two visual tasks would interfere with each other than a visual with an auditory task. Also, the task content type may be similar in different modalities, causing them to overlap. (Sternberg, 1995, 193)

There are a number of factors which influence how one directs external attention. In general, one attends to only a limited number of events in the environment. First, there is voluntary attention, where one voluntarily searches and attends to stimuli. Second, there is automatic or nonvoluntary attention. This can happen when there is a novel stimuli in the external environment. The same happens if the stimuli is intense, or if the stimuli has personal meaning to the perceiver. Attention may also be shifted to stimuli which reflect current personal interests or concerns regardless of the relevance of the stimuli to the task at hand. (Farthing, 1992, 196)

One may then think of the external objects of perception as consisting of dimensions of i) focal attention and ii) dimensions of background in relation to the point of focal attention. The conception of the object of perception entails that it is the point of focal attention. The conception of context of perception entails that it is not the point of focal attention, but may be present in a more peripheral way in perception. The object of perception and context of perception are then different dimensions of the same thing; i.e. a flow of events from the relative point of view of the observer. Hence, context may be thought of as the 'ground' of events with times and spaces in relation to the mind. The object of perception is then the figure arising out of the ground of events in time and space in relationship to the mind. The mind is evaluating the event consciously or nonconsciously in a continuous manner and shifting the focus of attention between different events in context. The study now relates the basic spatio-temporal dimensions of the mind to perceiving objects in the

immediate spatio-temporal context in Figure 4.
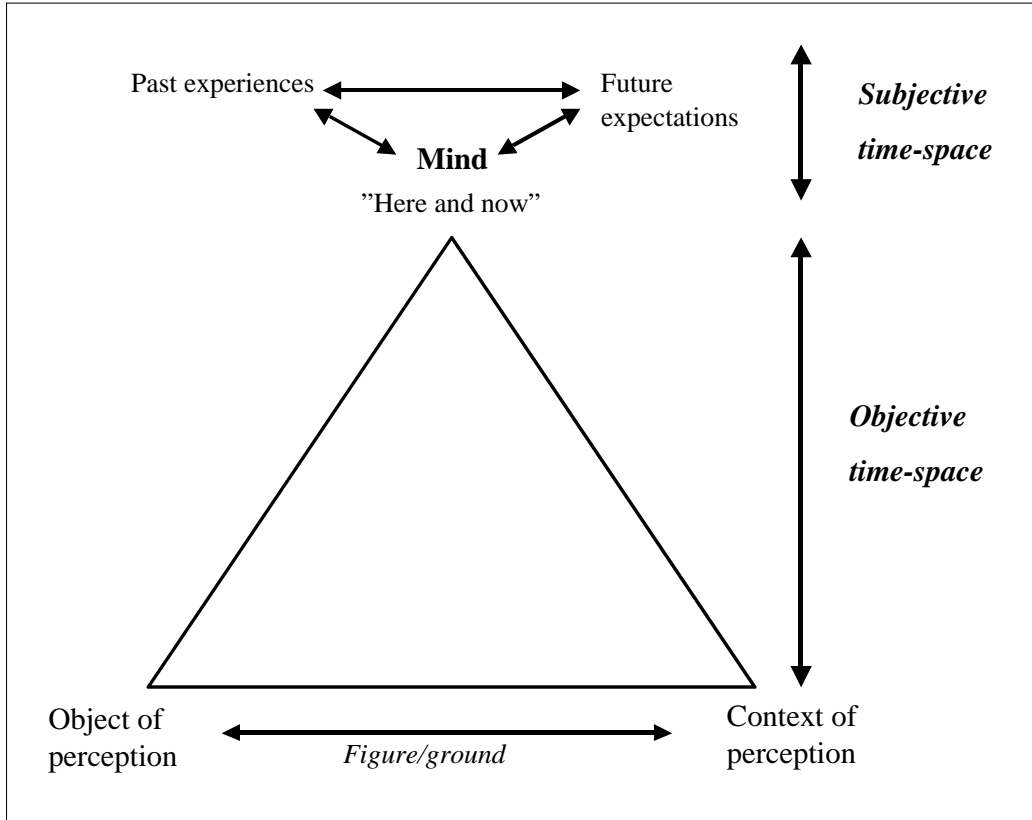


**Figure 4. Subjective and objective space-time in the here-and-now-moment of perception and action.**

In Figure 4 there are two spheres, subjective and objective time-space. Subjective time-space means that individuals inherently exist in a subjective continuum of the past, the now and the future. The point of the here-and-now of perception and action acts as a link to objective time-space. From the subjective point of view of the observer, the objective time-space is literally the flow of here-and-now moments in the immediate, physical environment of the individual. The object of perception exists in the objective time-space and has the dynamics of 'rising' from the ground, or context, as a figure to be perceived. It should be noted that the objective time-space has its own laws and dynamics and ways of interaction and ways of producing events independently from the perceiver. Hence, Figure 4 reflects the fact that the study has adopted a mind-centric view of one single perceiver on the immediate here and now situation of perception in an external spatio-temporal context. Next, the study will discuss the making of meaning as interaction of mind and context in the now-moment of perception from the relativist point of view of the perceiver.

# 3. Making meaning in perception

## 3.1. Influence of meaning on subjective experience and knowledge

### 3.1.1. Felt and personal meaning

The basic idea of this chapter is that meaning is made in various parallel processes in the mind. Representations are the units of the processing of information in the mind; they may contain or be connected to meanings. Different types of meanings may be either conscious or non-conscious and may co-exist. Meaning then has the capacity to change subjective, conscious experiences and/or knowledge via different mechanisms.

In this chapter the study discusses the making of meaning in perception and its influence on subjective experience and knowledge. Different types of meaning, unconscious processes, information processing units of the mind and the relation of information processing units to meaning are presented. The aim is partly to separately discuss these basic elements of making meaning first. Then, the study will focus on the sources of variability of meaning, specifically non-linguistic, presentational meaning. In this regard, organisation and modalities of sensation, ways of reasoning, use of basic mental models such as primary metephor and basic individual differences will be identified as key sources of variance of non-linguistic, presentational meaning. The process of making of meaning in perception and the sources of variability of meaning are then unified into one model in the next chapter. Hence, this chapter acts as a description of the basic elements of such a model. The model itself more clearly describes the interactions of the basic elements in the next chapter.

Now, the conception of meaning will be elaborated in order to better understand what 'making of meaning' for objects of perception implies. Nonaka and Takeuchi (1995) state that meaning can be seen as a form of information, specifically semantic information (Nonaka and Takeuchi, 1995, 58-59). This semantic information can be seen to be 'located' in language from this point of view.

Niiniluoto (1989) states that semantic information can be externalized with propositional clauses in the form of language or formal logic. Thus he sees, for instance, that via formal logic and a chain of analysis and argumentation one can make claims on the states of the world. He further says that semantic information is not necessarily related to communication and introduces the conception of pragmatic information that is connected to human subjects. He sees these two conceptions as intertwined: "Giving meaning to states of affairs is an 'extralogical', i.e. pragmatic act, relating to the users of language and the situations where language is applied." (Niiniluoto, 1989, 36-41)

Thus one is left with the view that language is something related to semantic and pragmatic information. Further, Niiniluoto (1989) claims that: "In a very common sense pragmatic information can be seen as referring to person and culture-dependent significance or meaning." (Niiniluoto, 1989, 41-42). Alasuutari (1993) emphasizes the 'fuzzy' nature of the construction of meaning by stating that the content of a conception is not defined by an object external to language or other systems of symbols; rather it is defined by other conceptions and definitions that are given to a certain term:

> *"…none of these definitions is the exact content of the conception, but that imagined essence is the "empty space in the middle" surrounded by all attempts of definition of the concept." (Alasuutari, 1993, 44)*

The production of meaning is not an exact process. The essence of the conception is what is not defined by the production of meaning. From this it follows that since meaning is not an exact conception, it can be seen as being in a constant process of change. Supporting Alasuutari's (1993) views, Bruner (1986, 65-67) states that people interpret the environment mostly through linguistic practice; and that culture itself can be understood as a kind of text, a message in itself, that is the object of interpretation. The development of self cannot be independent of one's cultural-historical existence. Hence, self is 'calibrated' by language and then the individual is: "…given a larger-scale map on which to operate by the culture…and ends up by being a reflection of the history of that culture…" (Bruner, 1986, 67). However, the conception of tacit knowledge seems to suggest 'pre-linguistic' meaning. From this discussion one arrives at the question: where is meaning? Is it in the world of the social or in the mind of the individual? Saari (1998a, 117) argues:

> *"… that meaning has to arise out of the relations of the individual and the structure. Any structure, such as culture, even when interpreted as a "text" or a message, can but suggest a "preferred reading" of the text as its contribution to the act of interpretation of the individual mind. Thus, as argued, meaning arises out of this dynamic negotiation between the structure and the individual."*

This view is supported by Dahlgren (1985, 10) who sees meaning as the process of making sense of the world:

> *"It has to do with creating a general coherence in our lives, of establishing a sense of order in which to anchor our existence. Also, it has to do with integrating into our worldview the continuous stream of new phenomena we encounter. For each of us, the production of meaning can have a dimension which is very idiosyncratic and private - we all have our own sphere of "personal knowledge". Yet…the foundations of meaning are largely social."*

Hence, there may be such a thing as personal, subjective and tacit meaning in addition to cultural, linguistic and social meanings. The study now elaborates on the dimension of personal meaning from the point of view of appraisal theories. Lazarus (1991, 143-145) has discussed the conception of personal meaning. He has conceptualized this by dividing the processes of the mind into two categories: knowledge versus appraisal. General knowledge in a person's memory can be tacit or explicit, as discussed. Generating and accumulating knowledge is one of the key processes of the mind. Appraisal is a cognitive activity which refers to the "continuing evaluation of the significance of what is happening for one's personal well-being." (Lazarus, 1991, 144). Kreitler and Kreitler (1976, 77-78) see personal meaning as being guided by certain questions as follows:

> *"Meaning generation is regulated by two focal questions: "What does it mean?" and "What does it mean to me and for me?," "In what ways does it affect me?," "Am I*

*concerned in any way?," "Should I be concerned?," "Am I involved personally?," "Should I be involved?," "Is any action required on my part?," "Am I to act or not?," "In which sense(s) does it or may it affect (or concern) my goals, my norms, my beliefs about myself, and my beliefs about the environment or any of its aspects?" Evidently, the formulation "What does it mean to me or for me?" is merely a label summarizing these different variants of the question."*

Hence, personal meaning implies that the person evaluates the relationships of the environment and himself within a particular context. According to Roth (1990, 119-120) there may be many types of person-environment relationships. First, physical objects are seen as being subject to an individual's power, or not. For instance, one may experience that a sea is too large for one's body to swim across. Second, persons are seen as similar or dissimilar to self, as sources of rewards and punishment, and as subject to an individual's powers or not. Making personal meaning can take place at the level of conscious or unconscious:

*"Preconscious evaluation of social events seems to be made for simple categorical distinctions such as good or bad rather than for finely graded analogical distinctions. This is consistent with the idea that conscious, deliberate and volitional evaluations, which have the advantage of language, may be more finely graded than unconscious, automatic, and involuntary ones, which are apt to be hasty and vague. The latter are regarded as primitive, developmentally earlier, and subcortical. (Lazarus, 1991, 158)*

Since there can be personal meaning at both levels of the mind, there may also be conflicting personal meanings at different levels. For instance, one may fear flying unconsciously and the tacit personal meaning of being in an aeroplane which is taking off is that of a threat to one's life. However, at the same time, one may be consciously very aware of the fact that statistically flying may be quite safe and that there is probably no reason to be afraid. Hence, these two meanings may exist simultaneously, without any necessary need for resolution between them.

Lazarus (1999, 75-76, 92-93) speaks of primary and secondary appraisal in explaining this multilevel existence of personal meanings. In primary appraisal one evaluates how the object of perception being perceived is relevant to oneself. Primary appraisal may be automatic and unconscious. There may be processes of judging the relevance of the situation to one's self and one's goals, deciding whether there is goal congruence or incongruence with the situation and what is the type of ego involvement, such as self esteem, ego ideals, personal values and life goals. Secondary appraisal centers around the options for coping with a particular situation in a person-environment relationship. Issues such as blame or credit, coping potential and future expectancies of how things might unfold are key dimensions of secondary appraisal. Hence, this type of rationalization and searching for coping options may be partly conscious and volitional.

The dimensions of the evaluation of relational meaning in primary and secondary appraisal may be seen as core relational themes which reflect the rise of personal meaning based on the interaction of the perceiver and the object of perception. (see Lazarus, 1991, 431). Personal meaning may then be more related to certain dimensions of the mind, such as self-schema, personal worldview and val-

ues, goals and future expectations. Primary appraisal may produce tacit, unconscious personal meaning and secondary appraisal may produce rationalizations of personal meaning for coping purposes in a particular situation.

There is also another type of meaning made for objects of perception. Felt meaning is an unconscious meaning based on immediate sense perception. Hunt (1995) discusses felt meaning as: "...the immediate state aspect of the sense of understanding that must accompany all moments of transition and novelty in symbolic cognition, to the extent that we can be said to follow what is happening." (Hunt, 1995, 29)

Sensations do not come directly out of the 'world as such', but rather from a visual field. This visual field is the product of a special self-referential attitude closely related to nonverbal metaphors and aesthetics. In a way it is a 'creative' reconstruction of the sensory information in the field of perception. (Hunt, 1995, 41). One may conceptualize the relationship of the perceiving organism and the object of perception within the visual field as that of close interconnection. Shepard (1984) has used the term "resonance" as related to perception:

> *"Instead of saying that an organism picks up the invariant affordances that are wholly present in the sensory arrays, I propose that as a result of biological evolution and individual learning, the organism is, at any given moment, tuned to resonate to the incoming patterns that correspond to the invariants that are of significance for it... Moreover, with the notion of selective tuning I can encompass the notion of affordance and thus explain how different organisms, with their different needs, pick up different affordances in the world." (Shepard, 1984, 433)*

The conception of resonance is one example of automatic processing or 'matching' of the properties of perceptual mechanisms and properties of objects of perception. Hence, the resonating patterns are not located only in either, but in their interaction. Consequently, as different people perceive different objects, there may be different types of resonances. Similarly, Hunt (1995) suggests that:

> *"Painters and poets must be sensitive to just these expressive properties of the immediate array. Rather than reflecting building blocks or microgenetic stages, contemplation of experience for its own sake induces a transformation of consciousness, in another sense, its completion." (Hunt, 1995, 41)*

Felt meaning may not be primitive, but a necessary preliminary stage for more complex symbolic cognition. In that sense felt meanings may guide thinking. This may imply that subjective experience is filled with felt meaning and different types of sensing of direct, abstract and symbolic significance. This significance is not linguistic, but rather expressive and polysemic. (Hunt, 1995, 29, 41)

In general, there are at least two main sources of meaning: the objective time-space and the subjective time-space, the mind. In the objective time-space there are two sources of meaning. First, meaning may be based on the relationships of the external objects of perception themselves in an

objective manner. Hence, meaning would be different types of configurations or combinations of external objects of perception. Second, meaning may arise out of the relationships of mind and object of perception or mind and context of perception. This meaning is related to the existence of the individual in a particular objective time-space, i.e. a particular situation.

Meanings arising from the mind may be influenced by previous knowledge, perceptual mechanisms, ways of reasoning, actions, and levels of mind. Meaning may also arise out of the inherent temporal orientation between the past and the future of the human mind, and the continuous sensemaking nature of the human being. The mind may be seen as always projecting on alternative futures of navigation and action in an environment; or then being immersed in internal thoughts when remembering past events or imagining future worlds. In other words, the meaning arising out of the sphere of subjective space-time may be complex. While there may be objective meanings in relationships of objects of perception independent from any perceiver, the study views such meanings also from the point of view of a particular perceiver. This is because without perception by a perceiver the objective meanings do not materialize for a human being, even though objectively they may exist.

The study poses meaning made in perception as divided into two spheres: tacit and explicit meanings. Tacit meanings are meanings which are made at the level of the unconscious, perhaps via automatic processing of objects of perception. Tacit meanings may often be presentational, immediate, personal, subjective and non-linguistic and not easily communicated via formal language. They may be quite profound, but may lack a delicate and very well defined resolution of meaning.

There may be two main types of tacit meanings: personal meaning and felt meaning, but there may also be other types of tacit meaning. Personal meaning reflects the relationship of the person and environment in general, and may consist of the immediate relevance of an object of perception in a particular situation to goals, motives, self-concept, personal values or future expectations of a particular perceiver. Felt meaning may be more abstract and presentational, related to the 'hardwired' biological mechanisms of perception as they 'fit', resonate or interact with the features of the object of perception. Both personal meaning and felt meaning influence further processing of an object of perception in the mind and further meaning making.

Explicit meanings may be seen as well refined, multisided and exact, with lots of variations and resolution. They are most often based on semantic and linguistic analysis and the use of linguistic categories in making meaning. In that sense, explicit meanings may be social and objective, and there may not be great variation in explicit meanings between different perceivers in similar situations, for instance. In the mind there may simultaneously exist tacit meanings and explicit meanings for the same object of perception which may be contradictory or conflicting. Next, the study will discuss the nature of unconscious processes. This is done in order to show that there may be a large number of parallel, unconscious processes in making meaning.

## 3.1.2. Unconscious processes

Unconscious processes are now discussed in the process of making meaning. This is because they may have a dominant position in the making of meaning. They may be even described as a series of parallel, semi-autonomous processes which interact and make meaning.

One may argue that most of the processing in the unconscious is automatic. For instance, perceptual, motor and cognitive skills require less conscious mental attention the more often they are used. Eventually no conscious attention is at all needed:

> *"With experience, these processes come to operate autonomously; once started in motion, they interact with the complex environment as automated strategies. The professional tennis player does not consciously decide to run to a certain spot on the court, but moves there "instinctively" on the basis of the relevant cues: the speed of the ball, the angle of the opponent's racket, and expectancies on where the ball will land..." (Bargh and Barndollar, 1996, 460)*

Vera and Simon (1993, 14) have called this phenomenon functional transparency. It entails that sufficient experience in a given domain leads to knowledge at a highly abstract functional level which can be processed without a conscious awareness of details. It is important to notice that this behavior is not simple, but complex:

> *"...what is running off autonomously and without conscious guidance here is not a static behavioral response, but an automated strategy for dealing with the environment to affect a desired goal...What is operating is a mental system that interacts with the environmental information; in fact, the system requires the input in order to operate...these skills that operate nonconsiously are not simple fixed stimulus-response connections, but sophisticated strategies or plans that guide responses according to the information available in the current environment." (Bargh and Barndollar, 1996, 461)*

Vera and Simon (1993, 17) argue also that these plans are not fixed actions as such, but strategies which may be able to guide action automatically by determining each successive action as a function of the current information about a particular situation. Bargh (1990) claims that goal-directed behavior may be partly automatic in three ways in the form of an 'auto-motive' model. First, one's chronic goals or motives may become automatically linked to models of particular situations in memory. Second, this interlinked schema then may operate without conscious awareness of the linkage. Third, the individual may not even be aware of the source of some goal directed action due to automaticity. (Bargh, 1990, 93-105)

Based on this view there may exist unconsciously generated motivations and automatic action. The unconscious may be then viewed as an implicit repository of a person's long-term history of past choices. Based on the auto-motive model, there can also be environmental activation of automatic strategies of behavior:

*"…this goal or intention itself - this complex strategy of interacting with the world - can be activated or triggered by environmental stimuli…the environment can directly activate a goal, and this goal can then become operative and guide cognitive and behavioral processes within that environment, all without any need or role for conscious decision-making." (Bargh and Barndollar, 1996, 462)*

The empirical evidence for the auto-motive model comes from priming. Priming means a mental construct has been recently activated or is frequently activated and due to this it is easily brought to mind; hence influencing the processing of other stimuli. For instance, it has been shown that a goal used in one context may persist even when the person is in another context without conscious reflection of this transfer of goals between contexts. (Bargh and Barndollar, 1996, 466)

This implies that priming may be a major source of reasons for behavior. If so, it may have a central position in influencing meanings made for a particular object of perception. Consequently, social-perceptual judgments, such as stereotyping and impressions of people are also influenced by automatic processes:

*"Research on social perception has documented the existence of preconscious perceptual processes that influence one person's categorization of another's behavior, and consequently the impressions formed of the other person. Trait concepts such as "honesty", "intelligence", and "aggressiveness" can, with frequent use in understanding relevant social behavior, become capable of preconscious automatic activation in the presence of the features of that type of behavior in the environment." (Bargh and Barndollar, 1996, 466)*

This may imply that people have frequently used networks of knowledge in their long-term memory. These networks may then become chronically accessible, not to the conscious mind, but to the unconscious processes involved in perception and action; and may hence exert unconscious influence on the meaning made for certain objects as well as influence lines of action. But what is then the role of the reflective awareness, critical reflection, or conscious volition? This may be approached by investigating conscious and unconscious processes as subject for automaticity or control.

Conscious processes may be seen as computationally inefficient, with many errors and relatively low speed. Unconscious processes may be seen as very efficient in routine tasks. Conscious processes have a great range of possible content and are able to relate different conscious contents to each other. Conversely, unconscious routines have a limited range of contents, and the routines may be quite isolated and autonomous. Conscious processes have high internal consistency at any given time and over time, but have limited processing capacity. Unconscious processes may be seen conversely as more diverse and parallel, thus having great processing capacity. (Baars and McGovern, 1996, 71)

One can separate between automatic and controlled processes. Automatic processes are unintentional, involuntary, autonomous and outside awareness. There may be preconscious states, such as subliminal perception. This means that for instance inferences may be made automatically. There is also postconscious automatic processing, which may occur when initial unconscious processing has

unintended outcomes. This may be thought of as situational priming. For instance, material still in the consciousness based on previous processing influences the processing and meaning of new stimuli. Also, there may be goal-dependent automaticity, such as automatic responses or behavioral sequences in an environment. Types of controlled processes may include the ability to start, monitor, and terminate them at will. (Fiske and Taylor, 1991, 272-273; see Bargh, 1989; see Bargh et al, 1986; see Bargh et al 1982)

Ansfield and Wegner (1996) argue for an interplay of conscious and nonconscious influences on goals and action. They describe two types of processes in 'internal' action. One promotes the seeking of mental contents linked to the wished state or goal. The other is a monitoring process which monitors whether the individual has attained the mental contents linked to the goal. If there is no attainment, the conscious thought may interfere and redirect action. (Ansfield and Wegner, 1996, 482-484). Sorrentino (1996) also argues for the interaction of conscious and nonconscious processes in the direction of unconscious action. This is based on the multiplicity of possible goals at any given time:

> *"The organism is not static, addressing one goal or action tendency at a time, but is filled with a number of action tendencies competing for expression or over action…All these tendencies (albeit some are stronger than others) are in competition with my current tendency being expressed in action…conscious thought can serve to help me choose among action tendencies." (Sorrentino, 1996, 639-640)*

Hence, conscious thought may be seen as monitoring internal and external action and unconscious or conscious goals. However, there may be other types of differences between conscious and unconscious processes from the point of view of perceptual processing. Velmans (2000) argues that unconscious and nonattended processing of stimuli in perception takes place in several sensory channels simultaneously:

> *"…input stimuli in different channels are preattentively analysed in a fast, parallel, automatic, preconscious fashion, with little mutual interference, up to a point where each stimulus is matched to its previous traces in long-term memory, enabling a simple analysis of its meaning or significance…Whether nonattended processing can extend to more complex analyses is uncertain." (Velmans, 2000, 201)*

This may imply that attention is not limited, but may operate via parallel processes. This supports the idea of perception as a continuous flow. Regarding ways of knowing of the world there is some discussion of implicit learning, i.e. learning without a conscious awareness of what has been learned:

> *"What do psychologists think is going on when a child acquires a natural language or becomes socialised and inculcated with the norms of society? With language development the case is quite clear. Formal instruction is essentially irrelevant, explicit processes are absent, learning is essentially unintentional, individual differences in the basic skill are minimal, language users have virtually no access to the rules of their language, and the end product of the acquisition is a rich, complex and abstract representation that mirrors*

*that of the structure of the linguistic corpus. A similar picture is easily painted for the processes of socialization and acculturation. (Reber, 1997, 139)*

Hence, it seems that even complex stimuli, such as whole language systems can be learned with no particular conscious intention, and the results of learning are not easily accessible to consciousness. Velmans (2000) has studied the preconscious analysis of meaning taking place in reading and speaking. He argues that the analysis of meaning of whole sentences and texts may already be done before the meanings enter consciousness:

*"…by the time perceived text or speech enters consciousness, the analysis of words in context (including both semantic and syntactic analysis) has already been achieved. If so, consciousness (of the input) arises too late to affect the processing with which it is most closely associated. Reading and speech perception of the attended-to messages are universally thought of as conscious processes. Yet the processes that enable reading and speech perception are, strictly speaking, preconscious." (Velmans, 2000, 210-211)*

Much of the learning and making of meaning may then be unconscious, as discussed. For instance, people have no direct awareness of the process of how they are able to remember something, or how they are able to encode particular information into long-term memory:

*"To learn anything we merely pay attention to it. Learning occurs "magically" - we merely allow ourselves to interact consciously with algebra, with language, or with a perceptual puzzle…and somehow, without detailed conscious intervention, we acquire the relevant knowledge and skill. But we know that learning cannot be a simple, unitary process in its details…all forms of learning involve specialized components of knowledge and acquisition strategies." (Baars, 1988, 214)*

How is one then to determine the differentiation between conscious and non-conscious processes? A process may be conscious in three ways. First, it may be conscious in the sense that one is conscious of some process. Second, it may be conscious in a way that some process operating is accompanied by a consciousness of the results of the process. Third, consciousness may be seen as causally influencing some processes, like in the case of volition. (Velmans, 2000, 215)

This implies an interplay of conscious volition and unconscious automatic strategies of making meaning or guiding behavior. It is fruitful to see the processes in the unconscious as parallel; not necessarily strictly sequential. This means that there is no one correct and only way of processing information in the unconscious. Hence, there is no strict hierarchy, but more or less powerful processes of making meaning which may interact with each other in a fluid manner. Hunt (1995) emphasises the fact that:

*"Consciousness and the cognitive unconscious appear as the two sides of a common dimension of becoming conscious. They are stages in a process of expression. There may be no unconscious cognitive capacity that is not on its way toward consciousness, and no consciousness that does not emerge out of previous stages that are not ordinarily accessible to full self-referential awareness." (Hunt, 1995, 39)*

It is then this principle of 'becoming conscious' which may characterize the automatic processes of the unconscious. In that sense they are 'intentional', not just existing in a random manner. This intentionality may be linked to the making sense of the environment of the organism.

Becoming conscious may be seen as organic growth or as a rapid unfolding of successive stages of synthesis and selection. Cognitive processes which are unconscious in making meaning may literally constitute the form of other processes of making meaning. (Hunt, 1995, 39). This means that stages of the growth of consciousness may be seen as frames of meaning which may influence each other. Then, the emergence of a sequence of unconscious processes of making tacit meaning is a set of frames of meaning which is based on perception of events. Some of these frames become conscious and the content of subjective experience, others are more hidden. The interaction of these frames of meaning may be seen as a constant selection of information to be processed and the synthesis of that information in making tacit and explicit meanings; constituting more frames of meaning. A frame of meaning may be the source of information for another frame. In each of the frames the 'raw information' based on sensory perception is transformed into different degrees of meaning. Hence, the 'original' form of information is mixed with different meanings and previous knowledge. In that sense, the content of processing may not be just 'pure' information in the narrow sense of the word. The influence of these frames of meaning is mediated by mental representations which are based on the object of perception at various stages of processing. The central role of representations in the processing of meaning in the mind will be introduced next.

### 3.1.3. Representation

The central process of the mind in perception is the construction of mental images or mental representations of the object of perception. These representations are the contents of processing and the making of meaning of objects of perception. If one takes this perspective it follows that representation is of great importance in understanding how perception works and how direct sensory mechanisms and previous knowledge may interact. Representation may be seen as:

> *"…bundles of information on which processes operate. Cognitive processes such as perception and attention encode information from the world, thus creating or changing our representations. Processes of reasoning and decision making operate on representations to form new beliefs and to specify particular actions…representations include the ideas, sights, images, and beliefs that fill our thoughts and also the sensations and dispositions which may fall outside our awareness." (Billman, 1998, 649)*

The most fundamental aspect of representation is the relationship of the representation and the thing represented. A representation may be seen as the system for preserving some information from the world:

> *"Our mental representations of some event does not contain the same information as did the event itself.…Even the simplest percept is not the same as the stimulus which triggered*

*it. Our perception selects, organizes and sometimes distorts information from the perceived world. The perception of one individual differs from that of another, and differences among species are even greater." (Billman, 1998, 650)*

There are several realms of representation. First, external representations are systems such as writing, pictures or maps, or media. Second, mental representations are internal systems of information used in mental processing. Third, computational representations are used by computer systems. Fourth, theoretical representations are part of a theory of something. (Billman, 1998, 650-651). The study at this point elaborates mental representations and physiological representations. Mental representations may be seen as previous knowledge and schemas and physiological representations as sensations or sensory representations. Representations have content, i.e. they are about something (Billman, 1998, 653). For instance mental content may be imagery or daydreaming, which a person can discuss with other people. Of course, there can be 'unconscious' content also, since representations are not all accessible to consciousness. Mind at both the conscious and unconscious levels may be thought of as being involved intimately with levels of representation of mental content, automatic processing of information and previous knowledge:

*"There are many forms of representation in the brain that are preconscious or unconscious. And we know how to carry out many sophisticated mental tasks, although knowledge of how the mind/brain analyses information, stores it, retrieves it, transforms it and controls the musculature to make some appropriate responses has little, if any, manifestation in what we experience. A vast reservoir of knowledge about the world and about ourselves is also encoded in long-term memory. While some of this might become conscious, it largely remains unconscious even while it plays a role in ongoing adaptive functioning (in the interpretation of input, the creation of expectations, the planning of appropriate responses and so on). That is, representation and knowledge may be either conscious or unconscious." (Velmans, 2000, 258)*

Representations also have an organization. This means: "…the way in which the units within a representation system are related to each other. Organization is important because much information can be represented indirectly, in the way local units are organized or related to each other." (Billman, 1998, 653). For instance, memories may not be organized in a neat timeline, but rather thematically. Also, there may be other types of organization of memories. The format of representation regards the 'conventional frame' of organizing representations. For instance, there may be analogous or propositional representations:

*"Propositional format is a discrete language of thought from which propositions can be constructed. Analog format is continuous with spatial and quantitative relations in the represented world, which are preserved in the very format of the representing world." (Billman, 1998, 654)*

Mental images may be analog representations, as they refer to the immediate appearance of an object of perception. Also propositional representation may be constructed so that it mimics an analogue representation. Hence, the differences between formats are difficult to define. (Billmann,

1998, 655-656). This means that there may be representations with formal, linguistic structures such as propositional representations. There may also be analogous representations which 'look like' the object of perception being represented. Representational symbolism may be seen as being linked to ordinary language as the automatic code of representing complex objects and their relationships in the in a quite systematic manner. With non-linguistic presentational representation meaning emerges as felt meaning:

> *"…as the result of an experiential immersion in the expressive patterns of the symbolic medium. It appears as spontaneous, preemptory imagery and is fully developed in the expressive media of the arts. Here felt meaning emerges from the medium in the form of potential semblances that are "sensed", polysemic and open-ended, and so unpredictable and novel. It is the receptive, observing attitude common to aesthetics, meditation, and classical introspectionism that allows such meanings to emerge." (Hunt, 1995, 42)*

The different forms of linguistic and non-linguistic meanings are intertwined. Referential language is linked to gesture and intonation, while presentational states may also contain a sense of intentional, even systematic meaning. Each of these modes of thought have as their background the other form, from which they may emerge. (Hunt, 1995, 42)

The study will now discuss the interaction of direct and indirect theories of perception and the implications of this interaction on the nature of representation and meaning. The radical constructivist or radically indirect theories of perception treat raw sensations as lacking any dimension of meaning. Meaning arises when isolated features of raw sensations are picked out and constructive algorithms are used to construe output which carries a certain structure and meaning. (Leeuwen, 1998, 266). Similarly, according to the theories of cognition as information processing, what is processed in the mind is 'cold', logical, propositional information. Lazarus and Folkman (1984) speak of this view as a misunderstanding, which:

> *"…has to do with the concept of information that is processed as meaningless…When information is appraised as having significance for our well-being, it becomes what we have called "hot information"…, or information that is laden with emotion. Subsequent processing takes place with this hot information, which means that the stuff of processing is no longer cold, meaningless bits.…emotion and information (and therefore cognition) are conjoined for large portions of the evaluative appraisal process." (Lazarus and Folkman, 1984, 277)*

Hence, the dimension of sensation itself may be seen as the 'black box' of constructivist or indirect theories of perception. Sensory processes are then only merely faithfully reproducing certain relevant aspects of physical signals, such as light intensity, but they are indifferent to any pattern inherent in sensation (Leeuwen, 1998, 266). Obviously, the main problem of such a view of perception is how exactly can one get from things in the world to representations of them.

Conversely, the direct view on perception holds that meaning is inherently in the objects of perception. Hence, the perceiver is sometimes posed as a 'zombie' which merely picks up features of

objects of perception, such as affordances (see Gibson, 1979). Consequently, meaning is not located in the head, but rather is 'in the world' in the form of features of objects of perception.

One possible starting point for unifying the direct and indirect theories of perception may be in understanding better the nature of sensation. In the brain there are several modules for processing sensations in different sensory modalities, such as color, odor, temperature or pitch. However, many important attributes of perception:

> *"…are amodal (duration, rhythm, shape, intensity and spatial extent) or multimodal (such as being in a brushfire, which involves the heat, the smell and the glow). So, the notion of sensory modularity increases the need for perceptual integration." (Leeuwen, 1998, 269)*

The way of integrating sensations differs from one theory to another. For indirect theories, modality-specific perception proceeds integration across the modalities of sensation. The integration is done by inferential processes involving the use of previous knowledge. The direct view argues that amodal and multi-modal aspects of sensation are primary properties due to being important features of objects of perception themselves. Empirical research in sensory development suggests that:

> *"…perceptual integration is not achieved according to the constructivist picture of sensory processing as feed-forward signal propagation. Rather, the significance of amodal and cross-modal information early in the development suggests that integration between the sensory modules occurs early in processing…The neurosciences support the notion that intersensory perception at all possible levels of description…integration of sensory stimulation into a coherent pattern does not wait until sensory processing is completed…" (Leeuwen, 1998, 269-270)*

This means that sensory features may not exist in isolation from their context (Leeuwen, 1998, 270). Hence, the context for sensory information is not strictly based on 'fitting' sensory information patterns onto previous knowledge to make meaning for the whole of the event. The theory of direct perception may be helpful here to clarify the issues. Objects of perception may be seen as invariant, high-order properties of the environment of an organism. This means that there are objective features in the objects of perception which may resonate with sensory mechanisms. In that sense, objects have meaning from the point of view of  thesensation on them. However, since it seems obvious that people also use previous knowledge to make sense of sensations, the differences between the direct/indirect views of perception have not yet been resolved.

One possible solution is to use ideas from Gestalt psychology. The term microgenesis  of perception has been used to refer to dynamic processes which give rise to the formation of sensation. A percept originates as an undifferentiated whole in the brain at a low-level. A series of rapid transformations leads to the full articulation of the objects structure in the higher layers of the brain, such as the cortex. Hence, perceptual processing may proceed from the lowest levels of the brain towards the higher levels. (Leeuwen, 1998, 276). This rapid processing may not necessarily be a hierarchy, but rather a distinction between "…fast but coarse and slow but fine-grained sensory processing channels operating in parallel." (Leeuwen, 1998, 276). Leeuwen (1998, 277) consequently argues for a

hologenetic process of perception. Perception starts off from basic components and joins these to form integral wholes of increasing complexity as the processing in the brain proceeds at different levels. The main idea of hologenesis is that of emergence and complex interaction:

> *"…in hologenesis the parts interact nonlinearly to form the whole object structure. There are no fixed feature representations in the hologenetic process, so the components of an organization that are obtained later do not resemble the ones that are predominant in earlier processing. So the structural composition of the percept does not reflect its history." (Leeuwen, 1998, 277-278)*

Hologenetic principles of self-organization and chaos have been found in studies of the formation of perceptual categories and pattern learning. The key in hologenesis is not chaos itself, but rather: "…the idea that the brain is an instrument of stepwise creative synthesis." (Leeuwen, 1998, 280).

From the point of view of the study, hologenesis is used to indicate the possible functional-temporal nature of perception. Perception takes place in 'lower' levels of the brain as determined functionally, rather than by locational sequential or hierarchical structure, and proceeds to more evolved levels of processing. The principles of processing are temporal, but non-linear. This means there may be various parallel processes operating, and some of those processes may be faster than others in evolving to higher levels of the brain. These processes may be chaos-like and interact in complex ways within the different functional levels of the brain. The representations used in the processes may also not be 'historically' related to each other, i.e. they may not have analogical structures to each other.

However, the study argues that conceptual systems or previous knowledge is used in interaction with these non-linear and emergent processes of 'evolution' of the making of meaning for the object of perception. Similarly to the principle of hologenesis, there may be different levels of mental models and previous knowledge involved in the different functional levels of the brain in processing the sensations. This would mean that the processing of sensations may be both influenced by direct perception as well as by ways of relating the sensations to previous knowledge to make sense of them. How, why, when and where these two processes exactly meet is difficult to explain. Perhaps they may be best seen as a chaotic, emergent, system in which certain patterns of interaction are more probable than others, rather than the interactions having strict rules and predictable outcomes in all situations.

The study hence sees perceptual processing in the making of meaning as a i) collection of mostly unconscious and parallel processes, ii) containing analogous information and propositional information which may have iii) meanings already embedded in it, iv) which is processed in the mind in the form of mental representations, and v) which are based on the interaction of sensory information and previous knowledge. Hence, the study does not claim that the 'information processing view' of the mind is necessarily wrong as such. Rather, the study claims that by also including a dimension of meaning into the very microgenesis of perception, a more fruitful model of mind may be reached. This is because representations may be constructed into frames of meaning which may act as sources of 'information' for subsequent or parallel stages of processing. Also, sensory repre-

sentation may carry an influence of the resonance of mind and an object of perception, while memories may carry meaning inherent in previous knowledge.

## 3.1.4. Processing of representations

The study now argues for the mechanisms of interaction of sensation and previous knowledge and their influences on meanings at the conscious or unconscious levels of the mind via representation. It should be noted that there is no conclusive agreement in scientific research in how exactly the mind works in perception. From this follows that the study is here only able to present a preliminary, schematic and descriptive view of this process, rather than an extensive and detailed explanation with broad explanatory and predictive powers. What, then, may influence the structures of sensory information and the consequent representations which are made?

First, there is the interaction of mechanisms of direct and indirect perception. Gibson (1979) argued for the continuous flow of perception. There is also another type of perception in this flow. Neisser (1976, 142-144) discusses the system of recognition as the capacity of identifying various potential significances of perception. This means that there may then be two separate systems of perception: the flow of information from the environment and one's position in it for navigation and the identification of the objects in the environment via recognition, or applying previous knowledge on sensory information to make meaning. These two systems are in interaction:

> "It seems impossible to see one of these systems as evolutionary primary and the other as the derivative. It is as difficult to imagine a creature oriented in an array in which it does not "recognize" selected patterns as especially relevant as it is to imagine a recognitive creature moving in a surrounding to which it was otherwise insentient. Motile creatures must both navigate and identify patterns of significance." (Hunt, 1995, 69)

These two mechanisms also interact with action. Neisser (1976) argues that perception is an active process involving the interaction of information via the senses, previous knowledge and behavior. This is called the perceptual cycle. Previous knowledge may be involved in perception via schemas. Schemas further guide acts of exploration of more information of the context. This in turn produces more inputs via senses into the process and further influences interpretations, schemas and actions. (Neisser, 1976, 20-24)

There are certain stages in the perceptual cycle. First, there is preliminary sampling. These are preattentive processes which occur automatically and unconsciously. The result is a preliminary representation of sensory data based on bottom-up-processing. This means that the structures of knowledge do not influence this stage significantly; rather it is a result of biological mechanisms of perception. Second, there is direction. This is based on the preliminary sampling suggesting there is an important stimuli to attend to. The observer uses schemas in memory to make meaning for the object and builds a perceptual model; a mental representation of likely objects or events. This is top-down- processing where knowledge influences the meaning made for an object. Third, there is

modification of the perceptual model. This means that if the comparison of sensory data and previous knowledge produces a match, the mental representation may be used as the final perceptual model for the event. If there is no direct mach, the model has to be refined until a good match is found. (Rookes and Willson, 2000, 31)

The dimension of action comes into play in the situation where more sensory information is needed from the object to feed into the perceptual system because there was no direct match between previous knowledge and the mental representation of the object of perception. Hence, people may use their bodies to further explore the object in order to make sense of it or to be able to build a better perceptual model.

The second aspect structuring perception and representations is that expectations, needs, motives, goals and emotion may influence what one perceives, as discussed with priming. This can be called the perceptual set. This means that perceptual bias influences attention. Sets have a variety of functions:

> *"They are affected by motivation, emotion, past experience and expectations and serve to make perception more efficient. This is achieved because sets reduce the choice between alternatives. This means that predisposition towards a stimulus will make any choice quicker than considering all the alternatives." (Rookes and Willson, 2000, 28)*

Past knowledge or interests at some given moment literally may make people choose between stimuli differently in different situations. This study has discussed motivation and needs as well as future expectations and goals and the temporal and intentional nature of consciousness in general. These may be included in the conception of the perceptual set, which is seen as part of priming.

The study will now elaborate on the interaction of flow of perception and recognition from one unified perspective. The aim is to be able to include many of the conceptions already discussed into the same theoretical framework. This is done in order to simplify the descriptions of the process of perception and making of meaning, and to be able to model these processes better in the next chapter.

When one receives sensory information, one constructs mental models or representations based on that sensory information. Based on the discussions of the top-down and bottom-up, or direct and indirect theories of perception and embodied cognitive models, the study concludes that the ways a mind perceives an external object are scanning and construal.

Scanning involves recognizing, exploring, differentiating or feeling the object. It is the low-level categorization and recognition of the objects of perception. Scanning is the perception one has based on the biological mechanisms of sensation. Construal is the representation of the object of perception at various levels for further processing in the mind. (Mezirow, 1994, 24). Hence, scanning may be seen as capturing the dimension of the flow of perception. Scanning also involves recognition, i.e. identification of the object of perception. Consequently, scanning is seen as similar to the flow of perception and recognition as discussed earlier in the study (see Gibson, 1979; Neisser, 1967).

It should be noted that already scanning involves meaning; i.e. recognition of the object based on meaning-filled sensory representations. Scanning also involves representation in order for the recognition to take place. Consequently, scanning and construal are both intertwined and about representation. Scanning the environment and receiving 'direct' sensory information of it may be thought of as resulting in the sensory representation of the object of perception.

Scanning is related to an imaginative projection of previous knowledge, schemas and symbolic models onto the sensory representation of the object of perception. This happens when the first sensory representation is mapped onto previous knowledge in recognition. This results in another type of representation based on the mixture of influence of previous knowledge and sensory representation. The types of previous knowledge used in recognition are various. The study conceptualizes them as symbolic models, a special type of collection of schemas. Symbolic models combine a number of classificatory schemas regarding direction, dimension, sequence, time, space, direction, entities and punctuation. They also enable people to make immediate judgments. Further, they are used for projecting basic categories, or the most common concepts with which people are familiar: "Mental processes such as scanning, focusing, figure-ground reversal, superimposition, and vantage point shifting are used to process symbolic models." (Mezirow, 1994, 21). Lakoff (1988) describes the dynamics of scanning:

> *"Very general innate imaginative capacities (for schematization, categorization, metaphor, metonymy, etc.) characterize abstract concepts by linking them to image-schematic (symbolic models) and basic-level physical concepts. Cognitive models are built up by these imaginative processes." (Lakoff, 1988, 50)*

It is not clear exactly what types of symbolic models people may project on sensory representation in order to recognize it. Lakoff (1987, 154) describes metaphoric models as based on motor schemas and analogies based on the relationships of the environment and one's actions within it. These may also be included in symbolic models. The dimension of metaphoric models used in recognition will be elaborated later in the study. Another type of symbolic model may be symbols. Symbols may be seen as forms that embody significance. They also imply an 'ideal' form of the thing they symbolize, such as fairness, responsibility and equity. Symbols also exemplify, and hence directly present rather than represent, dimensions of reality. (Mezirow, 1994, 18).

However, there is a classical debate in perceptual psychology at work here as noted earlier. Clearly, in order to recognize an object of perception, one has to classify it somehow; that is, one must construct a representation of it and compare that representation with previous knowledge. Bottom-up or direct processing theories claim that the process operates in a bottom-up direction until a match is found in previous knowledge. This means that perception is 'data-driven' or driven by features of the stimuli. Top-down or indirect theories claim that previous knowledge is needed all the way in recognizing an object. (see Rookes and Willson, 2000, 15)

Since the study has adopted a synthesis view of these theories the study claims that people use both ways of classifying an object of perception. This means that the properties of the object of perception in sensory representation and previous knowledge interact in complex ways in recognizing

objects. Basically, the study proposes that recognition itself is quite 'schematic', and after recognition a more developed representation is constructed in further processing.

If different types of non-linguistic, symbolic models, such as symbols and metaphors are used in recognition, it may mean that even before people have the opportunity to cognitively interpret the exact meaning of an event, they already have some meaning present in the mental representation made in recognition of an object. The study discussed the propositional and analogue structures of representation. It may be that analogue structures of representation are more related to symbolic models. The study does not directly claim that only models of this kind are used in recognition, but they may be influential among the models used to recognize an object of perception. Also, metaphors may be of symbolic, 'direct' and presentational nature, rather than linguistic. These all contribute to the immediate, tacit meaning of an object of perception and thus influence the following representations and processing.

After recognition an intermediate representation is created. It falls into two categories. First, presentational construal is the immediate, analogical appearance of an object in consciousness as a spatio-temporal whole, with distinct processes and presences. It is similar to the analogue structure of representations discussed earlier. This means an object of perception perceived is construed from its elementary parts and shape or size, movement or form: "Presentational construal also includes construing dimension, direction, sequence and event punctuation by interpreting cues evoked by sense perception. Presentational construal is prelinguistic." (Mezirow, 1994, 24). Since symbolic models are projected onto the sensory representation of the object of perception, the next stage of representation, the presentational construal, also carries many of the dimensions of the symbolic models and other frames of meaning generated 'earlier' in the process of perception. Second, propositional construal is related to linguistic comprehension and cognition. It is similar to the propositional structures of representation discussed earlier. It is partly based on the presentational construal and/or sensory representations and related to experiencing objects based on linguistic concepts and categories:

> *"…presentational construal can be a significant influence on and serve as a monitor for the propositional construal. Feelings, intuition, dreams and changes in physiological states bring the influences of presentational construal into awareness. Propositional construal, similarly, monitors presentational construal by introducing rational and reflective interpretations of the meaning of our propositional awareness. Both forms of construal become modified through experience and, obviously, are highly interactive." (Mezirow, 1994, 24)*

Lakoff (1987, 154) also notices this division. He claims that propositional models contain linguistic properties of categories of objects. Image-schematic models are immediate presentations of the appearances of objects based on schematic rules of representation.

Hence, scanning results in a continuous flow of sensory representations of the objects of perception in the environment based on the sensations of the object of perception. This representation is first

recognized via projecting symbolic models on it. It means that certain types of non-linguistic symbolic models in previous knowledge are compared with the sensory representation to be able to categorize and identify the object of perception. This identification or recognition results in tacit meaning for the object of perception in relation to the perceiver. This tacit meaning may be personal or felt, for instance. After recognition, the combination of sensory representation, symbolic models, and the result of the recognition or identification, i.e. meaning of the object are turned into a presentational construal. Also, propositional construal may be based on sensory representation as well as on the presentational construal. This highlights the parallel processes in the mind as well as the co-existence of different types of meaning based on types of processes involved in the making of meaning.

Meaning may be further made by relating the presentational construal to the propositional construal. The presentational construal then partly acts as the source of the propositional construal, and interacts with it also. The complex interaction of propositional construal and presentational construal results in an imaginative insight, which results in cognitive interpretation and further meaning. Comparisons of the combination of presentational and propositional construals regarding an object of perception are made with previous knowledge. (Mezirow, 1994, 33)

Hence, there seem to be two layers of meaning made. The first level of meaning is made at the non-linguistic, symbolic and image-schematic level of the mind via sensory representation, recognition and presentational construal. This is the core area of tacit meaning, including personal and felt meanings. They may be various kinds of tacit meanings, but their resolution may not be great, i.e. there may be different archetypes of tacit meaning, rather than infinite variations. Mezirow (1994) discusses the conception of tacit meanings as follows:

> *"Tacit meanings may arise from presentational construal, and either tacitly or explicitly understood meanings result from propositional construal. Thus some tacit meanings derived from presentational construal may be symbolic but do not involve language." (Mezirow, 1994, 25)*

Second, there is the level of cognitive interpretation or further processing, where combinations of propositional and presentational construals are compared with previous knowledge in more detail. These meanings may be personal, but perhaps are more social, objective, linguistic and exact with great resolution and nuance. Cognitive interpretation and semantic analysis may also be partly unconscious, as discussed. Cognitive interpretation may result in explicit, linguistic meanings for an object of perception.

From this it follows that the sensory and presentational representations may be able to carry 'direct', non-linguistic, tacit meaning in them before being compared with previous knowledge in more depth. Propositional construal then adds the dimension of more systematic linguistic meaning to representations, and these two construals are then processed further in a more elaborated cognitive evaluation or interpretation of an object of perception. However, also meaning made with propositional construal may be tacit. Next, the study will discuss the consequences of making meaning on subjective experience and knowledge.

### 3.1.5. Change of subjective experience

Meaning making involves two processes: prereflective learning and comprehension and is based on sense perception, sensory representations, symbolic models and presentational and propositional construals as well as previous knowledge in general. These processes may influence subjective experience and knowledge. The change of subjective experience is elaborated first.

Symbolic models acquired through socialization or otherwise and used in imaginative projections actually may partly produce subjective experience and influence its qualities. Meaning perspectives have a crucial role in this: "Meaning perspectives filter the way we project our symbolic models imaginatively to construe what is presented through our senses." (Mezirow, 1994, 38). Consequently, when people project symbolic models on sensory information, meaning perspectives 'filter' which symbolic models they use. Also, when people construct a presentational or propositional construal, meaning perspectives act similarly. Meaning perspectives contain condensations of prior experiences and may hence contain more or less 'distortion' from the point of view of an immediate perception and interpretation of a certain object. Using meaning perspectives as frames to compare old experiences to the new experience then constitutes a complex set of similarities and differences between the perceiver and the perceived object, which influences the process of making meaning.[16] This projection of symbolic models takes place in the process of scanning and recognition. It is called prereflective learning (see Mezirow, 1994, 15-16).

Making meaning may also happen differently from prereflective learning. Comprehension involves analysis which is based on determining the perceived differences and similarities between the individual's previous experiences in the form of tacit and explicit knowledge and the external object of perception (see Mezirow, 1994, 19). It is more based on the explicit or tacit propositional construals, but also presentational construals. The evaluation of similarities and differences determines the relevance of the object of perception and whether it fits the individual's frame of reference or not:

> *"This comparative analysis, which is often prereflective, may involve one or more of the physical, instrumental, methodological, linguistic (lexical, syntactic, semantic), psychological, or social dimensions of similarity and difference." (Mezirow, 1994, 25)*

The analysis is not objective nor derived from the facts of the categories representing the perceived object, but depends how the individual has defined for himself the nature of his experience (Mezirow, 1991, 25). Hence, the facts related to an object of perception are subjective and in interaction with the perceiver's previous knowledge or frame of reference. This also means that a comprehension type of comparative analysis may occur later in the process of making meaning than prereflective learning, although it may also occur in parallel with prereflective learning. The analysis involved in comprehension may begin with an analogy, which serves as a bridge between the previous knowl-

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[16] *The central nature of meaning perspectives as orienting frames of reference has a support in philosophy. According to Giddens (1976) Wittgenstein´s ´language games´, Castaneda´s ´alternative realities´, Whorf´s ´language structures´, Bachelard´s and Althusser´s ´problematics´ and Kuhn´s ´paradigms´, Cell´s ´maps´ and Foucault´s ´episteme´ all refer to the "…Codes of a culture governing its schemes of perception, language, values and the order of its practices." (Giddens, 1976, 142).*

edge and the new experienced phenomenon (Mezirow, 1994, 25). Comprehension is based on the conscious and nonconscious interaction between evaluations of objects of perception and previous knowledge structures.

The study, then, has two basic processes describing meaning making: prereflective learning and comprehension. Prereflective learning happens at the unconscious level of mind in the process of recognizing sensory representation and may give rise to felt and personal tacit meanings directly. Tacit meanings may then be heavily influenced by perceptual mechanisms and symbolic models. Comprehension at the unconscious level of mind involves the use of both linguistic and non-linguistic representations in interpretation, such as presentational and propositional construals.

The study will now investigate the influences of different ways of making tacit meaning. Tacit meanings made in prereflective learning and comprehension may directly influence states of consciousness at any stage of processing. They may also influence previous knowledge via changing it. These two dimensions of states of consciousness and changes in previous knowledge may be difficult to separate. First, the study will elaborate on the 'direct' influences of tacit, non-linguistic meanings, such as personal and felt meaning, on states of consciousness.

Lazarus and Smith (1988, 283) have discussed the interrelation of emotion and cognition in making personal meaning. Underlying emotion there is a cognitive interpretation or evaluation, and appraisal of the meaning of a certain stimuli. Consequently, emotion is a reaction to something significant and meaningful, like and evaluation of an object of perception from the point of view of a particular person. Primary appraisal may be seen as partly similar to prereflective learning as discussed by Mezirow (1994). This means low-level and mostly non-linguistic interpretation and evaluation of an object of perception at the level of the unconscious mind. Secondary appraisal may be more related to comprehension made at the unconscious and conscious levels of mind. In appraisal, concrete or abstract knowledge is formed based on how people perceive certain events. Appraisal consists of the personal meaning of this abstract knowledge. The mind processes the personal meaning of a certain stimulus related to the previous experiences, attitudes, characteristics and other dimensions of the particular perceiver, and relates them to the personal well-being and future goals of the individual. (Lazarus and Smith, 1988, 281).

It may be that lower-level automatic and unconscious processes may also explain emotions as part of a broad conception of conscious and non-conscious cognition. In several respects affective reactions may be seen as primary to cognition. First, evaluations, or meanings made based on affective reactions, are primary; decisions are based on preference rather than computation. Second, affect is a basic component of all perception and meaning when evaluating things. Third, affective reactions are inescapable, they are present in one's consciousnes,s often in a demanding way. Fourth, affective reactions may be seen as irrevocable. One's knowledge may be wrong, but not one's feelings, for example. Fifth, affective reactions describe how one feels about an object of perception being evaluated. Sixth, affective reactions are not reducible to cognition. The sum of the traits of people we really love does not necessarily predict how much we love them. (Fiske and Taylor, 1991, 451-452). Fiske and Taylor (1991, 455-456) argue further that:

*"(a). emotion concerns the person's own experience as subject or origin, rather than focusing on the object itself out there; (b). emotion tends to influence perceived "reality", whereas thinking to a greater extent accommodates to reality; (c). emotion views the target as important for its relationship to the person, but intellective cognition emphasizes an object's relationship to other external objects; (d). emotion involves physiological experiences, not just environmental inputs; (e). emotion regulates the intensity of style of behavior, rather than the goal-directed efficiency of behavior; (f). emotion is experienced passively or in reaction to the stimulus, but people experience themselves as the source of intellective cognition; (g). emotion commits one to action more than does the cost-benefit calculation of intellective cognition; (h). emotion norms are moral and aesthetic, while intellective norms are rational; (i). emotion helps define self, rather than the world."*

Consequently, emotion can be seen as closely linked to cognition. The main idea of this approach is that emotions depend to a great degree on the way a person sees a situation or an event: "Emotions are responses to the meaning of events and are closely associated with a person's goals and motivations...different emotions are associated with different types of appraisal." (Cornelius, 1996, 187)

Key to the cognitive approach to emotion is that if person's interpretation of a situation is changed, emotions change accordingly. Hence, emotions arise out of certain types of cognitions, "as a result of the way in which the situations that initiate them are constructed by the experiencer." (Ortony et al, 1988, 1). Different persons interpreting the same situation may have different emotions. Also Höijer (1992, 285) argues for a very broad conception of emotion by stating that cognitions play a role in all kinds of human reactions except pure reflexes. This is further supported by Brewin (1988):

*"Experiencing emotions such as anxiety or depression may bring back memories of previous times when these emotions were felt, memories that may themselves upset the person still further and exacerbate feelings of sadness or helplessness." (Brewin, 1988, 10)*

In this sense people seem to attach emotional reactions to the stimuli they interpret cognitively, and thus emotion may be a part of the meaning produced based on a certain perception. Emotion and cognition interact in various ways in the process of making meaning for objects of perception. An emotion may trigger cognitive processes or vice versa. Höijer (1992) introduces the 'hidden' nature of emotions as cognition: [17]

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[17] *Emotion and knowledge may in time turn to special, action-oriented schemas, or attitudes. Attitudes can be seen as incorporating affect, cognition and behavioral tendencies. There are many ways of seeing attitudes, for instance in the light of cognitive mediation of persuasion in communication. In such studies it has been shown that variables such as communicator credibility, message characteristics and audience factors influence our attitudes. For instance repetition of a complex message will over time enhance comprehension and thus affect attitudes. The key factor explaining these cognitive responses to persuasion is involvement. It means that the more one starts caring about a certain thing posed in the message the more one starts paying attention to the quality and content of the message at the expense of the "surface of the message". (Fiske and Taylor, 1991, 411-412)*

*"…emotional reactions always include cognitions in the form of memories, ideas, images and interpretations of a phenomenon. Similarly we can hardly think of cognitive processes isolated from emotional reactions. Emotions are involved in all human activity…they are often…hidden in the unconscious." (Höijer, 1992, 285-286)*

Appraisals are constructed quite quickly and are automatically based on an object of perception, such as a certain person-environment relationship:

*"The appraisal that arouses an emotion…is not the result of reflection. It is immediate and undeliberate. If we see somebody stab at our eye with his finger, we avoid the threat instantly, even though we may know that he does not intend to hurt or even to touch us. Before we can make such an instant response, we must have estimated somehow that the stabbing finger could hurt. Since the movement is immediate, unwitting, or even contrary to our better knowledge, this appraisal of possible harm must be similarly immediate." (Arnold, 1960, 172)*

As appraisal for certain objects of perception is made, personal meaning comes into existence and may be further processed in the mind. Personal meaning is extracted from the person-environment relationships. There are various relevant variables which are useful in trying to conceptualize the interaction of the person and environment from the point of view of personal meaning:

*"…the mechanism proposed here by which the social environment may possibly control judgments, decisions, and behavior is the formation of direct and automatic mental links between representations of motives and goals in memory (and consequently the goals and plans associated with them) and the representations of the social situations in which those motives have been frequently pursued in the past. The result of this automatic associative link is for the motive-goal-plan structure to become activated whenever the relevant triggering situational features are present in the environment. The activated goals and plans then presumably guide the social cognition and interaction of the individual, without the person's intention or awareness of the motive's guiding role." (Bargh, 1990, 100)*

Consequently, one may arrive at an appraisal of a particular situation or object of perception via either automatic, unconscious processes or via deliberate, self-controlled and volitional cognitive analysis (Lazarus, 1991, 159). Personal meanings and emotions based on appraisals are dynamic. They can change rapidly and also vary between different people in different situations:

*"…personal meaning - and the emotions associated with it - keeps changing from moment to moment, situation to situation, and person to person, expressing the altered significance of what is happening. Personal meanings, which easily change with the flow of events, lie at the heart of every emotion and contribute to the fluidity of emotions." (Lazarus at al, 1994, 146-147)*

Hence, it seems that appraisal is related to at least one type of conscious, subjective experience; emotion. Consequently, unconscious processes, such as appraisal, which are seen as prereflective

learning and comprehension at the unconscious level of mind in making personal meaning may be reflected in conscious experiences. One may also argue that felt meanings based on an object of perception elaborated in prereflective learning or appraisal, may also give rise to subjective experiences (see Mezirow, 1994; Hunt, 1995). One way to better understand felt meaning is to see how it interacts with semantic, linguistic meanings. For instance, in the process of perception there is a considerable effect of delaying the stage of making literal, linguistic meaning for an object of perception, either on a voluntary basis, or then unvoluntarily. Hunt (1995) argues that to demonstrate this means to:

> *"…delay a normally predominant semantic categorization long enough to allow the emergence into awareness of the expressive perceptual dimensions that are basic to the presentational symbolisms…We all vary in the degree to which we delay "function" in order to bring forward the presentational-state side of our experience. It ranges from ordinary moods, to aesthetics, to the "be-here-now" sense of presence in peak experiences and meditative states." (Hunt, 1995, 43)*

Consequently, the study hypothesizes that prereflective learning may directly give rise to many types of conscious, subjective experiences, such as emotion, flow and daydreaming. Influence to emotion may be quite direct, while influence on daydreaming and flow may be more indirect. Daydreaming may also have emotional components. Also, felt meaning as open and presentational may lead to daydreaming. Flow as a balance of perception and action is also a presentational state. Hence, felt, bodily meaning of a balance of skills and challenges may be related to flow. However, it should be noted that empirical studies and more elaborated conceptualization is needed to conclude the influence of tacit meaning on subjective experience. However, the study bases its preliminary claims of the direct link of tacit meaning and subjective experience on the fact that different meanings may be processed in the mind via similar mechanisms and may have similar consequenses, such as changing emotion via appraisal. There may be several, parallel, more or less elaborated processes of making meaning in the mind which are seen as being in the process of organic growth towards consciousness. Some of the processes may reach consciousness and some not. Some processes may also reach consciousness more quickly than others.

The study then links prereflective learning and comprehension at the unconscious level of mind and meanings generated to possible 'direct' effects on subjective experience via personal and felt tacit meanings. However, there may also be another source of meaning more related to the relationship of an object of perception to previous knowledge. This dimension of the effect of meaning changing previous knowledge will be elaborated next.

## 3.1.6. Change of knowledge

Since previous knowledge and perception are in interaction, one key aspect in understanding how people make meaning may come from describing how knowledge changes. Tacit and explicit knowledge have been described in the study as consisting of schemas. The conception of meaning schemes

and meaning perspectives has been used to argue for a specific dimension of meaning inherent in knowledge. The study will use theories of transformational learning to explain the basic dynamics of changes in previous knowledge. This means that change in tacit or explicit knowledge is not only seen as steadily accumulative, but also as non-linear and emergent. Transformative learning theories are especially suitable to describe adult learning, where already the basic knowledge of the world has been acquired and many frames of meaning already exist in the individual.

According to Mezirow (1994, 4-6) an important part of adult learning is the process of validating or justifying the information received with previous knowledge. Learning then involves the process of reflection, the process of validity testing of previous knowledge, which may result in the elaboration or transformation of knowledge. Further, learning is then:

> *"…a dialectical process of interpretation in which we interact with objects and events, guided by an old set of expectations. Normally, when we learn something we attribute an old meaning to a new experience…In transformational learning, however, we reinterpret an old experience (or a new one) from a new set of expectations, thus giving a new meaning and perspective to the old experience." (Mezirow, 1994, 11)*

Learning may be seen as the dynamics of making meaning of objects of perception via containing the processes of prereflective learning and comprehension. One other element of learning is the resulting change of schemas due to meanings made and storage of those changes in memory. Consequently, learning is specifically related to changes in previous knowledge. From this follows that there may also be processes in the mind which are not necessarily oriented to change knowledge. However, it may be difficult to show that all processes of making meaning are necessarily related to changes in knowledge. There may also be processes not related to changes of knowledge. It may be fruitful to think of perception and meanings as producing more or less obvious effects on previous knowledge. Also, the study earlier discussed the possibility of meanings to influence subjective experience directly, without the need for in-depth reflection and comparison of sensations to previous knowledge.

An accumulative view of learning suggests that learning rarely results in any change in knowledge or that the changes are somehow mechanistic and predictable. This is because people use meaning they already have to guide how they should interpret a certain experience at hand. How may learning then be emergent or transformative?

Mezirow (1994) discusses transformative learning as the creation of new levels of meaning in schemas. The key in this is reflection. Meaning schemes are more likely than meaning perspectives to be changed by critical examination and be transformed by reflection (Mezirow, 1994, 44). Reflection is a: "… process of critically assessing the content, process, or premise(s) of our efforts to interpret and give meaning to an experience." (Mezirow, 1994, 104). Reflection is the central dynamic in problem solving. One may reflect on the content of the problem, the process of the method of problem solving, or the premises on which the problem is based. These different ways of reflection are involved in the transformation of meaning perspectives and meaning schemes: "Through content and process reflection we can change (elaborate, create, negate, confirm, problematize, trans-

form) our meaning schemes; through premise reflection we can transform our meaning perspectives." (Mezirow, 1994, 117). Reflection may be conscious, in the area of focal awareness and reflective consciousness. However, reflection may also be unconscious, further pointing out the importance of unconscious processes of perception and evaluation. This is supported by Kulkki (1996, 53-54) who proposes that individuals construct new meanings of reality on the basis of reflection at the tacit level of knowledge, a construct of their prior knowledge and values.

Reflection may also be due to semi-automatic unconscious processing or meaning making. As knowledge is continuously processed at the unconscious level of the mind, new levels of understanding or emergent patterns of meaning may arise from it semi-automatically (see Saari, 1998a, 174). A similar view is discussed by Kulkki (1996, 69), who states that at the level of meaning perspectives knowledge can be further developed and created as long as (i) the content of the knowledge is complex and open-ended, and (ii) there are tacit elements in it that might still be latent or non-activated.

The study then has two conceptions of learning or change of knowledge which are divided by the kinds of problem solving involved. Reflection taking place in the unconscious is tacit reflection. If reflection takes place in consciousness, it may lead to conscious problem solving. Depending on the level of reflection and the level of the change of schemas, learning may be divided into reflective and transformative kinds:

> *"Reflective learning involves the confirmation, addition, or transformation of ways of interpreting experience. Transformative learning, on the other hand results in new or transformed meaning schemes or, when reflection focuses on premises, transformed meaning perspectives." (Mezirow, 1994, 117)*

Kulkki (1995, 51) has conceptualized these types of learning. Transformative learning refers to knowledge creation, which is about constructing new meanings for reality; and transforming meaning perspectives. Reflective learning is similar to 'normal', accumulative learning, knowledge construction, that is characterized by already existing meanings and expectations and leads to predictable changes in behavior and actions.

This means that the study separates two different ways of change in knowledge: knowledge construction and knowledge creation (see Saari, 1998a, 165-168 ; Kulkki, 1996, 53-54). According to Kulkki (1996), fundamentally new knowledge is created in stages of discontinuity. She sees this as a process taking place in the "…liminal places of discontinuity, where old interpretations of meanings and actions are transformed into new interpretations of meanings and future actions." (Kulkki, 1996, 52). From the point of view of the individual this means that knowledge creation can be seen as a process which may not occur without some special circumstances. Kulkki (1996, 54-55) writes that knowledge creation can take place in the domain of non-intentional, pre-linguistic and tacit meanings (mostly meaning perspectives) as well as in the domain of intentional, linguistic and explicit meanings (mostly meaning schemes), through transformative and reflective actions. The creation of knowledge can occur through tacit reflection, i.e. through changes in meaning perspectives or through explicit reflection, i.e. through problem solving and meaning schemes.

This means one may nonconsciously reflect on some problem which does not enter awareness and 'solve' that problem with a semi-automatic way of processing it, resulting in change of knowledge and perhaps proper future behavior in an environment when the new knowledge is used. Similarly, one may be rational and focused and use reflective consciousness to work out an explicit mathematical problem and do calculations to solve a problem. Hence one may speak of conscious and 'critical reflection'. One resorts to such reflection only when one needs guidance, for instance in interpreting a new experience (Mezirow, 1994, 107). Premise reflection, or critical reflection, involves "…our becoming aware of why we perceive, think, feel, or act as we do and of the reasons for and consequences of our possible habits of hasty judgment, conceptual inadequacy, or error in the process of judging…" (Mezirow, 1994, 108)

In reflective consciousness one must critically reflect upon the result of an interpretation that poses a fundamental problem in the problem-solving process. This may lead to a change in meaning perspectives. Consequently, tacit meanings are related to both i) immediate personal and felt meanings made for an object of perception, which may directly influence subjective experience, such as emotion; and ii) more cognitive and elaborated meanings made for an object of perception via comparing presentational and propositional representations to previous knowledge, which may result in knowledge creation or knowledge construction. The study suggests that both spheres of tacit meaning, either oriented towards changing states of consciousness or changing previous knowledge, are in interaction and may exist in a parallel manner.

The study adopts the view of personal meaning as i) depending on the interrelationships of the perceiver and the object of perception within a particular context, based on for instance goals, personal values and ego-involvement; and ii) taking place mostly at the unconscious level of mind via automatic processing, especially via primary and secondary appraisal in both tacit reflection and comprehension; iii) which may directly give rise to conscious, subjective experiences, such as emotion; and iv) which may also change previous knowledge via knowledge creation or knowledge construction. However, the study does not wish to limit the use of appraisal theory only to emotions. It may be that automatic, unconscious mechanisms such as appraisal may be even broader, and they may also give rise to other types of subjective experiences than emotions. Felt meaning may share many properties with personal meaning.

Felt meaning is seen as i) the result of a resonation of sensory mechanisms of the perceiver and the features of the object of perception; ii) resulting in sensory representations which are the basis of further cognition via projecting symbolic models on sensory representation; which together iii) may directly influence subjective experiences, such as emotions; and iv) which may influence previous knowledge via knowledge creation in further processing via tacit reflection. The study concludes its approach to tacit meaning in Table 3.

| Dimension of tacit meaning | Sources | Mechanisms | Influences |
|---|---|---|---|
| Felt meaning | **Flow of perception:** -resonation of sensory mechanisms and features of the object of perception **Recognition:** -symbolic models | **Prereflective learning:** -using sensory representation and symbolic models to make immediate, presentational and non-linguistic meaning, which also results in some aspects of image-schematic presentational construal | Changing instantly subjective experiences, such as emotion Changing knowledge via tacit reflection, leading to instant knowledge creation Producing representations which act as frames of meaning for subsequent or parallel processes of making meaning, such as aspects of the presentational construal |
| Personal meaning | **Flow of perception:** -resonation of sensory mechanisms and features of the object of perception Recognition: -symbolic models **Further processing:** -relating representations to previous knowledge in more depth | **Prereflective learning and unconscious comprehension:** -using sensory representation and symbolic models to make non-linguistic and linguistic meaning, which also results in some aspects of image-schematic presentational and linguistic, propositional construal -primary and secondary appraisal of person-environment- relationships, such as the immediate relevance of an object of perception to future goals or expectation, self-concept and personal values. **Conscious comprehension in further processing**: -rationalizing and analyzing the situation to make personal meaning and search for coping options | Changing instantly subjective experiences, such as emotion Changing knowledge via tacit reflection, leading to instant knowledge creation Changing knowledge via comprehension at the conscious or unconscious level of mind, leading to knowledge construction Producing representations which act as frames of meaning for subsequent or parallel processes of making meaning, such as aspects of presentational and propositional construals |

**Table 3. Dimensions of felt and personal meaning as tacit meaning.**

They are seen as the results of parallel and interactive processes of making meaning. Both have their sources in the flow of perception and low-level recognition of an object of perception. However,

personal meaning may have its sources also in the further processing in the mind in the form of more elaborated comparisons of representations and previous knowledge.

Felt meaning is made in the mind via prereflective learning in recognition. It results in immediate, non-linguistic and expressive meaning. Personal meaning is made based on using both the process of comprehension and prereflective learning in recognition. This happens at the unconscious level of the the mind. Consequently, both linguistic and non-linguistic meanings may be made at the unconscious level of mind. At the conscious level of the mind, personal meaning may be made via comprehension and secondary appraisal. Felt meanings may influence states of consciousness, such as emotion directly, and change them in a dynamic and rapid manner. Felt meaning may also lead to instant tacit reflection at the level of meaning perspectives and initiate a process of knowledge creation via abstract, non-linguistic, symbolic and presentational representations which are compared to deep elements and structures of meaning in tacit knowledge. Personal meanings may influence states of consciousness similarly to felt meanings. They may also change knowledge via both instant knowledge creation and more accumulative knowledge construction. Also, personal meaning may influence both presentational and propositional representations.

The study discusses the nature of tacit meaning rather than the nature of explicit meanings. The study also elaborates the immediate sources of influence on meaning before presentational and propositional construals are made in the mind. From the point of view of mind and the nature of tacit meaning, the study will now investigate the possible sources of influence on tacit meaning resulting from i) resonance of the features of the object of perception and properties of sensory mechanisms; and ii) symbolic models used in prereflective learning in interaction with the sensory representation in making felt and personal meaning; iii) ways of tacit reflection or everyday reasoning in making personal meaning; and iv) the influence of present states of consciousness, unconscious processes and individual differences on felt and personal meaning. This investigation is done to highlight the complexity of the sources of variability of meaning in the mind, and to be able to concentrate on the sources of variability of felt meaning in a larger context.

## 3.2. Variability of felt and personal meaning

### 3.2.1. Organization of sensation

The structure of sensory information may be seen from the point of view of the habitual ways of organizing sensory information in the mind into sensory representations. These structures may be seen as related to felt meaning, as they are related to the properties of sensory mechanisms and features of objects of perception. However, they may also influence personal meaning made to a degree. There are at least three types of explanations of this structure. First, the structure of perceptual information may be seen as being based on gestalt psychology and the way features of the object of perception are related to structures of sensory mechanisms. Second, the structure of perceptual information may be seen as influenced by cognitive style. Third, the structure of perceptual information may  reflect interactions of sensory modalities. These three structures may also interact

in influencing sensory representations. The study will first elaborate on the view of gestalt psychology on perception.

According to gestalt psychology the way objects are perceived depends on the relationships of the particulars of perception to the whole of perception. Perception is also schematic, not always direct and literal, but rather the result of 'best guesses' for an object of perception. The way to integrate particulars of perception may be governed by certain rules which influence the way information used for the 'best guesses' for an object of perception is structured. (Brunas-Wagstaff, 1998, 24-25)

The basic differentiation is that between figure and ground. They are part of the same perceptual whole. A figure may appear closer to the observer even though figure and ground may be on the same plane. Figure and ground can not be focally seen simultaneously, although they can be seen sequentially. The figure usually occupies a smaller area of the perceptual field than the ground, and it also has a specific form and contour whereas the ground has no specific contour. These principles may apply to visual perception, but also partly to auditory perception. There are also other gestalt rules of perception. Basically, the main idea of these principles is that they minimize load on the perceptual system by maximizing stability or invariant features in perceived information. This may happen via principles of symmetry, regularity, simplicity and uniformity. (Zakia, 1997, 2-12, 65)

Spatial proximity is one of the Gestalt principles. It states that things which are physically close together are perceptually grouped together. Similarity means that individual patterns are perceptually grouped together if they are similar in shape. This placing may be visual, for instance and hence the closer two or more visual elements are, the more it is probable that they will be seen as a pattern. Proximity may also be temporal, such as in music or a motion picture. This means that parts placed close to each other appear as a whole. Continuity means that visual elements which are smooth and continuous are likely to be perceived as a pattern. Symmetry means that symmetrical patterns are perceived as belonging more closely together than asymmetrical patterns. Closure refers to the fact that a closed contour tends to be seen as an object. However, even patterns which are incomplete may be completed, or their gaps may be automatically filled due to this tendency to perceive patterns as closed contours. The principle of relative size means that smaller patterns tend to be perceived as single objects, while larger patterns tend to be perceived as backgrounds. This provides the basis for figure/ground separations, for instance. (Ware, 2000, 203-212; Zakia, 1997, 31-63)

These perceptual laws and principles refer mostly to static visual representations. When perceiving dynamic patterns, there are several other rules. In general, people are very sensitive to patterns in motion. This type of perception is highly dependent on context. For instance, showing a dot inside a rectangle frame may create a feeling of movement of the dot, although when presented only as a dot, there appears to be no inherent movement. This is due to the perceived visual tension between the dot and the frame rather than as an indication of actual physical movement. Causality of motion also is a significant perceptual principle. When an object is presented before the other, or is shown to influence the other, like a ball hitting another ball, the other object is seen as causing the effect in the other object. (Ware, 2000, 230-237; Palmer, 2000, 466-479). Further, people are specifically sensitive to movement that has biological origin:

> *"In considering pattern perception, we should always bear in mind that the perception of abstract patterns is probably not a primary purpose of visual perception. Rather, pattern-finding mechanisms are a part of neural machinery that divides the world into visual objects. For example, the reason that closed contours are so compelling in segmenting space is that they normally define objects in our environment, not that in and of themselves they have any special significance." (Ware, 2000, 240)*

It may then be said that gestalt principles of perception refer closely to the inherent interaction of the features of the object of perception and ways of gaining sensory information about the particular configurations of those objects. In that sense, the gestalt view on perception then emphasizes the bottom-up processing or direct view of perception.

There may also be habitual ways of organizing sensory information, such as cognitive styles. Cognitive style refers to a way of thinking that is usually characteristic of the individual (see Riding and Rayner, 1998). Messick (1994, 869) states: "…cognitive styles are spontaneously applied without conscious consideration or choice in a wide variety of situations having similar information processing requirements." This means that cognitive styles are used in a non-voluntary manner rather than as a function of conscious choice. Leino (1998, 4-6) has proposed the classification of previous research on cognitive style seen in Table 4.

| Focus/theoretical background | Examples of dimensions of cognitive style |
|---|---|
| Information processing<br><br>-Perception psychology, cognitive psychology, clinical psychology | - Conceptual level: individual differences in processing social information; the way an individual 'reads' the stimuli<br>- Field independence vs. field dependence: approaching the environment or task in analytical or holistic terms<br>- Broad vs. narrow categorizing: forming categories in cognition; broad (few categories, many cases), narrow (many categories, few cases)<br>- Reflection vs. impulsivity (speed of information selection and processing); impulsive (faster response, but often incorrect), reflective (slower response after considering all the alternatives)<br>- Focused scanning/unfocused scanning: (extensiveness and intensity of attention); unfocused (all stimuli observed equally intensively); focused (stimuli observed in relevance ranking order; ignoring irrelevant stimuli)<br>- Levelling vs. sharpening (degree of merging new stimuli with previous knowledge when storing knowledge); levelling (minimize stimulus differences); sharpening (exaggerating stimulus differences)<br>- Tolerance for ambiguity (willingness to accept and report unconventional and ambiguous experiences) |

Table 4. Approaches to cognitive style.

In Table 4 different approaches to cognitive style are presented. There seem to be many possible dimensions of cognitive styles. Consequently, there have been problems with the definition, measurement and operationalization of cognitive style. There are attempts to group many dimensions of cognitive styles into a few simple dimensions. Riding (1997, 30) proposes a simplified, two-dimensional model. First, the wholist-analytic dimension refers to whether an individual tends to process information in wholes (wholist) or parts (analytic). Second, the verbal-imagery dimension refers to whether an individual is inclined to represent information during thinking verbally (verbalizer) or in mental pictures (imager). These two styles may have a physiological basis and may control the way in which individuals respond to the events and ideas they experience.

When processing information, wholists may obtain a more balanced view of the whole, while analytics sort out the information into its segments or parts. The strength of wholists is that they see 'the whole picture'. Their weakness is that they find difficulty in analyzing information. Analytics are good at analyzing information into its constituents, but it may be difficult for them to obtain large views on an issue. (Riding, 2000, 13). The relationship of imagers and verbalizers is more subjective experience-based:

> *"Imagers, who are reading, listening to, or considering information experience fluent, spontaneous and frequent mental pictures. By contrast, individuals who are Verbalisers read, listen to, or consider, information in words. The Verbal-Imagery mode of representation is a continuum with individuals placed along it. People in the middle tend to use either mode of representation." (Riding, 2000, 13)*

It may then be that dimensions of cognitive style partly influence how sensory information is structured in the mind and how sensory representations are created. For instance, ways of seeing objects of perception as wholes or parts may be of some consequence to representations and meaning. Further, preference for verbal or visual sensory modalities in representation may also influence meanings made for an object of perception and it may also influence daydreaming or types of mental imagery.

The study states that the principles of Gestalt psychology on how perception is organized are not necessarily directly adopted in the study. However, it may be that a number of principles similar to gestalt laws of perception may operate in making perception more efficient. If so, this may explain to some similarities or regularities in perception between people. Also, it may give rise to meanings. For instance, if two objects are experienced as similar just by being spatially or temporally close together, this may structure meanings. Similarly, the conception of cognitive style is used as one possible way of exemplifying how sensory information and sensory representations are structured in the mind. The gestalt principles of perception are seen as more related to the bottom-up type of influence and cognitive style more as related to the individual differences in perceptual processing. Consequently, a number of organizing principles may be operating in perceptual systems, reducing complexity and load on the system. The structural properties of modalities of sensation are discussed next in more detail.

## 3.2.2. Modalities of sensation

The Gestalt theories have not only emphasized visual perception, but also the unity of the senses. Hornbostel (1938, 214, 216) states that in art

> *"...what is essential...is not that which separates the senses from one another, but that which unites them...It is the same organizing principle which calls forth organism from mere substance, and which binds the stream of happening into wholes, which makes the line a melody which we can follow, and the melody a figure which we can see in one glance...the unity of the senses is given from the very beginning. And together with this the unity of the arts."*

This implies that multimodality and ways of integrating multimodal sensations may be significant in explaining how perception is formed into wholes, even though at the same time each sensory modality may have some unique characteristics. Consequently, when one studies perception scientifically by breaking down different modalities of perception separately, it may be that the inherent tendency of the perceiver to form wholes is neglected. It may be that perception takes place in the spaces between the elements of the object of perception, rather than in them: "Meaningfulness was to be found in the reaction among the elements and in the relationship which formed a unified whole, not in the separate parts themselves." (Barry, 1997, 44).

Consequently, sight, touch and hearing as separate 'channels' of sensation are in an interaction which may give rise to thinking, or the form of thinking.[18] The result of this cross-modal synthesis is then not strictly determined by the nature of the objects of perception or other factors. In a sense, this cross-modal interaction may be seen as emergent:

> *"...a capacity for cross-translating and so reorganizing the differentiated patterns of perceptual modalities. It would operate in terms of its own spontaneous potential for emergent structure and relatively independent of the reward and punishment centers of the limbic region." (Hunt, 1995, 84)*

Cross-modal transformation may allow the emergence of symbolic thoughts. It would mean that thinking may be seen as a form of higher-order organizations based on simpler sensory modalities:

> *"Human symbolic intelligence...emerges with the addition of vocalization-audition to this emergent capacity of visual-tactile translation, creating the potentiality for three-way trans-*

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[18] *An orthogenetic principle may underlie the development of consciousness. This means that development of an organism moves from initially undifferentiated or global organization to a differentiation of multiple parts which are coordinated together. Finally, there is the development of a hierarchic integration of these differentiated levels. Hunt (1995) argues that:*

> *"First comes the progressive differentiation of perceptual attunement in multiple modalities on the vertebrate and especially mammalian levels, where recognitive need systems are largely governed by modality-specific releasing cues. That will bring about the developmental possibility of a subsequent reciprocal translation of these modalities...Cross-modal translation would be developmentally distinct from both the associational linkage of differentiated modalities in learned reinforcement and the more undifferentiated polymodal redundancy that is part of navigating an array." (Hunt, 1995, 84)*

*formations across perceptual patterns that would eventuate in the symbolic frames of human intelligence...indeed...language entails the transformation of patterns seen into patterns kinesthetically articulated, in turn producing vocal sounds whose enunciation induces in others visualizations that are akin to the initiating visual forms. We see something and transform it into movements that make a sound." (Hunt, 1995, 85)*

This would mean that the symbolic abilities of people may be at least partly rooted in ways of sensing, or patterns of ways of sensing the world. Hence, one central content of thinking which is continuously processed in consciousness would be different patterns of cross-modal translations of sensation. Also, knowledge of the world would be partly based on patterns of such sensations. However, there may also be other aspects to sensation than the interactions of sensory modalities. For instance, there may be dimensions related to a particular sensory modality as such. Also, it is not clear what may mediate different types of interactions between sensory modalities.

Consequently, sensory representations and subjective experiences may also be visual-vocal, or kinesthetic-verbal; of a mixture of different types of sensory modalities and their combinations in creative ways. There are two possible ways of interactions of sensory modalities. First, there is amodality of invariant features, which means that there are features in sensations which are common to each modality to a degree. Second, there may be specific combinations of sensory modalities.

In theories of intersensory perception, modalities of perception have been often treated as separate. This means that the senses are sources of different types of information, and that special mechanisms of translation are needed for the cross-talking of sensory modalities. Often touch, cognitive and linguistic systems and vision have been considered as such a mediating modality between other modalities of sensation. In other words, they have acted as organizing principles of a variety of sensory modalities. (Millar, 1997, 19). One may also view the organizing principles of interactions of modalities of information as based on some invariant, amodal features which are inherent in each modality itself. For instance, it may be that sensory systems are unitary and that certain unimportant modality-specific aspects of stimulation, such as color may not be subject to this:

*"What is common between the sense modalities is the direct perception of amodal, abstract relational properties that are invariant across the sensory systems, although they are picked up more or less well by different sensory modalities. The theory implies that vision and touch give exactly the same invariant information about shape, except that touch is less efficient." (Millar, 1997, 19)*

There have been studies of so-called form constants when investigating the experience of hallucinations in mental patients. Several repeating descriptions of how hallucinations were seen and experienced were found. These repetitions seemed to fall into four classes of visual patterns: gratings and honeycombs, cobwebs, tunnels and cones and spirals (Cytowic, 1997, 29). He argues further that:

*"Variations in colour, brightness, movement, perspective, symmetry and replication provide finer gradiation of the subjective experience. These are not just visual phenomena but sensory form constants that are apparent in any spatially extended sense. Initially, we*

*thought these spatial configurations reflected some anatomic structure; then we tried mapping it to some prototypical function. Now, neuroscience is not sure what their physical correlates are, but many people do suspect that the form constants point to some deep, fundamental aspect of perception." (Cytowic, 1997, 29)*

Hence, while perception may be tuned to be very good at observing the natural environment, it may also be used to observe less natural or more abstract phenomena. For instance, fireworks fascinate many people and they are experienced as exciting:

*"The pulsation, flicker, drift, rotation and perspective of fireworks of course remind us of the form constants. When we see fireworks, do we not get a feeling of salience, as if we recognize something? Isn't the 'that' or 'that was great', an ineffable experience of recognition? I do not think it is out of line to suggest that the satisfying appeal of something as unnatural as a fireworks display lies in its astonishing similarity to an externalized catalogue of form constants." (Cytowic, 1997, 30)*

The study discussed the hologenetic principle of perception by Leeuwen (1998) including the dimension of perceptual integration of sensory modalities. There is also neurological evidence for the convergence of inputs from different sensations:

*"Multimodal cells in the brain respond to stimulation from more than one type of sensory source and this presumably contributes to intersensory processing...inputs that have been analyzed by different specialized systems converge in the same cerebral areas, often in single neurons..."(Millar, 1997, 20)*

Similarly to this, Crick (1994, 244-245) claims that:

*"...neurons in the visual cortex fire in a somewhat rhythmical manner when they become active due to a suitable stimulus in the visual field...neurons symbolizing all the different attributes of a single object (shape, colour, movement, etc.)...bind these attributes by firing together in synchrony."*

This suggests that the brain is extracting invariant features of stimuli as a whole. Then, a kind of temporal synchrony occurs when perceptions are comprehended simultaneously. According to Barry (1997, 94): "Perception then may be something very much like a neurological symphony, an ancient music capable of wonderfully new transformations of thought." However, it may be that the invariant features of sensation may be too rigid a categorization. Based on empirical findings it has been somewhat difficult to prove the existence of a strict amodal structure. Rather, the intersensory coding of sensory information may be seen as convergence and partial overlap of inputs from different senses. Also, the outputs of these systems are convergent: "...outputs from specialized analyzing systems normally also converge and partially overlap, thus providing important further redundancy." (Millar, 1997, 19). In empirical studies it has been shown that matching shapes and lengths across modalities is not necessarily worse than within modalities. Crossmodal coding does not significantly improve with age or experience. Also, crossmodal effects are not necessarily sym-

metrical: Seeing a line and recognizing it from touch produces a different effect from feeling it first and judging it from vision. (Millar, 1997, 19-20)

Millar (1997, 20) suggests this evidence indicates that there are certain similarities to different modalities of perception, but that there are also modality-specific features. The interactions are then of mutual redundancy, for instance, and these interactions overlap with the sensory-specific processing systems. Another proof of crossmodal interactions of senses is the phenomenon of synesthesia:

> *"Synesthesia refers to a curious phenomenon of perception in which sensory images or qualities of one modality, for instance, vision, find themselves transferred to another modality, such as taste or hearing. To a synesthetic perceiver, a sip of lemonade may take on a distinctive green color as well as a sour-sweet taste, or an aria sung by a soprano may take on visible form that modulates in shape, size and tint with the pitch of each note. In synesthesia, therefore, an inducing stimulus produces at the same time, two kinds of sensory response: the primary sensory experience that is normally associated with that stimulus and, anomalously, a secondary experience in another modality." (Marks, 2000, 121)*

This may imply certain mechanisms, such as overlapping, which are involved in the translation of stimuli from one modality to another. There are two cases of synesthesia: weak and strong. In weak synesthesia the experience is not especially vivid, although it is perceptible. In strong synesthesia the experience is usually vivid and difficult to separate from a real experience. (Marks, 2000, 122-123). A classic example of synesthesia is color hearing. When people perceive music with high tone, they may experience bright colors or other sensations such as taste or touch. Luria (1968) describes an experiment with a synesthetic person: [19]

> *"Presented with a tone pitched at 50 cycles per second and an amplitude of 100 decibels, S. saw a brown strip against a dark background that had red, tongue-like edges…The sense of taste experienced was like that of sweet and sour borscht, a sensation that gripped his entire tongue…Presented with a tone pitched at 2,000 cycles per second and having an amplitude of 113 decibels, S. said: "It looks something like fireworks tinged with a pink-red hue. The strip of color feels rough and unpleasant, and it has an ugly taste…" (Luria, 1968, 45-46)*

Synesthesia can consist of regular and systematic relations of two or more modalities of sensation. There is widespread research on the synesthetic connection between temperature and colors. For instance, certain colors, such as orange, are warm and certain colors, such as blue or green are cool. In visual hearing, one can experience shapes, sizes or colors based on auditory stimuli.:

> *"…many cases of visual hearing reveal a direct correspondence between the pitch of sound and the lightness or brightness of the associated visual image: The higher the frequency of*

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[19] *Stern (1985) has studied the perceptions of infants. He found that even small babies recognize the interactions of an auditory-temporal sequence, such as a rhythm and visual-temporal sequences, such as a blinking light. They are able to associate the intensities of these two modalities of perception easily. (Stern, 1985, 48-49).*

*the inducing sound, and hence the higher its pitch, the greater the visual brightness or lightness. Low-frequency sounds tend to induce visual photisms with dark colors, such as brown, navy blue, and crimson, whereas high-frequency sounds tend to induce light or bright colors, such as white or yellow." (Marks, 2000, 128)*

Another type of synesthesia in visual-auditory interaction is the relationship of pitch and the spatial features of size and shape: "In synesthetic perceivers, low-pitched sounds generically produce photisms with rounded, relatively large shapes, whereas high-pitched sounds produce photisms with more angular shapes and smaller sizes." (Marks, 2000, 129)[20] There seems to be a principle of congruence at play with certain kinds of synesthetic experiences. This may hold for a variety of intermodal relations:

*"…Wherever there are reliable and systematic synesthetic correspondences (between pitch and brightness, between loudness and brightness, and between pitch and angular shape), nonsynesthetic individuals process intermodally congruent or matching pairs of stimuli (e.g. low-pitched sounds paired with dark colors, small sizes, sharp contours; high-pitched sounds paired with bright colors, large sizes, rounded contours) more efficiently than incongruent or mismatching pairs of stimuli." (Marks, 2000, 141)*

One possible explanation for synesthesia or synesthetic effects in nonsynesthetic individuals is that there is a common way to neurally code a variety of stimuli in different modalities. In essence, there may be relatively few choices in sensory coding available for the nervous system. Thus, a time-based or frequency-based rule may be used for both loudness and bright color as relative to rates of response across populations of active neurons: [21]

*"The puzzling result that a single visual dimension - brightness - maps psychologically onto two auditory dimensions - pitch and loudness - thereby finds a reasonable explanation in mechanisms of sensory encoding." (Marks, 2000, 143-144)*

Further, one explanation of the influence of potential form constants in perception is that the brain is representational in a digital way. This means that the brain encodes the sensory modalities in various computational ways. Yet, subjective experience is analogue, smooth, and continuous. One implication of this view is that synesthetic effects may be related to the form constants. Synesthetic observations may then be a way to study form constants. In a way form constants may then be the

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[20] *There are differences between how synesthetic and non-synesthetic individuals perceive stimuli. For instance, non-synesthetic individuals vary largely in their cross-modal perceptions in visual-geometric associations. However, the dimension of a louder sound is widely perceived as a brighter color, as is a higher pitched sound. This implies that both loudness and pitch of sound may be related to experienced visual brightness of stimuli. (Marks, 2000, 129-130)*

[21] *The mechanisms underlying synesthesia are not perfectly known. However, it may include suppression of activity in the cerebral neocortex and an increase in activity also in neural systems, especially the limbic system. A critical area in the brain involved in synesthesia is the hippocampus. Another view of synesthesia is that it is a result of a cutoff between higher and a lower, more primitive- level processing of information. (Marks, 2000, 131-133)*

building blocks of perception based on which subjective experiences are formed. (Cytowic, 1997, 38) [22]

The study treats synesthetic effects as one possible way the sensory systems may be related to each other, perhaps via sharing similar encoding principles such as the rhythm of encoding via rates of response of neurons. However, it may be that there are many other mechanisms at work. The study does not wish to elaborate on these dimensions further; rather it suffices to state that i) interactions between various modalities of sensation are possible and commonplace; ii) based on unspecified, perhaps differing mechanisms, such as common ways of organizing sensory information; and iii) these interactions may give rise to certain types of tacit meaning, such as presentational felt meaning, via influencing sensory representations. Next, the study will elaborate influences on meaning in prereflective learning using symbolic models.

### 3.2.3. Primary and complex metaphor

There are aspects of the environment people may understand directly based on their physical involvement with the environment related to the types of symbolic models used in recognition of sensory representations. Since this type of perception is perhaps related to the evaluation of the relationship of the person and the environment, the resulting tacit meanings may partly be personal meanings. However, there may also be more abstract features used in symbolic models, which may give rise to felt meanings. There are various sources of direct understanding [23] in prereflective learning when projecting symbolic models on sensory representations, but the study concentrates on primary metaphors.

Primary metaphors are used for directly and quickly categorizing objects of perception.[24] Since the categories used to judge the events of the world are neural, they are embodied in the form of knowledge. (Lakoff and Johnson, 1999, 19). Reasoning with embodied mental models has consequenses for the way people understand the world:

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[22] *However, the influence of learning is difficult to rule out from synesthetic effects. In some experiments arbitrary associations of colors and tones have been repeated hundreds of times; resulting in modest recognition of similar patterns between subjects. (Marks, 2000, 144)*

[23] *First, there is entity structure. Humans are bounded entities and hence people experience other entities they encounter as bounded, too. Second, the orientational structure of a situation is directly evident. For instance, something may be in front or behind. Third, there are automatic processes of interaction with their environment. They are the processes by which people operate most of the time when in interaction with the environment. Fourth, people have direct experiential gestalts. This means that the objects of perception have direct meaning in being perceptual, motor activity, part/whole, functional or purposive. Fifth, there is the background which can be thought of as an experiential gestalt which serves as a background for making meaning for something people experience as an aspect of that gestalt. Sixth, highlighting means that people understand a situation as being a part of an experiential gestalt and hence can pick out the elements of the situation which are fitting into the experiential gestalt. Seventh, objects of perception have interactional properties. This means people categorize*

*"An embodied concept is a neural structure that is actually part of, or makes use of, the sensorimotor systems of our brains. Much of conceptual inference is, therefore, sensorimotor inference." (Lakoff and Johnson, 1999, 20)*

Hence, the locus of conceptual reason in prereflective learning or other processes of making meaning may be partly similar to the locus of sensory perception and motor- bodily function:

*"Our subjective mental life is enormous in scope and richness. We make subjective judgments about such abstract things as importance, similarity, difficulty and morality, and we have subjective experiences of desire, affection, intimacy, and achievement. Yet, as rich as these experiences are, much of the way we conceptualize them, reason about them and visualize them comes from other domains of experience. These other domains are mostly sensorimotor domains...as when we conceptualize understanding an idea (subjective experience) in terms of grasping an object (sensorimotor experience) and failing to understand an idea as having it go right by us or over our heads. The cognitive mechanism for such conceptualizations is conceptual metaphor, which allows us to use the physical logic of grasping to reason about understanding." (Lakoff and Johnson, 1999, 45)*

People acquire primary metaphors in childhood. Further, since people's bodies move in time-space continuously, they may form even more primary metaphors. What, then, are the contents of primary metaphors as 'direct' and embodied symbolic models to make instant meaning for objects of perception?

There may be hundreds of primary metaphors. For instance affection may be experienced as warmth. This may be due to the sensorimotor domain of warmth, which may be associated with a primary experience in childhood as a feeling of warmth while being held by one's parents. Similarly, importance may be seen as big, as for a child large objects may be able to exert influence over the child. Happy may be up, like having a straight up posture when happy. Intimacy may be physical closeness. Bad things stink like spoiled food. Difficulties are burdens like carrying heavy objects. More is up, like piling up things on top of each other. Categories are containers, like food in containers. Similarity may be closeness, as things may be seen clustered together in real life, and organization is physical structure, as in how some pieces of material fit together. (Lakoff and Johnson, 1999, 50-51). [25]

There are also complex metaphors in addition to primary metaphors. They are built from primary metaphors and certain types of previous knowledge, such as cultural models, informal and popular theories of the world, or knowledge and beliefs which are typical to a certain group of people (Lakoff and Johnson, 1999, 60).

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[24] *The use of primary metaphors is seen as based on neural dynamics of the brain:*

*"Whenever a domain of subjective experience or judgment is coactivated regularly with a sensorimotor domain, permanent neural connections are established via synaptic weight changes. Those connections, which you have unconsciously formed by the thousands, provide inferential structure and qualitative experience activated in the sensorimotor system to the subjective domains they are associated with." (Lakoff and Johnson, 1999, 57)*

It seems that both primary and complex metaphors are at least partly social. Primary metaphors are the reflections of generic human 'form' on knowledge. Many people have similar bodies and similar sensorimotor systems. Hence, they have partly similar experiences, which may turn into primary metaphors. Complex metaphors are then seen as being in interaction with cultural knowledge and primary metaphor. Complex metaphors may also be linked to symbols, as they make use of the immediate, sensory-motor primary metaphors and deep structures of cultural knowledge, such as archetypes. It also seems that primary metaphors are crossmodal, i.e. they involve the mapping of sensory-motor perception with other types of sensations. From the point of view of the study, primary metaphors and complex metaphors are treated as examples of various symbolic models in previous knowledge which are used directly to map onto sensory representation in recognition to make tacit meaning. Next, ways of quick recognition and reasoning are discussed as shortcuts to judgment and meaning in prereflective learning and comprehension at the unconscious level of mind.

## 3.2.4. Ways of reasoning

Prereflective learning and comprehension in the unconscious may be influenced by quick ways of reasoning. These ways of reasoning may then influence personal meaning. In everyday life, people are faced with complex situations and may make meaning in habitual ways, rather than ways that are based on multisided analysis.

Iyengar and Kinder (1987, 64) state that rather than conducting exhaustive analysis of each situation, people resort to intuitive rules of thumb and shortcuts when making meaning: "One such heuristic is reliance upon information that is most accessible." Iyengar and Kinder (1987, 64) further argue that since the processes of judgment in everyday life are rarely exciting, creative or detailed, people tend to depend less on the repertoire of their knowledge in-depth, but rather on

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[25] *Time may be seen as motion, as one observes moving objects. Change may be seen as motion also, since one may experience the changes of states of matter or objects when one moves. States may be experienced as locations, as one experiences certain states of matter correlated with a certain location. Hence, one may experience time and space subjectively as ´here and now´, as discussed earlier in the study. Actions may be seen as self-propelled motions, as one feels himself moving across space voluntarily as a child to perceive other objects or to interact with them. Causes of events may be seen as physical forces, as in throwing objects so that they hit other objects. Actions then may entail force to move himself or an object. Causes of events are then consequences of these forces which are moving the objects. (Lakoff and Johnson, 1999, 52-53)*

*Purposes of actions may be seen as destinations. For instance, to eat, one must move to the fridge to obtain food. Purposes may also be seen as desired objects to be grabbed, as in when one wants a toy and grabs it. The motivations or reasons for actions may be seen as the desire to use force to move oneself or an object. Knowing may be thought of as seeing, since it is the dominant sense. Seeing may be seen as touching also, since one may pick up an object to further examine it. Understanding may be seen as grasping, when one may manipulate the object one has picked up. Knowing of the events of the world may be heavily associated with seeing, but also with exploration and manipulation of physical objects. Knowledge then may have an inherent property of action. (Lakoff and Johnson, 1999, 53-54)*

what comes to mind when they encounter a particular object of perception to be interpreted. Fishhoff, Slovic and Lichtenstein (1980, 127) state that:

> *"People solve problems, including the determination of their own values, with what comes to mind. The more detailed, exciting, and creative their inferential process, the more likely they are to think of all they know of the problem. The briefer that process becomes, the more likely they will be controlled by the relative accessibility of various considerations."*

The process of social inference may be seen as an example of the way people may make everyday judgments and meaning. Inference may be seen as both process and product; it involves assessing what information needs to be gathered to be able to make a particular judgment; or it may be the result of that reasoning process, i.e. the content of the judgment made (Fiske and Taylor, 1991, 346). The study concentrates briefly on one central aspect of social inference i.e.; the reasons for action. Often people want to know why a particular event has happened and what are the sources or 'forces' behind a particular event.

Attribution may be seen as the explanation of causality to why a certain event has happened. There are three factors influencing the perception of an existing causality in general. First, if there is temporal ordering of events, it may be perceived that the former event caused the latter. Second, there may be spatio-temporal contiguity, which means that cause and effect must be close to each other in space and time to be perceived as causal. Third, people tend to judge stimuli that attract attention, which are more causal than stimuli which are in the visual background. (Fiske and Taylor, 1991, 58-59)

Further, there are some fundamental biases in causal attribution regarding the behavior of other people. First, there is the fundamental attribution error. This means that people overestimate the influence of the individual in a situation on the outcome of the situation, and underestimate the situational factors. There is also an interesting effect called the actor-observer-effect. This means there is a tendency to explain the reasons for one's action by situational factors, but at the same time explain the actions of others via more psychological factors.[26] Another fundamental bias in attributing social causality may be seen in the use of consensus information. This means that even when the opinions of others are clearly available, people still use their own version of consensus-information. This means that they project what they think others will do in a given situation and use that as the opinion of others. This production of the opinion of others is a result of a self-reflection and may exaggerate the degree to which other people are seen as similar to oneself. (Fiske and Taylor, 1991, 67-68, 93)

There are also individual differences in attribution, called the attribution style, which is: "…a tendency to make particular kinds of causal inferences, rather than others, across different situations

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[26] *The base of this effect may be that the situation one is in is perceived as salient and hence it is seen as having causal influence on oneself. In other words, one may see himself as a ground due to not being able to see oneself as a figure arising from the ground. When observing others moving and acting in an environment, they may constitute a figure and the situation is the ground, and hence the causes of behavior are seen to be more internal, as the actors are more salient. (Fiske and Taylor, 1991, 67-75)*

and across time." (Metalsky and Abramson, 1981, 38).[27] It is then evident that people are not 'little scientists' when evaluating objects of perception. There are four archetypal ways of evaluating information quickly which people may use most often. These may be seen as quick shortcuts to making a judgment based on insufficient information to fill in the gaps in an ambiguous situation.

First, the representativeness heuristic is used to make inferences about probability. This is based on comparing the attributes of one object of perception to the attributes of another and making a similarity or difference judgment based on a number of perceived similarities or differences. For instance, if the object of perception being judged is perceived as having many properties similar to another object of perception, the probability that they will be judged as associated or similar is high. Hence, one may judge a person to be an engineer on the basis of his wearing glasses, as engineers often wear glasses. (Fiske and Taylor, 1991, 382)

Second, the availability heuristic means that people evaluate the likelihood of an event based on how quickly associations to the event come to their minds. When one is able to achieve an association to an object of perception very quickly, it may be interpreted as meaning that the event occurs frequently or has a good likelihood of occurring in the future. Hence, the ease of retrieval of related knowledge from memory may influence judgments. This emphasizes the role of priming in making meaning. Third, the simulation heuristic is used to construct hypothetical scenarios on how events will unfold. It may be based on the availability heuristic. One may play out different scenarios for the event in his mind. The bias here is that people tend to judge situations which they have simulated in their minds as more likely to happen than not. It may mean that people give more weight to factors which may make the event happen rather than factors which may keep the event from happening. Fourth, when people make judgments under uncertain conditions, there is a tendency to reduce ambiguity by starting with a reference point or beginning anchor and then adjusting the anchor until a conclusion is reached. For instance, when people are asked to evaluate how a certain person will behave in a situation, they tend to judge the probability of behavior based on how they would have themselves behaved. In this case people use themselves as an anchor in determining a judgment. (Fiske and Taylor, 1991, 388-389)

There are many other less frequently used ways people may use shortcuts in the collection of information needed for a particular judgment. For instance, they sample information in an unrepresentative manner and draw inferences from small and unreliable samples. Case histories of events also may influence people more than solid information. There is also the phenomenon of regression. This means that extreme events, when observed again and again, tend to seem less extreme. Further, extreme events are likely to be used in predicting the future of such events in general. This

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[27] *Much research has been conducted on the pessimistic attributional style, characterized by a tendency to regard aversive events as caused by internal, stable and pervasive, global factors. When one believes that desirable outcomes are unlikely or when one has no way of influencing a situation to be favorable, depression and helplessness occur. Reflecting this, there are people who chronically see positive events as due to external, unstable and specific factors and failures due to stable, internal, and global factors. When these types of people are in a situation which may be depressing, their way of attributing the causes of the situation tends to depress them even more. (Fiske and Taylor, 1991, 88-89)*

may reflect the tendency of people to rely on the truthfulness of unlikely events. When integrating collected information together, there also biases. In the case of an insufficient amount of information, people evaluate covariation, i.e. the degree of association of two or more events, mostly based on their prior expectations and beliefs. (Fiske and Taylor, 1991, 404-405)

In conclusion, there may be the following sources of influence on meanings made for an object of perception prereflective learning and comprehension by ways of quick everyday reasoning: i) using similarity heuristics; ii) using availability heuristics (priming); iii) using hypothetical scenarios on how future events will unfold based on the availability heuristic; and iv) using self as an anchor of making meaning in an ambiguous situation. General attribution is related to i) temporal ordering; ii) spatio-temporal closeness; and iii) vividness of stimuli. Social attribution is influenced by: i) fundamental attribution error; ii) actor-observer-effect; iii) use of consensus information; and iv) individual differences such as attribution style. The categorizations made here do not necessarily reflect a complete list of all possible influences on meanings made for a particular object of perception. Rather they may be treated as a sample. As ways of reasoning more conceptualize the person-environment relationship, they may be more related to personal meaning than felt meaning. Next, the study discusses the influence of present states of consciousness and some individual differences on making meaning.

## 3.2.5. Individual differences

The study will now discuss some well known individual differences. The aim is to create a better view of some basic-level variables which may be involved in the variability of meaning in the process of perception. These variables can then be included in the model of the variability of meaning in the next chapter.

Consequently, a number of individual, situational and cultural differences may influence perception and meanings made. For instance, age, gender, personality, physiological state, mood or an individual's life experience may influence a particular perception. Also the social environment, direct physical environmental conditions, cultural background or tradition may influence a particular perception. Aging influences the ability to perceive. When one grows older, perceptual abilities in general seem to improve, but certain physical aspects detoriate. Gender differences in perception have been found for instance in touch, taste and smell, but for visual perception the differences between genders may not be so great. (Rookes and Willson, 2000, 93-94) [28]

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[28] *Personality influences the way a person behaves differently from others in certain situations and how a particular person may respond to information. For instance, there may be people who are field-dependent or field-independent, depending on whether they are able to visually perceive wholes in complex figures, or not as discussed with cognitive styles. This may in turn influence the way they perceive visual information. Also, extroverts and introverts may differ in perception. Introverts have more sensitive visual perception and are generally better with perceptual tasks which may require sustained attention. (Rookes and Willson, 2000, 95)*

With individual differences there is the question of what explains or predicts behavior in a particular situation. This is an inherently complex question, which may be dependent on the type of individual difference, such as personality, and the type of situation. The study does not wish to build a detailed theory of this complex issue, but will address the nature of interaction of people and situational factors.

The interactionist view of personality entails that behavior results from the interaction of person-centered and situation-related variables. There may be situations which allow the maximization of individual differences and situations which minimize individual differences in behavior. One can divide between situational moderators of personality and dispositional moderators of situations. When either the situation or individual difference is the dominant predictor of behavior, there may be two basic types of such situations. First, a strong situation is one in which there are only a few choices available for action. This makes most people behave similarly. A weak situation is then a situation in which people may have a variety of options for action and may manifest their individuality. Second, there are tasks which involve a high degree of self-absorption so that attention is focused on the details of the procedure. In these situations people become less self-aware and may behave similarly to each other. This is due to the automatic and habitual nature of the behavior within a particular situation. In contrast to this, when people are self-reflecting freely, they may manifest individual differences. (Brunas-Wagstaff, 1998, 76-77)

This implies that if one is able to know enough of a particular individual difference and enough about a particular situation, it may be possible to predict how people may behave in that situation. While this may be very difficult to establish across a wide variety of contexts, concentrating on a particular situation may help in using the interactionist approach to individual differences. Hence, the study concludes that there is an interplay of situational and individual forces in influencing behavior in a particular situation. However, the study does not wish to elaborate more on this issue. Consequently, a number of individual differences in interaction with the type of situation may influence meanings made for an object of perception.

States of consciousness are now examined as a source of influence on tacit meaning. When concentrating on the immediate effect of an object of perception on the mind, one particular aspect of subjective experience as a state of consciousness is emotion and mood. It has been claimed that affect, evaluation and mood are important aspects of perception. They have been seen even as dominant when interpreting the social actions of other people: "This dominant factor cuts across traits, behavior, and appearance. Regardless of which other dimensions organize people's descriptions of other people…the overall affective dimension emerges." (Fiske and Taylor, 1991, 223).

Emotion and moods may then influence the way people make judgments and meaning. Mood congruence means that people remember more easily material which fits the valence of their current mood state. This means that people tend to recall positive material in positive moods and negative material in negative moods. Mood also influences judgment. People who feel positive and cheerful like everything better such as the future, politics and themselves. A negative mood does not seem to influence people as directly as a positive mood, and it may be hard to distinguish the effects of a

neutral vs. a negative mood. However, some effects occur, such as people judging other people according to more negative traits when temporarily depressed. When making decisions people in a positive mood tend to be more impulsive, make decisions quickly, see more unusual connections between things and are more creative. (Fiske and Taylor, 1991, 410, 443, 447, 449). Moods may also influence the kinds of schemas that are applied in making meaning. Moods do not need to be strong in order for effects to occur:

> "Unlike strong emotion, these states do not interrupt our thought and behavior; rather, they gently color and redirect ongoing thoughts and actions, influencing what will happen next but almost without notice and certainly without changing the context or basic activity." (Isen, 1984, 186-187)

Moods may then have 'carry over-effects' wherein a certain mood influences evaluations or judgments for a while. Hence, the influence of moods is seen as the influence of subjective experience on meanings made for objects of perception. However, there is likely to be a flux of emotions in consciousness at any given time with differing temporal lengths, valences and intensities. The study views emotion as an integrated part of cognition, as discussed in relation to appraisal theory. The study then adopts the position that emotion and mood with different temporal reaches, intensities and valences may influence the way people perceive and make meaning in a particular situation, for instance via mood congruence.

Also, other types of subjective experiences may influence meaning. For instance, if there is a volitional state, such as wanting to find a particular book, it may be that one finds a particular book easier in the library. Priming in general mediates the influences of states of consciousness into the process of making meaning. This is due to people resorting to 'shortcuts' in making meaning, i.e. using the mental models most easily available or using mental models congruent with previous mood states, for instance. Next, the study summarizes its view on the sources of variability of meaning in the mind.

# 4. Meaning Interfaces

## 4.1. Variability of meaning in mind

In this chapter a model of the variability of meaning in mind, objects of perception and context is introduced as Meaning Interfaces. This model enables the focus of the study on the sources of variability of meaning in relation to a given object of perception. Also, it enables the focus on the sources of variability of felt meaning. Meaning Interfaces act as a conceptual conclusion of the nature of the perceiver in context. Meaning Interfaces is further used to relate media and communications technologies to the mind as an object of perception. The chapter proceeds in three parts. First, the sources of variability of meaning in mind are summarized. Second, mechanisms of perception of some objects over others in context are defined as attention and salience. Third, three stages of perceptual processing when making meaning are introduced as the basis of making meaning in the mind.

The study will now summarize its approach of the key sources of variability of tacit and explicit meaning in prereflective learning and comprehension in Table 5. This view does not necessarily include the sources of influence on meaning resulting from more in-depth comparison of representations of objects of perception with previous knowledge. Rather, it focuses on the immediate effects on meaning in the very quick making of meaning for an object of perception in the area of tacit meaning before further, more in-depth processing is initiated.

In Table 5 the mind has been divided by level of mind and types of processes involved in perception and making of meaning. In prereflective learning the flow of sensations may be carrying influences of modality specific features, amodal features and crossmodal features as well as individual differences, such as ways of organizing sensory information. These influence sensory representations. In recognition there may be the influence of different types of symbolic models used, such as complex and primary metaphors; ways of reasoning; individual differences, such as attributional style and cognitive style as well as motives and needs, such as cognitive consistency and self-consistency. In prereflective learning the flow of sensations and recognition produces various types of representations, such as sensory representation which is compared to symbolic models to construct presentational construal. Also, priming as the influence of past processing and future expectations, as well as needs, motives and goals, influences meaning in prereflective learning. The meanings made at this unconscious level of mind are tacit, i.e. felt and/or personal meanings and possibly other types of tacit meanings not conceptualized in the study. These may directly and instantly lead to changes in subjective experience, such as emotion and/or to knowledge creation via tacit reflection. Also, they may be processed further.

In comprehension at the unconscious level of mind, a propositional construal is created. This is then compared to presentational construals and previous knowledge in more depth, resulting in cycles of iteration which look for matches between the representations and previous knowledge until a match is found. These may be influenced by priming, similarly to prereflective learning. Meanings generated may lead to changes of states of consciousness and/or previous knowledge via tacit reflection. If there is not much energy spent on accommodating the new information into

| Level of mind | Sources of variability of meaning |
|---|---|
| **Unconscious**<br><br>1. Prereflective learning | **A. Flow of sensation:**<br>i) Modality-specific features<br>ii) Amodal features (rhythm, gestalt-laws, form constants, other)<br>iii) Crossmodal features (synesthetic, multimodal, other)<br>iv) Individual differences (cognitive style, age, gender, personality, other)<br><br>**B. Recognition:**<br>i) Ways of reasoning (various)<br>ii) Priming (information recently processed in the mind, needs and motives, future expectations and goals, other)<br>iii) Individual differences (cognitive style, age, gender, personality, attribution style, other)<br><br>**C. Type of representation:**<br>i) Sensory representation<br>ii) Symbolic models (primary and complex metaphor, other)<br>iii) Presentational representation based on sensory representation and symbolic models |
| **2. Comprehension** | **A. Type of representation:**<br>i) Presentational and propositional construal<br>ii) Previous knowledge (meaning perspectives, meaning schemes, other)<br><br>**B. Other**<br>i) Priming (information recently processed in the mind, needs and motives, future expectations and goals, other) |
| **Conscious**<br><br>**1. Priming** | **A. Subjective experiences in peripheral awareness**<br>**Levels:** primary/reflective consciousness, focal/peripheral awareness<br>**Qualities:** flow, emotion, daydreaming, (volition, mental imagery, remembering, inner speech, conceptual thought, unity)<br><br>**B. Perceptual set:** motives, needs, volition, future expectations and goals |
| **2. Comprehension** | i) Reflection of critical reflection |
| **3. Volition** | May monitor and interfere with processing, may initiate autonomous action. |

Table 5. **Sources of variability of meaning in the mind.**

previous knowledge, it may be that knowledge may not be changed radically. This may imply knowledge construction. However, it is also possible to critically reflect on the nature of the new information vs. previous knowledge via tacit reflection. This may lead to problem posing, which may lead to immediate knowledge creation.

At the conscious level of mind there is the influence of priming. This includes the contents of subjective experiences in peripheral awareness and perceptual set. Another conscious process is explicit ways of rationalization and making meaning in comprehension. Subjective experiences

may vary quickly from emotions to daydreaming to flow to conscious volition, for instance. One may also consciously initiate problem solving based on volition. If one uses critical reflection on the premises of the problem, it may be that the result is knowledge creation. If there is no critical reflection, the result may be knowledge construction.

In Table 5 there are a number of possible influences on tacit meaning. Influences on felt meaning are seen as more related to the flow of sensations and the resonances of features of the objects of perception and the properties of sensory mechanisms. This resonance then influences sensory representations. In recognition, sensory representations compared to symbolic models, such as primary and complex metaphors, may then give rise directly to presentational felt meanings. Personal meaning is seen as more related to the relationship of person and environment and more influenced by ways of reasoning, types of symbolic models used, future goals and expectations, motives and needs and present states of consciousness. It may also be that felt and personal meaning may exist parallelly in the mind, and are then partly mixed. Consequently, the division made is not exact, but only suggests some emphasis on certain types of influences on tacit meaning.

Felt meaning is non-linguistic, as is personal meaning made in primary appraisal. Personal meaning made in secondary appraisal or comprehension is more linguistic. Also, as discussed, propositional construals introduce the dimension of tacit, semantic meanings in comprehension at the unconscious level of mind. Felt, personal and tacit semantic meaning may exist in parallel and interact to create a polysemy of meaning.

How then to separate the influence of non-linguistic personal and felt meaning and tacit linguistic meaning, such as personal and semantic meaning? This may be difficult due to their mixed nature and due to meaning being polysemic. However, as discussed, one may bring the influence of felt meaning forward by deliberately delaying semantic categorizations. This means that there is an object of perception, which does not emphasize semantic categorizations. Hence, it may be experienced more 'directly' via the use of non-linguistic primary metaphor, for instance. This may then change subjective experience. Personal meaning may also be involved in tacit, immediate meanings made. However, if there is an object of perception which does not have an immediate personal meaning, it may be that felt meaning dominates. Such an object of perception may be an abstract painting, for instance. However, as can be seen, many objects of perception are not abstract, but concrete and may have meaningful relationships to the perceiver, influencing the making of personal and semantic tacit meaning.

One should observe that the model described in Table 5 is complex and schematic. Also, there may be different situational factors which may guide the tendencies to make meaning. For instance, in a threatening situation there may not be much choice for making meaning, but to be afraid and escape. In a relaxed situation with no time pressure for the making of meaning, one may experience objects of perception in a multitude of ways and levels. Hence, the environment may also influence possible meanings made in a certain situation. This reflects the continuous tension between mind and context.

It should be noted that the ontological standing of the study was that of mind and knowledge of the mind as an ontological category. Also, the way the study has outlined perception speaks for unity of mind and context, rather than separation. Perception in context is embodied in various ways. First, perception may be seen as 'direct', i.e. that people ontologically perceive in the world, not separated from it. This means that perceptions may give some ontological knowledge. Second, low-level categorizations of events are at least partly based on the use of primary metaphors. Primary metaphors are embodied motor schemas which are based on the way people have made direct sense of the world in terms of motor-bodily movements. The use of these primary metaphors in perception results in embodied knowledge. Third, actions are also a source of perceptions and hence knowledge. Bodily behavior can certainly be thought to 'exist' in context with no separation between our bodies and the context.

If perception is thought of as a continuous flow, the complex interaction of sensory modalities may form an individual 'way of perceiving' with certain resonances, or turbulences. When people perceive as continuous flow, they must stop and 'freeze' the flow in order to perform recognition tasks. Hence, there is a certain pulsation to perception; a flow and a rhythm of stops via a series of recognitions in prereflective learning. These recognitions form the basis of categorizations of objects of perception. In a way people live in a series of 'now' moments in which they make meaning. Next, the study will present the mechanisms of perception of some objects over others in context.

## 4.2. Attention and salience

How and why does one perceive certain objects in a particular, complex context over other objects available? This may be explained via the conception of attention and salience. Attention refers to analysis of environmental stimuli in the process of continuous scanning and recognition of the environment. Hence, attention takes place 'before' recognition as some sensory representations are selected for further processing and some not. (Fiske and Taylor, 1991, 246)

There are three factors that arouse attention. The first is salience, which means that attention will focus easily on stimuli that are somehow radically contrasting to their context (Fiske and Taylor, 1991, 403). Salience may be seen as the figure-ground separation of an object of perception and context. When a certain stimuli becomes salient, it raises out of its context; it becomes the figure and attention is focused on it. Salience may be related to several factors in the external and internal context of a person in mind or context. For instance a person may be salient-related to the perceiver's:

> *"…Immediate context. By being novel (solo person of that race, sex, hair color, shirt color)…By being figural (bright, complex, moving)…Prior knowledge or expectations. By being unusual for that person (e.g., behaving in unexpected ways). By being unusual for that person's social category (e.g., behaving in out-of-role ways). By being unusual for people in general (e.g., behaving negatively or extremely)…Other attentional tasks. By being goal-relevant (e.g., being a boss, a date). By dominating the visual field (e.g., sitting*

> *at the head of the table, being on camera more than others). By the perceiver being in-*
> *structed to observe the person." (Fiske and Taylor, 1991, 248)*

Principles of salience in an immediate, external context are based on two basic features: novelty and figurality. Novelty literally means that the stimuli is new as such or that it is somehow unexpected or conflicting with one's expectations. Figurality, as may be seen based on Gestalt psychology, as the relative brightness, complexity and movement of the object of perception relative to its context. In relation to internal context, expectations and goals may make an object of perception salient, for instance. [29]

The second factor arousing attention is vividness, which is the inherent feature of the stimuli. This refers to the pervasiveness of the stimuli itself rather than to its relationship to context. A stimulus can be vivid as follows: "(a) emotionally interesting, (b) concrete and imagery-provoking, and (c) proximate in a sensory, temporal or spatial way." (Nisbett and Ross, 1980, 45). Defined as such, vivid information may be seen as influencing several stages of encoding information:

> *"…vivid information is processed more fully at encoding, and therefore it should be more*
> *memorable. Hence, it would be recalled faster or more fully…vivid information is, by defini-*
> *tion, highly imageable, that is, likely to provoke internal visual representations…vivid infor-*
> *mation seems to have more emotional impacts on the perceiver." (Fiske and Taylor, 1991, 255)*

Hence, vividness seems to be related to the emotional aspects of objects of perception, which are present to the perceiver in a very real way. The difference of salience in context is difficult to define, however. For instance, do vivid stimuli have no context at all? Also, there have been difficulties in obtaining and defining the influences of vividness in experimental studies (see Fiske and Taylor, 1991, 255). The study adopts a view on vividness of stimuli as one special, emotion-bound property of salient stimuli in context. It may be thought of being the 'aesthetic-emotional' dimension of stimuli in addition to figurality and novelty. The study then concludes that events may be salient or vivid in order to become the focus of attention of perception and hence be selected for further processing.

The third factor influencing attention is accessibility. This means that people's attention may be primed by what they have recently been thinking about or what they frequently think about. Accessibility may be thought of as the reflection of the categories we have for evaluating the events of the world. Priming is central to this concept:

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[29] *In social psychology novelty in relation to one´s expectations may also be seen in that extreme social stimuli are more salient than modest social stimuli. For example, people pay attention to extremely positive (movie stars) or negative (traffic accidents) stimuli. People tend to expect social stimuli to be mildly positivistic and have optimistic views of the future: "Hence, negative social stimuli in general are more salient than positive ones; because most people are optimists, negative stimuli are relatively unexpected, and thus, salient." (Fiske and Taylor, 1991, 249)*

*Also one´s goals may direct attention. If one wishes to be hired to a new job, one pays close attention to the interviewer and other relevant people when visiting the firm. The common feature in all salience is its relativity to the levels of context of the perceiver. (Fiske and Taylor, 1991, 250)*

*"...Priming describes the effects of prior context on the interpretation of new informa-tion. Priming is specifically a name for the fact that recently and frequently activated ideas come to mind more easily than ideas that have not been activated." (Fiske and Taylor, 1991, 257)*

Hence, perceptions of the world may be influenced by the structure of knowledge, including goals, needs and expectations in a particular situation. Priming does seem to be temporal, i.e. there must be a certain time between the primer, the actual stimulus, and the judgment of the stimulus in order for the priming effect to occur. (Fiske and Taylor, 1991, 247). There are then the following factors which influence attention: novelty, figurality, vividness and accessibility or priming. Why, then, is attention aroused in each instance?

Attention may be seen as a connected modular system in which there is a preattentive and an attentive stage. In the preattentive stage, sensory features are abstracted from the sensory informa-tion and are represented in separate modules, such as auditory or visual modules of processing. In the attentive stage, a serial 'spotlight' is directed on the stimuli in a particular module. In such a modular system:

*"...attention consists of additional activation stemming from task-dependent external or internal advance priming of units representing task-relevant attributes in task-relevant modules. That attention is directed by internal activations which stand for the informa-tion processor's goals and intentions....there is no difference between active and passive attending; these forms of attending differ only in size and in complexity of the set of connected modules involved." (Van der Heijden, 1988, 124)*

This means that both the preattentive stage and the attentive stage may operate in parallel modes of interactions of modules of processing. This is consistent with the idea of 'direct' perception, or the flow of sensation. There are also pulses of recognition, or making of initial meaning for an object of perception, which interact with this flow. Hence, there are influences from both direct and indirect views of perception onto attention, at least in the visual system:

*"There is passive, sensory (bottom-up) selective attention when events in the world (e.g., sudden onsets or changes) are solely responsible for the spatio-temporal pattern of addi-tional attentional activation in the visual system. There is active, voluntary (top-down) selective attention when higher-order modules with patterns of activation representing expectations, goals, and/or intentions codetermine the spatiotemporal pattern of addi-tional activation in the visual system." (Van der Heijden, 1998, 125-126)*

This view implies the interaction of top-down and bottom-up processes in determining attention. It may be said that the novelty of stimuli is relative to the previous experience of the perceiver, or something may be inherently novel by the way it is present in an environment, such as a sudden change in an environment. Figurality relates to the interaction of the expectations or properties of the individual and environment as well as to the features of the environment. For instance, having certain interests or expectations may lead to an object of perception being rendered figural. Vivid-

ness relates to the inherent influence of the stimuli itself. It may then be seen as the 'direct' influence of the environment on the perceiver. For instance, a large predator heading towards a perceiver is certainly a vivid stimuli to perceive. Hence, for vividness, novelty and figurality of an object of perception there are different sources of influence on attention. First, the environment may produce an object of perception, which is vivid, novel and figural at that instant, more 'directly' by virtue of its objective properties. Second, the mind may have pre-existing meanings which make a particular object of perception vivid, novel or figural as such, based on expectations, for instance. Third, there may be interaction between the features of an object of perception in the environment and meanings in the mind, producing resonance as discussed earlier.

The mechanism of accessibility or priming may be related to the way the pre-existing meaning in the mind participates in the direction of attention. Accessibility relates to the contents of knowledge and consciousness. It has two aspects. First, a certain part of previous knowledge may become easily accessible if it is used often. Hence, it easily comes to mind. Second, experiences which have been processed lately in mind either consciously or unconsciously, and which are fading away from being the focal points of processing, may be 'reactivated' and hence brought back to mind. This process may be thought of as influencing a particular object of perception, to become salient, i.e. noticed and processed in the conscious or unconscious levels of the mind.

When making an object of perception salient, it makes other possible objects of perception not salient, i.e. they act as ground. The mind may pick out many objects of perception sequentially, or perhaps even pay attention to a few objects at a time. Since attentional resources may be limited, it may be that attention only focuses on one object of perception at a time; but may skip or browse around very flexibly. However, it may also be that there are parallel systems of attention. The study then views attention as possibly of greater capacity, when looked at from the point of view of mind being capable of continuous input of sensory information and recognition. Some selection occurs in recognition, but still there may be various parallel processes in the mind at any given time.

Attention is directed on the basis of what is perceived. In that sense, the relationships between figure, the object of perception and ground, the context of perception or other objects, are created in the mind. However, for instance vivid objects of perception may partly determine the direction of attention and hence act as a 'direct' environmental influence. How then to conceptualize this 'internalized' state of perceived context and object of perception and all the factors embedded in it? This will be discussed next.

One may hypothesize a subjective time-space as a fundamental base for the mind; if one sees the future as 'something' based on the evaluation of a current situation or the relationships of a current situation and possible future situations. This perception of future possibilities may in theory be unlimited, but there may always be a horizon. After the horizon begins the truly unknown. Hence, conceptions of the possibilities of action in the future may be the basic way to ground understandings in the here-and-now. Similarly, past experiences, 'behind' may be seen as a fixed path, which also has a horizon of reach and some resolution, which is present here and now. One may also reflect on future possibilities by making analogies based on past experience and the interaction of an immedi-

ate here-and-now situation. The sense of volition may then be linked to this perception of an open horizon of possibilities of action in the future immediately after the here-and-now moment of perception. Previous knowledge, future expectations and current emotional states can be then seen as divided along a time-axis in the mind.

The mind then carries possible influences of expectations of how events will unfold in immediate time-space, influences of past and now moments which may influence forthcoming perceptions, meanings, emotions, knowledge or behavior in a particular situation in making a particular object of perception salient. This view of the mind is summarized in Figure 5.
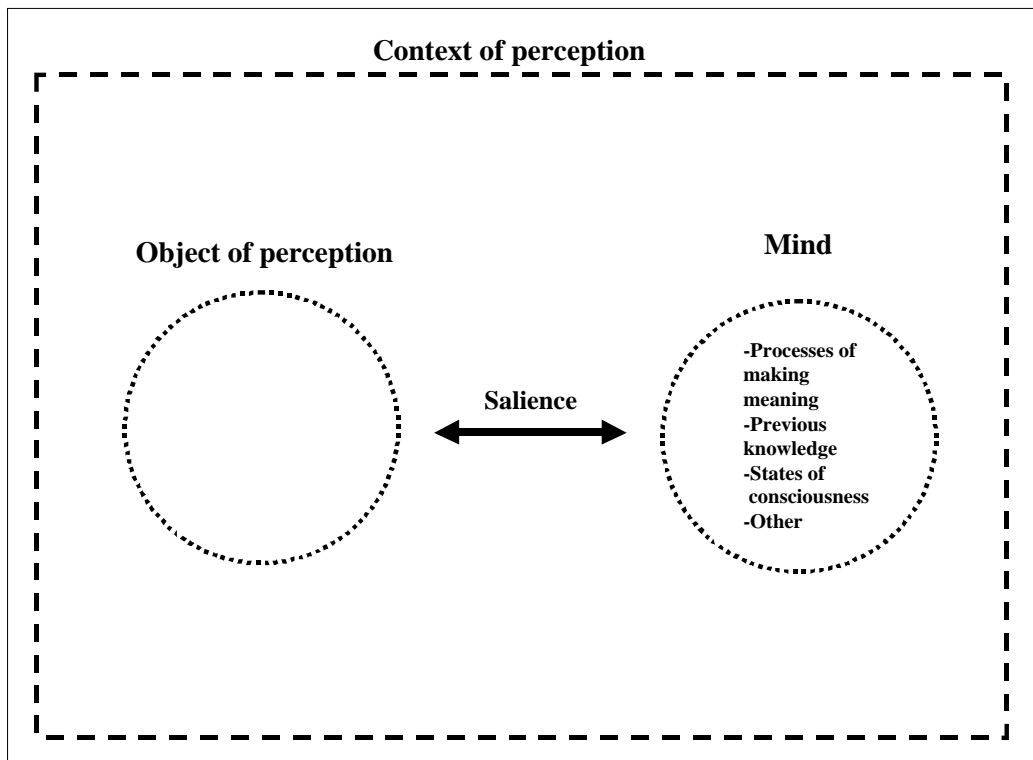


**Figure 5**. Interaction of mind and object of perception via salience.

In Figure 5 it is thought that mind exists in a spatio-temporal continuum between the past, present and future. The moment of perception is 'here and now'. The here-and-now of perception is influenced by past experiences and future expectations, such as previous knowledge or projections about desired future states. The moment of perception is also influenced by elements of the mind the here-and-now of pre-existing meaning such as previous knowledge, emotion or other subjective experiences, and future expectations. The mind perceives an object of perception through these 'filters of pre-existing meaning' out of context based on principles of salience, such as figurality, vividness

and novelty. The influence of accessibility or priming is seen as embedded in the whole of the mind in the form of pre-existing meaning. Mind also similarly perceives the ground; the context from which the object of perception is separated as a figure. This creates a projection in the mind of the actual, external physical objects of perception, i.e. perceived object/context.

The mind continuously changes the figure and ground between different objects of perception and contexts depending on the principles of salience. The object of perception and context of perception exist in objective space-time, which meets the mind in the here-and-now of perception and action. The objects in context may have interactions with each other, which may further influence perception. For instance, objects in context may 'suggest' meaning for a particular object of perception via making it salient in context. This may be seen as the direct influence of the context on perception and meaning. Despite this, the mind is 'grounded' in the environment as follows: i) external stimuli are hypothesized to have priority in guiding attention over internal thoughts; ii) the mind uses embodied mental models and schemas to make meaning; iii) actions of the perceiver are embodied in the environment, and the perceiver may change states of matter, such as objects of perception; or iv) interact in other ways with the environment, such as navigate in it; and v) the here-and-now moment of perception within the natural sensory envelope is the spatio-temporal link of the mind and body to the immediate environment.

The principles of salience are in relation to the states and elements of mind at a particular moment of perception. One may then speak of the processes, states and elements of mind as partly 'creating' the principles of salience; figurality, vividness and novelty are based on pre-existing meanings and particular objects of perception. Salience then may be influenced more or less by the environment, the mind or their interactions. Next the study will elaborate on what exactly may contribute to a certain object of perception being rendered salient at a given moment. This means investigating the mechanisms of salience at different levels of the mind.

## 4.3. Stages of processing meaning

Pre-existing meanings may be seen as the properties of the mind at any given time, which are 'waiting' for a new object of perception to appear to be made meaning of. Pre-existing meanings may be related to past knowledge, present states of mind, or  future expectations. Due to the interactive nature of perception and making of meaning, pre-existing meanings may be seen as theoretical constructs, rather than as absolute structures. Basically, pre-existing meaning is the complex combination of all the tendencies, motivation, goals, moods, previous knowledge, perceptual biases and so forth which may influence the making of meaning of a particular object of perception. Pre-existing meaning partly determines which new objects of perception are paid attention to. In other words, interactions of pre-existing meanings and objects of perception make some objects of perception vivid, figural and novel. In the immediate context, there may be certain objects of perception which interact in complex ways with each other and resonate with the perceptual mechanisms and other levels of the mind via salience. This illustrates the interaction of bottom-up and top-down processing in perception.

The study proposes that all these sources of internal and external influences on meanings made for objects of perception may be grouped under one term: Meaning Interfaces. Meaning Interfaces captures the totality of all possible sources of variability on meaning made for an object of perception from the point of view of pre-existing structures of meaning in the mind and their relationships to the object of perception being made meaning of. Consequently, Meaning Interfaces also can be conceptualized as a collection of different types of frames of meaning, which may influence an object of perception soon to be perceived in a certain way, producing a complex effect on meaning. There may be a large number of factors influencing Meaning Interfaces at any given time. Hence, the study does not wish to present an exhaustive list of such influences, but rather concentrate on the few most evident and important ones. The study proposes that perceptual processing takes place in loops or waves of more or less parallel processing. The loops of perception and action, attention and further processing may capture the sources of variability in internal and external sources of influence on meaning. This is described in Table 6.

In Table 6 there are three interrelated loops: perception-action, attention and further processing. Perception-action is a loop-like interaction with the context. This means there is a continuous flow of sensations influenced by the properties of objects of perception and the properties of perceptual mechanisms, and continuous interaction with objects of perception and context via action. The Attention loop is a continuous loop of immediate recognition of sensory representations. It involves the selection of some representations for further processing and the rejection of others. Attention resources may be partly limited, but the study hypothesizes that there may be several parallel processes of recognition existing simultaneously. The Further-processing loop is a more elaborated, continuous loop of making meaning.

The perception-action loop is the primary loop, and the two 'internal' loops attention and further processing are seen as subsets of the perception-action- loop. Hence, perception is a way 'inwards' into the mind via two loops: attention and further processing, and action is a way 'outwards' from the mind after attention and further processing. In that sense, the perception-action loop is both the input of the context into the mind and output of the mind in the context via action.

In each loop, there are sources of variability of meaning. That means that they are clusters of the most important and evident factors which may influence meaning made for a particular object of perception. These clusters are in interaction within the loop. The loops can also interact. For instance, the further processing loop can interact with the perception-action loop by influencing it via giving birth to thoughts or processes leading to conscious or unconscious actions. The perception-action loop can interact with the attention loop via producing sensory representations. The attention loop may influence the perception-action loop immediately via production of unconscious meaning for an object of perception and lead, for instance, to instant action. Most of the sources of variability of meaning in each of the three loops are unconscious, rather than conscious.

In the perception-action loop there are five major clusters as sources of variability. First, there are the properties of the immediate context of perception and action. This may include such things as being inside a building or outside in nature. The objects of perception may have configurations of

| Perception-action loops | Attention loops | Further-processing loops |
|---|---|---|
| ***1. Sources of external variation*** <br> i) Figure-ground interactions of object of perception and context <br> ii) Configurations of features of objects of perception <br> iii) Time available for perception <br><br> ***2. Sources of internal variation*** <br> **1. Unconscious:** <br><br> **A. Perceptual mechanisms** <br> i) Modality specific features <br> ii) Amodal features (rhythm, gestalt-laws, form constants, other) <br> iii) Crossmodal features (synesthetic, multimodal, other) <br><br> **B. Individual differences** <br> -cognitive style, age, gender, personality, other <br><br> **C. Types of representation** <br> i) Sensory representation <br><br> **2. Conscious:** <br><br> **A. Actions** <br> i) Actions to navigate an environment <br> ii) Actions to manipulate | **1. Unconscious:** <br> **A. Processes** <br> i) Attention <br> ii) Prereflective learning (ways of everyday reasoning, other) <br> iii) Tacit reflection <br><br> **B. Types of representation** <br> i) Sensory representation <br> ii) Symbolic models (primary and complex metaphor, other) <br> iii) Presentational representation based on the interaction of sensory representation and symbolic models <br><br> **C. Priming-complex** <br> i) Information recently or repeatedly processed unconsciously <br> ii) Perceptual set (goals, motives, needs, future expectations, other) <br><br> **D. Individual differences** <br> -cognitive style, age, gender, personality, attribution-style, other <br><br> **2. Conscious:** <br><br> **A. Priming complex** <br> i) Contents of peripheral awareness (moods, other) <br> ii) Perceptual set: goals, motives, needs, other <br><br> **B. Volition** | **1. Unconscious:** <br> **A. Processes** <br> i) Prereflective learning (ways of everyday reasoning, other) <br> ii) Comprehension (ways of everyday reasoning, other) <br> iii) Tacit reflection <br><br> **B. Types of representation** <br> i) Presentational construal <br> ii) Propositional construal <br> iii) Types of previous knowledge (meaning perspectives, meaning schemes, other) <br><br> **C. Priming-complex** <br> i) Information recently or repeatedly processed unconsciously <br> ii) Perceptual set (goals, motives, needs, future expectations, other) <br><br> **D. Individual differences** <br> -cognitive style, age, gender, personality, attribution style, other <br><br> **2. Conscious:** <br> **A. Priming complex** <br> i) Contents of peripheral awareness (moods, other) <br> ii) Perceptual set: goals, motives, needs, other <br><br> **B. Processes** <br> i) Comprehension <br> -reflection/critical reflection <br><br> **C. Volition** |

Table 6. Meaning Interfaces as sources of variability of meaning.

features which reflect inherent vividness, novelty, or figurality by their objective relationships with other objects within a certain context. This may reflect the figure/ground relationship of objects of perception and context. For instance, a sudden change in the relationships of objects within a context may create figurality. There may also be the influence of the time available for perception. For instance, if there is an instant threat like an animal in the environment, there is not much time for making of meaning.

Second, there are properties of the perceptual mechanisms already discussed, such as amodal, invariant features, crossmodal combinations and ways of organizing and representing sensations in the mind. Third, there are individual differences such as cognitive style, personality, age and gender, and other possible individual differences influencing perceptual processing. Fourth, there are the actions which are possible in an environment. Two main types of actions in an environment may be navigation and the manipulation of objects of perception. By actively acting on an object, meaning may be influenced depending if the object is 'usable' or not, i.e. how well it 'fits into hand' for a particular task or what are its interactional properties as discussed. Fifth, there are the types of representations made based on sensations, i.e. sensory representations.

In the attention loop, there are six main sources of variability. First, there are processes in recognition. The main process is that of attention. This means there are certain principles in determining which sensory representations are attended to and which are not. Other processes include prereflective learning and tacit reflection as a way of processing representations and making meaning for them. When processing, ways of everyday reasoning can also be used as quick shortcuts. Second, there are the types of representations processed. These may be sensory representations, symbolic models and presentational construals as a result of integrating sensory representations and symbolic models. Third, there is the priming complex. This includes information which has been recently or repeatedly processed at the unconscious level of the mind. Also, it includes the influence of the perceptual set, including future expectations, goals, needs and motivation. Fourth, there are individual differences similar to those in the perception-action loop which influence processing. Fifth, at the level of conscious mind there is the priming complex. This includes the contents of peripheral awareness which have been recently processed in the mind and which have been the content of subjective experiences as well as the perceptual set. Sixth, there is the influence of conscious, autonomous volition, which may influence processing.

Based on the ease of direct and quick categorization and identification of objects of perception in recognition in the attention loop, it may be that further processing is initiated. This leads to the emergence of the further-processing loop, where more elaborate processing of representations and previous knowledge in making meaning takes place.

In the further-processing loop there are seven sources of variability. First, there are types of processes in the unconscious. These are similar to those of the attention loop, but without attention. Also, more systematic analysis of an object of perception is made via comprehension. Ways of everyday reasoning may also be used. Especially important is tacit reflection in processing further representations which have not been quickly and easily categorized in the attention loop. Second, there are the types of representations processed. These include presentational construals, propositional construals and types of previous knowledge in general. Third, there are individual differences similar to those in the perception-action loop. Fourth and fifth, the priming complex is also similar to the attention loop at both conscious and unconscious levels of the mind. Sixth, there are conscious ways of volitional problem solving. These may be reflective or critically reflective types of processes of comprehension. Seventh, there is the influence of conscious, autonomous volition.

Being able to predict the behavior or reactions of a certain individual in a certain situation of perception and action, or to predict which object of perception will become figural, novel and vivid for a particular individual in that situation involves several aspects. To understand these sources of variability requires knowing i) the sources of variability of each loop of processing, ii) knowing the patterns of possible interactions within and between the loops as sources of variability; and iii) knowing how i) and ii) influence vividness, novelty and figurality of a given object of perception for iv) a particular individual in v) certain types of situations and vi) the resulting effects on mind, such as tacit and explicit meanings, which lead to changes in knowledge and/or subjective experience and possibly also result in behavior. This is a seemingly complex task. However, these sources of variability on meaning may be further conceptualized in relation to the object of perception. Figure 6 illustrates this.
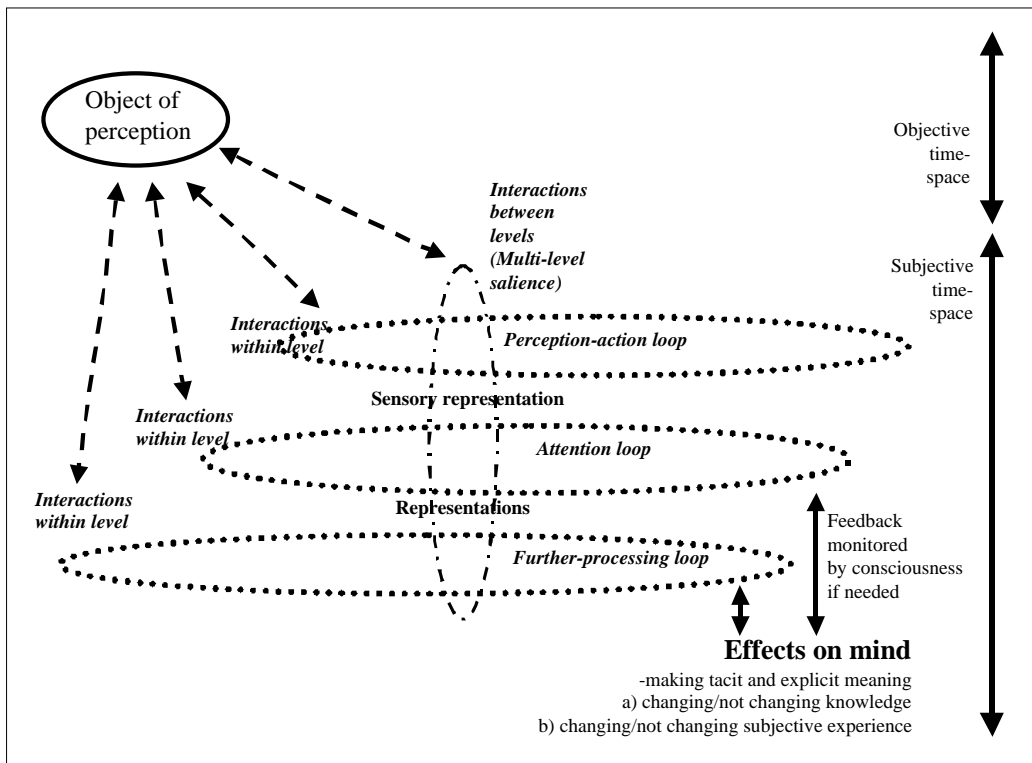


Figure 6. Multi-level salience as mediating effects of sources of variability of meaning.

In Figure 6 the object of perception has 'arisen' out of context due to being salient at various levels of the mind. The object of perception can have indirect or mediated relationships with the three loops of perception-action, attention and further processing. The nature of these relationships then may have certain patterned effects on the mind based on how these interactions and relationships influence tacit and explicit meaning made for an object of perception at various stages of processing. This meaning may then lead to changes in knowledge and/or changes in subjective experience.

In Figure 6 the different loops of processing mental representations in the mind are seen as being in constant change. There are interactions within the levels. There are also interactions between the levels. These are mediated by representations and salience. For instance, in order to be recognized in the attention loop the sensory representation has to be salient from the point of view of some of its features as related to the sources of variability of making of meaning within the attention loop. Also, in order for representations generated in the attention loop to be processed further, they have to be salient from the point of view of the further-processing loop. There are then at least three types of salience in Figure 5. First, there is perceptual salience, which means that the features of an object of perception may have to resonate with perceptual mechanisms and other sources of variability of making meaning in the perception-action loop. Second, there is attentional salience, which means that sensory representations have to resonate with some properties of the attention loop. Third, there is further processing salience, which means that representations produced in the attention loop have to be resonating with levels and elements of the further processing loop, for instance via priming or other mechanisms. In further processing, salience may also consist of the mismatch of a mental representation to previous knowledge, leading to tacit reflection.

Hence, the study sees salience as a multi-dimensional concept, linked to the relationships of an object of perception to various stages of perceptual processing. Various types of salience may be intertwined in quick, parallel processing in the mind. In that sense, representations carry the meanings of salience and act as 'storage' of meaning.

Each of the resulting patterns of resonance may create effects on the mind. The resulting effects on the mind are seen as mediated by the making of tacit and explicit meaning. The meanings may or may not change knowledge and/or subjective experience. The effects can originate from interactions within loops or between loops. The effects may lead to feedback. For instance, behavior can be changed due to change in knowledge and/or subjective experience. The feedback of effects is monitored by the conscious level of mind. This means the individual can also choose not to let an impulse of effect on the mind to lead to a change in behavior, for instance. Also, conscious and autonomous volition can directly initiate some feedback on some loops. However, there may be various automatic, unconscious programs in the mind which make quick and habitual decisions without the need of feedback monitored by conscious experience. The effects of interactions within and between loops or levels may lead to creative outcomes of meaning, not necessarily determined by the nature of the object of perception only. In the attention loop, felt and personal meanings may emerge in primary appraisal. Their influence is carried over to further processing, mainly by presentational construals. In further processing, more elaborated personal meaning may evolve, as well as tacit, semantic meanings in comprehension via the use of propositional construals. The conception of Meaning Interfaces is now concluded in Figure 7.

In Figure 7 Meaning Interfaces is seen as consisting of the complex interaction of the properties of the object/context of perception, the perception-action loop, the attention loop, the further-processing loop and the monitoring of the effects of the interactions of the loops via conscious volition. The patterns of interaction within Meaning Interfaces in a certain situation may be seen as complex, fluid and emergent. Each element of the Meaning Interfaces may be seen as a frame of meaning or
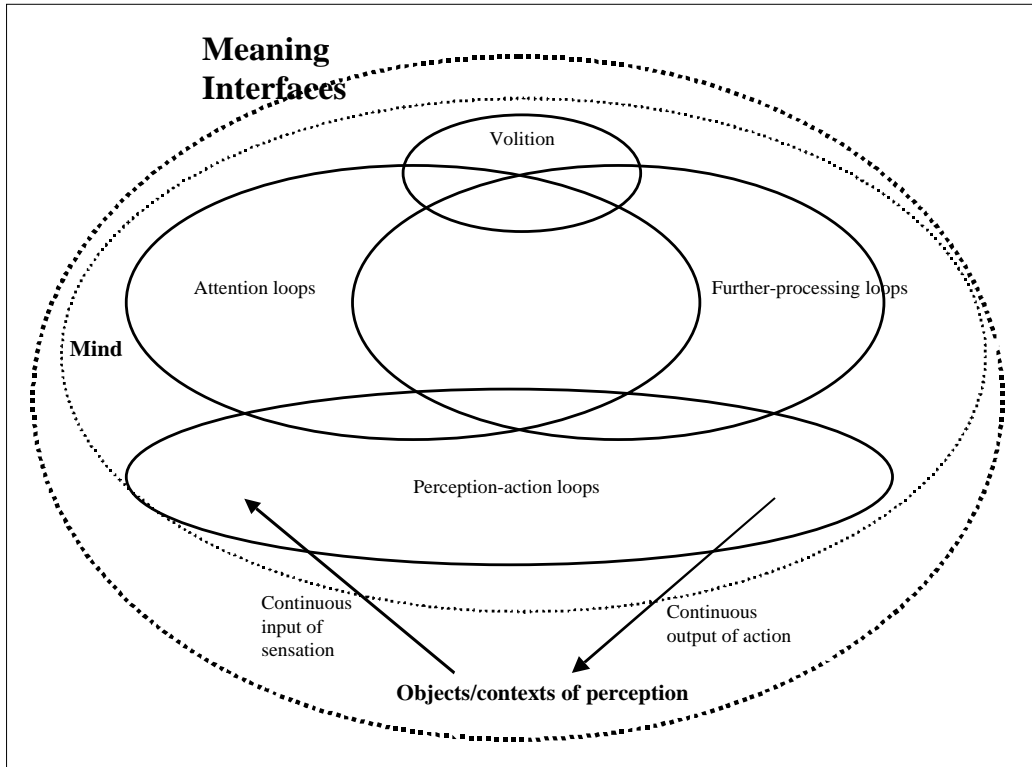
**Figure 7. Meaning Interfaces.**

a source of possible variability of meanings made for objects of perception, consisting of several sub-frames at any given time. Meaning Interfaces is a larger construct than the mind, because it involves direct interaction with objects of perception in context through perception and action.

Objects of perception are seen as located in the immediate external, physical environment of the perceiver so that they can be perceived via the senses. Objects in context do not inherently exist only in relation to the perceiver's subjective point of view, but may have genuine interactions with each other regardless of any perceiver. This perspective emphasizes the situatedness of the human being as embodied in the context, but it does not undermine the creative potential of a single human individual, or the creativity of social relationships in any manner. Any field in Figure 7 may be seen as a possible source of emergent powers or surprising outcomes for meaning. Consequently, the interactions of fields are seen as possibly having emergent powers. This creates a flux of different probabilities for particular meanings of objects of perception to 'materialize' in the mind of a certain individual at a certain time.

Meaning Interfaces are embodied in the way that sensations of the world are bodily. Also, our actions in the world are bodily. Further, at least part of knowledge of the world is embodied. Meaning Interfaces may also be social, individual or situational at a given time depending on how different factors influence each other. Social Meaning Interfaces may include such things as the

common human 'form' or body as pre-existing meaning. For instance, an ocean is a large obstacle for self-propelled bodily movement such as swimming for virtually all human beings, no matter how well they can swim. Social dimensions may also be seen in the form of shared knowledge in a community of individuals, such as a culture. There may also be stereotypic ways of reasoning of the events of the world, which may tend to make meaning-making more social.

Individual dimensions of Meaning Interfaces may be the particular configuration of previous knowledge, or motivations to do something at a particular moment, i.e. individual volition and capacity of action. Also, there may be differences in cross-modal translations of sensation, for instance. This may result in the fact that some people literally 'sense' the world at different levels than others. Most importantly, creativity of thinking or action of a single individual makes the individual powerful over context in certain situations. Situational dimensions of Meaning Interfaces indicate that a particular situation may be structured in such a way as to allow only a certain type or a few types of behavior or meaning to be made. For instance, in a threatening situation the meaning of the situation may be generically seen as a threat to one's self and there may be only two options: to fight or flee.

Meaning Interfaces may be seen as non-static structures which have a particular configuration in a given point of time-space, but this way of viewing them may not be beneficial. Even though one could 'freeze' a moment and determine an infinite number of mediating and intervening variables which may influence meaning, a question still remains of the whole meaning of a flow of frozen moments. One can not neatly pick out a frozen moment in time-space and separate the individual variables at work. It may be that it can not be directly observed just by shortening the time of observation or increasing the spatial resolution of observation. Of course, one may make rough estimations and measurements of Meaning Interfaces at any given time, but their value in predicting the future behavior or meaning making may or may not be good.

The influence of Meaning Interfaces is realized in a series of 'now'-moments of perception. Meaning Interfaces may be seen as containing tendencies to influence meaning of an object of perception, not necessarily undermining the creativity of interpretation. In that way, Meaning Interfaces may to a greater or lesser degree influence or 'frame' the meaning of a particular object of perception. This influence may go on over time with different contexts and different objects of perception. The influence, whilst more simple to point out theoretically, may be quite difficult to study empirically. This is because the target is not stable, but 'moving', i.e. Meaning Interfaces change from one particular moment to another.

Methodologically, when one wishes to know of the properties of all the dimensions of the Meaning Interfaces, one would have to be able to, for instance, observe such hidden constructs as unconscious goals, future expectations, shifting emotional states, shifting patterns of daydreaming, levels of engagement and types of volition at any given time. This may turn out to be quite difficult. However, it may be that indirect methods of observation may be used to gain knowledge of the state of Meaning Interfaces at any given time. Perhaps the pattern of influence of the Meaning Interfaces at any given time is best thought of as a field of probability or a cloud of probability. This

means that a particular configuration of the Meaning Interfaces may produce probabilities of certain objects being interpreted in certain ways in a given time point; rather than allowing for direct, mechanistic and precise prediction. [30]

One way to indirectly observe some composite variables embedded in Meaning Interfaces would be to try to keep some elements of Meaning Interfaces constant, if possible. This would mean that one may study the interaction of objects of perception and perceivers in particular types of situations with particular types of objects of perception and particular types of perceivers. Hence, it may be that by reducing complexity of observation based on the idea of fluid and field-like interactions of the sources of variability of meaning, it may be possible to conduct empirical studies.

The question then arises, what kind of objects of perception are media and communications technologies as related to the mind? Consequently, what is the nature of Meaning Interfaces as a result of the interaction of a certain media and communications technologies and a particular perceiver? These issues will be discussed next.

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[30] *It then seems that a direct attempt to study the influence of Meaning Interfaces on meaning is like trying to understand flowing water or gas. If one freezes one moment of flowing water, it may be that something can be understood of the structure and basic elements of water, such as oxygen and hydrogen, but not much is understood from what is the influence of a series of ´slices´ of water. These slices interact in such a way that they form a flow, which, when meeting obstacles, forms turbulences and may even flow backwards in some instances. Instead, one may learn from the essence and influence of water by watching its changing generic patterns of influence after having studied the particulars of water. In a way, it may be beneficial in understanding water to look at the microlevel of its elements together with the way water elements behave and exert influence in an environment over time. Hence, emergent patterns or generative mechanisms are more fruitful to study than slices of the phenomenon. However, it may be possible to better study slices of a phenomenon based on an understanding of the generative mechanisms. In that sense, it may not be impossible to study the influence of Meaning Interfaces on a particular 'micro-situation'.*

*While a straight analogy between Meaning Interfaces and flowing water may be not well placed, it may be that studying dynamic patterns of the influence of Meaning Interfaces together with the particular elements of them, even crudely measured, may give a better understanding of how Meaning Interfaces may interact in ´framing´ meanings to a lesser or greater degree.*

# 5. Perception through modern media and communications technologies

## 5.1. Media and communications technologies as objects of perception

### 5.1.1. Time-space bridges

In this chapter the study presents the basic elements and processes of perception through media and communications technologies. This helps in determining the sources of variability of meaning inherent in media and communications technologies. The dimensions of time-space bridge as well as psychological engagement with media and communications technologies will be discussed. Symbolical information is defined as a basis of media and communications technologies. Also, a basic model of media and communications technologies as objects of perception is introduced.

Media and communications technologies as time-space bridges are important from the point of view of the study, because they link information as an object of perception to the relativist point of view of a single perceiver. Hence, perception of information in media and communications technologies takes place within a natural sensory envelope, but the objects of perception are synthetic. The perceiver focuses on information and is immersed in it. This immersion mechanism then partly enables the perception of events described in the information as if perceiving real objects in a real, physical environment. Consequently, the study starts linking the dimensions and sources of variability of meaning in mind and media and communications technologies from the point of view of the here-and-now of perception in the external context. First, media and communications technologies will be defined.

There are six basic ways to conceptualize technology. First, technology may be seen as instrumentation which extends human activity. Olson (1974, 12) defines technology as: "...any tool or artifice that amplifies or extends man's muscular or intellectual abilities." Similarly to this view McLuhan (1964) claimed that media systems may be extensions of human senses. This means that for instance television may be seen as an extended way of seeing the events of the world. However, technology as an extension of the senses is not without bias, but: "...shapes and controls the scale and form of human association and action." (McLuhan, 1964, 23)

Second, technology may be seen as generating, processing and delivering information. The key to understanding the content transmitted in media messages is symbolical information. Information may be seen as "...communication of the knowledge of some fact or occurrence...communicated about a particular subject, event, etc." (The new shorter Oxford English Dictionary, 1993, 1364). In communication studies information theory is the basis of the view that information can be transmitted efficiently over distances via mechanical means. Within information theory the concept of information is used to refer to the: "...predictability of the signal, that is, its physical form, not its meaning." (O'Sullivan et al, 1994, 151). Porat (1977, 2) claimed: "Information is data that have been organized and communicated. The information activity includes all the resources consumed in producing, processing and distributing information goods and services." For instance, information refers to some events of the world observed by an author of information.

The author of information, after having observed an event of the world, uses language and symbolic tools to formalize his insight of the event into information. Symbols refer broadly to "...a sign, object or act that stands for something other than itself, by virtue of agreement among the members of the culture that uses it." (O'Sullivan et al, 1994, 312). Language may be seen as referring to "...an instrument for naming objects that exist out there in the world; and...an instrument for expressing thoughts that exist inside the head." (O'Sullivan et al, 1994, 161). Language can then broadly be seen as a set of symbols which can be manipulated to refer to events of the world by for instance an author of symbolical information. This symbolical information can then be delivered by media and communications technologies and received by people having access to a particular media and communications technologies.

Since symbolical information transmitted by media and communications technologies refers to events of the world, it may be seen as representation. In communication studies representation refers to the process and product of making signs stand for their meanings: "Representation is the process of putting into concrete form...an abstract...concept." (O'Sullivan et al, 1994, 265). This makes representation a process of giving form to abstract concepts, such as describing events of the world with symbolical information. Consequently, the sphere of symbolical information may be seen as related to external representations, which are systems such as writing, pictures, maps, or media (see Billmann, 1998, 650). Similarly, in philosophy, representation has also been seen as linguistic and pictorial representations. This may include wide categories: "sculptures, maps, diagrams, graphs, gestures, music notation, traffic signs, gauges, scale models..." (Schwartz, 1996, 536). The study then notes that symbolical information transmitted by media and communications technologies may be posed as multimodal representations of events of the world as described by an author. This means that symbolical information as representation may include text, pictures, graphics, video or other modalities. Representation can be divided into content and its organization of form (see Billman, 1998). Form may in general be seen as referring to:

> *"...shape, arrangement of parts...the visual aspect, esp. the shape or configuration of a thing...shape and structure considered abstractly as an element in the arts...an image, alikeness, a representation...the particular mode in which a thing exists or manifests itself..." (The new shorter Oxford English Dictionary, 1993, 1006)*

Applying this to the symbolical dimension of information, one may say that the topic and message of information is content, for instance. In media products this is influenced by authors embedded in centralized organizations which may manipulate symbolical information. The organization of symbolical information may then consist of ways of expression and aesthetic forms of the content of information which are related to the properties of the particular technological device used. Content and organization of symbolical information may be in interaction with, and difficult to distinguish from, each other, but this division is used to clarify the conception of making meaning via media and communications technologies. The study conceptualizes the organization of symbolical information as the form of symbolical information. The content may be called the substance of symbolical information. Symbolical information as representation may be multimodal. This is the definition of symbolical information in the study.

Third aspect of technology is that by generating and delivering information, technologies become a way to know. People receive symbolical information from technologies and interpret it. This gives birth to the ground concept, communication technology:

> *"Communication technology is the hardware equipment, organizational structures, and social values by which individuals collect, process and exchange information with other individuals. Certain communication technologies go back to the beginning of human history, such as the invention of spoken language and such written forms as the pictographs on the walls of caves." (Rogers, 1986, 2)*

This means that communication technologies are fundamental technologies for knowing the world. In that way they extend the senses:

> *"All communication technology extends the human senses of touching, smelling, tasting, and (especially) hearing and seeing. Such extensions allow an individual to reach out in space and time, and thus obtain information that would not otherwise be available. Media technologies provide us with a "window on the world", and as a result we know more of distant events than we could ever perceive directly." (Rogers, 1986, 2)*

Fourth, communication technology also creates a 'way of being' as it penetrates everyday life. When people use communication technologies they become a part of everyday life. Hence, to receive symbolical information mediated via communication technologies is a natural way of existence. There may no longer be a 'non-technological' form of being:

> *"…none of us can escape daily encounters - both direct and indirect - with the objective phenomena of motion-picture, televisual, and computer technologies and the networks of communication and texts they produce…these objective encounters transform us as subjects…cinematic and electronic media have not only historically symbolized but also historically constituted a radical alteration of the forms of our culture's previous temporal and spatial consciousness and of our bodily sense of existential "presence" to the world, to ourselves and to others." (Sobchack, 1994, 83)*

Fifth, technology may be thought of as tools. This may be the most common way to think of technology, like a hammer or a saw. With technology one may efficiently alter one's physical environment, for instance by building a house. Also, media and communications technologies may be seen as tools which: "…extend the immediate biological capabilities of human beings, and when media systems function as tools, they are appropriately understood as extensions of the self." (Miller, 1978, 229). Sixth, technology may be thought of as something capable of emerging beyond its original purpose. People may use technologies creatively and invent surprising uses for them. Over time these uses may significantly extend the original conceptions of the use of a particular technology. In that sense, technology is both a product of a human activity and a force by itself in certain circumstances. (Chesebro and Bertelsen, 1996, 185)

What is common to these views is that media and communications technologies are both a way to know and a tool at the same time. Also, they may have their 'own minds' when it is used creatively on a wide scale in the everyday life of people. This would mean that, for instance, certain widely-used technologies such as television are not 'controlled' by anyone specifically as people receive information through them. The study then views media and communications technologies as i) tools for broadening perception, and consequently as ii) ways to know the world. These both create a 'way of being' as technology penetrates all aspects of life. But what are the mechanisms of perception of media and communications technologies?

When interacting with media and communications technologies there is a special psychological mechanism which allows the perceiver to 'psychologically move' into the world of symbolical information. This may be thought of as a function of three separate time-space coordinates. First, there is the time and space of the events described in the symbolical information. These events may be truthful or imaginary. Second, there is the time and space of the symbolical information itself. The coordinates of time and space inside information may be altered quite freely by the author of the symbolical information. Third, there is the time and space of the context of reception and interpretation of the symbolical information. (Thompson, 1995, 92)

The three space-time coordinates are interacting. One should note that there are difficult questions of the kind of time and place each zone represents. For instance, the original time of real events actually happening in the world may be thought of as one particular time-space. If the original events are fictional, it may be difficult to locate them spatially or temporally elsewhere than in the imaginative processes of the author. This kind of time-space may be called creative time-space. The time and space of the symbolical information itself, whether based on real or imagined events, is manipulated. The events may be simplified and timelines may be altered. This may be called the time-space of symbolical information. The time and space of the context of perception may be objectively seen as the time and space of the body in context. In receiving symbolical information and interpreting it:

> *"…individuals routinely orient themselves towards space-time coordinates which differ from those characteristics of their contexts of reception, and interpolate mediated space-time coordinates into the spatial-temporal frameworks of their everyday lives." (Thompson, 1995, 93)*

This makes the subjective experience of time and space of the receiver a mixture of different types of time-spaces. This experience may be called a:

> *"…discontinuous space-time experience. Individuals… must to some extent suspend the time-space frameworks of their everyday lives and temporarily orient themselves towards a different set of space-time coordinates; they become time-space travelers who are involved in negotiating between different space-time frameworks and relating their mediated experience of other times and places to the contexts of their everyday lives." (Thompson, 1995, 94)*

The conception of time-space-travel here is psychological, internal and subjective. It implies that when mentally engaged in the interpretation of symbolical information one is psychologically transported to another time-space. One may temporarily not be aware of the immediate external, physical context while one is concentrating on the symbolical information. The 'zone' of time-space one is transported into is an interaction of the time-space of the original event, the time-space of the symbolical information itself and the psychological fusion of those in the subjective experience of the interpreter. Hence, the location of these interactions is in the mind of the individual in a certain external context. Based on earlier discussions the study states that there are two main coordinates of engagement with media; i) external time-spaces, including the objective time-space of the external context and the time-spaces of symbolical information and original events and the ii) mind seen partially as subjective time-space.

The basic awareness of one's past and speculations or visions of the possible futures one may encounter are more or less continuously present in consciousness. This copresence of past and future mixed with awareness of the immediate external time-space is then the fundamental basis of existence and meaning making. Hence, when in interaction with symbolical information, which may contain its own time-space coordinates and refer to the time-space coordinates of the original events, one fuses together the internal and different external space-time coordinates. Even though this may seem complex, it happens quite naturally in everyday life. Most everyone has experiences of watching television and being immersed in it or reading a book and losing track of time. Hence, this type of subjective experience is real and widely shared in modern societies as an everyday experience. The study next describes the now-moment of perception from the point of view of the interaction of mind and media and communications technologies as distributed over time and space in Table 7. This is done in order to elaborate on the basic relationship of mind and technology in perception.

Based on Table 7 it may be said that one property of media and communications technologies is that they are part of the external and immediate environment or external physical context of the perceiver. This presence as a physical object enables people to perceive the symbolical information transmitted via communication technologies. Mostly, media and communications technologies include descriptions of the past or now-moment of faraway places from the point of view of the immediate context of perception. Also, the future may be speculated over time and space, either by the perceiver or by the author of symbolical information. This capacity of perception of the symbolical information of faraway places with differing temporalities very quickly then amplifies human senses over space and time. In may give rise to a new spatio-temporal basic awareness of events of the world on a mass scale. In broadening perception capacity, media and communications technologies also become a way to know of the world. However, the dimension of truthfulness has not been taken into account here. If one thinks of the factual events of the world actually taking place, one may see media and communications technologies as 'objectively' broadening perceptual abilities. However, in the case of fictional or imaginary events, this perception is more complex. This is discussed in Figure 8.

| Temporal dimension | Spatial dimension | |
|---|---|---|
| | Immediate environment | Faraway |
| Past | **Mind:**<br>-memories of past events | **Mind:**<br>-memories of faraway places in the past<br><br>**Media and communications technologies:**<br>-perceiving spatially distant past events via perceiving symbolical information in the immediate environment |
| Now | **External context:**<br>-natural physical and social environment<br>-media and communications technologies<br><br>**Mind:**<br>-perceiving events in the immediate environment | **Media and communications technologies:**<br>-perceiving spatially distant and temporally close events via perceiving symbolical information in the immediate environment |
| Future | **Mind:**<br>-projecting alternative futures of the immediate environment | **Mind:**<br>-projecting alternative futures of faraway places<br><br>**Media and communications technologies:**<br>-perceiving temporally and spatially distant imaginary events via perceiving symbolical information in the immediate environment which speculates on the possible futures of events technologies. |

**Table 7. The spatio-temporal  relationship of mind and media and communications**

In Figure 8 it should be noted that the conceptions of real and imaginary events are complex. A real event may be seen as an event which has truthfully happened in the world. An imaginary event may be seen as a result of human imagination and human knowledge, as an author describes imaginary events in symbolical information. This is problematic, because human the mind and human knowledge are seen in the study as an ontological category. Consequently, one may think of products of human imagination as also ontological or real. Popper and Eccles (1979) see information as an ontological category. However, he applies principles of truthfulness in making information ontological. Hence, the question of fictional information or mis-information is not solved. Yet, it is clear that much of the symbolical information mediated via media and communications technologies is fictional and imaginary. However, the study wishes to avoid elaborating philosophical differences between the origins of types of events, and concentrate on the dimension of symbolical information. It may then be said that in symbolical information there may be more or less clearly defined types or mixtures of descriptions of real or imagined events made by human authors.
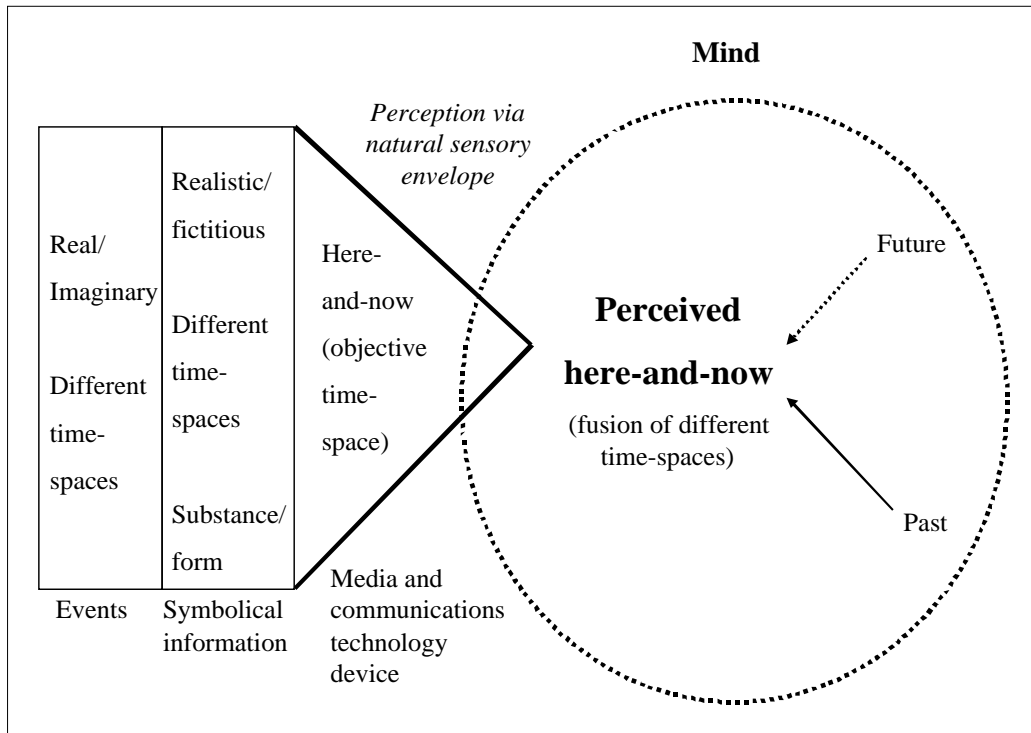
Figure 8. Media and communications technologies as time-space bridges for perception.

Also, as discussed, symbolical information as multimodal representation has form and substance, which make up the fictional or realistic events and their time-space coordinates. The substance of symbolical information, i.e. the literal message, is more related to the types of events and different time-spaces. The form of symbolical information is more related to ways of presenting the substance of the symbolical information within a particular technological device. In enabling people to perceive symbolical information, media and communications technologies are then a way to know both real and imaginary events of the world.

A particular communication technology, the device information is displayed on, exists in objective time-space as a physical artefact. People's bodies also exist objectively in the same time-space. One often has to be physically close to a communication technology in order to perceive through it. A communication technology carries with it symbolical information, which may have different time-spaces embedded in it. When perceiving symbolical information through a technology people are engaged primarily with the symbolical information and the time-spaces embedded in it. The objective time-space of the body and media and communications technologies device fades into the background. This makes the media and communications technology a time-space bridge in two ways from the point of view of the perceiver. First, it acts as a link between the objective time-space of the context and the different time-spaces contained in the symbolical information it carries. Second, when people interpret the symbolical information received through a communication tech-

nology, they are psychologically transported into a subjective experience of time-space where they interact with the space-times contained in the information. This interaction also gives people mediated relationships to the time-spaces of the real and imaginary events of the world described in symbolical information. This is the basic principle of engagement with media and communications technologies. Next, the study will more closely define the nature of psychological engagement with media and communications technologies.

## 5.1.2. Psychological engagement

### 5.1.2.1. Similarity to real life

The study argues that perception and subjective experience with symbolical information takes place similarly to perception within the immediate, physical environment. This is a fundamental observation when thinking of the influence of symbolical information on meaning and its consequenses for the change of subjective experience and knowledge.

From the point of view of experimental psychology the form and substance of symbolical information embedded in a particular technological device may have psychological effects on the unconscious. This may be called 'implicit' content in media:

> *"…implicit elements in the media are manifold: They may include subliminal or barely detectable imagery, but also expressions of attitudinal biases, social prejudices, and behavioral scripts that are in some respects overt (e.g. identifiable and quantifiable by researchers) yet not always consciously recognized by lay users of the media." (Durkin, 1998, 274)*

Implicit content then may also reflect intentional or non-intentional arrangements of the form of symbolical information, such as using particular ways of expression. Implicit content in media may refer to the selection of stories and the substance of symbolical information, which may reflect for instance racial prejudices of the author of the information. In general, media processing: "…demands a great deal of constructive activity by the user, though to what extent this is explicit, implicit, conscious, or automatic, and how processes at different levels interact, remains to be settled." (Durkin, 1998, 275).

With regard to the implicit influence of the substance of symbolical information, it is quite obvious that for instance: "…certain values, social categories, and behavioral schemata are "there", in the sense that they recur frequently or that they underlie the surface structures of media events." (Durkin, 1998, 276). However, it is difficult to show that implicit media content has significant effects on the perceiver. This is based on the complexity of the variables involved:

> *"…the extent to which implicit content, whether sensory or sociocultural, is influential in actual media experiences is difficult to appraise because it depends also on the processing capacities and preexisting beliefs of the receiver. Processing capacities may be invoked at*

*different levels of consciousness, and there may well be individual differences in these respects." (Durkin, 1998, 279)*

However, as discussed with priming, in experimental psychology it has been established that recognition and memory can be influenced or typically even enhanced by previous exposure to subliminal visual or auditory images of which the subjects are not consciously aware (see Jacoby et al, 1992; Kihlström et al, 1992; Marcel, 1983; Roediger, 1990). Also, in social psychology there is evidence that people's attitudes and impressions of other people can be influenced by information embedded in a message which is not consciously detected by the perceivers (see Bargh, 1992; Erdley and D'Agostino, 1988; Lewicki et al, 1992; Niedenthal, 1990). Consequently, it may be possible to hypothesize that symbolical information has real psychological effects on the perceivers. In media studies it has been found for instance that different modalities, such as visual and auditory, may lead to different kinds of psychological influences; and that there may be a mere exposure effect which may explain comfort with some stimuli; and further that the valence of a preceding subliminal stimulus influences the subsequent evaluation of a person evaluated (see Cuperfain and Clarke, 1985; Zajonc, 1968; Krosnick et al, 1992). Also, as discussed regarding the substance of symbolical information it has been shown that the semantic analysis of a text takes place at least partly at the level of the unconscious (see Philpott and Wilding, 1979; Underwood, 1976). Regarding text it may be concluded that:

*"…unattended stimuli, which subjects are unable to report perceiving, not only undergo semantic analysis but are also categorized, and serve to evoke emotional responses based on previous learning experiences, all without their identity being consciously apprehended." (MacLeod, 1998, 62)*

In general, the unconscious perceptual system may be seen as a parallel system which is capable of processing multiple meanings of symbolical information at the same time. This suggests that the analysis of semantic meaning of text takes place in several variations before the stimuli enters consciousness. In consciousness, the meaning of the word may no longer be further changed. (MacLeod, 1998, 76)

Consequently, there seems to be support in experimental literature that unconscious and automatic processing of symbolical information in media and communications technologies takes place, and that it has real psychological consequenses. The study has discussed several types of subjective experiences such as emotion, flow and daydreaming. These basic types of subjective experiences, while not a comprehensive list of all possible subjective experiences, will now be investigated in relation to whether symbolical information or interaction with media and communications technologies is able to give rise to these experiences. In media studies the role of emotion in processing information has been researched quite often:

*"The presence of emotion in mediated content improves attention, evaluation, and memory for mediated presentations. In addition, emotional media content elicits emotional responses in users. While intense emotion (both positive and negative) can interfere with cognitive processing, moderate levels of emotion have been shown to improve perform-*

*ance on many aspects of processing, including attention, liking, enjoyment, memory and*
*vigilance." (Dietz and Lang, 1999, 62)*

There are two approaches to the study of emotion in media studies. First, the categorical approach means defining specific categories for different types of emotion. Research on this area suggests there are 4-6 basic emotions, which combine to produce the emotional states of people (see Izard, 1977; Plutchik, 1980). Second, the dimensional approach to emotion poses emotion as having a small number of underlying dimensions, along which the entire range of human emotions may be organized. The most common dimensions are valence (from happy to sad) and arousal (calm to excited). Another dimension is dominance, which ranges from in control to out of control. Research has shown that emotions with pictures, radio, computers, sounds and television can be mapped onto an emotional space with arousal and valence where the viewer's levels of arousal and valence predict physiological, emotional and cognitive responses to emotional stimuli. (see Lang, Dhillon and Dong, 1995)

Research concerning emotional influences on the cognitive processing of mediated messages has often concentrated on how different emotions related to symbolical information change the way users pay attention to, evaluate and remember the mediated message. This research has results on the influence of emotional symbolical information as increasing the user's self-reported emotion (see Lang, Newhagen and Reeves, 1996); attention (physiological and self-reported) (see Lang, Dhillon and Dong, 1995) and memory for mediated messages, particularly arousing messages (see Lang, 1990; Lang, Dhillon and Dong, 1995; Lang, Newhagen and Reeves, 1996).

Reeves and Nass (1996, 111-116) have studied both valence and arousal based on symbolical information. They have found that people evaluate symbolical information as primarily good or bad. They argue for the fundamental nature of this primary evaluation of symbolical information: "…Whether a word processor or a word game, all media experience is good or bad first." (Reeves and Nass, 1996, 117). Arousal, the intensity of emotional activation, is another issue of importance for emotion based on symbolical information. The effect of pictures seems to be such that both arousal and valence operate similarly to real life. In that sense most media experiences are also emotional experiences:

*"There is virtually no type of content and no form of presentation that is incapable of*
*causing changes in emotions. This is true even though people may seem to approach*
*mediated presentations with the detachment necessary to render pictures and words emo-*
*tionless." (Reeves and Nass, 1996, 136)*

It then seems that there is reasonable support to think that engagement with symbolical information gives rise to emotions, which may be similar to situations in physical environments. There is also some research on optimal experience when interacting with the internet; i.e. flow. Flow is characterized as an optimal experience, including experiencing high involvement and enjoyment. For instance Trevino and Webster (1992) characterize flow with Computer Mediated Communication (CMC):

> *"Flow characterizes the perceived interaction with CMC technologies as more or less playful and exploratory"..Flow theory suggests that involvement in a playful, exploratory experience - the flow state - is self-motivating because it is pleasurable and encourages repetition. Flow is a continuous variable ranging from none to intense." (Trevino and Webster, 1992, 540)*

Hoffman and Novak (1996, 52) describe flow as related to a web-type navigation:

> *"the state occurring during network navigation which is 1) characterized by a seamless sequence of responses facilitated by machine interactivity, 2) intrinsically enjoyable, 3) accompanied by a loss of self-consciousness, and 4) self-reinforcing... [and] extends a sense of playfulness. ... Consumers must focus their attention on the interaction...and they must perceive a balance between their skills and challenges....two additional antecedents - interactivity and telepresence - enhance flow."*

Flow may then be experienced as part of a specific balance of skills and challenges brought about by the physical and mental interaction with a computer or media and communications technologies. Daydreaming may also occur when using media and communications technologies. For instance, if one reads a book, one may be thinking of all kinds of things. Thoughts related to the text of the book may be seen as stimulus-dependent operant thoughts. For instance, one may critically reflect on the content of the book to make meaning for it or start an act of problem solving. This would be a typical aspect of trying to learn from a textbook. One may also reflect on other types of media and communications technologies, such as the internet or television. However, it may be that many thoughts which occur while one is engaged with a media and communications technology may be not directly related to symbolical information; but are a variation of associations based on what is seen or heard. For instance, when one is looking a scene in a movie where a couple gets married, one may think of oneself getting married and have vivid images of it. The shift of focus from the symbolical information to internal thinking may be smooth and flowing; and people may spend quite a lot of time in their internal images vs. with symbolical information. Thoughts may also be stimulus-independent. For instance, one may be thinking about one's personal life or some other concerns which are not related to the symbolical information at hand. When the thinking is done, one may again be engaged with a particular media and communications technology and shifting mental focus back to the symbolical information to be interpreted.

The study then states that it is possible to have quite similar subjective experiences, such as emotions, flow and daydreaming, with symbolical information when engaged with media and communications technologies just as in one's immediate, physical environment. Exactly how similar these subjective experiences are to real life is not known, however. Also, it seems that the unconscious processing of symbolical information is possible and commonplace. Consequently, it may be that the mechanisms of making meaning are similar when one is perceiving in a real, physical environments and when one is perceiving symbolical information.

What should be noted here is that media and communications technologies give rise to a broadening of sources of subjective experience via the types of symbolical information encountered and the

spatial and temporal reach of that information. Hence, it may be argued that media and communications technologies may give rise to new types of experiences. This can be based both on the fact that for such an event to happen in everyday life to a particular person is unlikely; or that the event portrayed in information is fictional. For instance, a fantasy movie is fiction, and most likely not possible to experience in the physical world. However, it may give rise to intense emotions and daydreaming. Similarly, experiencing a distant disaster, such as an earthquake via watching coverage on the television news is also a type of experience which the person may never have due to not living in an earthquake area. If psychological engagement with a media and communications technology is 'subjectively real' even to a small degree it follows that media may have unconscious influences on how people understand the world and themselves. However, it is difficult to know exactly how strong these influences may be and the study will not elaborate on that. Rather it is enough to state that it is possible to experience symbolical information mediated via media and communications technologies subjectively at least partly similarly as if it were a real situation in a real context and that the processing of symbolical information may take place similarly to processing sensations in the immediate, physical environment. The proposition of felt realism is developed in the next chapter.

## 5.1.2.2. Presence and social interaction

The conception of presence is used to describe the different aspects of felt realism with media and communications technologies. Lombard and Ditton (1997) argue that the concept of presence, the perceptual illusion of nonmediation, lies at the heart of interactions with media and communications technologies. Perceptual refers to the fact the phenomenon requires: "...continuous (real time) responses of the human sensory, cognitive, and affective processing systems to objects and entities in a person's environment". (Lombard and Ditton, 2000, 1). The illusion of nonmediation takes place when: "...a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there." (Lombard and Ditton, 2000, 1).

The concept of presence is central to theorizing about traditional media such as television and film (see Sobchack, 1994; Kim and Biocca, 1997; Lombard et al., 2000; Lombard and Ditton, 1997) as well as advanced computer interactive media such as virtual reality (VR) systems (see Biocca, 1997; Lombard and Ditton, 1997). Hence, all kinds of media use activities which might be associated with the feeling of presence. According to Lombard and Ditton (2000) the essential dimensions of the study of presence are divided into two parts, based on how the illusion of nonmediation when interacting with technology is created:

> *"...1) the medium can appear to be invisible or transparent, with the medium user seeming to share the same physical environment with the medium content (objects and entities); and 2) the medium can appear to be transformed into something other than a medium, a social entity." (Lombard and Ditton, 2000, 5)*

The study first deals with the transparency of symbolical information. There are four approaches to presence in the domain of transparency. First, presence may be seen as realism. Social realism is the extent to which a media portrayal is plausible or true to life in that it reflects events that do or could occur in real life. This is analogous to perceived reality which is in cultivation research defined as: "...the degree of reality that people see in mediated messages." (Potter, 1986, 160). Perceptual realism refers to realism as perceived by sensory organs. It is most influenced by the dimensions of media and communications technologies and symbolical information (see Biocca and Levy, 1995). For example, a high quality display may increase perceptual realism when watching movies.

Second, presence may be thought of as transportation. This has three components – 'You are there', 'It is here', and 'We are together.' The 'You are there' approach is based on the old oral tradition of storytelling. If someone was telling a story to a group of people they were 'transported' to the time and place where the events actually occurred (see Biocca and Levy, 1995). 'It is here' refers to the fact that a media technology may transport events from across time and space to the user of the technology, making it seem as if the events or objects were present in the media user's physical environment (see Lombard et al, 2000). According to Millerson (1969, 201-202): "Watching a television programme, we feel not so much that we are being taken out into the world, as that the world is being brought to us." 'We are together' means that users of a media and communications technology are co-existing 'in cyberspace'. For instance telepresence in video conferencing may be seen as: "the degree to which participants of the telemeeting get the impression of sharing space with interlocutors who are at a remote physical site." (Muhlbach, Bocker and Prussog, 1995, 301).

Third, presence may be posed as immersion in a mediated environment, either perceptual or psychological. Perceptual immersion refers to the degree to which a media system engages human sensory channels while shutting off inputs from real environments. Biocca and Levy (1995) state that:

> *"...in the most compelling virtual reality experiences, the senses are immersed in the virtual world; the body is entrusted to a reality engine. The eyes are covered by a headmounted display; the real world is invisible. The ears are covered by headphones; ambient sound is muffled. The hands are covered with gloves or props: touch only the virtual bodies. Virtual reality may share common elements with reading a book in a quiet corner, but this book has stretched in all directions and wrapped itself around the senses of the reader - the reader is swallowed by the story." (Biocca and Levy, 1995, 135)*

Psychological immersion which refers to the degree of involvement or attention is often more important than perceptual immersion, like when reading a book. Psychological immersion occurs when users feel involved, absorbed or engaged in the media experience (Lombard and Ditton, 2000, 4). Fourth, there is an approach to presence which sees engagement with media and communications technologies as strongly analogous to real life. Reeves and Nass (1996) argue that mediated experience is not vicarious but fundamentally real. This means that people respond to the situations portrayed in media as real situations. In some research done in the area, young children failed to distinguish between the objects in media and the real world, based on whether:

> *"…an object seen on videotape could be touched or could come out if the top of the set were removed, whether it would spill out of the open container it was in if the set were turned upside down, and whether a person seen on videotape could see, hear, and know about the experimenter's ongoing actions." (Flavell, Flavell, Green and Korfmacher, 1990, 402).*

It is interesting how realistic symbolical information has to be in order for these transparency- and reality-based effects to occur. But do they occur for all people? According to Reeves and Nass (1996):

> *"Even the simplest media are close enough to the real people, places and things they depict to activate rich social and natural responses….our research shows that social and natural responses are remarkably common, and true for every group we have tested, including children, college sophomores, people in business, and technology experts. All people automatically and unconsciously respond socially and naturally to media." (Reeves and Nass, 1996, 7)*

Hence, it seems that sketchy information, even textual information may be enough to give rise to a certain illusion of reality when engaged in reading. This means that even if information is 'just' symbolical representation, it may give rise to responses as if it were a situation in real life. Reeves and Nass (1996) explain the tendency of people to respond to media as if it were real by speaking of the evolution of the human brain:

> *"…people are not evolved to twentieth century technology. The human brain evolved in a world in which only humans exhibited rich social behaviors, and a world in which all perceived objects were real physical objects. Anything that seemed to be a real person or a place was real." (Reeves and Nass, 1996, 12)*

Based on the above discussions it seems that the psychology of presence and transportation with media and communications technologies 'into' subjective experiences of time and space with symbolical information may seem much like the real, physical environment. Even though a person may be aware of his objective spatio-temporal environment, he may enter into the 'world' of the media and psychologically interact with events and objects within it. Next, the study will discuss the transformation of media and communications technologies into a social entity.

When people are in front of a media and communications technologies such as a computer terminal, they are bodily present as with any other object in their immediate context. This implies that the hardware, or technology has a 'media body'. Sobchack (1992, 124) argues that in perceiving movies the role of the body in perception is that of embodied perception. An important part of embodied perception is the individual's own view of his or her body as it is in touch with the world. Film as a narrative world then is seen as analogous to the perceiver's relation to the lived world (Sobchack, 1992, 219). Sobchack (1992, 161) even sees film as a lived-body. This means an agency attributed to the film, which is the basis of the dialogical relation between the spectator and the film. Hence, the dialogue happens between two lived-bodies: the film and the viewer. The viewer

has a freedom to have a critical dialogue with the film which is not predetermined in any special manner. In that sense, critical interpretations are possible regardless of the film. Sobchack (1992, 167) then claims that the film's body is a technological body. However, it is not identical to the camera, but it has organs such as a camera (Sobchack, 1992, 133, 222). At the same time the properties of the film are greater: it can even be spontaneous, autonomous and exhibit transcendent freedom (Sobchack, 1992, 285, 246). She summarizes that the film's body: "…lives out there before us a perceptual life expressed as kin to our own." (Sobchack, 1992, 212)

Consequently, one may think of the 'media body' as possibly a social/dialogical interaction partner. Reeves and Nass (1996, 19-90, 143-162) have studied computers and media from the 'bodily' point of view. They have conducted a number of experiments where rules of real-life social interaction were applied to computers or media. The results, for instance in politeness, interpersonal distance, flattery and evaluating personality, seem to indicate that people use similar social interaction rules and judgment processes with media and communications technologies and computers as in real life. Also, such technologies may adopt social roles, such as a specialist, a teammate or even a gender, and people respond to them as if they were real. The findings may be partly explained by the influential nature of perception:

> "…perceptions are far more influential than reality defined more objectively. When perceptions are considered, it doesn't matter whether a computer can really have a personality or not. People perceive that it can, and they'll respond socially on the basis of perception alone." (Reeves and Nass, 1996, 253)

Other dimensions of the media body may include such things as the size of the device. Especially the size of the screen may be influential. This is because a large picture is perceived to be closer to the person than a smaller picture. Also, larger screens may enable an easier focus on the information: "When displays are large, more of the picture is in peripheral vision. This means that the boundary between the screen and the rest of the environment is farther in the corners of vision." (Reeves and Nass, 1996, 195). Of course, a similar effect may be achieved by holding a display very close, if the picture is good enough. Overall, it also seems that psychologically there is not a great difference on how people respond to different media bodies as such: "Psychologically, the PC is not terribly different from the TV. New technologies share important features with old ones…" (Reeves and Nass, 1996, 252). The sophistication of the technology itself, however, does not necessarily mean that more features equals better experiences with a particular media body:

> "The similarity between simple and sophisticated media is particularly impressive. Claims about amplified responses to new media are often exaggerated….we can cry when we read, and we can be bored in a virtual world…Ultimately, it's the pictures in our heads that matter, not the ones on the screen." (Reeves and Nass, 1996, 252)

Hence, when interacting with symbolical information embedded in a particular device, people may expect a certain type of dialogical communication or social interaction to take place. Of course, people's learned habits on how media and communications technologies are used may interact with this possible fundamental human need for dialogical communication.

The study will now briefly elaborate on the nature of human-human dialogue. The earliest forms of human communication were predominantly nonlinguistic gestures and body movements. Vowel sounds emerged later, possibly in order to emphasize certain gestures (Buettner-Janusch and Day, 1987, 947). This type of communication, once it emerged, brought about different kinds of sensory data to people than what had been previously available. This may be seen as the birth of human-human nonverbal communication. Nonverbal communication can function as an emblem, to act as if it were a verbalization. It can also illustrate, display emotions, regulate, control and help adapt self and others to the environment. (Chesebro and Bertelsen, 1996, 8) [31]

With the introduction of speech and language, human communication changed. This type of communication enables people to: "...store and transmit knowledge gained by past experiences, as well as discuss plans for the future." (Buettner-Janusch and Day, 1987, 947). The use of spoken, oral

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*[31] Hence, an evolutionary perspective may be taken to the development of communication. This means that people´s motives for communication had more to do with procreation and survival than conscious motives and volition to do things. If one adopts this view, it may imply even a different type of consciousness or being or "...mentality utterly different from our own." (Jaynes, 1976, 68).*

*[32] One may envision a school classroom based only on oral communication:*
  *"No text, of course; no lecturing from outlines or notes, and, certainly no notes would be taken. Oral discourse is of a totally practical nature, fully interactive, conducted by a teacher who maintains active intellectual engagement with the audience..." (Haynes, 1988, 96)*

*[33] Sound is a fundamental element of speaking. It has certain properties, such as that it disappears quickly. When someone says something; when it is said out loud, it fades and is gone. Ong (1967, 129) describes this:*
  *"At a given instant I hear not merely what is in front of me or behind me or at either side; but all these things simultaneously, and what is above and below as well...I not only can but must hear all the sounds around me at once. Sound thus situates me in the midst of the world."*

*Sound also organizes human perceptions and experiences into a coherent picture. The relationship of the immediate context of sound and what is said give rise to meaning and interpretation. Physiologically, sound shapes thought by resonating through the auditory system (Chesebro and Bertelsen, 1996, 84). This gives a view of oral communication as acoustic. Sound can be seen as an ´echo´ which binds together different parts of verbal expression. The speaker hears and feels his own echo when speaking. This tactile sensation also functions as a mnemonic device. (Havelock, 1986, 119). Echoing serves two different functions in oral communication. First, it engages memory via repeating certain patterns of tactile sensations over and over again. Second, echoing gives a sense of rhythm to speech and structures experiences in an immediate, dialogical context; for instance in music performance. Havelock (1986, 72) suggests that all human biological and intellectual pleasures are connected to this rhythm of the echo: "...acoustic rhythm is a component of the reflexes of the central nervous system, a biological force of prime importance to orality."*

*This may mean that human breathing or beating of the heart also function as creators of certain rhythm in oral communication (Chesebro and Bertelsen, 1996, 87). This may also extend to the experience of artistic forms of oral communication: "...the rhythmic processes of oral presentation would serve to make such modes of thought more stable, fixing them in a rhythmic pattern" (Gregg, 1984, 76). The centrality of rhythm in human beings may even extend to more fundamental levels of the mind and brain and emotion:*
  *"We perceive data rhythmically, and such data rhythmically pulsate across the pathways of mind-brain...rhythm appears to be central to levels of arousal, to emotional states, to pattern recognition, and*

language changed human behavior with respect to how humans interacted with each other and organized themselves. Knowledge was shared in discussions and dialogues. [32]

Dialogue has two basic dimensions. First, it is a constant interaction of the participants. This means that they constantly iterate on the topic of discussion and monitor their responses in real-time to adapt their behavior to the next stage of the interaction. (see Chesebro and Bertelsen, 1996, 90-92) Second, in human-human dialogue there is a wealth of non-verbal signs which can be used to emphasize and colour the speech. These may include tone of voice, rhythm, touch, smell, the distances of speakers, eye-contact, the use of colourful clothing, gestures and body movements and other features. Rhythm of speech and gesture may be seen as especially important.[33]

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*indeed to conception and comprehension. Rhythm underlies the process of knowing, the behaviors of social interaction, and can induce symbolic involvement and action." (Gregg, 1984, 106)*

*Hence, the physical and embodied experience of rhythmical patterns of sound when speaking may be of great importance in interactive and dialogical, human-human communication. Tactile sensations can also be produced in such dialogical communication. For instance, the speaker may touch the other person in meaningful ways. With touch one can express authority or hostility, sexuality and warmth. This makes it a powerful and intimate communication device in oral communication (Henley, 1977, 96). Oculesis, or eye contact, may also be one important variable influencing oral communication. Looking at a person who one is speaking to or who speaks to you, may give rise to meanings in communication. Knapp and Hall (1992, 295) describe this:*

*"We associate various eye movements with a wide range of human expressions: downward glances are associated with modesty; wide eyes may be associated with frankness, wonder, naivete, or terror; raised upper eyelids along with contraction of the orbicularis may mean displeasure; generally immobile facial muscles with a rather constant state are frequently associated with coldness; eyes rolled upward may be associated with fatigue or a suggestion that another´s behavior is weird."*

*Smell or aromatics may also influence person-to-person communication. Hall (1969, 34) argues that: "...the external secretions of one organism work directly on the body chemistry of other organisms and serve to help integrate the activities of populations or groups in a variety of ways. Just as the internal secretions integrate the individual, external secretions aid in integrating the group." Usually to smell another person requires physical closeness. Physical closeness as such may influence as a sign in communication. The closer one is to another person, the more intimate the conversation. When one is close to another in an intimate range of distance, a whisper may be enough for discussion. The message may also be felt as personal and secretive or at least very confidential. When more distant physically, the voice can still be lowered a bit, and the meaning of the message may be felt as quite personal. A social distance of oral communication is even further; about 1.2 metres to 3.6 metres. Within this sphere one may carry a more formal discussion with some loudness in the voice. (Chesebro and Bertelsen, 1996, 88, 91)*

*Oral communication may also be influenced by gestures or body movements. One example of this is dance as an extremely expressive bodily movement which may also be linked to verbal communication in rituals or art. Pauses and length of expression may also influence meanings of oral communication. Intonation in speech may emphasize one word over another. Further, physical objects may be of importance in making meaning for oral communication. For instance, the wealth of a speaker may be emphasized by expensive and visible jewelry or clothing. Also colours may influence meanings of oral communication. The hue, brightness and saturation of light reflecting from clothing or make-up is essential to rituals and rites of passage. (Chesebro and Bertelsen, 1996, 88-89)*

It may then be that the media body as a social entity has two main aspects: i) expectations for social interaction and ii) expectations for dialogical interaction. The dimension of dialogical interaction then may consist of verbal and non-verbal features of communication and constant interaction. The dimension of social interaction may consist of expectations of social habits, norms, social rules and cultural practices, for instance. However, the study adopts a moderate position on the dimension of expectations for social interaction and dialogue. It may then be said that at least in some instances social and dialogical expectations for interaction with media and communications technologies may be more evident, but that not all interactions are necessarily heavily influenced by these expectations. Despite this, interaction with symbolical information embedded in media and communications technologies is seen as heavily influenced by the fact that it is subjectively experienced as a real environment.

## 5.1.3. Mediated context

The study now summarizes its approach to the psychological dimension of media and communications technologies as objects of perception. The presence created when being transported 'into' media may seem quite much like the real world. From this it follows, that interaction with it may be psychologically similar to that of interaction with the external environment. Symbolical information displayed via technology is then a special kind of object of perception, enabling people to psychologically immerse into different time-spaces; real or fictional:

> *"The viewer who turns on the news will be prepared to travel in this vicarious way to different parts of the world, but will assume that the temporal disjunction is relatively small (no more, in most cases, than a day)...It is clear that watching news and other programmes that seek to present or portray actual persons or events, involves a certain type of space-time interpolation, precisely because the persons or events are generally assumed by viewers to exist in real space and real time - albeit in a space and time which is non-contiguous and non-contemporaneous with the time-space coordinates of the contexts of reception."* *(Thompson, 1995, 95)*

Transportation into realistic or imaginary space-times subjectively is related to the capability of people to always 'return home' to the immediate space-time. [34] Hence, the basic dynamic of presence is the return to 'real' life, even after being immersed in symbolical information. The discussions between similarities of real environments and real people as interaction partners in dialogue

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[34] *"Competent viewers are skillful space-time interpolators: they know which symbolic cues to look for, and they use these cues skillfully to orient themselves toward the space-time coordinates of the message and of the world portrayed herein. Their experiences of space and time are no longer restricted by the physical movement of their bodies through space and time; or by their face-to-face interaction with others in a shared locale. Their experience of space and time becomes increasingly discontinuous, as they are able to move between worlds, both real and imaginary, at the flick of a switch. And yet, despite this increased mobility, the space-time framework of the context of reception remains the "anchor frame" for most viewers, since their life projects are rooted primarily in the practical contexts of their day-to-day lives."(Thompson, 1995, 95)*

| Levels and elements | Similarity to real environment, result of psychological transportation and presence with symbolical information | Similarity to a human social and dialogical interaction partner; result of unconscious projection of social/dialogical expectations on the media body |
|---|---|---|
| **1. Mind** **A. Unconscious** Scanning | People are able to receive cues for scanning symbolical information and focus on them. | People may possibly perceive the media body as a social/dialogical entity. |
| Construal | People are able to construe different modalities and structures of symbolical information into mental representations. | People may possibly construe the media body as a social/dialogical entity. |
| **B. Conscious** Subjective experience Emotion | Emotions may be aroused. | Emotions may be aroused. |
| Flow | Some flow may possibly result in the way of interaction with symbolical information. | Interactions with the media body may create flow. |
| Daydreaming | Daydreaming may occur. | Some daydreaming may possibly be involved in interaction with the media body. |
| Reflection | -A person may critically reflect upon the premises of symbolical information and engage in problem solving. -A person may reflect on the fact that the experience one is having is not literally 'real', but rather a product of engagement with media. | Possibly difficult to critically reflect on the nature of technology as a social/dialogical interaction partner. |
| **2. Navigation, interaction** | -People may use symbolic space-time cues to help them navigate symbolical information. -People may choose certain objects for perception and some not. People may to a degree manipulate the objects. | People may interact with the media body (and symbolical information) as if in dialogue and/or social interaction with another human. However, most often, due to technical limitations of responsiveness, interaction is pseudo-interaction, rather than dialogical. |

Table 8. Perceptual and interactional similarities of media and communications technologies and the external environment.

and presence and unconscious expectations of dialogical partners with media and communications technologies are summarized in Table 8.

Based on Table 8 the study states that there are possibly quite a lot of similarities between media and communications technologies and immediate, physical environments from the point of view of perception and subjective experience. For instance, perception of events via media and communications technologies is possible and often comprehensible to the perceiver. Emotions may be aroused which are similar to real environments. One may also experience flow and daydream. Also, daydreaming based on the technological device may be unlikely due to symbolical information being the focused object of perception.

There are also important differences between immediate, physical environments and media and communications technologies. First, people may perceive a media body as a social interaction partner at the level of the unconscious, even though in physical environments there is not always a conversation partner mediating one's perceptions of the world. Rather, in real life one may perceive some events directly without mediating partners. Of course, one may also be in dialogue with a human partner. Hence, with media and communications technologies, there may at least sometimes be a 'presence' of another social being when one perceives. Second, reflection is partly similar but partly different from perception through media and communications technologies as opposed to physical environments. In a physical environment, as with symbolical information, a person may critically reflect on the nature of some external, directly-observed event and problematize it. In perception, through media and communications technologies seen as social interaction and dialogue, it may be hard to reflect on the nature of the 'conversation' partner, i.e. the social entity present or the author of symbolical information. Hence, the interaction partner may seem 'close but hidden' from the perceiver.

Consequently, the dimension of symbolical information is seen as similar to perceived real-life situations when there is no mediating, human interaction partner present. The dimension of a media body is seen as similar to social interaction and dialogue with a human partner. The mixture of these two basic tendencies of the mind in perception may then create different types of influences on how people may make meaning for events of the world. These discussions are reflected in Figure 9.

In Figure 9 the perception of media and communications technologies takes place in an immediate, physical context, the context of perception. Due to presence, the perceiver focusing on the symbolical information embedded in a particular technological device psychologically moves into the 'world of the media' and is immersed in it. This makes the media and communications technology another context of perception, a mediated context of perception. Hence, the qualities of a particular media and communications technology are in the background of making meaning for symbolical information. Due to the mediated context, with the device, fading into the background, the substance and form of symbolical information become the object of perception in focus. The mind perceives the substance and form of symbolical information in a particular mediated context at various stages of processing as discussed. The mediated context includes the conceptions of broadened spatio-tem-

**Context of perception**

**Mediated context of perception**

**Object of perception**                                    **Mind**

Substance

Form

-Perception-
action loops
-Attention loops
-Further-processing
loops

Effects of interactions on the mind: the making of
meaning, which may lead to
-changes in subjective experience
-changes in knowledge
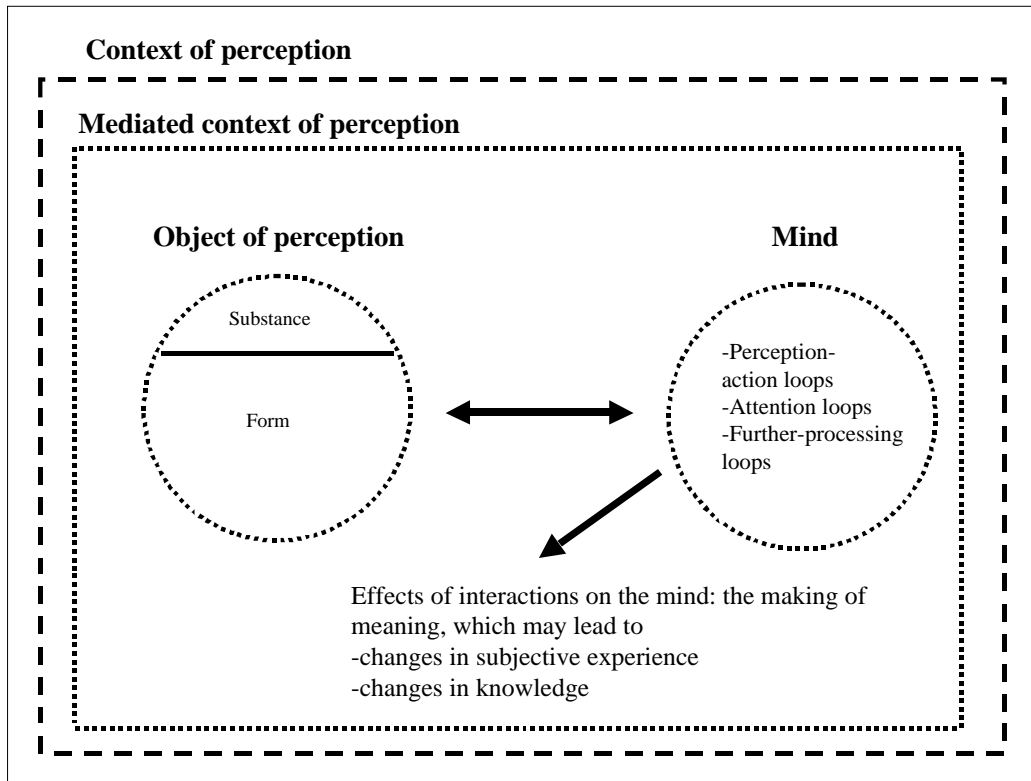
Figure 9. Media and communications technologies as mediated contexts of perception.

poral perception, the use of factual and imaginary symbolical information, the different time-spaces embedded in symbolical information, the type of technological device and ways of interaction with it. These are then in the background of the focus of the perceiver of symbolical information.

The interaction of the i) properties of the time-space bridge as a mediated context, including spatio-temporal broadening of perception, imaginary and real events with manipulated time-spaces ii) in the form of substance and form of symbolical information, iii) ways of interaction with a techno-logical device, iv) the type of technological device and v) properties of the perceiver may then produce effects on meaning which can lead to changes in subjective experience and knowledge. As the perceiver stops using the media and communications technology, the mediated context dissolves and the perceiver returns to the immediate, external context. This is the view of the study of media and communications technologies as a psychological, mediated context and as time-space bridges. Based on this mechanism, there can be a number of complex sources of variability of meaning in media and communications technologies. These are discussed  in next chapters in more detail.

## 5.2. The influence of media and communications technologies on felt meaning

### 5.2.1. Frames of meaning

The study will now addresses the influence of media and communications technologies on meaning. The aim is to highlight the complexity of sources of variability of meaning and to be able to focus on the sources of variability of felt meaning in symbolical information. First, a model of the influence of media and communications technologies on meaning is introduced. Second, traditional media and communications technologies, such as newspapers and television are discussed as sources of variability of meaning, specifically felt meaning. Third, the form of symbolical information is identified as the key influence of felt meaning.

The flow of symbolical information via media and communications technologies creates a sphere of experience (see Thompson, 1995).[35] This sphere is the source of perception, and may be called 'synthetic' vs. natural perception. Funkhouser and Shaw (1990) discuss how synthetic experience shapes perception. They claim that in addition to the information as such, media also produce new kinds of "…processes of communicated experience, thereby shaping how the audience perceives and interprets the physical and the social reality depicted." (Funkhouser and Shaw, 1990, 75). By reality they mean the pragmatic, usually experienced, common reality, which they claim to be the fundamental type of reality. Berger and Luckmann (1966) refer to this as: "..the reality of everyday life…It does not require additional verification over and beyond its simple presence. It is simply there, as self-evident and compelling facticity. I know it is real." (Berger and Luckmann, 1966, 23). This everyday reality refers to the common perceptions of everyday life. Funkhouser and Shaw (1990) argue that this everyday reality is changing due to the influence of media as they expand the sphere of experience of the average person:

> "Until the nineteenth century, for most people actual experience was limited to events occurring within the "natural sensory envelope" - the limits of the human nervous system to detect physical stimuli, governed by natural, physical processes." (Funkhouser and Shaw, 1990, 78)

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[35] *The wide accessibility and amount of information and its growing influence on the shared knowledge of societies gives rise to four different types of lines of inquiry. First, via systematic manipulation of symbolical information received widely, it becomes possible to manipulate shared, social knowledge. Second, via the wide spread usage of media and communications technologies the role and importance of symbolical information grows in everyday life. Since the systems and organizations which produce this flow of messages are not directly controlled by the individual nor anyone else, but may have a composite effect, the result is the dependency of the individual on these systems for large amounts of symbolical information about the world. Third, the sheer amount of available information and easy access to this flow of information may have a disorienting effect on the individual. One can speak of the ´overload´ of information. To cope with this, individuals need to be selective on what they attend to, to better understand the premises of how and why information is produced for them and to comprehend and make sense of symbolical information by discussing it with other people. Fourth, the wide and easy availability of information about the world which is mediated via media and communications technologies may encourage the absorption of self into this flow of information and lead to an ´overreliance´ on symbolical information vs. personal experiences. (Thompson, 1995, 213-219)*

Altheide (1985, 19) argues that the media have made it possible to experience even real events in new ways. This is due to two factors. First, the nature of a 'real experience' as such is different from mediated experience, because the persons perceiving the experience relate in a different manner to real than to synthetic experience. Second, the media operate by creating formats, i.e. they can take experiences out of context and place them in another context and in another time.

Funkhouser and Shaw (1990, 79-80) elaborate on these views and differentiate between real and synthetic experience as follows. First, real experience (i) physically originates from a person's natural sensory envelope, continuous sight, sound and smell arising from (ii) events occurring at their own pace in 'real time'. Second, synthetic experience is about perceptions that can not have originated from the natural sphere of the person's sensory envelope.[36] Hence, perception of events of the world via media and communications technologies may be considered a synthetic experience, which is felt as subjectively real.

It then seems that symbolical information mediated via media and communications technologies i) may influence perceptions and ii) contain many different types and layers of symbolical information and media bodies based on which meaning is made.[37] Basically, meaning is made based on lived, immediate spatio-temporal experience of one's 'real life'. The relevance of lived experience itself is largely unquestioned as a source of meaning. In the case of symbolical information, which gives rise to a different type of lived experience, the making of meaning may be not so unquestioned:

> *"Mediated experience is not a continuous flow but rather a discontinuous sequence of*
> *experiences which have varying degrees of relevance to the self...individuals...draw selec-*

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[36] *Funkhouser and Shaw (1990, 83-85) point out five different influences of synthetic experience. First, people are simply used to a lot of stimuli and mediated experience is full of it. Real experience seems boring. Second, synthetic experience is full of glamorous and talented people, more interesting than those in real life. Third, people expect quick, effective and neat resolutions to problems. This ´instant´ reality is often posed in mass communication, making difficult and complex problems seem easy to solve. Fourth, for lack of personal experiences people may take the image of an event from the media and treat it as real. Fifth, people are often only superficially in contact with their natural environment, leading to limited views of it.*

[37] *These developments are important if one thinks of the role of communication as dual. First, it is a way to know of the world. This means that people can have knowledge of the world, and based on it, act better or wiser in their environments, for instance. Second, communication may be seen as a source of building the conception of self (Thompson, 1995, 210). From this point of view, communication and information are ways of ´mirroring´ self in relation to the environment, and hence in developing a certain type of self-image or self-schema. Information received via media and communications technologies then becomes a sphere of experience, a natural part of everyday life which is sometimes indistinguishable from the immediate, physical environment (Thompson, 1995, 226). From the point of view of development of self, information then becomes one major source for mirroring oneself and one´s position in the world. The key in this is the construction of personal meaning:*

> *"If we understand self as a symbolic project which the individual shapes and reshapes in the course of his or her life, then we must also see that this project involves a continuously modifiable set of priorities which determine the relevance or otherwise of experiences or potential experiences...therefore, experiences and potential experiences are structured in terms of their relevance to the self." (Thompson, 1995)*

> *tively on mediated experience, interlacing it with the lived experience that forms the con-*
> *nective tissue of their daily lives…" (Thompson, 1995, 230)*

How a certain individual chooses to mix the information mediated via media and communications technologies and his real, lived experience, and how it may influence meanings, may vary from person to person or situation to situation.[38] Based on the above discussions it may be said that the making of meaning happens in a mixture of real-life lived experience and when interpreting selected symbolical information mediated via media and communications technologies. It may be that each media and communications technology itself has a differently patterned way of influencing meaning. These patterned ways may then more or less systematically 'frame' meanings which are made as they act as composite sources of variability of meaning.

These sources of variability of meaning are various. The outermost layer is the structure of what exists, i.e. ontological structures. Events are observed by authors of information. Events may involve the actions of human beings or then just acts of nature. The author comprehends the event and encodes his view of it into symbolical information (see Fiske, 1990). The author may then produce imaginary or factual symbolical information based on the type of event. The author is embedded in cultural practices of how such information may be produced, such as journalistic practices in news organizations (see Altheide, 1985). The symbolical information is then 'packaged' into a media- or communication technology and its substance and form is designed in a certain manner. The perceiver accesses symbolical information via a particular media and communications technology available. He may manipulate the packages via selecting some symbolical information for perception and some not, for instance.

The perceiver then interprets the symbolical information selected within his own framework of meaning, or understanding of the world. This framework is not necessarily any smaller or of poorer quality than the framework of the author. It means the perceiver has his own view of life, has a view of the technology used and understands the cultural practices of how symbolical information is produced for him. In that sense the meanings of the symbolical information may not be totally determined by the author of information. Rather, the perceiver creatively decodes the different layers of symbolical information and constructs meaning (see Fiske, 1990). This may also mean that the receiver may find meanings the author did not explicitly encode in the symbolical information. This may be due to the different life-situations or interests of the receiver from the author, for instance. Hence, interpretation of symbolical information is a creative act. Figure 9 illustrates the discussion.

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[38] *"For any particular individual, we could in principle construct a map of the relevance structure of different forms of experience as he or she moves through the time-space paths of daily life. At one end of the spectrum, there is the individual who only values lived experience and who has relatively little contact with mediated forms. For this person, the project of the self is shaped overwhelmingly by lived experience…At the other end of the spectrum, there is the individual for whom mediated experience has become central to the project of the self…this person organizes his or her life in such a way that mediated experience is a regular and integral feature of it. Taken to the extreme, mediated experience may even supplant or become confused with lived experience in such a way that individuals may find it difficult to distinguish between them." (Thompson, 1995, 230)*
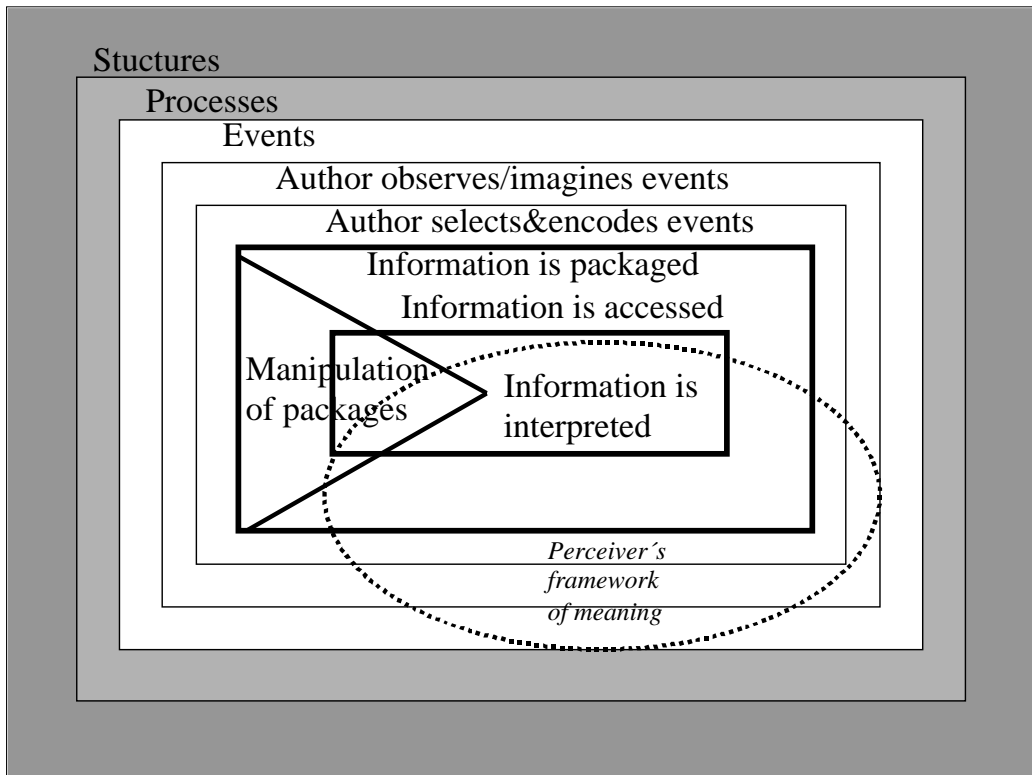
**Figure 10. Frames of meaning in media and communications technologies.**

Based on Figure 9 the influence of different types of media and communications technologies as specific kinds of time-space bridges influencing meaning at the level of packaging and accessing symbolical information may be evaluated. For instance, certain aspects of substance and form of symbolical information may tend to 'colour' meaning made in a certain way.[39] This implies that the immediate meaning of an event described in symbolical information may be varied depending on the nature of the perceiver and the nature of the substance. It may also be influenced by the form of symbolical information within a particular technological device. This is based on two factors. First, media and communications technologies may be seen as a channel. This means that they may use oral, visual and other means of expression as well as certain modes of interaction with a certain channel (see McQuail, 1994; Ong, 1982).

Second, media and communications technologies create their own unique aesthetic forms. Usually a new communication technology mimics an older one in order to be more widely accepted. Once

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1 Gerbner (1991, 244) states that:

   "The convergence of communicative technologies confers controls, concentrates power, shrinks time, and speeds action to the point where reporting, making and writing history merge....Instant history is made when access to video-satellite systems blanket the world in real time with selected images that provoke immediate reactions, influence outcome and then quick-freeze into received history."

it evolves, it may gain its own way of expression: "Technology enables humans to create new art forms and demands new aesthetic standards... (Batra, 1990, 17)." The sources of variability of meaning in media and communications technologies may then be partly seen as the properties of the channel, the medium, which carries symbolical information. In a way media and communications technologies can be viewed as:

> *"...the perceptual or encoding/decoding system that gives order to external stimuli. The channel or medium of communication cannot reasonably be treated as only or as merely a "conduit of a message". (Chesebro and Bertelsen, 1996, 21)*

Hence, the way symbolical information is presented may generate knowledge as such in addition to the actual substance of the information. Salomon (1979, 55) claims that:

> *"When a medium's messages are encountered, knowledge of two different kinds is acquired: information about the represented world and information about the mental ability used in gaining it...while the contents of messages and experiences address themselves to one's knowledge and map upon one's knowledge base, the ways they are structured and presented address themselves to one's mental skills or abilities."*

It then seems that the way symbolical information is presented, or the form of symbolical information, may have psychological consequences worthy of attention. Of course, there are also other possible sources of variability of meaning:

> *"Assuming that the major media of communication differ- to a smaller or larger extent - in their modes of gathering, selecting and packaging, and presenting information, it becomes important to examine the psychological consequences of these differences."* *(Salomon, 1979, 55)*

It may be that each medium has a unique mix of these characteristics of gathering, selecting, packaging and presenting information and that these different combinations may then influence meanings more or less systematically. Next, traditional media and communications technologies will be discussed as concrete examples of different aspects of these sources of variability of meaning. This will then enable the study to further investigate form and substance of symbolical information in a wider context.

### 5.2.2. Print, electronic and oral communication

The study will now elaborate the different types of symbolical information and technology-combinations and their influences on meaning. These may be seen as traditional communication technologies such as oral dialogue, newspapers and television. Discussing these technologies is done in order to highlight the complexity of various sources of variability of meaning inherent in media and communications technologies. They also act as real-life examples of the more theoretical aspects of the study. Further, they enable the development of approaches to modern media and communica-

tions technologies as different from traditional technologies. Also, they enable the observation of complexities of substance and form.

First, the study introduces print communication. Being able to read newspapers is based on literacy and printed text. One may speak of a literate culture in which people can write and read (see Ong, 1982). Writing as such may influence the way people think or express themselves: [40]

> *"Because the permanence of writing overcomes the limitations of auditory memory span imposed on speech, sentences of greater length can easily occur in writing, especially in types of written language that are not normally read aloud and that do not directly represent what would be spoken." (Robins, 1987, 585)*

This implies that the medium on which writing is stored stretches the time and place of knowing. One does not have to rely heavily on personal memory in order to obtain knowledge. Rather, one may pick up a piece of writing and read it. This means that the relationship is that of the reader and the text he is reading, and not the immediate presence of the author for discussions as with dialogue.[41] Printing and literacy changed the nature of time and space and social relationships. One could even argue that the ways of thinking and understanding changed with technology:

> *"The basic unit of communication became the individual word. In the oral culture the basic unit of human communication was a complex set of interactions that included the character and role of the speaker, the verbal and nonverbal delivery of the speaker, the context in which the speech occurred, and the listener's sense of the immediacy and relevancy of the entire speaking occasion. In the written mode, human contact is made through words constructed from a phonetic alphabet that may bear little resemblance to what is- or can be-directly experienced in everyday life. The symbolic relationship created between writer and reader was contained in words that, once preserved in written form, could exist as meanings independent of either the writer or the reader or the context in which the words were written or read....writing allowed humans to interact through a series of abstractions... (Chesebro and Bertelsen, 1996, 17).*

These transformations created a number of social 'institutions', such as mass literacy and mass education and helped establish science. Once print was the dominant way of communication it may also have had effects on the spoken language: "Talk, after writing, had to sound literate - and

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[40] *The earliest system of writing evolved about 7000 years ago. A phonetic alphabet was the first development. Each sign included a description of the object it referred to and the sound of the sign was also indicated. This system of writing was not directly derived from language. Pictographic signs added some dimension to writing and emphasized the visual orientation of writing. A logographic system of writing evolved and began to use one written sign for each word or unit of meaning. The Greeks were the first to develop this system of writing. They also invented the alphabet. (Chesebro and Bertelsen, 1996, 14-16)*

[41] *Print was the transformer of writing to be available on a mass scale. It was probably invented in China, but wider use was brought about by Gutenberg in the mid 1440´s. This mass scale of disseminating writing brought a sudden change in the number of books. From 1450 to 1500 the number of books rose from a few thousand to nine million. (Chesebro and Bertelsen, 1996, 16-17).*

"literate", we must remind ourselves, means "lettered" or post-oral." (Ong, 1977, 87). Ong (1977, 339) argued further that:

> *"...writing leads verbalization out of the agora into a world of imagined audiences - a fascinating and demanding and exquisitely productive world. Print grows out of writing and transforms the modes and uses of writing and thus also of oral speech and of thought itself."*

This emphasizes one possible influence of the dominant way of communication in societies on the way people think. If thinking is seen as at least partly based on symbolic thought and language, whether inherently formal or nonverbal kinds of language, then media and communications technologies may establish new levels of 'language' or understanding which then may change the foundations of how symbolic thoughts are formed. This in turn may influence ways of thinking as such. What is then the characteristic of symbolical information which is interpreted by people in a literate or print culture?

First, visual perception is emphasized over other modalities of interaction or perception as the phonetic alphabet reduces speech to a visual code (McLuhan, 1962, 39). This shift from oral-aural to visual forms of communication is described as follows:

> *"All script represents words as in some way things, quiescent objects, immobile marks for assimilation by vision...The alphabet, though it probably derives from pictograms, has lost all connections with things as things. It represents sound itself as a thing, transforming the evanescent world of sound to the quiescent, quasi-permanent world of space." (Ong, 1982, 91)*

When people use their sight more than their hearing, it introduces certain types of influences on cognition. There may be three significant differences between sound and vision. First, sight emphasizes spatial relationships, as it reduces sounds into letters and words and their interrelationships when written. This may influence the way people interpret the events of the world (Ong, 1982, 91). The Greeks, inventors of the alphabet, may have been the first to experience this. Instead of the multisensual experience of immediate interaction with people in dialogue, they may have begun to envision their world in a fragmented manner in which events could be separated from their lived context and investigated as independent beings (Logan, 1986, 121-122).

Second, visual perception focuses attention on external events rather than the internal states of the mind: "In the multisensual world of oral-aural perceptions, inner rhythmic harmony constitutes human experience. Visual experiences, however, deemphasize oral ways of knowing." (Chesebro and Bertelsen, 1996, 111). Humans have a natural tendency to segment visual information into a flow of external events. In that way writing is one way to reduce the events of the world into simple representations of the events of the world, words and their interrelationships (Gregg, 1984, 98-102).

Third, vision also focuses on the exteriors of things, what can be seen, and privileges space over sound. This allows for the sense of order and control of the environment (Chesebro and Bertelsen, 1996, 111).[42] In conclusion, literate communication systems rely on the visual perception of sym-

bolical structures which are simplifications of what the physical environment is thought to be like. This makes events of the world seem somehow controllable:

> *"The process of making symbolic sense of the world through the use of literate communication technologies imposes regularity on uneven events because the concepts of order and control inhere in the nature of the symbol usage itself." (Chesebro and Bertelsen, 1996, 112)*

Literary culture also emphasises linear and sequential processing of information. Words are organized in linear patterns of expression. A collection of pages of words is tied together as a linear story to be read from the beginning to the end. It may even be claimed that literal systems emphasize linear organization of thought (Ong, 1980, 199).

A collection of words, text, may be seen as the new context of experience. This has two main elements. First, texts are read independently from the sociohistorical context in which they were created. This makes text in a way 'less real' than oral communication. Ong (1982, 101) similarly states that "written words are isolated from the fuller context in which spoken words come into being." Second, texts lack certain dimensions that human-human oral communication has. There are no explicit and subtle facial gestures or variations of the pitch and tone of speech as encountered in discussions. (Chesebro and Bertelsen, 1996, 114). Text can then be seen as both text - the message - and the context of interpretation. This emphasizes the independent nature of texts as such. By emphasizing the possible influences of ways of disseminating information in a culture, the study does not suggest a deterministic view on the influence of technology on human thinking as such. Rather, the study wishes to highlight the possible interactive relationships of ways of communication and the development of human thinking and culture.

Knowledge in literate culture is related to the permanence of writing over time and the transformation of context of knowing. In a way, collections of writing serve a mnemonic function. It is not necessary only to remember everything personally in order to be able to use social, shared knowledge. One just needs to be literate and have access to a pool of written information in order to 'augment' one's personal memory. Hence, knowing becomes an interplay of what one remembers and how one can use or has access to mnemonic devices, such as collections of texts. (Chesebro and Bertelsen, 1996, 117-118)

The knower is both the author and the reader. They both bring some new knowledge into the text. The author originally authors the text and hence is the 'source' of knowledge. However, the reader may creatively interpret the text within his own framework of meaning. The reader and writer can

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[42] *On the contrary, oral communication systems:*

> *"...encourage direct experiencing of the human life-world. Within the rhythmic harmony of human existence, events are communicated through shared physiological and psychological states. For example, members of an oral culture might reasonably share their fear and panic a forest fire generates. Their collective understanding of such an event, induced through a story or song, would be largely determined by the storyteller´s or singer´s ability to evoke specific psychological and physiological conditions. This direct experiencing of reality encourages the perception that events happen over which humans have little control. Quite simply, life is experienced as it happens." (Chesebro and Bertelsen, 1996, 111)*

be both temporally and spatially distant. A text may be read a hundred years after it has been published faraway from the physical place where it was written. The dimensions of stretched space and time also enable texts to be influential in determining and changing social relationships, on through influencing of social knowledge within societies or between societies.

Writing also enables people to be authors and integrate various ideas together in various ways. Hence, heterogenic and abstract ideas may be fused together via creative authoring of a text. There is also a certain aesthetic to the expression in writing which has evolved: "Employing literate technologies as communicative art mediates human experience and, at the same time, shapes and contains that experience." (Chesebro and Bertelsen, 1996, 120).

The era of electronic communication came with the invention of the telegraph. The speed of electronic communication fundamentally altered the conception of space and time, because before the telegraph:

> *"…information could travel only as fast as the messengers who carried it; communication of information and transportation of people and materials were not separated in meaning. But the telegraph changed all that; a network of "lighting lines" soon crossed the nation. The electrical messages that crackled along those wires were many times faster than the fastest trains, whose rails the telegraph wires paralleled." (Rogers, 1986, 29)*

Electronic technologies, a convergence of the transmission of symbolical information rapidly over vast distances in audio-visual modality, has become perhaps the dominant model of communication.[43] With the spreading of receiving devices, such as telephones, radios and televisions, this transformed the everyday lives of people fundamentally. In mass communication, television has become the most popular device. Its emphasis on the audio-visual has consequenses for perception:

> *"…the visual component of electronic media such as television and film highlights motion. The apparent motion within a frame, the movement embedded within a progression of shots, and the series and sequences of shots in one location and from one location to another defines what is known…The traditional notions of arrangement and style which characterize literate cultures are dramatically altered in such electronic media. The constant motion characterizing all electronic media reflects, not only metaphorically, but literally, a search and quest, or what has been identified in classical rhetoric as a concern for invention…While the knower and what is known are reunited in electronic media such as television and film, knowledge is separated from the lived experience. Television and film conceptions of "what is" report only what can be seen and heard; but more importantly; this visual and auditory conception of "what exists" is typically understood within a totally unrelated context (the home or the movie theater); a context which did*

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[43] *The first significant impact of the telegraph was on the print medium. Until 1844 newspapers did not contain much national or international news, rather concentrating on local news. News agencies, such as the Associated Press, were then created and international and domestic news was disseminated to local papers also to a greater degree. Also, the motion picture camera was developed. The telephone was invented. All these inventions together created a new way of communication. (Chesebro and Bertelsen, 1996, 19)*

> *not characterize the original situation. Context-defining influences are thus lost in the electronic culture." (Chesebro, 1989, 12)*

The electronic culture produces audio and audio/visual information as 'texts'. Events of the world are captured via recording technologies such as audio and visual recordings. These recordings are then constructed by editing selected fragments and combinations of audiovisual material from them into one sequence.[44] From the point of view of human perception then, watching television may feel 'natural' due to it containing people who are doing things and speaking; gesturing and talking with each others or due to it containing images of natural environments.[45]

Oral culture can also be seen as a special 'frame' of knowing, as can literary and electronic culture. Chesebro (1989, 12) has summarized the differences:

> *"In an oral culture, the knower and what is known are related. Accurate and reliable knowledge require direct social interaction, participation in the lived experience, and exposure to the imminent and immediate source of knowledge. However, in a literate culture, the knower and what is known are typically unrelated. The sociological and personal features of the source of the printed word are unlikely to be known. Indeed, in a literate culture, sources are likely to be, at best, ambiguous and receivers unpredictable. Once our words appear in print, we have no idea who will read them or how will they react. In contrast, the nature of knowledge is dramatically different in electronic modes such as television and film."*

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[44] *In this sequence there are certain ways of expression with structural aesthetics of the medium. These may be the way a particular shot or a scene is constructed internally or it may be about the relationships of sequential shots. Also, audio effects may be added.*

[45] *However, while television is analogical to real life, there are also differences. First, in television the viewer shares a different spatio-temporal context than that of the symbolical information displayed on tv which describes events of the world. This may feel like ´outside perception´ or watching things at a distance. Second, the viewer may not interact with the people or events portrayed in television. He can not discuss with a television character and the events portrayed on television have no direct physical causality over the viewer. Hence, this may promote a ´passive´ way of orienting to symbolical information. Third, television packages seemingly ´natural´ audiovisual information into certain types of packages and formats which are displayed to the viewer. Like writing, the way these packages are constructed may be like ´compressing´ the events of the world into a simpler form. Using print and electronic audiovisual technologies people who receive and interpret the information are central:*

> *"…living systems have an integrity of their own; they have commerce with the environment in their own terms, selecting from the environment and building representations of this environment as required for the survival and fulfillment of the individual and the species. It follows that our conception of physical reality is itself achieved by selective mediation…objects and events are not passively recorded or copied, but, rather, acted upon and perceived in terms of action performed." (Olson and Bruner, 1974, 128)*

*Consequently, despite the various effects of textual and audiovisual media and communications technologies on ways of perceiving and knowing over time and space, it may be argued that the making of meaning remains interactive and open. Media and communications technologies do not, then, directly determine the meanings made for symbolical information. This further emphasizes the view of the study on the active and creative nature of the human being and the constitutive interaction of mind and environment, and mind and technology.*

This implies that each medium creates its selective perception of reality. The oral mode of communication draws attention to the immediate presence of a speaker. There is also a clear relationship of the speaker and listener. The listener and speaker can see and interpret in 'full sensory bandwidth' each other's gestures and symbolic language and their interactions to make meaning of what is being communicated. In dialogue the role of immediate feedback is important. When speaking to another person, one monitors the responses of the other to further guide his action. This continuous monitoring of oneself and the other then contribute to the engagement of people when in dialogue. The listener and speaker are also in the same, immediate context. (Chesebro and Bertelsen, 1996, 13). Ong (1977, 217) states: "Oral utterance thus encourages a sense of continuity with life, a sense of participation, because it is itself participatory." [46] The properties of oral communication, print communication and audiovisual communication as patterned and complex sources of variability of meaning are concluded in Table 9.

Based on Table 9 there are a number of similarities and differences between dialogue, print and audiovisual communication. First, the spatio-temporal orientation is different, with print and audiovisual communication allowing for more time-space reach for perception. Second, the substance of communication is different. In oral communication, it consists of speech. In print the language used is formal, written language. In electronic communication, substance is formed based on a combination of oral and print communication as well as the portrayal of audio-visual images. Third, the form of communication consists of non-verbal signs in oral communication. In print communication there are some visual aspects of structural features of text. In electronic communication, non-verbal cues may be at least partly similar to oral communication. However, there is a certain temporal aesthetic of a sequence of images which constitutes the form of electronic audiovisual communication.

Third, the way of engagement with people in dialogue may be different from interaction with text and audiovisual symbolical information. In dialogue, one is engaged in constant interaction, feed-

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[46] *Ong (1982, 37-57) discusses the consequenses of oral culture on knowing. He argues that thought and expression in oral culture are additive rather than subordinative. This means that oral communication systems encourage a pragmatic oral structure that may ignore internal relations between ideas. This results in a nonformal structure of strings of ideas rather than a formal and externalized hierarchy of ideas. Thought and expression may also be seen as aggregative rather then analytic. Grouping events together as totalities may help remembering them. Thought and expression may also be redundant or copious. Repetition is necessary in order to memorize ideas. Rhythm of speech and tactile sensations, echoes, may help in this. Thought and expression may also be conservative. Knowledge shared widely between people may have to be continually repeated and used or referred to. This may result in oral communication systems to emphasize traditional knowledge over creative play with knowledge. This means that thought and expression are close to the human life-world. Lived experience is the grounds of knowing. Hence, knowing is situational and bound to real-world analogues rather than abstract. From this follows that this knowing may be based on dramatizing man´s continuous survival struggle with nature or other humans. This may be thought of as an antagonistic influence on what is remembered and how it is remembered. Thought and expression may also be empathetic and participatory. Interaction with other people takes place in a small space and time at a personal distance. The dependence on human memory as a basis for shared knowledge makes oral cultures homeostatic. Shared meanings in shared knowledge also define social relationships in a community.*

| Oral communication | Print communication | Electronic communication |
|---|---|---|
| **Time and space**<br>-Same time and space with the speakers.<br>-What is said is gone and must be remembered. | -Author and reader are spatio-temporally distant.<br>-Spatio-temporally distant events may be described in symbolical information.<br>-Text has permanence over time and space. | -Author and viewer are spatio-temporally distant.<br>-Spatio-temporally distant events may be described in symbolical information.<br>-What is displayed is gone and must be remembered, but recording technologies provide permanence over time and space. |
| **Type of interaction**<br>Dialogical, interactive, full bandwidth of modalities of sensory perception to make meaning available. | Interaction like an oral lecture in written form, one-way or as pseudo-dialogue between text and reader. | Interaction like an oral lecture with symbolical information, one-way and pseudo-dialogue in which natural environments and/or people are portrayed. |
| **A. Substance: Symbolic spoken language**<br><br>**B. Form: Non-verbal signs**<br>-Rhythm of expression in general (timing, pauses, length) intonations of words,<br>gestures and body movements, touching when speaking, eye contact when speaking, smells of speakers, the physical distance of speakers (intimate-personal-social), physical objects as colourful decorations (clothing, jewelry, makeup) | **A. Substance: Symbolic, written language.**<br><br>**B. Form: Non-verbal signs** are structural features of the text.<br>-Visual aesthetics of the text such as colour, touching the text when reading,<br>holding the text close in intimate-personal zone when reading, some rhythm may be present in the structure of the text, some intonations or emphasis with words with typographic expressions such as italic or bold.<br>-There are no gestures, eye-contact or smell involved. | **A. Substance: Symbolic, spoken language, text and audio-visual information**<br><br>**B. Form: Non-verbal signs** are both human-like and structural and audiovisual features of symbolical information.<br><br>**When portraying humans:**<br>-Similar to dialogue, but without smell and touching.<br><br>**General aesthetics of audiovisual information:**<br>-Creative combinations of multimodal representations over time as a flow of images and sound.<br>-Device can be close/far and large or small, for instance. |
| **Navigation**<br>Selection of topic done in mutual understanding. Change of topic possible quickly. Navigation in discussion done by referring to past parts of discussion based on memory, or starting new ones. | Offering a selection of topics among which the reader may select. Change of topic quite easy non-linearly. Structural navigation aids available, such as headlines, tables of contents and indexes. | Offering a selection of topics which the viewer may select. Change of topic difficult due to information being a linear, sequential flow. Difficult to return to information already presented without special technologies, such as video recording. |
| **General aspects of knowledge**<br>-Additive: knowledge is a string of ideas with no necessary formal and hierarchical, abstract structure<br>-Situational: knowledge is linked to concrete experiences of the lived world<br>-Empathetic and participatory: knowledge is gained in person to person or small group interactions. | -Knowledge is a hierarchical and systematic network of ideas.<br>-Knowledge is non-situational and separated from the lived world.<br>-Knowledge is simplified, abstracted and objectified. Text describes events of the world in a simplified and objectified way. This may lead to events being posed as possible to control and as de-contextualized fragments. | -Knowledge may be a loose network of ideas rather than a hierarchical and systematic network of ideas.<br>-Otherwise similar to print. |

**Table 9. Oral, print and electronic communication as sources of variability of meaning.**

back and a flow of ideas shared with another human being in the same external context. With print, the engagement is with immersion into the text when reading. In electronic culture, the engagement is more 'natural' and real-world like if television presents natural-looking information, such as people and places. One is then a 'watcher' of other times and places via television, but can not participate in the events. In oral culture then, there is i) less information of the events of the world available; it is ii) spatially and temporally limited; and iii) it is communicated via dialogue, which may contribute to an understanding of the information as shared, harmonious and co-rhythmical. In print and electronic cultures there is i) a lot of spatially and temporally distant symbolical information available; based on ii) non-dialogical interaction with symbolical information mediated by media and communications technologies.

Knowing in print and electronic culture is quite similar, having aspects of fragmentation, separation from the immediate lived world of the perceiver, and events of the world being simplified, abstracted and objectified. On the other hand, this compression allows a perceiver to perceive a great number of events vs. observing them in the natural environment. In dialogue, knowing is more empathetic, based on shared understandings and discussions with other people. The meaning of interaction in dialogue is more of a shared nature. Meaning is derived as a function of time, space, type of interaction, ways of interaction and properties of the perceiver. Meaning with text and audiovisual communication is derived as a function of available ways of interaction within the form and substance of the symbolical information and properties of the perceiver. Both text and audiovisual communication draw from the substance of symbolical information and 'non-verbal' signs. This area of non-verbal signs may be seen as the area of aesthetics and form of symbolical information. Meanings made for symbolical information may also be influenced by their interaction with media and communications technologies. Here it may be hypothesized that dialogue and social interaction may be a fundamental way of human understanding. Hence, one may speak of the dialogical and social dimensions of media and communications technologies, as discussed.

People often use oral communication when communicating with other people. Telephone is also a new way of using oral communication. Literary tradition is reflected when we read newspapers, magazines or books. Electronic media are consumed when we watch television or go to the movies. All these technologies have intertwined uses in everyday life. If one thinks of media and communications technologies as influencing the way a particular individual makes sense of the world one must balance for the interaction effects of different types of media as they are used in real life, not only concentrate on a single technology. At the same time people travel more than before, and also may share their experiences of faraway places they have been to. Consequently, there is a complex network of variability of meaning inherent in media and communications technologies and the symbolical information embedded in it. All these sources of variability of meaning are not possible to deal within this study. Also, some of the influences may be more immediate while others may accumulate over time. Consequently, the study deals specifically with i) temporally immediate influences on meaning based on the ii) form of symbolical information embedded in a technological device. This will be elaborated next.

## 5.2.3. The form of symbolical information

Based on the focus of the study on the form of symbolical information, the following categorization for the variability of meaning emerges, based on technology or channel-originated influences: i) the properties of hardware or a technological device, such as its expressive possibilities, ways of interaction and the type of device; and ii) the properties of symbolical information, such as the type of substance of symbolical information available, its aesthetic forms, ways or expression and modes of interaction with symbolical information.

One way to understand the sources of variability of meaning is their possibility to change very rapidly in relation to a particular perceiver in a situation where he is receiving information via a media and communications technology. In such a 'micro-situation' the hardware does not change very quickly, while it can change over longer periods of time as technology develops. There may be different technological devices available, however. This means that while the change of hardware may influence meaning, such changes may not be very rapid. The property of media and communications technologies as stretching spatio-temporal perception capabilities may not fundamentally change as long as there is symbolical spatio-temporally distant information available to perceivers on a mass scale. Also, the basic dimensions of social or dialogical expectations towards media and communications technologies may not change much. Further, the fact that symbolical information contains descriptions of imaginary and real events of the world does not change radically. Also, symbolical information as compressed images of the events of the world often contain manipulated time-spaces vs. the original time-spaces of the events described.

Conversely, symbolical information within a technological device may change rapidly, and hence create many frames of meaning within a short period of time. This is natural, since it contains the substance of symbolical information, i.e. descriptions of events of the world. In that way the substance of symbolical information is at the center of making meaning via media and communications technologies. The authors of symbolical information may heavily structure the selection of events of the world to be available via media and communications technologies. However, as discussed, the form of symbolical information may also be influential as a source of variability of meaning. The study investigates ways of expression and aesthetics as reflecting the form of symbolical information. These are in interaction with i) the substance of information, ii) the properties of the technological device and iii) the author. Hence, there may be the following sources of variability of meaning-made, based on symbolical information as seen in Table 10.

In Table 10 the technological device is seen as partly influencing the way of selecting the substance of information. For instance, visual material is needed for television, which may have an influence over what types of events of the world are selected for attention by centralized organizations. Centralized organizations may also have certain cultures and norms for selecting particular events of the world over others and using certain ways of organizing information. (see Altheide, 1985; McQuail, 1994)

| Source of influence | Symbolical information | |
| | Substance | Form |
|---|---|---|
| Author | Centralized organizations or individual authors may have certain ways of gathering, selecting and manipulating the substance of information. | There may be habitual ways of organization of information by centralized organizations or individual authors, creating certain ways of expression and aesthetic forms. |
| Device | Technological devices may partly influence the ways of gathering, selecting and manipulating the substance of information. | Technological devices have certain presentational and interactional properties which may interact with the available ways of organization of information, creating certain ways of expression and aesthetic forms. |

Table 10. Key sources of variability of meaning in media and communications technologies.

The interaction of properties of the technological device and form of symbolical information may be seen as one possible source of influence on meaning. This may bring about certain types of variability of meaning dependent on the interaction of substance and form of information. The interaction of substance and form of symbolical information is complex, and not of direct interest to the study. It is only hypothesized that the form of symbolical information may more or less intimately reflect the substance of symbolical information, and that the substance may influence meaning made to a great degree. This division is done in order to be able to focus on the immediate, non-linguistic aspects of meaning made for the form of symbolical information. However, along the study, some aspects of substance of symbolical information are touched upon, when relevant in developing approaches to form.

What is left is the interaction of form of symbolical information and the properties of the technological device, such as aesthetic, presentational and interactional properties. The study hypothesizes that this interaction influences meaning in various ways. For instance a certain substance of information may be organized and interacted with in various ways depending on the technological devices.

The influence of form of symbolical information in interaction with the aesthetic and interactional properties of technological devices may be seen as influencing meanings either immediately or then over time. The study deals with influences which may be quite immediate, such as taking place within one session when using media and communications technologies. Hence, while there may be important long-term effects on meaning, the study does not directly deal with them. However, it may be thought that there may be a mechanism which allows influences of meaning to accumulate over time. These influences take place in each interaction with media and communications technologies. Hence, the long-term influences may be at least partly based on the immediate, short-term influences on meaning.

The study will now elaborate on the symbolical nature of media messages based on seeing them as multimodal representations with substance and form. What is needed is a theory which addresses the dimension of active making of meaning of different levels of multimodal representation accessed via a media and communications technology. Preliminarily, the form of symbolical information may be seen as the shape or arrangement of parts of the substance of symbolical information, including different types of 'non-verbal signs' and ways of interaction with a technological device, as discussed. It is then basically the way of presenting the substance of symbolical information to the perceiver. A more elaborated definition of the different elements of the form of symbolical information is presented later in the study.

Signification and negotiation of meaning is one possible focus of understanding the nature of communication. This emphasizes the two different levels of the making of meaning by an interpreter of symbolical information. The first level of meaning making deals with how a sign is related to reality. This is thought of as denotation, the specific, linguistic, objective and formal meaning of a sign. At the second level of making meaning, there are various other ways of making meaning, such as connotation, myths and symbols. (see Fiske, 1990, 112-115; Barthes, 1977)

If one takes the example of two photographs of a bridge, the differences between the first and second level of making meaning may be highlighted. The first picture shows a bridge in black and white with a 50 millimeter lens photographed at eye-level. The second picture shows the same bridge, but photographed with a yellow tint from the air at a height of 50 meters with a 24 millimeter wide-angle lens which makes the bridge appear curved rather than straight. Both of the pictures represent the same bridge. However, these two representations of the bridge differ in their form. One looks neutral while the other one looks more dramatic and expressive.

Signs consist of the signifier, the material appearance of the sign and the signified, the abstract concept lying beneath the surface appearance of the sign (see Fiske, 1990, 116). For instance, the conception of a bridge is the signified and the photographs of the bridge are signifiers; material representations of the bridge. At the level of material representations - signifiers - one may analyze the form of the representation. This means that the form of representation may be seen as related to the material form of the signifier. Denotation refers to the commonly accepted and most obvious meaning of a sign. For instance, both pictures represent the same bridge; anyone may recognize them as being a bridge and even the same bridge. Connotation refers to another level of making meaning which is more subjective and experiential. This means that connotative meanings of symbolical information are dependent at least as much on the interpreter as the message itself. For instance, a certain perceiver of the pictures may interpret the second picture as being more emotionally appealing and dramatic. (see Barthes, 1977; Fiske, 1990, 113-115).

Making meaning at the first level as denotation may then be seen as related to the substance of the sign - the signified or substance of representation and symbolical information. Making meaning at the second level may be based on both the form and substance of the symbolical information. Connotation is specifically related to the form of the signifier in symbolical information. (see Barthes, 1977; Fiske, 1990, 116). O'Sullivan et al (1994, 286) argue that connotation:

> *"…then produces associative, expressive, attitudinal or evaluative shades of meaning. In photography the mechanical/chemical process produces denotative meanings, but the human intervention in the choice of features such as focus, framing and lighting produces the connotative. Connotation, then, is determined by the form of the signifier…"*

There may also be other ways of making meaning at the second level. The bridge as the substance of the representation may be seen as related to a cultural myth. The picture with the more dramatic posing of the bridge may be seen as part of an optimistic myth of the individual always being able to overcome obstacles in life; a personal bridge over personal difficulties in life. Also, the substance of representation may be related to symbols. For instance, the bridge is a symbol of the human capability of overcoming nature with modern technology. For instance, the Golden Gate bridge in San Francisco is a symbol of the wonders of architecture and modern technology as a way of overcoming nature. (see Fiske, 1990, 121; Barthes, 1977).

The study elaborates on the different dimensions of the form of representation and its possible influences on making connotative meanings for an object of perception. The study has discussed meaning previously. Meaning can be linguistic, tacit, felt, personal or cultural and social, for instance. Linguistic meaning is roughly based on the formal and arbitrary relationships of elements of language and their referents in the world. Tacit meaning is meaning which a person is not consciously aware of and which cannot be easily communicated via formal language. Cultural and social meaning is shared among communities of people and easily communicated. (see Niiniluoto, 1989; Alasuutari, 1993). Consequently, denotative meaning is the 'objective' meaning of symbolical information, while connotative meaning is the sphere of tacit meaning and which may also influence subjective experiences. Also, myths and symbols at the second level of making meaning may be seen as belonging to the tacit sphere of meaning.

Fiske (1990, 112-121) emphasizes the individual, subjective nature of the second level of making meaning, such as connotative meaning. The study has discussed the dimensions of felt meaning as related to the properties of resonation between sensory mechanisms and features of objects of perception and the use of symbolic models, such as primary metaphor. In that sense felt meaning is the immediate, presentational, abstract meaning of an object of perception. As it is an immediate meaning, it may also give rise to certain changes in states of consciousness, such as subjective experience or change knowledge. Hence, the study does not see that the form of symbolical information is necessarily heavily related to personal tacit meaning, which also may change states of consciousness and knowledge. This is due to the fact that personal meaning implies an unconscious cognitive interpretation of the immediate relevance of the object of perception to one's goals, personal values, ego, expectations or options for coping. In other words, personal meaning may include the unconscious analysis of the substance of symbolical information in addition to the form of symbolical information. However, the area of tacit meaning is complex and felt and personal meaning may also interact. Despite this it may be said that felt meaning may reflect the more presentational, abstract, non-cognitive tacit meaning of the form of symbolical information, while personal meaning may reflect the tacit, cognitive interpretation of both form and substance of symbolical information.

Consequently, the study proposes a connection between the form of symbolical information embedded in a particular media and communications technologies and the resulting connotative meaning made by a particular individual. Connotative meaning may be seen as similar to felt meaning. This is because it shares many properties with felt meaning, such as immediacy, individuality, and 'tacitness', reflecting also the non-linguistic, presentational, abstract and analogue nature of aesthetics of meaning. The study then adopts felt meaning as the immediate, abstract, non-linguistic and presentational influence of form of symbolical information. Next, the study will introduce changes in media and communications technologies and their possible influences on the form of symbolical information as part of the sources of variability of felt meaning

## 5.3. Manipulating the form of symbolical information

### 5.3.1. Personalization

In this chapter the study will discuss the sources of variability of the form of symbolical information. The aim is to create a list of elements of symbolical information, including form, which may influence meaning, specifically felt meaning. The approach includes new developments in technology which enable the manipulation of symbolical information at the individual level. To understand these possibilities in technology and their influence on meaning, theories of art will be discussed. This will help to investigate the relationship of the form of a single work of art and a single perceiver and the consequent psychological effects. The study will also discuss some techniques of creating psychological effects in perceivers in cinema. Computers and their special properties are introduced via discussing the spatio-temporal dimensions of the aesthetics of computer screens. Finally, a list of elements of form and substance of symbolical information embedded in modern media and communications technologies will be presented.

First, the study discusses the changes in technology influencing the form of symbolical information. The relationship between technological devices and symbolical information implies that as properties of technological devices change, the forms of symbolical information such as aesthetic forms and ways of expression as well as ways of interaction with symbolical information may also change. This may bring about new types of influences on meaning. In a sense then, the influence of the author and substance of symbolical information on meaning is not overlooked in the study. Rather, an indirect approach to the influence of the author in selecting a particular substance and form of representation for symbolical information is adopted as it is viewed via the development of technical and aesthetic possibilities of expression.

With the use of computers as media, one may see that new types of communication may emerge. For instance, the computer can be used as a tool to search for information, to write and send e-mail or to buy products online. At the same time the computer may be a medium, transmitting symbolical information describing the events of the world. The computer differs in flexibility from traditional mass-media such as newspapers or television. For instance, the information printed on a newspaper is selected, printed and delivered to readers. The reader can not alter the information,

merely scan through it and select or deselect information for his attention and further processing. The same is true of television. Television programs start at a given time and are broadcast widely. One either watches the show then or then records it on video to watch later. But one can not manipulate the information which has been selected for viewing. Rather one must follow how the author has decided to present the information. With computers, there is a lot of symbolical information available and it can be flexibly manipulated and accessed by perceivers. (see Saari, 1999; Saari 1998b; Saari, 1997)

The properties of the new types of modern, computerized media and communications technologies are based on four main features. First, numerical representation means that symbolical information can be turned into a formal, mathematical representation, such as zeros and ones in the process of digitization. It also implies that these numerical representations may be manipulated by algorithms; special software programs which arrange the numerical representations in certain ways depending on the nature of the algorithm. This means that the symbolical information in media and communications technologies becomes programmable like any other software. (Manovich, 2001, 27-28)

Second, symbolical information and digitized media elements are modular. This means that a digitized media object has the same structure as any other media object. For instance, sound and video files basically consist of similar zeros and ones. Third, automation means that, based on numerical representations and modularity, elements of symbolical representations may be easily manipulated. This implies that the authors of symbolical information may use various tools to alter digitized symbolical representations. Also, in media access and perception of symbolical information, some processes may be automated by software technologies. Fourth, the principle of variability means that many potential versions of the same media product or a particular collection of symbolical information may be available. (Manovich, 2001, 30-36). Further:

> *"Old media involved a human creator who manually assembled textual, visual and/or audio elements into a particular composition or sequence. This sequence was stored in some material, its order determined once and for all. Numerous copies could be run off from the master, and...they were all identical...New media, in contrast, is characterized by variability...Instead of identical copies, a new media object typically gives rise to many different versions. And rather than being created completely by a human author, these versions are often in part automatically assembled by a computer." (Manovich, 2001, 36)*

Variability implies that symbolical information is stored in a media database in the form of digitized objects. This means that it becomes possible to separate symbolical information and a user interface. The user interface refers to the way a human being operates the machine. If the task of the human is to manipulate or access some objects in the computer's memory, the way to do it is via a user interface. A common user interface is a graphical user interface in which visual elements are used to indicate different functionalities of the software and the computer. A typical device for manipulating graphical user interfaces is a mouse. (see Schneidermann, 1998, 4-16)

The user interface is then a combination of the ways of accessing and manipulating objects in a particular database. Hence, it is both expressive and aesthetic and also functional in supporting the

various tasks of a user of the computer. It is also the arena in which the symbolical information is 'shown' to the user. Hence, symbolical information is embedded in the user interface. For instance, the control and manipulation buttons and ways of navigation in a particular database of media objects are included in the interface. A number of different interfaces for symbolical information to be shown to the user of the computer may be created by hand or then automatically via modelling the user:

> *"Information about the user can be used by a computer program to customize automatically the media composition as well as to create elements themselves. Examples: websites use information about the type of hardware and browser or user's network address to customize automatically the site the user will see; interactive computer installations use information about the user's body movements to generate sounds, shapes, and images, or to control the behavior of artificial creatures." (Manovich, 2001, 37)*

The change of symbolical information to a particular user is based on adaptive systems. In general, adaptive systems are automatic software algorithms which try to detect potentially relevant events in the system, try to recognize and interpret the events via applying a set of recognition rules and try to respond. Responding to recognized and interpreted events in the system means that the system takes some action based on action rules which affects the user or which changes some of the rules of behavior of the system itself. In the first case of action, the system may vary the media objects which are presented to a particular user. In the second case, the system may learn of significant events to generate better rules of action or recognition, for instance. (see Erickson, 1997, 82-85) [47]

With variability a number of other ideas also come further. For instance, hypermedia is a media structure which is based on the association of different multimodal elements with each other. This means that the multimodal elements of symbolical information are connected through hyperlinks. (Manovich, 2001, 38). Consequently hypermedia systems: "…provide their users with the ability to create, manipulate and/or examine a network of information containing nodes interconnected by relational links." (Halas and Schwartz, 1994, 30). Due to individual media elements such as text, graphics or images retaining their individual identity, they can be wired to more than one object. Hyperlinking is one way of associating media elements with each other: "If in old media elements are 'hardwired' into a unique structure and no longer maintain their separate identity, in hypermedia the elements and structure are separate from each other. (Manovich, 2001, 41).

With adaptation and variability the possibility of personalization of symbolical information has emerged. This means that computers are capable in various ways of altering the information which is displayed to a particular person (see Riecken, 2000, 27-28). For instance, news services have the technological possibility of being personalized, i.e. tuned to the needs and preferences of a certain individual (see Saari, 1998a; Saari, 1999, Saari, 2000; Turpeinen, 2000). One may discuss the 'packaging' of symbolical information, which means how the different dimensions of information

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[47] *Adaptive functionality holds the promise of making computer systems more responsive, proactive and personal. However, an adaptive system is only as good as its rules for recognizing significant events and rules for acting on the events. Hence, there is still much to be developed in adaptive systems.*

are put together into a certain type of package, including form and substance. With personalization the packaging of symbolical information may be done in advance by the perceiver himself, as he chooses with the aid of software programs and filters the desired topics of his forthcoming information packages. These packages are automatically constructed through software filters at the time of perception, for instance. The perceiver may also control the way the information is presented to him by utilizing preferences among modalities, for instance, based on possible choices in the database of information. It may also be possible to combine several modalities into a particular presentation automatically. For instance, a newspaper article may be displayed along with video and graphics acquired from different producers of information, and 'packaged' in real-time by software. This may reflect changes in the way to access certain packaged symbolical information by the perceiver. (see Saari, 2000; Turpeinen, 2000)

This means that a collection of symbolical information digitized into numerical representations may have a great number of different interrelationships. These different variations can be quickly calculated and displayed by efficient computers. Variability based on information of the user may mean that different users of the same website may get different advertisement banners, for instance. The system recognizes a certain user entering a system and uses specific rules for action such as displaying a particular advertising on the first page the user sees. This is the ability of the software and adaptive systems to change the symbolical information presented to a particular perceiver very quickly. It also makes it possible to vary both the substance and form of symbolical information, as they are more independent from each other than in traditional media products. Also, one may vary the user interface and hence influence ways of interaction. The study calls these properties the flexibility of modern media and communications technologies. Consequently, it may be said that the older media, such as television, radio and newspapers, are less flexible as time-space bridges than more modern, computer-based media and communications technologies.

Modern media and communications technologies have then changed the aspects of packaging, accessing and manipulation of symbolical information. In packaging, the symbolical information may be packaged manually by the authors, as with television programming into a fixed set of substance and form of representation and tied to a particular media and communications technology. The symbolical information may also be partly packaged by automatic software programs based on information of the user. This means the author may not strictly be in charge of a certain daily package of symbolical information, such as a traditional newspaper article. Rather, the authors are producing a database of media objects which can be manipulated by software programs. Each perceiver may have personal packaging of symbolical information made partly based on how the author has encoded the original information and what are the possibilities of personalization based on the structure of the database and the capabilities of the software programs. For instance, the perceiver of symbolical information may wish to have as much video material as possible and as little textual material as possible on all the information packages he wants to receive. An adaptive system would then automatically construct a certain type of package of symbolical information for him.

In accessing symbolical information, the perceiver may utilize a number of media and communications technologies. He may wish use a personal computer one day and a mobile phone on another day. This means the symbolical information may have to be automatically manipulated in order to be able to present it in different media and communications technologies. In access, the user may also utilize different techniques of selection of symbolical information. For instance, at the time when he accesses the information, an information package according to his interests is created in real-time. This creation of packages of symbolical information based on the needs and desires of the receiver goes on continuously in real time. Hence, with adaptive technologies symbolical information as an object of perception may be seen as potentially a continuously evolving personalized package. The personalized package of symbolical information may have many dimensions, such as the substance and form of multimodal representations. Form may consist of dimensions such as modality, linear or non-linear structure and the type of visual presentation. Also, the user interface and the way of interaction may be related to the form of symbolical information.

Modern media and communications technologies may be seen as consisting of a layer of symbolical information and a device the information is displayed on. This separates the particular technology into hardware and software. Hardware is a physical object, which is partly subject to the same type of manipulation possibilities as any physical object. It may have certain properties, such as size and type of screen, and it may be portable or not, for instance. Software can be divided into two parts: operating software/user interface and symbolical information. These are electricity-based immaterial parts of technology and can be molded with little energy in real-time. Software and hardware make it possible to perceive symbolical information. (see Bradshaw, 1995; Rogers, 1986)

Since the flexible nature of media and communications technologies bring forth many objects of perception in a short time frame; the technologies themselves are moving while the perceivers are standing still. This movement, the presentation of fragments of symbolical information one after another creates a flow of information. Using technology as a tool, it is possible to automatically or manually select certain symbolical information from the flow, for instance. The study concludes its view on modern media and communications technologies as objects of perception in Table 11.

Symbolical information in modern media and communications technologies may be easily changed in 'real time' to a certain substance and form based on either the actions of the perceiver or then automatic adaptation. This means for instance that when a perceiver uses the internet and clicks on a hyperlink on a page, the page which opens may be constructed in real-time and does not have to 'pre-exist' in any database. For instance, each time a perceiver clicks on a link, this gives input to the software system to change the output, i.e. the next page the perceiver will see, to a certain form and substance according to the model the software has built of the perceiver. This reflects a semi-intelligent relationship of mind and technology, or more specifically mind and software. Software can then form certain types of relationships with any perceiver based on having information of the perceiver and having decision rules about what the nature of the perceiver means when displaying pieces of symbolical information to him. This may include changing the form of symbolical information automatically in personalization, for instance. Next, the study will investigate the relationship of the form of symbolical information and psychological effects based on the idea of personali-

| Media and communications technology hardware | Media and communications technology software (operating software/user interface) | Symbolical information |
|---|---|---|
| **Material orientation:**<br>Is made of solid matter. | Is made of electronic impulses. | Is made of electronic impulses. |
| **Spatio-temporal orientation:**<br>-Here and now within natural sensory envelope<br>-May be mostly immobile or portable. | -Here and now within natural sensory envelope.<br>-May move very quickly over space via communication networks. | -Has various spatio-temporal coordinates (broadened perception)<br>-May move very quickly over space via communication networks. |
| **Ease of manipulation:**<br>-Can be manipulated within predefined limits with little energy via hardware inter-faces, such as buttons and controls.<br>-Can be manipulated in real-time.<br>-Difficult to duplicate identi-cal copies of the original. | -Can be manipulated with little energy<br>-Can be manipulated in real-time.<br>-Very easy to duplicate identical copies of the origi-nal. | -Can be manipulated by the user via the user interface or by a software system using a set of rules for manipulation.<br>-Can be manipulated in real-time.<br>-Very easy to duplicate identical copies of the origi-nal. |
| **Basic relationship to the perceiver:**<br>-Is an object 'present' (media body) allowing manipulation of software.<br>-Basic properties: large or small, size of screen, portable or not | -Stays in the background, allowing manipulation of symbolical information via the user interface.<br>-May form 'intelligent' and constantly changing relation-ships to the perceiver via adaptation. | -Has form and substance (embedded in user interface)<br>-Creates a continuous flow of event-related symbolical information<br>-May be truthful or imaginary. |

Table 11. **Properties of modern media and communications technologies as objects of perception.**

zation of the form of symbolical information. This then draws attention to the relationship of a single perceiver and the form of symbolical information from the point of view of psychological effects.

## 5.3.2. Significant form

The study now develops further the conception of the form of symbolical information as it is accessed via a particular media and communications technology. This is done in order to be able to better define the aspects of form of symbolical information as related to a particular perceiver. First, theories of form in aesthetics will be discussed, in which form is related to psychological effects.

There are three classical views on form in aesthetic theory. First, the Platonian view entails that there is an ideal type of form which the artist reflects in the form of the work. Hence, the work of art must reflect the ideal organization faithfully (Eldridge, 1997, 159). In the Republic (3.398c-4000c) Plato mentions the different musical modes of different styles of performing music as having specific emotional effects. Two different works can have a similar effect by virtue of sharing a similar mode. Plato also applies a similar approach to poetry. Both of these descriptions of form seem to reflect a shared mode; a shared reflection of an ideal form. Second, Aristotle adopted an approach to form which does not focus on the absolute relationship of the original, ideal form and its representation. Rather, he focuses on the relationship of artistic forms to their audiences. In Poetics (1499b 27-8) he writes that the function of tragedy is to "...excite pity and fear...to effect the catharsis of these emotions.." (Butcher, 1911). For a work of art of a certain form to be functional means that it will please and instruct the audience, i.e. have specific effects on the audience. Hence, the characteristics of the parts of plots of tragedies may be seen from the point of view of how well they contribute to the function of the tragedy (Eldridge, 1997, 160). This suggests that the structure or form of ways of expression may be defined via their effects on the audience. Third, there is the view that the form of works of art is the result of the artist's psychic needs. Hence, all psychic experiences, such as thoughts and ideas are charged with specific emotions. These emotions must be discharged in some way, like expressing oneself via a work of art. Similarly, audiences experiencing a particular work of art also can experience some of this discharging of emotion themselves. (Eldridge, 1997, 160).

The study develops further the idea of the interrelationship of the form of art and the corresponding responses or psychological effects on the audiences. The study wishes to address these effects of work of art at the level of a single individual, but not separate individual works of art from their genre; collections of other works of art sharing similar forms. One tension in aesthetic history of the form of works of art is between the individual work of art and a group of work of arts or genre. Both can be seen as explaining the success of a work of art. Either a work of art has some individual characteristics which appeal to a particular viewer or a group of viewers or then it has some general characteristics which make groups of work of arts similar in form and hence make all works possessing this similarity in form successful. The trend nowadays in aesthetic theory is:

> *"...away from concentration of successful genre forms and on either forms themselves, and instead towards concentration on individual forms and individual audience members. That is, the general tendency is towards the subjectivization and individualization of the conditions of success of artistic forms." (Eldridge, 1997, 161)*

Kant (1928/1790) develops an aesthetic theory combining individual and shared features of a work of art and the influences of art on the perceiver. He argues that a successful work of art is required to be both original and exemplary. Originality refers to the original and unique characteristics of a particular work while exemplarity refers to the common characteristics of a group of works of art. The key to fulfilling these two requirements of success of a work of art by an artist is to aim at: "...making the form adequate to... thought without prejudice to the freedom in the play of those powers." (Kant, 1928/1790, 174).

This view partly combines the unique perspective of a single artist, a single audience member enjoying a work and the genre characteristics of a group of works of art. Hence, there can be aspects of individual form and genre present in the same work of art. The study adopts preliminarily a view on the form of an work of art as an i) individual form which has ii) specific effects for a particular individual observing the work. This does not mean that genre is totally neglected in the study, but rather genre is seen as secondary and possibly arising out of the fact that a particular work of art may have a similar effect on a large number of observers, for instance. Hence, one may observe the conditions of this effect across audience members and also compare different work of arts with similar effects to find commonalities. In a way then some aspects of genre may arise from the subjectivist perspective of the relationship of the form of a single work of art to a single observer. The aspects of a single work of art may consist of different shapes, visualizations or other features as discussed. One difficult question here is between the spoken and written language and text as an element in an work of art vs. other elements, such as the visual groupings, colours and layers of perspectives used in painting, for instance. The key is to be able to approach a 'language' of art form without the limits of spoken or written language.

Langer (1957, 89) has discussed a non-discursive mode of symbolism which would begin with the grammar of the eye and ear in sensation and then become articulated more fully in artistic expression. This grammar of the eye and ear may be seen as symbolism. Through these non-linguistic symbols people in essence organize their world of meaning. The symbol, due to its generality, liberates a particular stimuli from being interpreted rationally or with finite practical concerns (Alexander, 1997, 259). Even when perceiving ordinary objects people then transform a complex combination of sensations into a more abstract grouping of general symbols (Langer, 1957, 144). It is this grammar of the eye and ear which may be seen as the source of presentational, rather than propositional, meaning. Presentational meanings may grow via metaphoric thinking and myths, which may illuminate the underlying forces governing human existence. (Alexander, 1997, 259-260).

Langer (1957, 208) discusses music as the paradigm of presentational meaning due to it being able to exhibit 'pure form'. Music to Langer is not a psychological expression of emotions, but rather symbolic expression about feelings. Hence, it reflects the composer's knowledge of human feeling in general, rather than the composer's own personal feelings. (Langer, 1957, 235, 245). She further argues that:

> *"The tonal structures we call "music" bear a close logical similarity to the forms of human feeling - forms of growth and of attenuation, flowing and stowing, conflict and resolution, speed, arrest, terrific excitement, calm, or subtle activation and dreamy lapses - not joy and sorrow perhaps, but the poignancy of either and both - the greatness and brevity and eternal passaging of everything vitally felt. Such is the pattern, or logical form, of sentenience; and the pattern of music is that same form worked out in pure, measured sound and silence." (Langer, 1953, 27)*

Music as an art form has no literal, linguistic meaning to be semantically interpreted. Yet it seems to have syntax and vocabulary of a kind which make it possible to systematically compose, for instance. Hence, music may be seen as kind of symbolism:

> *"...there is no doubt that musical forms have certain properties to recommend them for symbolic use: they are composed of many separable items, easily produced, and easily combined in a great variety of ways; in themselves they play no important practical role which would overshadow their semantic function; they are readily distinguished, remembered, and repeated; and finally, they have a remarkable tendency to modify each other's character in combination, as words do, by all serving each as a context. The purely structural requirements for a symbolism are satisfied by the peculiar tonal phenomenon we call music." (Langer, 1957, 228)*

This non-linguistic nature of musical 'language' may also be expanded to other art forms. Langer (1957, 235, 245) claims that all works of art are directed towards significant, pure form. This view rejects the psychological explanation that forms are about expressing the emotions of the author in the form of art. Visual arts may achieve significant form indirectly via representing certain objects in a certain way, rather than directly as in music (see Alexander, 1997, 260). Langer (1953, 40) sees significant form in art related to "...the creation of forms symbolic of human feeling." This means she emphasizes the dimension of human feeling in art. This does not mean that art literally contains a consciousness as such, but rather: "...work of arts contain feelings, but do not feel them." (Langer, 1953, 22). In this way Langer defines the question: what is created when an artist creates a work of art. To her, creation refers to the creation of symbols which resemble human emotions, not to the creation of an artefact or representation as such.

The study adopts Langer's views on art to a degree. The concept of significant form is especially interesting. However, the study does not wish to limit its use to representing human emotions only, but rather a significant form in art may be more broadly seen as representing a whole range of profound human experiences, such as emotion, daydreaming, flow, or other experiences. This is because various subjective experiences may be based partly on similar mechanisms of perception and making meaning, as was discussed with appraisal and emotion. Also, the dimension of presentational 'language' of the human eye and ear is interesting. The study uses this approach to emphasize the role of the unconscious processes and mechanisms in making meaning. Further, significant form may be seen as not dependent on only one modality of representation, such as audio or music, but rather significant form may be present in various combinations of sensory modalities.

But how to better conceptualize this relationship between features of work of art and their psychological effects? One way is to use the example of music. Similarly to Langer (1953, 1957), Addis (1999) sees that music and certain states of consciousness may be similar to each other. This similarity may be that of isomorphisim. This may have two meanings. First, it may refer to the "...one-to-one correspondence in the sense of there being a rule that generates a systematic correlation of the elements of one realm or domain to the elements of another." (Addis, 1999, 24). Second, isomorphism may be similarity or identity of structure which does not permit one-to-one correlation:

"……here it is the form of elements and domains and not their content that is relevant; and different elements within a domain may have similar or identical form, differing only in content." (Addis, 1999, 25). Further, it can be argued that:

> *"…passages of music are isomorphic with certain possible states of consciousness…because consciousness and sound have a profound ontological affinity with respect to time and because human nature is what it is, music is a quasi-natural representation of possible states of consciousness of human beings such that, at some level of awareness that is not ordinarily that of what one is attending to, we are presented with those possible states of consciousness by music; that is, music brings them to mind, if not always to conscious mind. Finally…certain subtle differences in both the intentions and especially the modes of states of consciousness that are ineffable, that is, cannot be captured in language, can be represented by music; where language fails, music can sometimes succeed in symbolizing to us the nuances of mood and other aspects of consciousness." (Addis, 1999, 72)*

Hence, it may be that music as a stimulus may create different states of consciousness.[48] When presented with music as a kind of abstract, quasi-natural stimulus, the mind then is 'tuned' to the frequency of the stimulus, and hence a certain state of mind may be brought about. This influence may take place at the level of the unconscious. Via making meaning the unconscious mind may 'recognize' this quasi-natural stimuli and consequently change states of consciousness. Although the study does not literally wish to make such a broad hypothesis, the study still wishes to address this issue. Similarly to Addis (1999) and Langer (1953, 1957) Koffka (1923/1963), a gestalt psychologist concerned with visual and pattern perception, also proposed an isomorphic theory of perception, that:

> *"…would lay the foundations of a system of knowledge that contain the behavior of a single atom as well as…a human being, with all the latter's curious activities which we call social conduct, music and art, literature and drama." (Koffka, 1923/1963, 53)*

This may imply that there are indeed close relationships between multimodal representations and the corresponding states of consciousness, such as subjective experiences, possibly based on isomorphism or some other mechanisms. This type of close interaction of multimodal representations and corresponding experiences to a degree may be then underlying the conception of significant form, at least in the arts. How would the principle of isomorphisim then apply to media and communications technologies?

Television as a psychological stimulus consists of continuous action and change, as the images

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[48] *The possible isomorphic relationship between forms of music and consciousness also implies that there is a certain form of consciousness:*

> *"…one can talk about the "form" of a particular state of consciousness in terms of its possession of the two kinds of properties, the form of an emotion…that…has much more to do with its longer extension in time and in particular with its subtle changes through time…The content of a state of consciousness obviously is just the particular mode property and the particular intentional property that the state exemplifies." (Addis, 1999, 75)*

stream by the perceiver. This form of television, regardless of substance may be responsible for some psychological effects, such as promoting aggression in children (see Huston et al, 1982, 611-619). From the point of view of physiological responses to television it may be said that it is passive and consists primarily of slow brain wave patterns (Krugman, 1971, 11-13). Watching television also may have consequences for brainwaves and states of consciousness due to it not requiring complete and concentrated attention:

"When an individual is involved in conscious thought, the brain does not operate in synchronous rhythm, but when the brain lets down its alertness it moves into a more hypnotic alpha rhythm more characteristic of daydreaming. As we become more relaxed, the left hemisphere of the brain, which processes information logically and analytically, becomes inactive, allowing the right hemisphere to process information uncritically and emotionally." (Barry, 1997, 172-173)

Consequently, when one is in such a state of non-logical and emotional experience, there is continuing vulnerability to suggestion and manipulation. When watching television in this passive state, it may seem that the images are logically connected, but if one reflected on the relationship of the images, such as tv-programs and commercials, one may realize that they are not connected (Barry, 1997, 173). Wood (1979, 521-523) even suggests that television is a dream, having similar effects as dreams. McLuhan (1964, 277) suggests that this dream-like experiential quality of television may have profound effects:

*"Everybody experiences more than he understands. Yet it is experience, rather than understanding, that influences behavior, especially in collective matters of media and technology, where the individual is almost inevitably unaware of their effect on him."*

Consequently, it may be that one can also look at multimodal representation from the point of view of isomorphic relationships of the formal features of technology and symbolical information and states of consciousness.

The conception of significant form may be further advanced by investigating formalism as an art theory. Formalism emphasizes the structural properties of art. One may speak of significant form, which refers to the design of an work of art. The gestalt principles of expression are seen as important to achieving significant form.:

*"Significant form is comprised of arrangements of lines, colors, shapes, volumes, vectors and space (two-dimensional space, three dimensional space and the interaction thereof). Genuine art…addresses the imagination like the figures of Gestalt psychology, prompting the viewer to fill the work of art in such a way that we apprehend it as an organized configuration of lines, colors, shapes, spaces, vectors and so on." (Carroll, 1999, 109)*

Carroll (1999) further argues that the gestalt properties of a work of art are the key which compels attention and:

*"…encourage us to dwell on and contemplate the ways in which the composition interacts with our perceptual capabilities, thereby serving as pretext for us to explore our*

> *sensibility - to take note, for example, of how a particular diagonal line draws our atten-*
> *tion to the foreground." (Carroll, 1999, 109)*

Perception may then be taking place in the gaps of sensation based on the form of the work of art, rather than in various sensory modalities as such, as discussed. Hence, formalism emphasizes form over representation, i.e. whether an work of art actually represents something in everyday life. Formalism also holds that is not necessary to have representative content in a work of art in order for it to be pleasurable. This may be the case when artists are trying to create certain types of experiences in their audiences: [49]

> *"The abstract grillwork on a palace gate may be an example here. It possesses no distinc-*
> *tive expressive properties. It simply pleasures the eye with its look, and, moreover, this is*
> *all that it is intended to do...Such work of arts are simply beautiful. They are bereft of*
> *content; there is nothing they are about. Much of pure orchestral music and pure dance*
> *may also be described this way...the content of such works...are the rhythms, aural and*
> *visual devices, and arrangements of elements that command audience attention, that pleas-*
> *ure us, or that absorb us." (Carroll, 1999, 131)*

This emphasizes the influence of form of symbolical information on psychological effects vs. substance. It also means that all art may not be meant for critical reflection upon it, even though there may also be art which invites conscious, critical reflection. In that sense certain art forms produce 'only' experiences of beauty and feelings of pleasure:

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[49] *Based on the formalist conception of art, one may further investigate the theory of aesthetic experience, the experience of being engaged with art. There are two basic kinds of theories: the content oriented theory and the affect oriented theory. In the content oriented theory, an aesthetic experience is the experience of the aesthetic properties of the work people are attending to. Aesthetic properties include: "...the expressive properties of a work, the properties imparted by its sensuous appearance (elegance, brittleness, monumentality), and its for-mal relations." (Carroll, 1999, 168)*

*There are three underlying dimensions of aesthetic experience: unity, diversity and intensity. Unity of a work depends on the formal relations of its elements. For instance, a work may be unified by repeating certain motifs of themes through the work. The coordination of elements throughout the work give rise to certain type of aesthetic experience. The intensity of a work means that works may possess certain properties, such as joy or sadness, in varying intensities. A work may be very sad, for instance, or somewhat sad. Elements of the work may have differing intensities of expression. The diversity of work of art is exactly the variation of a wide range of expressive properties. When one attends to the different dimensions of unity, diversity and intensity, one can appreciate the work and have an aesthetic experience. (Carroll, 1999, 169). The content-based account for aesthetic experience seems to give priority to the formal structures of the work of art itself. While it may be a good account for how the structural features of art may be combined, it says little about how an work of art actually is subjectively experienced. The affect-oriented theory of aesthetic experience seems to be more fo-cused on subjective experience. It does not so much rely on the focused, reflection on the formal properties of the work of art, but rather is a certain way of looking at works of art:*

> *"...an aesthetic experience is marked by the disinterested and sympathetic attention and contemplation*
> *of any object of awareness whatsoever for its own sake alone. Aesthetic experience is a form of*

*"…not all abstract music and painting has this reflexive apperceptive dimension. Much absorbs us without guiding us to reflect upon or to contemplate the conditions of our absorption. Much art engages us with its sheer beauty, without inviting us to stand back and ask from whence that sense of beauty springs…It may engage our sensibilities- engage them richly - without encouraging us to interrogate the sources of that engagement."* *(Carroll, 1999, 132)*

However, theories of art and music have three drawbacks from the point of view of the study. First, the study does not directly deal with works of art, but rather with the possible influences of form of symbolical information mediated via media and communications technologies. It may be argued that symbolical information mediated via everyday media and communications technologies is not strictly art, or even mass-art. The study does not wish to elaborate on the philosophical differences of art and mass media information, but rather to state that at least some principles, such as the gestalt principles of perception may be useful in understanding the form of symbolical information. Hence, the form of symbolical information may have similar properties to works of art via using similar techniques of expression and organization of multimodal representations. The form of symbolical information may then influence connotative and felt meanings, which may change subjective experiences and/or knowledge.

Consequently, the study will use the concept of significant form as preliminarily referring to i) the presentational and non-linguistic aspect of an object of perception, such as the form of symbolical information embedded in a particular technological device ii) based on manipulating material combinations of multimodal representations and other expressive devices which iii) may have psychological effects such as changes in subjective experiences and/or knowledge iv) on a particular perceiver v) via influencing connotative, felt meanings or possibly also other types of tacit meanings, such as

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*attention…Disinterest is not equivalent to noninterested attention…disinterest amounts to…"interest without ulterior purposes"… We attend to work of art in its own terms." (Carroll, 1999, 170-171)*

*When one attends to an work of art aestheticly one is being disinterested. One may also be sympathetic:*

*"It involves surrendering to the work - allowing ourselves to be guided by its structures and their purposes. Sympathetic attention is directed at the object and one willingly accepts the guidance of the object over the succession of our mental states by the properties and relations that structure the object. Sympathetic attention presupposes playing by the object´s own rules, rather than importing our own - for example, going along with the convention of people singing to each other in operas, instead of saying people don´t behave like that, or accepting the notion of warp-drive while reading a science fiction story." (Carroll, 1999, 171)*

*Formalism as a theory of art then emphasizes the interaction of perception and the different layers of generic structures in works of art. This observation is used to further argue for the importance of different types of generic forms or ´significant form´ in symbolical information. Especially interesting are the dimensions of a work of art: unity, complexity and intensity as sources of conceptualizing about layers of information mediated via media and communications technologies. Also, the concept of aesthetic experience as a way of attention or of surrendering to the work of art on its terms, may to a degree also apply to ways of attention as people are engaged with media and communications technologies.*

non-linguistic personal meanings. This reflects a certain type of resonance between the features of object of perception and the dimensions of an individual perceiver. Also, it reflects the emergence of felt meaning which may occur when using a particular media and communications technologies device with a particular form of symbolical information.

The second drawback of the theories of art discussed above is that they do not take into account the change of symbolical information over time. Formalism, for instance, often concentrates on static paintings or statues as an object of analysis. But film, television and sound are inherently dynamic. Also text in a newspaper or book is read over time, i.e. it is experienced as having a beginning and an end. The third drawback is seen in the example of music which reflects the psychological influences of an abstract, unimodal representation which may be seen as consisting of only form over time, rather than form and substance. Hence, there may be different principles of isomorphism with combinations of multimodal representations with both substance and form. Due to these limitations, the study does not directly adopt formalism, isomorphism and musical theories as such. However, significant form may be related to the material properties of designing certain combinations of multimodal representations. This is discussed in the next chapter.

### 5.3.3. Meaning units

The study now concentrates on the temporal and spatial features of symbolical information. Temporal features refer to such issues as the time it takes for a certain substance and form of symbolical information to be perceived. Information in audio modality may be an example here. It is meant to be listened to in a linear manner in a particular sequence for a particular duration. The spatial features of symbolical information refer to the way a particular screen of information is constructed visually as a 'still-frame' with certain designs with certain shapes and colours, for example. Then there are spatio-temporal features in which different modalities of symbolical information are intertwined in a temporal sequence like in a movie. These are discussed as examples of the manipulation of material combinations of multimodal representations, which may create psychological effects on perceivers.

Modality and technology specific ways of expression may be used which may be seen as carriers of different layers of symbolical information. This may be called the aesthetic of each medium, or particular combination of features in each media and communications technology:

> *"With the tv, the viewer is the screen. He is bombarded with light impulses that Joyce called the "Charge of the Light Brigade" that imbues his "soulskin" with "subconscious inklings". The TV image is not visually low in data. The TV image is not a still shot. It is not a photo in any sense, but a ceaselessly forming contour of things limned by the scanning finger...The TV image offers some three million dots per second to the receiver. From these he accepts only a few dozen in each instant, from which to make an image. (McLuhan, 1964, 313)*

The aesthetics of a certain medium is then partly a function of its technological capabilities and

their relationship to the viewer.[50] The way television information is visually structured as a narrative is that it is based on scenes, setups of situations, and shots which may vary within a scene as ways of visual framing of the scene. The shots are joined together by placing them one after another, so that the visual flow of shots creates a continuum, or a storyline. Several shots are used to illustrate the plot or events being portrayed. All these different forms of visualization may influence meanings. For instance, a close up shot on a small part of the body may convey intimacy. A wipe of the image from the screen may entail the ending of some event. A long and wide shot may be used to create a sense of context. When the camera looks up to the event, the viewer is 'small' and powerless. When the camera looks at a scene from above, the viewer is made to feel powerful and in control. Using cuts, or putting different elements of shots together, one can create excitement. (Berger, 1997, 114)

Music is an especially interesting modality of expression. In a way, music may be thought of as a movement of audible forms, i.e. as narrative.[51] Music may also contain a harmony, a certain type of abstract and directly-experienced relationship between the different musical forms as they move over time and are perceived. The recognition of this special kind of tone may not be a result of learning,: "The tendency, the harmonic function, of a tone is not something that we recognize thanks to a special training in music theory. Rather it is a phenomenon that we experience directly, without any mediation of theoretical concepts." (Berger, 2000, 33). There may also be differences in the way certain modalities of information, such as music, are experienced when compared to, for instance, visual information, such as a painting:

> "...the most important components of the aural medium, the effects of tonality and meter, as well as of rhythm and tempo, are experienced directly, without the mediation of

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[50] However, other issues may also be involved, such as the way a certain medium is used and the meanings arising out of a particular type of use.

"Television is the most voyeuristic of all communication media, not only because it provides more material in an unending stream of images and in the form most universally acceptable to the total population, but also because it is the most intimate of the dramatic media. In the theater, the actors are relatively remote from the audience, and the dramatic occasion is public. In the cinema, also a public occasion gathering a large audience into a single room, the actors are nearer to the spectators than in the theater, but in close-ups they are larger than life. Television is seen at close range and in a more private context. The close-up of the television performer is on a scale that most nearly approximates direct human contact." (Esslin, 1982, 30-32)

[51] This may make music partly similar to theater, film and literature:

"...each phase except the last of a musical work contains a "future" with respect to further phases of the work that, by being anticipated, colours in a specific way the phase being actualized. Sometimes the work´s finale is also anticipated in this way, without of course opening up perspectives onto any further phases. Only works characterized by quasi-temporal extension, that is, musical, literary, theatrical, and film compositions, can have such endings. The continuum of experienced real time does not have this type of ending. Even when real objects...come to the end of their existence, ...a perspective always opens further temporal phases...; but not such "afterward" is possible once the musical work has come to an end...In the same manner its...content does not designate any "before"...The organized quasi-time of the composition is complete at both ends and does not enter into the time-continuum of the real world." (Ingarden, 1986, 77-78)

*cognition...In representational painting...by contrast...recognition is a precondition of experience, with regard to the impact of both the represented world and the composition."* (Berger, 2000, 38-39)

This implies that different modalities of symbolical information may have different impacts on perceptions and subjective experience. For instance, the experience of music draws oneself to reflect on one's inner world, rather than focus on the outside world (Berger, 2000, 34). How may one then think of the interactions of different modalities and structures or forms of symbolical information as they move over time?

Eisenstein has comprised a theory of the montage. He emphasizes not only logically connected stories but the emotional impact of a film. A montage is two pieces of film "..of any kind, [which] placed together, inevitably combine into a new concept, a new quality arising out of that juxtaposition." (Eisenstein, 1957, 4). The mechanism behind the working of montage is psychological. The source of the psychological state of the perceiver is the 'original' emotion of the creator of the film:

*"The strength of the montage resides in this, that it includes the creative process, the emotions and mind of the spectators. The spectator is compelled to proceed along that selfsame creative road that the author travelled in creating the image. The spectator not only sees the represented elements of the finished work, but also experiences the dynamic process of the emergence and assembly of the image just as it was experienced by the author."* (Eisenstein, 1957, 32)

Eisenstein (1957) further emphasizes the multimodal sensation of a work of art; as he sees the film can impact all senses. He suggests that even a printed text may contain the sense of touch, the sense of smell, light, hearing, movement and pure emotion. He argues that there may not be significant differences between a purely visual montage and the other types of art forms in the way they link feelings and sensations together. The ways of integrating multimodal elements together in a linear and sequential manner, such as cinema, may have significant psychological consequences. For instance, montage as used by Eisenstein is based on the deliberate attempt to create perceptual dissonance.[52] He utilized the principles of Japanese ideograms and avoided the narrative continuity of classical film expression.

*"He set his images at counterpoint, reasoning that a dialectical collision of images would force the viewer to resolve the conflict and to derive a meaning not implicit in any of the individual film frames.... For Eisenstein, the significance of a film as an art form rested in the relationship between the images resolved as a completed gestalt in the mind of the viewer. The process required the viewer to be an active participant in constructing the meaning of events shown on the screen."* (Barry, 1997, 204)

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[52] *Eisenstein (1949, 37) argues accordingly that:*

*"The shot is a montage cell. Just as cells in their division form a phenomenon of another order, the organism or embryo, so, on the other side of the dialectical leap from the shot, there is montage. By what, then is montage characterized and, consequently, its cell - the shot? By collision. By building conflict of two pieces in opposition to each other."*

When actively being forced to make meaning for the montage, the viewer then is partly influenced by the author of the montage. If one can manipulate at will this type of variability of meaning, at least in principle one may indirectly influence what types of meanings are made for a particular montage.[53] It may then be that some combinations of modalities and structures of symbolical information can create patterns of psychological stimuli which may influence people as they make meaning and experience emotions or other subjective experiences:

> *"…a relatively simple verbal text can generate sense experiences. Film can also do so, but with even greater intensity and power. This happens only when a film is successful, of course…the element of psychic compulsion felt by those attending films and generated by filmmakers…is an important aspect of watching films." (Berger, 1997, 151)*

Along these lines Mitry (1963/2000) has discussed an issue related to the techniques and psychological effects of the cinema, such as montage and works of art. He concentrates on the problem of artistic form in general:

> *"…the problem exists in creating a form both necessary and suitable for giving the chosen idea its complete meaning, enabling it to become fulfilled in an original signification, and, at the same time turning a potential reality into an actual reality." (Mitry, 1963/ 2000, 339)*

When discussing the meaning made for an object of perception, such as a work of art, it may be said that not all connotation as variation of form produces an artistic effect. Similarly, in cinema, there are certain necessary relationships between denotation, signifieds and connotation, signifiers or the form of cinematic representation. (Mitry, 1963/2000, 333-344) [54]

> *"In cinema, the signifiers are always visual or audiovisual, that is obvious; but though their material is the same, their forms are not. They do not exist a priori but contingently. Formed in terms of a specific content, existing themselves in terms of specific associations and, what is more, a specific style, they are always different, i.e. "formed in a different way"… the units of meaning are almost always composed of heterogeneous elements (images, words, sounds) whose internal articulations are infinitely variable." (Mitry, 1963/2000, 344)*

Consequently, when two different movie directors direct the same film, the result will be different. This is because the meaning of the story and its perspectives become modified with different views

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[53] *For Eisenstein, the ultimate application of such a way of expression was propaganda:*
> *"…by a process of comparing each new image with the common denotation, power is accumulated behind a process that can be formally identified with that of logical deduction…(this) leads to the formal possibility of a kind of filmic reasoning. While the conventional film directs the emotions, this suggests an opportunity to encourage and direct whole thought processes as well." (Eisenstein, 1949, 45, 48)*

[54] *Mitry (1963/2000, 339) argues that the content and perceptible form of a work of art are closely interconnected. For him the separation of content and form is the consequence of lack of artistic knowledge or an attempt to make art a vehicle completely alien to art itself. However, the study has adopted the view of a partial separation of substance and form of symbolical information.*

when directing the movie. In that sense, the connotations of cinematic narratives are dependent on the way they are produced (Mitry, 1963/2000, 345). There is a curious paradox here. The film is a wholistic experience for the perceiver. This experience is influenced by decisions of a director when making the film. However, the technique of the director in influencing the film consists of ways and means of manipulating the material as multimodal representations:

> *"It is obvious that narrative and expressive techniques are subordinate to the narrative, since the whole effect depends on the associations which its development in time creates. However, the units of meaning are formalized by these techniques. And since the narrative derives its deeper meaning exclusively from the connoted significations, it follows that the semiology of the narrative depends on techniques which, paradoxically, are subordinate to it: a specific code is formed for the expression and comprehension of a story, but the intelligibility of that story depends on the formal qualities of that code."* (Mitry, 1963/2000, 345)

Hence, there can be 'rules' for designing a certain film utilizing cinematic techniques which apply to material representations, such as the form of symbolical information. The application of these rules by a director when designing a certain film then leads to certain connotative, felt meanings in the perceiver. Of course, other types of meanings may also be made. Moreover, these manipulations of material representations according to rules may be seen from the point of view of the psychological effects they produce in the perceiver. If so, these combinations of multimodal representations may be seen as meaning units as judged by their influences on meanings and the consequent effects on subjective experiences and knowledge. What the movie director does, then, is to carefully design multimodal meaning units at many levels of symbolical information. This same principle of the design of meaning units in producing psychological effects on perceivers may also be utilized with modern media and communications technologies. [55]

The study concludes that significant form in multimodal representations may be either representational or non-representational, i.e. consisting of combinations of substance and form of symbolical information or then just consisting of patterns in the form of symbolical information as such. These patterns in the form of symbolical information as meaning units may highlight a more 'abstract' significant form as a quasi-natural stimulus partly similar to the pure form of music. This type of significant form may be related to a certain type of 'direct' perception of the movement of multimodal forms over time. It may be influenced by the resonation between sensory mechanisms and features of objects of perception. Significant form may reflect a kind of harmony between the perceiver and

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[55] *How are these meaning units then perceived and processed by the viewers of multimodal representations and what types of technologies have been constructed? One example is the use of the tendency to perceive patterns in motion as discussed in relation to gestalt principles of perception. This has led to the invention of motion picture technology. Television, video and computer graphics create real movement from the point of view of the perceiver:*

> *"All are capable of producing the perception of smooth, continuous motion, seemingly indistinguishable from real motion, yet they do so by presenting a rapid succession of discrete frames, each of which is entirely motionless."* (Palmer, 1999, 473)

the object of perception, which elevates experiences of such combinations of multimodal representations to levels of higher experience, higher meaning. However, with modern media and communications technologies, the creation of significant form via manipulating meaning units as material representations may also be influenced by the constant interaction of the user and technology. This is addressed next.

## 5.3.4. Narrative and dialogical interaction

### 5.3.4.1. Multimodal narratives

The dimensions of significant form in modern media and communications technologies will now be discussed. This is done in order to be able to synthesize a list of elements of possible meaning units which may reflect the material constituents of significant form. First, the study concentrates on the visual interfaces of computers and their aesthetics over time. Then, ways of interaction with computers are introduced. Finally, a list of features of meaning units as material representations, especially related to the form of symbolical information embedded in modern media and communications technologies, is presented.

The screen of a particular technological device is the basic element of modern media and communications technologies if one focuses on visual perception. One may discuss a classical screen, which is usually a flat, rectangular surface intended for frontal viewing:

> *"It exists in our normal space, the space of our body, and acts as a window into another space. This other space, the space of representation, typically has a scale different from the scale of our normal space." (Manovich, 2001, 95)*

The classical screen has been exemplified by classical, static painting, for instance. The arrival of cinema created a dynamic screen, which was capable of displaying images changing over time. This is the screen of television, video and cinema where a single, large image dominates the whole screen. There is a change brought about by the dynamic screen:

> *"A screen's image strives to suspend disbelief and to identify with the image...the viewer is expected to concentrate completely on what she sees...focusing her attention on the representation and disregarding the physical space outside." (Manovich, 2001, 96)*

The arrival of the computer screen has brought about even more changes. No single, large image dominates the screen anymore. Several layers of overlapping windows are offered to the user of a computer and in principle none of the windows dominate the attention of the user. This is the case of a rectangular computer screen for visual representation partly similar to the classical and dy-

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*This means that even if people know beforehand that a presented information is not true, or it is just an illusion, they still may persist in believing it. People love illusions of different kinds. Hence, perception is a process of filling in the missing parts of information which is presented and this creates a certain kind of perceptual bias of information. (Barry, 1997, 25-27).*

namic screen. Virtual reality makes the screen disappear altogether, filling the viewer's visual field completely. Virtual reality may bear resemblance to other traditions of simulation, like frescoes and mosaics. Frescoes are often in human scale and are inseparable from architecture. The perceiver is not immobilized, but is free to move when observing the fresco. On the other hand, the fresco can not be moved. (Manovich, 2001, 97)

In the tradition of representation, as in the case of the classical screen, the perceiver is bound to immobility in relation to the screen. This is because the screen itself is mobile, it is capable of bringing movement to be perceived.

> *"...in the simulation tradition, the spectator exists in a single, coherent space - the physical space and the virtual space that continues in it - in the representational tradition, the spectator has a double identity. She simultaneously exists in physical space and in the space of the representation. This split of the subject is the tradeoff for the new mobility of the image as well as for the newly available possibility to represent any arbitrary space, rather than having to simulate the physical space where an image is located." (Manovich, 2001, 113)*

The study deals with representational and visual computer screens embedded in various technological devices. When thinking of the aesthetics of such a screen there are two main points. First, in the era of telecommunication and the internet, it may be difficult to define exactly where symbolical information presented to a particular perceiver, ends and what is the correct order to view pieces of symbolical information. Goodman (1976, 252-253) exemplifies the traditional notion of a fixed aesthetic object, which has a self-contained structure which is limited in time and space. Such objects may be a painting, a building, a photograph or a movie. In the era of the ubiquity of information, which is interlinked in various databases, it may be difficult to see how an aesthetic object, such as a representational computer screen, can be 'objectively' limited in time and space. It may the be that the decision of the user to be engaged with symbolical information and the decision to stop it better captures the boundaries of the aesthetic object. This reflects the subjective and relativist position of the perceiver in relation to the aesthetic object.

Second, since a computer is capable of personalization, it may be that the aesthetics of a particular screen may be individual and vary from person to person. It may be that some individuals may find a 'significant form' to be different from what others think and experience. This means that the visual design of the computer screen may be at least partly individualized.

The design of the computer screen may happen at the level of one single screen or then between a series of screens over time. The study will now address the visual elements of a single computer screen. This may be related to the user interface and its control buttons, to the way of embedding the substance of symbolical information into the user interface and to the various, overlaying windows on a single computer screen, for instance. Visual representations in symbolical information may be divided into two main groups: sensory vs. arbitrary symbols. Sensory visualizations refer to symbols which: "...derive their expressive power from their ability to use the perceptual processing power of the brain without learning." (Ware, 2000, 10). Conversely, arbitrary symbols refer to:

> *"…aspects of representation that must be learned, having no perceptual basis. For example, the written word dog bears no perceptual relationship to any animal. Probably very few graphical languages consist of entirely arbitrary conventions, and probably none are entirely sensory. However…sensory representations are effective (or misleading) because they are well matched to the early stages of neural processing." (Ware, 2000, 10).*

The study focuses on sensory visualizations as one dimension of the visual aspect of the form of symbolical information. These types of representations can be understood without training, they resist instructional bias and they are processed automatically and very quickly by the perceptual system (Ware, 2000, 14-16). Issues with such visual representations include lightness, brightness, contrast, constancy, colour, perception of static and moving patterns, spatial vision, depth vision and dynamic vision. All these aspects of visual representations may have differing effects on how they are processed by the visual system, how meaning is made for them and what their psychological effects on the perceive may be. (see Ware, 2000, 100, 148, 198, 239; Palmer, 1999)

There are also certain ways of integrating visual representations on one computer screen. These may include typography, the perceived directions of elements, the rhythm and perceived movement of elements, the amount of empty space, relationships and ways of grouping visual elements and the use of colours (Levy, 1999, 50-51). The study does not deal with all these issues of elements of visual design in-depth, but touches on some points. In a dynamic computer screen there may be auditory, visual, textual and video representations, for instance. Also, there is the dimension of a single computer screen, which may be only one of many overlapping windows the user is simultaneously seeing, and the dimension of relationships of different single computer screens. Audio may be divided into human speech, audio effects and music. Textual representations are obviously text. Visual representations are perhaps the broadest category in computer screens. These may include photographs, graphics and drawings, for example. Visual representation is also the key in a computer screen due to both the control interface and the symbolical information often being presented visually in quite a small space. Consequently, there are often many different visual elements present in any computer screen. Further, these elements have certain shapes and colours and groups of elements may be arranged on the computer screen in various ways.

The study will now elaborate on the issues of visual interfaces as related to the way of using the interface to control the computer vs. perceiving the substance and form of symbolical information. This is done via discussing the relationship of narrative and control with computers. First, the dimensions of a narrative are discussed.

A narrative is a story which tells about things which have happened or which are happening or will happen. A story contains a sequence of events, which means that narratives take place over varying lengths of time. Drawings, photographs or other pictorial material are usually not considered to be narratives, but they may act as parts of narratives. For instance, a collection of pictures shown after each other may construct a narrative. A narrator is the one who tells the story, i.e. he is the author of the narrative. (Berger, 1997, 4-6). Further, narrative may be seen as the basic way people experience the world. In perceiving objects, one may be still, or moving, and the objects may be still or

moving. When there is movement and/or perception over time, the perceptions appear as a flow, i.e. a sequence of events. Richardson (1990) argues that:

> *"Narrative is the primary way through which humans organize their experiences into temporally meaningful episodes...Narrative is both a mode of reasoning and a mode of representation. People can "apprehend" the world narratively and people can "tell" about the world narratively....narrative reasoning is one of the two basic and universal cognition modes. The other mode is the logico-scientific...the logico scientific mode looks for universal truth conditions, whereas the narrative mode looks for particular connections between events. Explanation in the narrative mode is contextually embedded, whereas the logico-scientific explanation is extracted from spatial and temporal events. Both modes are "rational" ways of making meaning." (Richardson, 1990, 118)*

Narratives may then be a basic way of perceiving and knowing about the world as well as meaning-making reflected by the interaction of the mental representations of events of the world with previous knowledge. [56] The role of the reader in reading narrative texts may be seen as one of 'gap filling'. The schematized information offered is full of empty spaces spatially or conceptually, which invite active interpretation of the text by the reader:

> *"The fictional writer selects like the scientist, and invites the reader to fill in the blanks. Stories or articles can give only a sample of experience, because experience is overwhelmed by irrelevance: taking out the rubbish, bumping the table, scratching the back of one's head, seeing the title of the book one was not looking for. What distinguishes the good storyteller and the good scientific thinker from the bad is the sense of pointedness." (McCloskey, 1990, 19)*

This means that symbolical information is indeed descriptions of 'compressed' experiences made by an author. The meaning of the information is then made, when the reader 'decompresses' the original information in various ways: [57]

> *"What is missing from the apparently trivial scenes, the gaps arising out of the dialogue - this is what stimulates the reader into filling the blanks with projections (the image of the reader running a motion picture inside his head, which is of course why novels can still compete with television...)...the "enduring form of life", which Virginia Woolf speaks of*

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[56] *As discussed, Lakoff and Johnson (1980) have argued for a widespread use of metaphors in making meaning of everyday life:*

> *"Metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature. The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do everyday is very much a matter of metaphor." (Lakoff and Johnson, 1980, 3)*

*is not manifested on the printed page; it is a product arising out of the interaction be-*
*tween the text and the reader." (Iser, 1972/1988, 19)*

Narratives need not only be textual in the literal sense of being written or printed. Texts can also be seen as video, audio, graphics and their combinations (Berger, 1997, 13-15). In that sense, one can see any form of narrative information, i.e. information taking place over time, as narrative and as textual. Hence, the same kind of gap filling may be used when reading a printed text or watching television. Inside these multimodal texts there may be various layers of information outside the immediate appearance of the elements of the texts. The gaps may give rise to creative interpretations by the reader/viewer of the text. In that sense, a certain type of ambiguity may give rise to more creative interpretations than would a strict, informative and formally restricted text.[58] A narrative text is then all kinds of multimodal narrative texts which may exist. A narrative genre reflects a group of narrative texts, such as in television: science fiction, soap operas, news shows and commercials (Berger, 1997, 37). These types of narrative texts may use specific ways of expression or ways of structuring the narratives.

For instance, one can use descriptions of events, the thoughts of characters, dialogues between characters, stereotypical characters or other types of means of expression. Different types of action may be used, such as physical conflict or violence. One may characterize the actors of the story in various ways to give them personality and depth. One may use conflicts which give the story suspense. Exposition or rising action may be used to elevate the level of suspense or drama in the story until some definite point where a resolution is provided for the conflict of the story. A certain kind of plot, which is the way the author arranges the events of the story, is used. The points of view of different characters may be inserted into the events of the story. The author may also imply the tone of the text, meaning that the text should be read as sarcastic, comedy or as serious, for example. (Berger, 1997, 45; 63-69) [59]

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*This means that there may be two fundamental ways of making meaning; narrative and metaphor. Narrative is related to the structure of experience whereas metaphor is related to the use of concepts in making meaning. Both of these ways of making meaning may be seen as embodied. Narrative is the very structure of perceptions, and metaphor is the result of motor-schematic conceptualizations, as discussed earlier in the study. Hence, the dimension of time and basic constructs of making meaning are encountered here. It is then no surprise that information structured in a narrative form using metaphors may be quite natural to comprehend, such as reading a text, like a novel or newspaper article.*

[57] *Iser (1972/1988) makes a division of this text full of empty holes into two parts, the artistic and the aesthetic. This is explained as follows:*

> *"The literary work has two poles, which we might call the artistic and the aesthetic; the artistic refers to the text created by the author and the aesthetic to the aesthetic realization accomplished by the reader. From this polarity it follows that the literary work cannot be completely identical with the text, or with the realization of the text, but in fact must lie halfway between the two. The work is more than the text, for the text only takes on life when it is realized, and furthermore, the realization is by no means independent of the individual disposition of the reader though this in turn is acted upon by the different patterns of the text." (Iser, 1972/1988, 212)*

It seems then that narrative text as multimodal representation is one possible way to conceptualize dynamic symbolical information with form and substance. Basically, the authors of information have specific devices at their disposal to create certain types of expressions in multimodal texts or narratives. These devices may be related to both the substance and form of symbolical information. For instance, the substance may be different if one places one piece of text before another. This type of manipulation of substance may also be seen as related to the form of symbolical information as a way of presentation of the abstract ideas of substance. In that sense there is a constant interaction between the form and substance of symbolical information. However, due to the modularity and flexibility of modern media and communications technologies, it may be argued that the form of symbolical information in narratives may also become more independent of the substance. This is highlighted next via discussing the control of symbolical information via the user interface as related to the possibilities of traditional narrative.

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[58] *One basic way of creating ambiguity in a text of is the symbols which use:*

> *"...objects, events, or actions to stand for things outside themselves....A symbol is something that conventional knowledge tells us stands for something else; thus we have to be taught what symbols mean...a symbol brings two things together - for example, an object and an act by a character that has some higher meaning." (Berger, 1997, 68)*

*Symbols are like basic or fundamental carriers of very ´deep´ meaning. Hillmann (1983) has discussed symbols as archetypal patterns:*

> *"...like psychic organs, congenitally given with the psyche..., even if somewhat modified by historical and geographical factors. These patterns or archai appear in the arts, religions, dreams, and social customs of people, and they manifest spontaneously in mental disorders." (Hillmann, 1983, 10)*

*Hillmann (1983) considers archetypal patterns to be primarily based on the metaphorical discourse of the myths. Hence, in order to deeply understand human nature at a fundamental level:*

> *"...one must turn to culture (mythology, religion, art, architechture, epic, drama, ritual) where these patterns are portrayed." (Hillmann, 1983, 11)*

[59] *Also in fairytales there are certain kinds of "archetypes" when one judges the characters of a fairytale. Propp (1928/1968) claims that there are 31 different functions for the characters of the stories which may perform a similar action. These generic actions are, for instance, the initial situation, violation of existing rules, villainly, victory, solution and wedding. Since the same actions may be performed by different types of characters, one may study the function of the character in the context of the story. There may be characters such as villains, heroes, the helper of the hero, a false hero and the princess and her father. When putting the characters and actions together, it was found that the structures of different fairy tales were almost identical in this respect. (Propp, 1928/1968, 89)*

*When one mixes together these actions and characters, the result is a fairy tale. An existing situation is violated by evil forces. A hero is going out after the evil. He receives magical help from a helper. The hero defeats the evil and returns home. The hero is married to the princess and claims the throne. These seem like generic types of actions, storylines and characters. They may be considered also to be mythical or partly archetypal. Rather than trying to build a theory of archetypes in symbolical information, the study states it suffices to show that there may be symbolical, archetypical or mythical aspects in certain types of narratives, also including those which are mediated via media and communications technologies.*

## 5.3.4.2. Multimodal adaptive narratives

With computer screens there is the issue of the visual interface acting both as a stage for narratives and other ways of expression by the author and as a control interface between the perceiver and the machine. Further, there may also be automatic actions made by the computer when it is using decision rules to predict which type of information will be presented to the perceiver. The user also actively explores the information space:

> "The new media image is something the user actively goes into, zooming in or clicking on individual parts with the assumption that they contain hyperlinks (for instance, image maps in Websites). Moreover, new media turn most images to image-interfaces or image-instruments. The image becomes interactive, that is, it now functions as an interface between a user and a computer or other devices. The user employs an image-interface to control a computer, asking it to zoom into the image or display another one, start a software application, connect to the Internet and so on." (Manovich, 2001, 183)

One may conceptualize the relationships of the user and adaptive systems as based on two main categories. These are based on which party is taking the action and who has control over deciding the course of navigation or other features when the user interacts with the computer. First, the active dimension refers to the degree of adaptation. For instance, the adaptive software following the actions of the user may take 'independent' action when making adaptations to the various computer screens the user interacts with (Pilke, 1999, 12). Second, the dimension of degree of control means the source of decisions on how certain operations are performed when interacting with the computer (Pilke, 1999, 12). For instance, control of the system can either reside with the user of the system or with the system.

Based on this classification there can be a number of different types of meaningful systems. First, there can be systems which do not adapt at all and in which the user is in control. This means that the control over decisions on navigation and selection of particular symbolical information to be viewed is with the user. For instance, the user may be surfing the web and actively navigating and clicking on interesting information. In the world of more traditional media and communications technologies, reading newspapers may be similar to this. Second, there can be systems which do not adapt at all and in which the system is in control. For instance, a system may present a certain, predefined sequence from beginning to end, like a movie clip or an audio file. Cinema or movies may also be seen as similar to this mode of interaction.

Third, there can be adaptive systems in which the user is in control. For instance, the user is in control of the navigation and selection of particular features of symbolical information he wishes to perceive, and the system may actively suggest other pieces of information similar to what the the user has already selected. This may happen by placing extra information on the computer screen to be viewed at the user's convenience, also called augmentation (see Turpeinen, 2000).

When using a particular computer with a particular screen and ways of control via the user interface while surfing a website which has adaptive properties, all these types of user-computer rela-

tionships may be taking place within a single session. For instance, the user will have a continuous selection of where to navigate within the mass of symbolical information. When navigating, the system presents him with extra information which the system has decided may be of interest to the user. Also, the user may be able to select from narrative or dialogical ways of interaction. The narrative way of interaction may be seen as similar to normal web surfing in which the user actively navigates a sea of information and then focuses on some pieces and reads or views those as normal narratives. If the piece of information is inherently linear in structure, like an audio or movie clip, the user may follow the clip from beginning to end, but may pause, or rewind the clip, or use other non-linear ways of access. The dialogical way of interaction may mean that the user engages in textual or auditory dialogue with a semi-intelligent software program and can use conversation-like interaction with the computer, asking questions and getting answers from the adaptive software.

Consequently, there may be a narrative way of interaction with a computer, in which the user follows more or less traditional multimodal narrative texts. Also, there may be a dialogical way of interaction in which the user 'asks questions and the system answers them'. Further, there may be a basic way of exploration or navigation in the sea of multimodal representations provided to the perceiver. All these ways of interaction and controlling the computer may be in interaction and exist simultaneously or sequentially within a single session.

From this follows that the user may not be linearly following a narrative, a film or a text exactly as structured by an author. Rather, the user is multitasking, controlling the computer with his input and then selecting to focus on some pieces of symbolical information and viewing them for a while. And depending on the type of system, the software may be doing adaptations or then not. One way to open the possibilities of narrative and dialogical ways of interaction with symbolical information is to discuss the notion of the database. A database is a collection of digitized objects, such as text, audio, video and graphics related to a particular website. The authors of a website construct a certain interface for this database for the user. That means the authors of a website may pose some ideal ways for the user to interact with the objects of the database and consequently the user may not be totally free when viewing the database:

> *"The new media object consists of one or more interfaces to a database of multimedia material. If only one interface is constructed, the result will be similar to a traditional art object, but this is an exception rather than the norm." (Manovich, 2001, 227)*

In principle, the user can view, navigate and search computer databases (Manovich, 2001, 219). This is similar to traditional media and communications technologies in which viewing and navigation are also conducted by the perceiver. With computers the searching of information by the user is more flexible than with traditional technologies. Also, there may be more ways to view or navigate a computer screen than a newspaper. With the computer, there may also be more combinations of digitized objects available in a database than in traditional media and communications technologies. For instance, the same symbolical information may be in textual, audio and video modality. This means that there is potential flexibility in the choice of the objects in a database.

When the user accesses symbolical information in a database, it may not construct a narrative as such. A narrative in a traditional way may be seen as the definition of an author of the exact sequence of pieces of symbolical information. A narrative may also be seen as more loosely based on the perceiver selecting a particular path in a hypermedia database. That means that out of all possible objects to view in a database the perceiver selects to view 30% in an order on which he has decided based on the available ways of navigation of a particular database. Theoretically, it can be said that this kind of browsing does not constitute a narrative in the strict sense of the word, since no author has exactly determined the sequence of symbolical information. However, in everyday life when using media and communications technologies, this type of browsing and skipping is very usual. TV channels are watched for a while and then another channel is selected. A newspaper is read selectively. Consequently, this type of behavior may not constitute a classical narrative, but within it one may have narrative experiences as one focuses on particular, narratively constructed pieces of symbolical information. When adding the dimension of dialogue or conversation to this as one possible way of interaction with user and computer, there is more complexity. Dialogue may be thought of as a special way of doing searches into a database of symbolical information. Further, the real-time adaptation of symbolical information to the actions or other dimensions of the perceiver makes this combination of user action and computer action even more problematic from the point of view of narrative.

One example of active navigation of the user and adaptive action by a computer may be computer games. The user is continuously inputting actions into the game and then viewing the outputs or results of his actions. The computer calculates the consequences of the actions of the user, calculates its own possible counteractions and displays them. This loop goes on continuously as the game evolves. Even though games may contain no specific narrative to be experienced, they:

> *"… are experienced by their players as narratives. In a game, the player is doing a well-defined task - winning the match, being first in a race, reaching the last level, or attaining the highest score. It is this task that makes the player experience the game as a narrative."* *(Manovich, 2001, 221-222)*

Consequently, games may be thought of in terms of narrative actions and exploration. This means that the player has to perform actions in the game world and if he doesn't, the narrative stops:

> *"From this perspective, movement through the game world is one of the main narrative actions. But this movement also serves the self-sufficient goal of exploration. Exploring the game world, examining its details and enjoying its images, is as important for the success of games such as Myst and its followers as progressing through the narrative."* *(Manovich, 2001, 247)*

Thus, the movement or browsing as such in a game is an act of exploration, finding out what interesting things the game has to offer. When then taking action in the game, the perceiver engages in interaction with the computer and then can see the outcome of his action and the possible responses of the computer. Then the act of navigation through space itself can be seen as a key form

of new media (Manovich, 2001, 252). Kabakov (1995) has taken the example of interactive art installations to highlight the interaction between the designer of the installation and the viewer of the installation: "The reaction of the viewer during her movement through the installation is the main concern of the designer...The loss of the viewer's attention is the end of the installation." (Kabakov, 1995, 162)

This means that designers of new media are not designing an object as such, but designing the perceiver's experience in time and space (Manovich, 2001, 267). The interaction of the viewer with a database may be then based on just movement through space. This may be seen as typical to the culture of the internet:

> *"...the subject in the information society finds peace in the knowledge that she can slide over endless fields of data, locating any morsel of information with the click of a button, zooming through file systems and networks. She is comforted not by an equilibrium of shapes and colours, but by the variety of data manipulation operations at her control." (Manovich, 2001, 275)*

Movement through physical space, like within a building, usually consists of the perceiver moving and the building staying the same, not adapting to the mover. However, different locations in the building create different environments as the user moves about. When looking at the movement of the user of a database, there is movement of the user within the pieces of database via the user interface. However, the database as an 'environment' may change as the user navigates, like in a game where new screens are adapted in real-time to the dimensions and actions of the user. This adaptation may produce a great number of different environments in a short time-frame for different perceivers vs. the real, physical world. There is then an elastic and interactive relationship between the perceiver of symbolical information when using adaptive systems and predesigned ways of interaction to view information in databases. This elastic interaction may also have 'dialogical' features, like being in fluid interaction of questions and answers and steering a course of a discussion with another human being. Yet, the form of this 'conversation' may not exactly be linguistic or oral. Rather, it is based on the interaction of the 'intelligent' human perceiver and actor with a 'semi-intelligent' adaptive software system.

If one takes an analogy from the interaction of the player and computer in a computer game to perceiving symbolical information in a hypermedia database, like news or entertainment, one may see that the act of exploration or navigation as such may explain some of the behavior of the perceiver. However, the perceiver may have no specific or well-defined tasks, such as winning a game, but may be just passing his time browsing symbolical information on the web. Of course, the perceiver may have specific motives, such as trying to find information. As the perceiver finds something of interest in the database, he may stop and view that particular piece of symbolical information. In doing so, he concentrates on for example a text which has a narrative form and reads it from beginning to end. While reading, his experience of the story may closely resemble his experience with any other similar type of narrative story. Similarly, if he chooses to focus on a video clip, he may focus on it as if he would focus on an interesting story on television. When he is done

with his selection of interest, he moves on and further explores the database based on available cues provided by the authors of the interface and database and based on his own actions. This is the narrative way of interaction with media and communications technologies.

The dialogical way of interaction then may have more adaptation and responses from the computer than in narrative ways of interaction. The dialogical way may be explicit, like when doing searches or actually discussing with the computer with a voice interface. Also, dialogue may be implicit, i.e. the system interprets the actions of the user and adapts symbolical information based on a set of rules. There are then two basic ways of interaction with media and communications technologies: narrative and dialogical. Both include exploration and navigation as active movement of the perceiver in databases. These ways of interaction may coexist simultaneously or within a single session. Next, the study will conclude its view on the material elements of significant form of symbolical information in modern media and communications technologies.

## 5.3.5. Factors influencing meaning units

The study will now elaborate on the dimensions of multimodal representations on a computer screen and then use the example of the design of meaning units in cinema in trying to establish some key material elements of significant form. The aim here is to create of list of features and factors which are the central elements of symbolical information when embedded in a particular media and communications technology device.

There are four points to be discussed. First, the study has discussed multimodal representations as one key to the contents of a visual computer screen. Consequently, it may be that the way of designing these multimodal representations in time and space may be parallel to the design of meaning units in cinema and art. Second, the study has proposed that substance and form of representation may become detached from each other due to the flexibility of modern media and communications technologies. Symbolical information such as digitized objects in a database may be combined in various ways in real-time, giving rise to the possibility of varying both substance and form of symbolical information. Hence, there may be a 'design space' of meaningful variations of form for a particular substance on a particular computer screen for a particular perceiver. This means keeping the substance of symbolical information 'constant' and varying its form. This view acknowledges that not all possible combinations of form and substance are meaningful. At the same time, this view does not claim that each variation of form for a particular substance producing a psychological effect is an original work of art.

Third, the active exploration of the user of the work of an author, like a website, and automatic adaptation may undermine the narrative dimension of the experience from the point of view of formal narrative. However, at the same, when stopping and focusing on some piece of symbolical information, the perceiver may be subject to narrative techniques within that particular piece. This means that within the particular piece of symbolical information, narrative techniques of varying symbolical information may be applied in potentially meaningful ways. Fourth, there may also be

other types of significant forms than those concentrating on the classical, rectangular screen or a traditional, non-adaptive computer screen, such as the ways of interaction, the visual and functional form of the user interface, or the size of the screen and type of device. In that sense, the study proposes it is possible that the conception of significant form is multidimensional. Consequently, the study does not limit the use of significant form to modern media and communications technologies. Significant form may possibly be found in any type of interaction of mind and media and communications technologies, for instance movies, telephones, personal digital assistants (PDA), laptops, newspapers, magazines, television and radio.

The study consequently proposes that meaning units are the material reflections of ways of designing multimodal representations in time and space which reflect significant form. Hence, by producing certain patterns of meaning units, one may indirectly produce psychological effects in particular perceivers via partly influencing meanings made. Now, different dimensions of meaning units will be introduced.

Based on the discussions of the study, there may be the dimension of the media body, or hardware, such as size relative to the human perceiver. For instance, the movie screen is very large compared to the perceiver, whereas the screen of the mobile phone is quite small. Also, there is a certain distance between the perceiver and the technological device. A movie is physically faraway, and the screen of the mobile phone is physically close. Depending on the viewing angle and distance, each may appear to be 'subjectively' large as a screen. Further, the hardware may be mobile or not. A movie screen can not easily be moved, whereas a mobile device may be carried with the perceiver.

The dimension of software has been seen as controlling the software/user interface, which allows certain ways of interaction with a computer, including the adaptation and presentation of symbolical information. At this level there may be certain ways of exploration, dialogue and narrative to be experienced by the perceiver depending on the issues of control and activity by either/and the software and the user. This is reflected in the design of the visual-functional user interface.

Regarding the substance of symbolical information the author has certain ways of selection of events and describing events at the literal or more symbolic level. As discussed, the study does not focus on the level of the substance of symbolical information, but wishes to include its rough outline to be considered due to its hypothesized quite strong link to the form of symbolical information. With substance the author may be specific and explicit, or then use metaphors, archetypes and symbols as 'deep structures' of substance. Also, narrative techniques influence substance as the sequence of symbolical information matters. Further, the type of substance, roughly seen as factual or imaginary, may influence the available ways of expression, as within a certain genre.

With the form and substance of symbolical information, there are spatial and temporal dimensions of design. There is the dimension of layout of visual representation in which certain visual elements are used and grouped in a certain manner. This dimension of the classical, 'static' screen may be seen as mostly spatial. Even though one may utilize techniques suggesting perceived movement or create other effects, the study proposes this as mostly spatial form. Then there is temporal struc-

ture. This involves the temporal relationships of elements within one screen or between a number of possibly overlapping screens. For instance, there may be a linear way of structuring an element in the database, such as a video clip, which is played on one spatial and visual screen. The user stays within one screen, which may have pop-ups or other screens floating on top of the 'host screen'. One may also use a combination of a non-linear structure and narrative. One may present a text article on one screen as a traditional narrative. As one clicks on a link based on a word in the text, one may enter another piece of text, for instance. In this way the user is non-linearly moving between two texts in a hypermedia database. Basically, there are both linear and non-linear structures often present when perceiving symbolical information via a computer.

The form of symbolical information may also consist of modalities, such as text, video, audio or graphics. These elements may be considered to have spatial and temporal dimensions, depending on the particular modality. For instance, audio is temporal, and often sequential, which means that the audio information should be listened to in a particular order. Video is spatio-temporal, as it builds on a series of images which are displayed in succession. Graphics, such as maps, are more spatial, as they may be displayed once on a single computer screen and they may involve a lot of information which may be viewed at once.

It should be noted that the substance and form of symbolical information and the user interface are intertwined in a complex manner. They all exist in spatio-temporal dimensions. Spatially, the substance of a text modality may be located on one computer screen. Temporal dimension emerges as a perceiver reads the text. Spatially, the form of the text is the visual layout of the whole of the computer screen, including the user interface and control buttons. Form is also inherent in the typography and colour of the text and the relationships of paragraphs. Both substance and form are embedded in a visual-functional user interface. In a way, the user interface and the form of symbolical information are intertwined as they give material existence to the abstract ideas in the substance of symbolical information.

When adapting, the system may vary the substance or form of symbolical information, or then vary the ways of interaction (exploration, dialogue, narrative) of the interface or ways to access symbolical information. The study presents a summary of possible factors which can influence meaning units reflecting significant form at different levels of modern media and communications technologies in Table 12.

The abstract dimensions of meaning units may be made more comprehensible by using an example. For instance, on one computer screen there may be a text in the middle of the screen, a still picture in the upper right hand corner and a still picture in the lower right-hand corner which is a link to a video clip played inside the frame of the picture. The substance of the text is the literal message of the text. It is spatial, i.e. a visual sequence of letters. It is temporal when a reader reads it. There are no hypertext links, so it is a linear structure. The pictures also add to substance. The denotative meanings of the still pictures interact with the denotative meanings of the text. Also, the denotative meanings of the video clip are substance. It may contain human speech as the background of a flow of images. The formal, spoken language may contain also substance. The substance in the text has

| Dimension | Factors influencing the nature of meaning units |
|---|---|
| **1. Hardware** Type of media body | -Large or small vs. human scale (including the visual screen) -Mobile or immobile -Close or far from body (intimate-personal-social distance) |
| **2. Software** Ways of interaction via user interface | -Dialogical (lots of user control, lots of adaptive computer response, active exploration) -Narrative (lots of user control, little adaptive computer response, active exploration) |
| Visual and functional form of user interface | -Way of presenting controls in an interface visually and functionally -Blended with the form of symbolical information |
| **Symbolical information** **A. Substance** | -The essence of the event described -Type of substance (factual/imaginary; genre, other) -Ways of emphasizing explicit, literal meanings to describe events by authors -Ways of emphasizing less explicit meanings, such as symbols or archetypes or aesthetic devices such as narrative techniques to describe events by authors |
| **B. Form** Modalities (spatio-temporal) | -Text, video, audio, graphics, animation, etc. |
| Visual layout (spatial) | -Ways of presenting various shapes, colours, font types, groupings and other relationships or expressive properties of visual representations -Ways of integrating modalities into the user interface |
| Structure (temporal) | -Ways of presenting modalities, visual layout and other elements of form and their relationships over time -Linear and/or non-linear structure (sequential vs. parallel; narrative techniques, hypertextuality) |

Table 12. Key elements of meaning units in modern media and communications technologies.

gaps as it is 'compressed' by the author. This means that the reader may have to bring his own 'substance' to the interpretation of the text in the form of previous knowledge to fill the gaps. Similarly, the video sequence may consist of conceptual or continuity gaps, which are creatively filled by the perceiver. Depending on the perceiver interpreting the substance gaps literally or then imaginatively, different types of substance are produced, as discussed.

The form of text is the gestalt layout of the text as embedded in the whole of the user interface with the two pictures. The text also has typography. The form of the still picture is the possible expressive technique used when displaying the substance in a certain way and its relation to the whole of

the screen. This form is mostly spatial. The form of the video consists of the spatial layout of the first still-frame visible in the user interface and the spatial layout of shots which make the video sequence as well as the relationship of the visible first frame and the following sequence to the whole design of the screen. The shots of the video sequence may be related to each other in expressive, narrative ways. The sound in the video is human voice. It has rhythm, tone, and other expressive properties. The user interface is consequently the 'anchor form' in which the spatio-temporal dimensions of the form and substance of symbolical information are embedded. It may consist, for instance, of a background colour and the shapes, locations, colours and groupings of the navigation buttons.

Basically, one may think of substance as the 'raw information' in symbolical information, which reflects mostly objective, linguistic, denotative meanings. However, it may also have symbolical or mythical meanings. Form is the whole gestalt of expressive techniques used to create the elements of form deliberately or indeliberately as embedded in a user interface. The perceiver creatively engages in 'filling in the gaps' inherent in the substance and perhaps also the form of symbolical information. Form then may be seen as possibly 'shading' the meanings made for the substance of symbolical information in interaction with the properties of the perceiver. This illustrates the complexity of meaning units. There are three points the study wishes to discuss related to this complexity.

First, the study does not wish to state that it is possible, by combining automatically or manually the dimensions of different elements of meaning units of modern media and communications technologies to easily create great works of art via being able to produce significant form. A creator of art is an artist, a creative person. Not anyone is an artist; producing works of art mechanically may be difficult, if not impossible altogether.

Second, the form of symbolical information is also partly related to the substance of information. This probably places some limits to which types of combinations of substance and form may be used. However, at the same time, the form of symbolical information may be a separate element with no particular representative substance, such as an abstract work of art. For instance, the visual elements of the user interface and ways of interaction are not heavily subject to dependency on substance. Also, a similar substance may be expressed in various modalities. Hence, by varying the blending of control via the user interface and dimensions of the form of symbolical information while keeping substance essentially the same, it may be possible to approach significant form and create psychological effects on a particular perceiver.

Third, there is the dimension of perceptual processing of the meaning units. As has been implied by gestalt principles of perception and the notions of form constants, the structure of the perceptual system may partly determine, which combinations of formal features of an object of perception may create significant form. Moreover, the structures of perceptual systems or other dimensions of individual perceivers may vary to a degree. This means that the conception of significant form may be at least partly individual-specific, albeit there are bound to be various significant forms which are shared by a great number of perceivers.

Despite these limitations and complexities, it may be possible to alter or shade the meaning of the same substance of symbolical information via systematically varying some of the elements of the meaning units posed in Table 12. The study then proposes that there may indeed be a design space in which it is possible to create individually-centered significant form via manipulating different elements of meaning units in modern media and communications technologies. Naturally, to find such forms may require a great number of empirical scientific studies, which are beyond the scope of this conceptually and theoretically-oriented study. Next, the study will introduce preliminary theoretical frameworks and concepts as results of the study.

# 6. Mind-based media and communications technologies

## 6.1. Psychological resolution

In this chapter the properties of mind-based media and communications technologies are defined. First, the principle of psychological resolution is introduced. This gives a view on the manipulation of meaning units at the level of an individual perceiver to produce psychological effects. Second, the influence of form of symbolical information on felt meaning is defined. Third, based on the influence of form of symbolical information on felt meaning and the principle of psychological resolution, a larger perspective on the possibilities to influence meaning is presented. A media and communications technology is placed inside Meaning Interfaces and the properties of technology as an object of perception are observed. The relationship of modern media and communications technologies and mind is discussed as that of multi-level resonance. Multi-level resonance is a complex source of variability of meaning. Fourth, technologies used for influencing meanings and consequent subjective experiences such as flow, emotion and daydreaming, are introduced. Technologies which change knowledge are presented as Knowledge Media. Finally, the study concludes its approach to the nature of mind-based media and communications technologies.

The study has discussed the conceptions of significant form, properties of the aesthetics of media and communications technologies and isomorphic theories of perception. These will now be incorporated into one model of psychological resolution of media and communications technologies.

Psychological resolution refers to the fact that in symbolical information and other elements of media and communications technologies there are meaning units which may act as elements of creating patterns of psychological effects in a particular perceiver. Meaning units are seen as external stimuli, which cause responses in the perceiver. A meaning unit is a spatio-temporal combination of certain substance and form of symbolical information which is embedded in a particular type of media body with particular ways of interaction and a particular user interface at the time of perception. Certain meaning units or a combination of meaning units in a time frame create patterns of psychological effects in a particular perceiver. Meaning units are relative to the properties of the perceivers; not all meaning units produce similar effects in all perceivers. Effects are based on the influence of meaning units on the meanings made by the perceiver. This may indirectly change subjective experience and/or knowledge. This is called the principle of psychological resolution of a media and communications technology.

The principle of psychological resolution may be applied to mind within Meaning Interfaces. The Meaning Interfaces is a complex and dynamic field of interaction of the properties of the perceiver, objects of perception and context of perception. Meaning Interfaces are conceptually the key sources of variability of meaning. Within the mind, meaning is made in various stages of processing; it may change subjective experience and/or knowledge. Conscious volition may interfere with feedback of these effects of meaning. It acts as a space of 'free will', making meaning non-deterministic. This means the perceiver may choose to act or not to act according to meanings made.

The object of perception embedded in the mediated context consists of the form and substance of symbolical information. These are in interaction with the properties of the mediated context when a certain perceiver is psychologically engaged with symbolical information. The interactions of elements of mediated context, including symbolical information, may create meaning units which 'materialize' when they have specific psychological influences on the perceiver. The study has discussed the conception of tacit meaning, such as felt and personal meaning, as underlying the making of more conscious meaning by the perceiver and as partly determining the influence of external objects of perception on the subjective experience and knowledge. This means that certain types of tacit meanings made for external objects of perception, such as combinations of meaning units based on a specific mediated context and symbolical information, may influence subjective experience and knowledge of the perceiver. The conception of meaning units is then related to the conceptions of multi-level salience with the different loops of processing within the mind.

There are various spatio-temporal ways of integrating meaning units and producing salience. They consist of the sources of variability of meaning inherent in the form and substance of symbolical information and properties in the mediated context of perception, such as the type of media body and ways of interaction, related to the type of user interface offered by a particular media and communications technology. This discussion is reflected in Figure 11.
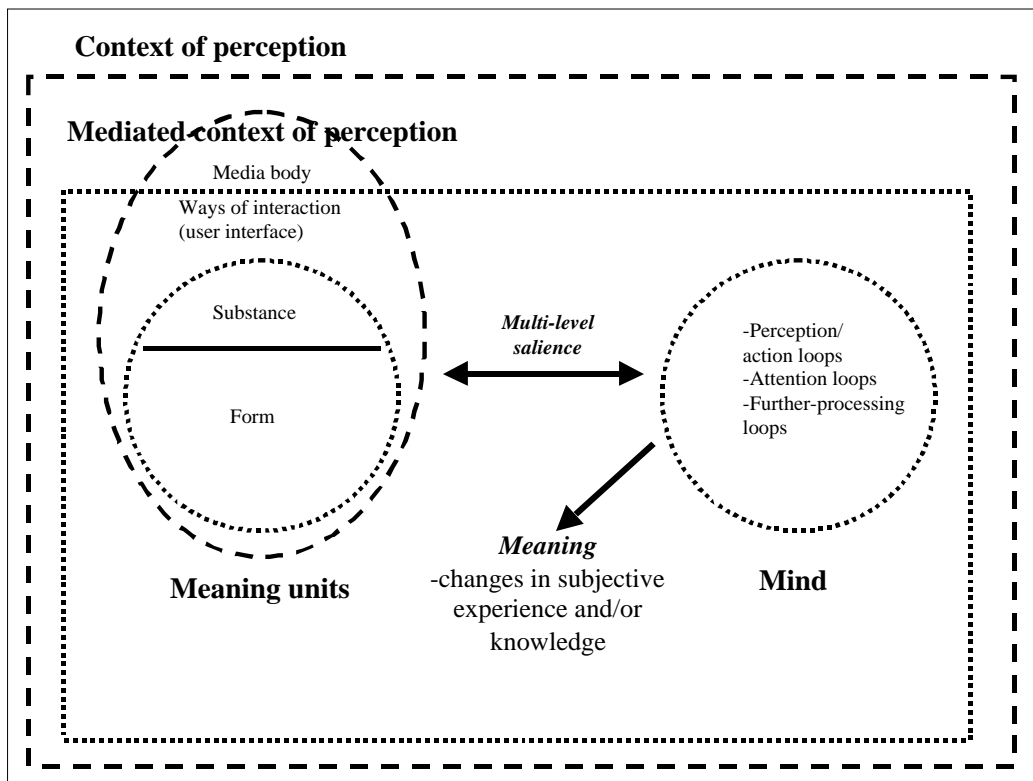


**Figure 11. Psychological resolution of media and communications technologies.**

In Figure 11 the mind perceives symbolical information embedded in a particular media and communications technology. The type of media body, ways of interaction related to the user interface, other basic properties of time-space bridges and substance and form of symbolical information create meaning units. Some of these meaning units are salient from the point of view of the mind. Meaning units are salient in relation to the properties of different loops of perceptual processing in the mind. Multi-level salience of meaning units in relation to the mind reflects the principle of psychological resolution of media and communications technologies from the point of view of a particular perceiver. Based on multi-level salience, meaning is made at various stages of processing. This may lead to changes in subjective experience and/or knowledge.

The study discussed three stages of making meaning as perception and action loops, attention loops and further-processing loops. At the level of perception and action, there is an interaction of the properties of the stimuli, such as figure ground separations, and properties of the hardwired perceptual system, such as ways of creating invariant patterns across sensory modalities, ways of combining sensory modalities and ways of organizing sensory information into wholes or parts or based on gestalt patterns. This level may then be seen as the level of 'primitive' or 'hardwired' meanings produced via resonance. These meanings may be carried over to other loops via sensory representations in various phases of processing. Felt meaning may be seen as related to this type of processing.

At the level of the attention loop, the meanings suggested by patterns of sensory representations are recognized and identified based on whether they are salient or not. Salience can then be seen as property of matching sensory representations with symbolic models, such as primary and complex metaphor with various mechanisms of quick matching. Here, meanings are also influenced by the priming complex, which may determine salience partly and hence determine if the representation is processed further. A presentational construal is produced at this level. The influence of this level of processing on meaning, such as felt and personal meaning, is carried over to further processing mainly via presentational construals. At the level of further processing, previous knowledge is matched with the presentational and propositional construals and processes of comprehension or reflection may occur. This may in turn lead to changes in knowledge, depending on the ease of match.

The study has proposed that meaning may be influenced by all these levels of processing in perception and that the levels are in interaction. The influence of each stage on meaning may be hypothesized so that at the level of perception- action loops there is the creation of some elements of felt meaning, which is reflected in the attention loop. This influence is stored in sensory representations. After being recognized and compared with symbolic models, felt meaning may emerge. The attention loop may directly influence states of consciousness, which may be reflected in subjective experience or it may influence knowledge via tacit reflection. At the level of further processing, there may be effects which may be categorized as more cognitive and partly semantic. This means there may be semantic tacit meaning also, as discussed. Representations of the external object of perception are processed and knowledge construction or knowledge creation may occur, which may in turn then change both subjective experience and/or knowledge.

Consequently, meaning units may be located at different levels of stimuli, such as symbolical information with certain ways of interaction displayed in a particular technological device, based on the i) type of meaning produced, such as felt, personal and semantic tacit meaning, ii) stages of processing and iii) types of effects on meaning on mind. These make up the key dimensions of meaning units from the point of view of the perceiver. Consequently, from the point of view of creating meaning units in symbolical information, one has to know i) the desired type of meaning produced, such as personal or felt meaning, ii) their psychological effects on a particular perceiver, such as change of subjective experience and/or knowledge and the iii) mechanisms of creating salience in relation to stages of processing iv) with ways of manipulating multimodal representations, media bodies, ways of interaction and other dimensions of meaning units. In essence, one may have to understand the type of Meaning Interfaces produced with a media and communications technology as an object of perception. This seems inherently complex and is in its totality not dealt within the limits of this study. However, the study has discussed one particular aspect of meaning units, which can be focused on: the form of symbolical information and its influence on felt meaning. This is presented next.

## 6.2. Influence of the form of symbolical information on felt meaning

There are three complexities when dealing with the influence of the form of symbolical information on felt meaning. First, the way of interaction with computers as dialogical or narrative may make a difference. With narrative, it is easier to see how meaning units may be made, but with dialogue this is more complex. Also, psychological studies have shown that computers and media are treated unconsciously as other intelligent beings, and interaction with them may be projected to be dialogical or social. Based on these observations it may be sensible to take into account the dialogical/social nature of media and communications technologies as one possible dimension of influence on meaning. This includes the way of interaction as well as the dimension of the media body.

Second, the form of symbolical information may be intertwined with many other variables which may give rise to felt meaning. This is due to the fact that when engaged with a particular substance of symbolical information with a particular form, it may be difficult to say whether felt meaning resulted from the size of the screen used, from the size of the technological device vs. human body scale, from the dialogical or narrative way of interaction from the visual-functional user interface, or from the modality, visual layout or temporal structure of the form of symbolical information itself. Naturally, one may conduct experiments which isolate each and every one of these possible sources of effects, but there may be composite effects which may be hard to detect. This implies that symbolical information is a complex psychological stimulus.

Third, the influence of the substance of symbolical information may be difficult to separate from the effects of form on felt meaning. However, there may be some instances in which the substance of symbolical information does not play a key role. For instance, one may read a typical news article on a computer. It consists of a screenful of text. One controls reading by a mouse and reads the text on a 15 inch colour computer screen. The article is embedded in the visual layout of the

user interface. There are no links from the text to other texts. The perceiver opens the article. He first perceives the totality of the whole of the contents of the screen. At this stage, the visual layout, colours, groupings and directions and other features of the stimuli as well as outlines of the letters in text are processed. These immediate properties of the stimuli may resonate with perceptual mechanisms and a sensory representation is created. In recognition, symbolic models are projected on the sensory representation. If the visual layout of the screen resonates with sensory mechanisms, felt meaning may be created. This may in turn quickly change subjective experience, such as giving a positive and pleasant emotion towards the stimuli. However, as the perceiver conducts a semantic analysis of the text of the news article and the substance, personal and semantic meanings may be made. These may also change subjective experience or knowledge. Hence, all types of tacit meanings may be intertwined when perceiving symbolical information. However, if there are no challenges to previous knowledge in the article, or the substance of the article is indifferent to the perceiver, it may not lead to vivid personal meaning or other types of meaning and may not change knowledge. In such a situation, the pleasantness of the engagement with the article based on layout may be in a dominant role. If there is immediate personal meaning in the substance of the article it may be intertwined with the effects of the layout on felt meaning.

Consequently, all the above dimensions may influence felt meaning to a degree. However, in some instances, the substance of symbolical information may not produce a strong effect on personal or semantic meaning. Within such a condition, one may then concentrate on whether within a particular technological device the narrative or dialogical way of interaction and a certain user interface with particular layouts, modalities and temporal structures of symbolical information produces felt meaning. First, the general principles of producing felt meaning are discussed via the design of meaning units.

In general, the creation of meaning units in stimuli, such as symbolical information embedded in a particular technological device, may be conceptualized based on spatial and temporal properties and ways of control of the symbolical information via a user interface. This results in the following division. First, if the stimulus is inherently spatial, meaning units are similar to the classical screen such as painting or then a fresco in the tradition of simulation. In the case of symbolical information, the classical screen may be present, but it may be also temporal. Second, if the stimulus is inherently temporal, meaning units may be related to the properties of music as an object of perception. Third, if the stimulus is both spatial and temporal, meaning units may be something like montage in cinema. One may conceptualize a visual computer screen as consisting of some of the elements of spatial meaning units, such as in a painting, elements of temporal meaning units, such as in music and the elements of spatio-temporal meaning units, such as montage. In a way, all these elements may be part of a design of meaning units based on the principle of psychological resolution. However, the dynamic computer screen also has the dimension of ways of control and access to symbolical information.

If one gives very little control over the temporal sequence of control of symbolical information, the design of meaning units may be more related to ways of combining the ideas of psychological resolution discussed with painting, cinema and music to meaning units. In that sense, the computer

acts as a way of integrating all types of traditional media forms together, but with little difference in their ways of interaction outside the fact that many forms of traditional media representations may be presented in parallel within a computer screen and that they may be experienced within the same session easily vs. other technologies used. In this type of situation, the creation of meaning units would then follow the principles of combinations of significant form of traditional montage, painting and music, for instance. These meaning units then may influence felt meaning.

With computers, the situation may be different due to the degree of control of the user over the engagement with symbolical information. If one gives the perceiver a lot of control over the temporal sequence of navigating and exploring the mass of symbolical information, meaning units may be more complex. First, the number of possible ways of combining multimodal elements of representations may increase significantly. This means it may be difficult to anticipate with pre-existing designs all the possible kinds of meaning units. Second, the 'social-dialogical effect' of feeling as if being in interaction with another intelligent being may be amplified. This is due to the possible semi-intelligent responsiveness of the computer to the demands of the perceiver. For instance, the interaction with the computer may be based both on using a graphical user interface with a mouse or pen and a voice interface. Especially in the case of using a voice interface and perhaps getting responses from the computer in audio modality also may increase the illusion of being in interaction with another intelligent being. Of course, increasing the flexibility of access to symbolical information via an intelligent search based on text or other ways of interaction may also contribute to the feeling of social interaction and/or dialogue. Consequently, to design meaning units for this type of system may have the dimensions of the interaction of a multitude of different combinations of modalities and visual layouts and the dimension of how to design for the unconscious expectation of being in interaction with another intelligent being.

What, then, may be the mechanisms of influence of meaning units concentrated on the symbolical information within the narrative and dialogical ways of interaction with computers discussed in the study? To a degree, similar mechanisms of influence on felt meaning underlie both ways of interaction. From the point of view of properties of perceptual mechanisms in the perception-action loop, one may say that single modalities, crossmodal interactions and ways of organizing sensory information may create resonance with the stimuli. Hence, one would have to know how to create certain patterns in stimuli in order to produce resonance with perceptual mechanisms. One may then further hypothesize that if one is able to produce resonance with perceptual mechanisms, it may be that the stimuli become salient and may have consequent pleasant or positive associations in the mind, for instance. Of course, it should be noted that without empirical studies such linkages are not possible to prove conclusively.

From the point of view of properties of the attention loop, one may think that the stimuli may resonate further with ways of recognition and priming complex, such as unconscious goals and motives, existing states of consciousness and future expectations, for instance. This means that the sensory representation produced in the perception-action- loop carrying possible positive/negative or other potential felt meanings may be further influenced by processing in the attention loop. When relating the stimuli to goals and expectations, one is making personal tacit meaning, as

discussed. Hence, the dimension of felt and personal meaning may be intertwined and/or co-exist in the mind. Also, the result of processing in the attention loop turns into a non-linguistic, presentational representation, which is further processed if the stimuli are not easily matched with previous knowledge. Hence, there may also be further meaning made for the stimuli before and together with linguistic, semantic interpretations. Tacit meaning may be dependent on each level of processing and interactions of levels of processing via mental representations and the types of tacit meaning involved, such as personal or felt tacit meaning. However, it may be that the level of turning sensations into a sensory representation may be quite influential in producing felt meaning of the form of symbolical information. Despite this, the level of attention loop and recognition of sensory representation may also influence felt meaning, as symbolic models, such as primary and complex metaphor, are used to recognize the sensory representation.

Consequently, the interaction of the two may be a suitable way to conceptualize the influence of the form of symbolical information on felt meaning. In the narrative way of interaction this is more evident. The user explores a database and focuses on some pieces of symbolical information. When focusing on some pieces of symbolical information in overlapping windows, the user is subject to more linear and narrative techniques to creating meaning units. With dialogical ways of interaction one may hypothesize that there is similar underlying perceptual processing taking place as in the narrative dimension. Hence, when the user temporarily stops or focuses on some pieces of information, in a non-dialogical mode, he is subject to narrative techniques of creating meaning units. Further, in both ways of interaction, the form of symbolical information is embedded in the visual-functional user interface. This user interface may be designed in such a way as to reflect significant form for particular perceivers.

An example may help understand the possible influence of form of symbolical information on felt meaning with narrative and dialogical ways of interaction. It is evident that felt meaning may be mixed with personal and semantic tacit meanings, for instance. Hence, one may concentrate on such types of symbolical information which do not produce significant effects on personal and semantic meaning, allowing a more 'pure' form of felt meaning to emerge, at least in theory.

For instance, a computer screen with text, a still picture and a still picture containing a video sequence may be used as an example. The perceiver may not pay totally concentrated attention to the screen. The substance of symbolical information is in no way challenging to the previous knowledge, personal values, goals and ego of the perceiver. The semantic processing based on text is quick and superficial and produces indifferent effects on meaning. Then the form of each sub-element of form, such as the form of text, video and picture as well as the whole of the user interface, may have a more direct effect on felt meaning. The text may use a very abstract, futuristic-looking typography, which appears quite technical. The design of the user interface is also 'techno-oriented', emphasizing machine-like precision and containing simulated steel-textures in the navigation buttons on a black background. The video may be MTV-like, with fast cuts and a rhythmic soundtrack. The still picture may have been manipulated to add to the 'techno-effect' of the interface. This total form of symbolical information described then produces certain types of felt meanings and subjective experiences in different perceivers. For one perceiver, the form may produce an exciting, pleas-

ant feeling. The user may also experience flow when exploring the various screens available. He may also daydream and fantasize of the symbolical information loosely. Another perceiver may have an opposite reaction, rejecting the interface and having negative emotions. Of course, there may be mixed meanings also. If the substance in the example used is interesting to the perceiver, personal meaning and semantic meaning may be made, perhaps even leading to knowledge creation. While making meaning, the excited and pleasant feeling, possibly based on both felt and personal meanings, is in the background when exploring the symbolical information further with cognitive interest.

However, this approach to the influence of the form of symbolical information on felt meaning is based on quite a simple design of meaning units, which is mostly spatial and which is concentrated on designing 'fragmented' meaning units for the browsing of the user between various windows or focus points on the screen. Hence, the study has neglected the i) temporal dimension of the whole user experience when he uses the computer during a particular session and ii) more complex, wholistic meaning units created by the various possible interactions of meaning units embedded in various overlapping windows and iii) the influence of dialogical/social expectations on felt meaning. The reason for not elaborating on these issues is that they are inherently complex and may not be possible to speculate on without empirical studies.

Consequently, it should be noticed that there are three basic complexities here. First, it is not well known how to design meaning units in general, let alone how it is done in modern, possibly dialogical media and communications technologies. Hence, the study may only preliminarily hypothesize and theorize some of the mechanisms for doing so. Second, it is not known exactly, how perceptual processing takes place. The study has created its own approach to perceptual processing, emphasizing the early stages of processing, such as the perception-action and attention loops and the emerging immediate meanings, such as felt meanings.

Third, the influence of substance of symbolical information cannot be neglected. It may be that the role of substance of symbolic information is more dominant when there is a challenge in the substance from the point of view of previous knowledge. Then the form of symbolical information, ways of interaction and type of media body may not have an evident effect on felt meaning and subjective experience. However, if the substance of symbolical information poses no challenge to previous knowledge, it may be that felt meaning may have more observable effects on the mind, as discussed. For instance, Jensen (1987, 13-19) claimed, based on empirical studies, that television news is mainly watched for entertainment, rather than for active searching of information. Hence, it may be that certain types of well-rehearsed, routinized and familiar interactions with repeating types of symbolical information which are not reflectively and intensively attended to then give rise to more felt meanings than information, which is reflected upon and cognitively problematized. This would imply that the form of symbolical information in tv-newscasts may be influential over substance at times.

However, it may be that usually there is a polysemy of meaning in the mind at any given time. To produce only felt meaning would mean to use abstract art pieces, which may produce open and

meditative states of consciousness. In everyday life, with symbolical information embedded in media and communications technologies, it may be that the form of symbolical information produces 'shades' of meaning for the substance, rather than producing totally separate, pure, abstract, existential meaning.

## 6.3. Multi-level resonance

The study now expands its view on the possibilities of media and communications technologies to influence meanings, subjective experience and knowledge. This is done in order to be able to present more general ideas of the nature of mind-based media and communications technologies outside the influence of the form of symbolical information on felt meaning.

Since it is possible at least in theory to create personalized packages of symbolical information based on, for instance, information of the dimensions of a particular perceiver, one can think of these personalized packages in terms of their relation to the essence of an individual. Consequently one may think of media and communications technologies as mirrors of the mind. What types of mirror images of the mind may be created with modern technologies and what may be their influences on the making of meaning?

A mirror image may be a seeming copy of the mind, trying to approach the limit of being indistinguishable from the mind. When a large amount of descriptive information is gathered about a single individual, the result should be quite a good conception of what the individual is like. When this information is used as a way to construct personal packages of symbolical information, the result is a package of information which 'looks and feels' like the perceiver. Hence, one basic relationship of symbolical information to mind is that of similarity. From the principle of similarity follows the principle of dissimilarity, i.e. not an exact image or reflection of mind. One may think of the information flows of traditional mass media as partly random packages of symbolical information relative to a particular individual, even though they may bear resemblance to the culture of the individual as a shared context of understanding the information.

The study conceptualizes the principle of similarity as that of confirmation. By selecting symbolical information and presenting it in a certain way, the individual's self-schema may be confirmed, for instance. This means there are no major conflicts between the self-image and the information or way of presenting information. The principle of dissimilarity may be that of challenging the existing self-schema. This means the symbolical information package is in at least moderately sharp conflict with the individual's self-schema. This can be extended to other elements or processes of the mind also. This is elaborated in Table 13.

In Table 13 the mind is seen as divided into three loops of processing and making of meaning. In the perception and action-loop, an object of perception, such as symbolical information in media and communications technologies, may be seen as easy on perceptual mechanisms or difficult on them. This may contain the influences of i) modality specific sensation, ii) amodal sensations and iii)

| Element of Subjective-time-space | Confirming | Challenging |
|---|---|---|
| Perception-action loop | -Being easy on perceptual mechanisms.<br>-Being easy for action of manipulation. | -Being difficult on perceptual mechanisms.<br>-Being difficult for action or manipulation. |
| Attention loop | -Being consistent with priming complex (goals, motives, needs, future expectations, moods, other)<br>-Being salient.<br>-Confirming symbolic models used in recognition, i.e. a direct match is found. | -Not being consistent with priming complex (goals, motives, needs, future expectations, moods, other)<br>-Not being salient.<br>-Challenging symbolic models used in recognition, i.e. no direct match is found. |
| Further-processing loop | -Not challenging previous knowledge.<br>-Being consistent with priming complex (goals, motives, needs, future expectations, moods, other) | -Challenging previous knowledge.<br>-Not being consistent with priming complex (goals, motives, needs, future expectations, moods, other) |

Table 13. The relationship of mind and media and communications technologies as confirming or challenging.

crossmodal sensations and iv) consequent ways of organizing sensory information. An object of perception may also be easy or difficult to manipulate from the point of view of action. This can be based on i) the physical feature of the object itself, or ii) on the availability of knowledge and experience on how to manipulate such an object. Naturally, if the object of perception is very difficult on perception and action, it may not be perceived or acted upon due to being too difficult. Hence, one must hypothesize a certain sufficient level of more or less ease with an object of perception in order for the object to be perceived and acted upon.

In the attention loop, it is possible that the object of perception is consistent or not consistent with the priming complex. Also, it may be that the object of perception is more or less salient. Of course, if the object of perception is not salient, it will not be recognized. Hence, some degree of salience, or a 'critical mass' of salience may be thought necessary. The mental representation of the object of perception can also either confirm or challenge the symbolic models used in recognition. This means there is a direct match between previous mental models and the representation or then there is no direct match. In challenging symbolic models used in recognition, tacit reflection may occur.

At the level of further processing the various representations can basically either be consistent or non-consistent with previous knowledge or the priming complex. For instance, in previous knowledge, the mental representations of the object of perception can confirm a person's self-schema and personal worldview, beliefs and attitudes or then challenge them, rendering them problematic. If a

representation challenges previous knowledge, an act of tacit reflection may occur, perhaps also leading to conscious problem-solving. If the representation does not challenge previous knowledge, comprehension may take place. Tacit reflection or conscious, reflective problem solving may lead to fundamental changes in previous knowledge, i.e. knowledge creation. Comprehension leads to knowledge construction. The representations of the object of perception and the meaning made for them in recognition and/or further processing may also confirm or challenge an existing state of consciousness in the priming complex. For instance, the emotion based on the representation of object of perception may be similar or dissimilar to the existing mood or emotional state of the mind. One may also think of cognitive dissonance as related to attention and further processing loops as a tendency to keep one's values and beliefs constant. There may then be an inherent need to reduce dissonance, for instance.

Based on Table 13 it may be said that the confirmation or challenging function of an object of perception is mediated in complex ways. First, it does not seem feasible that an object of perception can be extremely challenging at all levels. This is because it may not be perceived at all, or the processing of its meaning may be abandoned due to 'too much difference'. This means limits may exist as to how challenging an object of perception can be in order to be processed. Second, it should be noted that the direct influence of the environment in the perception-action loop is mediated via sensory representations which may influence the meaning of an object of perception. This implies that depending on the accuracy of sensation and sensory representations, differing meanings for the object of perception can be made. In that sense, sensory mechanisms act as gateways to the mind in determining how the first representations of the object of perception are constructed.

Third, the continuous flow of sensory representations is then recognized continuously; and some objects of perception are picked over others for further analysis. Hence, the salience of an object of perception is another gateway to the mind. If an object of perception is not salient, it will not be further processed or even noticed from the continuous flow of sensations. Fourth, in further processing it may be easier to conceptualize the nature of the confirmation or the challenging of previous knowledge, as it has been discussed in the study via knowledge creation and knowledge construction. However, less is known of the confirmation/challenge of different states of consciousness in the priming complex. One such principle was introduced earlier when discussing mood congruence, meaning that people tend to focus attention on objects of perception which match their mood state. Despite this, it is difficult to know, what a match means. For instance, a person may seek for more or less arousal consciously or unconsciously, and this may determine the match at any given time, or challenge/confirmation. Also, the relationship of different emotions or moods may be more complex than that of a match/mismatch of previous knowledge and representation of object of perception. For instance, a certain stimuli may 'cancel' a certain mood by neutralizing it. Or it can enhance it or lessen it.

Based on these basic relationships of mind and media and communications technologies the question is i) how are the different dimensions of meaning units related to the levels of mind, i.e. what may constitute challenge or confirmation at a certain level with a certain stimulus and ii) what types of effects would certain meaning units produce in a certain mind? These questions are quite

challenging. First, it may be difficult to observe and analyze all possible elements of the mind as such. Also, it may be problematic to analyze all possible elements of meaning units. Further, it may be very difficult to verify how and why a certain combination of variables used in producing a combination of meaning units influences a certain level of mind. Also, it may be challenging to observe composite, emergent and simultaneous influences of levels of stimuli on levels of mind as either challenging or confirming. Second, it may be difficult to determine what types of psychological effects a confirmation or challenge of stimuli vs. mind may produce. This is dependent on many factors, such as composite effects between levels of mind and levels of stimuli and their interactions. Also, it is dependent on the capability to conceptually understand possible effects as well as how to measure them empirically to identify an effect.

From the point of view of resonance of the properties of an object of perception and perceiver based on psychological resolution, one may discuss a broadened conception of resonance as explaining the complex interactions conceptually. This means there can be other types of resonance than that between the features of objects of perception and perceptual mechanisms. It may be said that perhaps resonance of mind and object of perception at a more general level does not strictly reflect either of the extremes of confirmation or challenge. It may be that resonance is a certain balance of confirmation and challenge, and that from the point of view of the properties of the perceiver there may also be different combinations of challenge/confirmation per level of mind, which may create different types of meaning. This balance may create a 'channel' of a continuum of resonance, which may bring about a continuum of meanings between levels of mind. Salience between levels of perceptual processing may mediate this resonance. Meanings influenced by resonance may then be reflected in a change of subjective experience and/or knowledge. This discussion is reflected in Figure 12.

In Figure 12 the mind perceives symbolical information within a particular spatio-temporal context embedded in a technological device. When engaged with the device and symbolical information, the device turns into a psychological, mediated context. Based on the conception of Meaning Interfaces, the study suggests that the interaction of meaning units and the mind may be seen as one field, in which meaning units emerge as defined by the type of meaning and consequent psychological effects in particular perceivers. These properties create a complex interaction and multi-level resonation within Meaning Interfaces. Within that resonance, elements of meaning units may include a narrative vs. dialogical way of interaction with symbolical information and the dimensions of spatio-temporal form such as visual layout, modality and structure as well as substance of symbolical information.

Meaning units correspond to the properties of the mind, such as different properties of loops of perceptual processing. These interactions create either challenging or confirming aspects in relation to the loops of perceptual processing and/or other elements of mind, creating a balance. This balance of confirmation and challenge may produce multi-level resonance between the meaning units and mind. The resonance may then structure tacit and/or explicit meaning, such as felt and personal meaning, and may also change subjective experience and/or knowledge. This is the view of the study on the nature of media and communications technologies as objects of perception and as
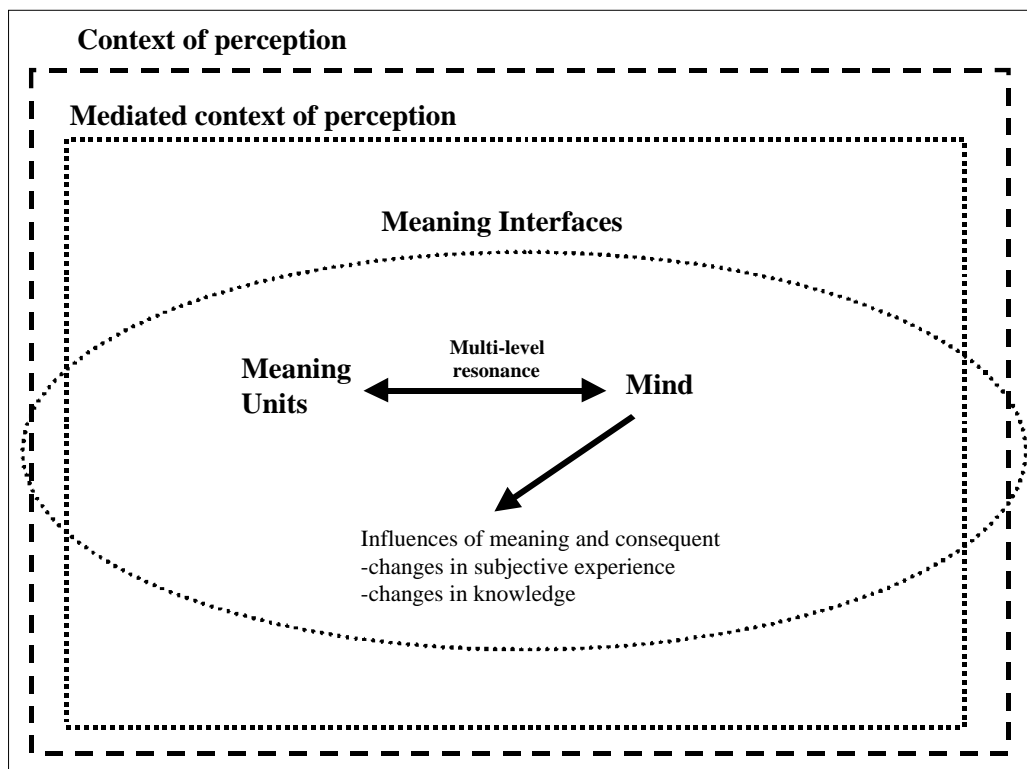
**Figure 12. Multi-level resonance between meaning units and mind.**

a part of sources of variability of meaning in Meaning Interfaces. Next, the implications of this view are elaborated from the point of view of creation of different archetypes of media and communications technologies.

## 6.4. Technologies influencing subjective experience

In media and communications technologies the study develops a view on the psychological effects brought about when designing of meaning units from the point of view of a particular perceiver. These types of technologies may be described as mind-based. This is because they utilize knowledge of a i) particular perceiver, ii) ways of creating and manipulating meaning units and the iii) resulting psychological effects for the perceiver. There can be various temporal scopes of these types of effects, ranging from very immediate to long-term. The study concentrates on the immediate psychological effects taking place within a typical interaction of mind and media and communications technologies. This may mean a focus from seconds to a couple of hours.

In mind-based technologies, there are a number of presuppositions. First, as knowledge changes, subjective experience may also change. Second, change may be weighted more or less on either of the types of change. Third, volition as a state of consciousness is seen as having creative degrees of

freedom, and it is hence not included in the effects-based view. Fourth, it may be that some elements of mind which are not discussed in the study mediate the effects of a particular object of perception and the resulting psychological effects. The study concentrates on the first two presuppositions. This focus creates the basis for Table 14, which schematically describes the interactions of changes of knowledge and subjective experience. It should be noted that  subjective experiences are complex, and may be intertwined with each other. However, the study briefly operates with them as 'separate' to be able to point out possible consequences for technology.

| Changes of subjective experience | Changes of knowledge<br>Little change:<br>Knowledge construction | A lot of change:<br>Knowledge creation |
|---|---|---|
| **Emotion, mood** | Little change  Little emotional effect; Knowledge Construction Technologies | Knowledge Creation Technologies with little emotional effect |
| A lot of change | Emotion Technologies + Knowledge Construction Technologies | Knowledge Creation Technologies + Emotion Technologies |
| **Flow**<br>Little change | Little flow effect; Knowledge Construction Technologies | Knowledge Creation Technologies with little flow effect |
| A lot of change | Flow Technologies + Knowledge Construction Technologies | Knowledge Creation Technologies + Flow Technologies |
| **Daydreaming**<br>Little change | Little daydreaming effect; Knowledge Construction Technologies | Knowledge Creation Technologies + little daydreaming effect |
| A lot of change | Daydreaming Technologies + Knowledge Construction Technologies | Knowledge Creation Technologies + Daydreaming Technologies |

Table 14. Possible technologies based on the immediate psychological effects of symbolical information.

In Table 14 subjective experience and knowledge are seen as being in interaction. In types of subjective experience there can be a lot of change or a little change within a short timeframe due to perceiving a particular object of perception. Changes of knowledge have been conceptualized as a) little change: knowledge construction; or  b) lot of change: knowledge creation. Objects of perception which create a lot of change in knowledge are seen as Knowledge Creation Technologies while those objects of perception producing little change in knowledge are Knowledge Construction Technologies. Objects of perception which create a lot of change in daydreaming are seen as Daydreaming Technologies. Objects which create a lot of change in level of engagement such as flow are seen as Flow Technologies. Objects of perception creating lots of change of emotion and mood are conceptualized as Emotion Technologies. Naturally, all these divisions are preliminary, as different

types of subjective experiences as well as learning are intertwined in perception. However, one may discuss emphasis on one aspect of a possible technology vs. other aspects as seen in Table 14.

Based on Table 14 it may be that Knowledge Creation Technologies are in interaction with emotion, flow and daydreaming, when there is a lot of change in knowledge and a particular subjective experience. These may then be seen as features of Knowledge Creation Technologies. There are also Knowledge Construction Technologies, which implies that the focus of the interaction with a particular object of perception is not the change of knowledge or challenge to previous knowledge. This possibly allows for other types of effects relating to particular subjective experience to emerge. For instance, there may be Emotion Technologies, which are based on changing the emotion of the perceiver. This may be like an amplification of an existing emotion or mood or then changing emotions or moods to different ones. One example of this may be movies, television or books. Based on them, one may 'manage' one's emotional state by selecting particular types of stimuli for particular 'uses'.

Also, daydreaming may be enhanced, if there are no real challenges to one's previous knowledge in the object of perception. It may then be that daydreaming based on the object of perception, or loosely related to the object of perception, is fruitful to include in this conception. Daydreaming Technologies may roughly be seen as entertainment, movies, books, music or plays which may give rise to different types of daydreaming. It may be difficult to separate between daydreaming-types of effects and emotional effects of a particular object of perception, and they may be seen as partly intertwined.

However, with strictly emotional effects there may be less fantasy and activity of the perceiver himself in elaborating the nature of the meaning of an object of perception. Emotion may be seen more as a direct response to a more structured object of perception, such as being suddenly horrified and surprised by a scene in a movie. There may be a bit daydreaming involved, but not to a great degree. The attention is on the film and its story, and hence one 'reacts' to the scene within the film. Also, there may be mood-related influences which take place over longer periods of time. Daydreaming may be brought about by more loosely structured objects of perception, which may give rise to polysemic meanings due to having 'larger gaps' for the perceiver to fill. These gaps may be filled with fantasy, or scenarios of oneself doing things related to the object of perception, or just being afloat of associations which come to mind based on the object of perception. This type of daydreaming may be seen as an 'active fantasy' which is based on an object of perception structured in a certain manner. One may also have emotions and moods while daydreaming.

Flow Technologies may be seen as a balance of challenges of perception and action and capabilities of perception and action, creating flow. One example of such technologies may be games like tennis. Not a lot of knowledge is constructed and there may not be a specific cognitive challenge in the activity. However, due to the balance of perception and action, the activity is inherently rewarding and enjoyable via continuous input and output. One may also partly see dialogue as one type of flow when discussing with another person via continuous input, further questions, feedback and self-monitoring. Further, Flow, Emotion and Daydreaming Technologies may have interactions which

may bring about different types of new effects. However, as already stated, it may become increasingly difficult to conceptualize these further without concrete examples and empirical studies. Hence, the study will only offer preliminary definitions of each hypothesized type of technology. First, technologies concentrating on the change of subjective experience are discussed.

Emotion technology is based on an object of perception being structured so that it activates certain immediate emotional responses in the perceiver. Emotion technology may then partly be about making felt meaning at the level of responses to immediate significances of the object of perception rather than actively problematizing the reasons or causes behind the object of perception. Also, there may be moods, which are patterns of emotional responses over time, which are less focused on specific individual features of objects of perception and more resistant to sudden change than emotion. However, emotion may also be based on personal meaning, related to a more cognitive but still quick interpretation of the meaning of the object of perception. This also means there may be no 'large gaps' for the perceiver to fill, but the object of perception is structured in quite a self-explanatory and familiar manner. Hence, there is no real challenge to one's previous knowledge. Emotion technology may be used to create responses which are similar or different to an existing emotion or mood. This way an existing emotion or mood can be amplified or changed to another, at least in theory. However, emotion is a complex issue, and may also be based on expectations, identification with characters of a movie or a book and lengthy narratives with dramaturgical effects. Examples of traditional emotion-based technologies may be certain types of scenes in movies and parts of books. Also, if one concentrates on felt meaning, one may think of abstract works of art, which have no direct personal meaning or a clear cognitive interpretation as examples of Emotion technology.

Daydreaming technology is based on an object of perception being structured so that it activates and facilitates object-dependent daydreaming in the perceiver. The idea of daydreaming technology is about interaction of the 'large gaps' of the object of perception and the levels of mind of the perceiver. This means the perceiver has to quite actively fill in gaps in the object of perception by fantasizing to create associations, rather than cognitively, explicitly and logically analyzing the gaps. This fantasy may be seen as a source of uncertainty about the explicit meaning of the object of perception, possibly leading to quite polysemic and open meanings. The object of perception is then structured in quite a challenging manner, but this challenge does not create new knowledge as such. This type of technology may be used to facilitate active creation of more or less ambiguous, open and polysemic meanings. Examples of Daydreaming Technologies may be 'art movies' or certain pieces of art or poetry. The study does not, however, claim that all art falls into this category, but rather claims that some of the basic features of how art as an object of perception as 'openly structured' may also apply to objects of perception for Daydreaming Technologies.

Flow-technology may be based on structuring an object of perception so that it promotes constant interaction of perception and action with the object. There may be a balance of skill and challenge of the task involved when designing the object of perception. Such a balance may create flow when engaged with the technology and result in loss of sense of time, enjoyment and playfulness with the activity. Examples of Flow-technologies may be computer games, reading articles from a magazine

with no particular information-seeking interest, and surfing the internet. As flow is related to the balance of perception and action and skills and challenge of task, it may be intertwined with emotion, daydreaming and knowledge creation and construction. For instance, if one interacts with a modern media and communications technology such as a computer it may be that the interaction as such using a mouse an a graphical user interface to explore the symbolical information available, may create flow. If one uses Emotion technology, for instance, the dimension of interaction and flow may be intertwined with emotional effects. The same principle may also apply to daydreaming and knowledge. Next, the study will discuss technologies focusing on the change of knowledge.

## 6.5. Knowledge Media

Saari (1998b) has discussed the concept of Knowledge Media, which refers to the use of media as a vehicle for understanding the world at the level of the individual:

> *"This means building for instance user and content-driven software systems that can support individually tuned exploration of the world...with filters and agents. This type of media, designed from the point of view of the processes of understanding and experience of a single individual - not anymore the point of view of the producer of packages - may be the future interface of mind and world, a sort of a ultimate personalized media service." (Saari, 1998b, 43)*

Saari (1998a, 231) further argues that Knowledge Media are based on three principles. First, the principle of user-oriented communication technology means that media and communications technologies may be made to serve the needs of the individual from the point of view of the individual, rather than from the point of view of the designer of a system. Second, the principle of user-oriented communication ecology means that the level of analysis when looking at knowing of the world through technology should be the individual, rather than a centralized organization which determines what is important to know on any given day. The point of view of the individual may lead to a meaningful amount and quality of knowledge of the world in a coherent manner. The point of view of a centralized organization may lead to the production of impersonalized information packages, which all resemble one another with little room for creativity in its extreme. Of course, a centralized organization may also be capable of producing interesting and personally relevant information packages. However, from the point of view of a single perceiver all the packages in a given day resemble each other, as centralized organizations offer essentially the same type of symbolical information in news, for instance. Third, the principle of individualized information refers to the use of news as one example of knowing of the world through technology. Using adaptive systems, it is possible to produce personalized packages of symbolical information, such as news. Saari (1998a, 232) summarizes the conception of Knowledge Media based on these principles:

> *"...one would like to teach our habits to technology and tame it to serve our needs, combining the principles of user oriented communication technology, user-oriented communication ecology and user oriented news in a fruitful manner. This may result in a totally*

> *new medium: Knowledge Media...We actually could be inhabiting this personal "mediated space of the world". It is possible to create a media environment which empowers the individual to organize the "information overflow" and make it personally comprehensible within the context of his own, everyday life. The creation of such a media environment may even be the ultimate goal of communication technology."*

The conception of Knowledge Media implies the creation of new knowledge. If discontinuities or breakdowns are one possible facilitator of knowledge creation, the question becomes how to involve such dimensions in a particular system for perceiving and knowing of the world. This analysis allows for further elaboration on the possible fruitful combinations of tensions between mind and context. These are discussed in Table 15.

| Element of MInd | Sources of discontinuity |
|---|---|
| Perception-action loop | i) Ways of structuring the object of perception so that it is easy/challenging (resonant) for a particular perceiver to perceive from the point of view of sensory mechanisms |
| Attention loop | i) The object of perception may be related to the priming complex in a way to create enough challenge for recognition to raise interest and curiosity (moods, needs, motives, future expectations, other)<br>ii) Individual differences may be taken into account so that the object of perception does not challenge them too much or make it impossible for the object of perception to be perceived and processed<br>iii) Previous knowledge is challenged so that it leads to problem posing and either tacit or explicit reflection, specifically related to symbolic models (primary and complex metaphor, other) |
| Further-processing loop | i) The object of perception may be related to the priming complex in a way to create enough challenge for recognition to raise interest and curiosity (moods, needs, motives, future expectations, other)<br>ii) Individual differences may be taken into account so that the object of perception does not challenge them too much or make it impossible for the object of perception to be processed<br>iii) Previous knowledge is challenged so that it leads to problem posing and either tacit or explicit reflection, specifically related to in-depth structures of knowledge |

Table 15. Possible sources of discontinuity in perceptual processing.

In Table 15 certain possibilities are presented to create fruitful points of discontinuity for an object of perception to facilitate knowledge creation. Basic ways of challenging the mind are to challenge previous knowledge, the contents of the priming complex, such as mood, goals, motivation, needs and future expectations, and the properties of sensory mechanisms. By varying combinations of discontinuity, one may possibly create different types of Knowledge Media. For instance, one may

focus on challenging the in-depth knowledge structures of the perceiver, such as personal values. However, it should be noted that the sources of discontinuity in perceptual processing are preliminary and complex. What is also interesting in creating the circumstances for discontinuity in Knowledge Media is the possibly occurring simultaneous other types of effects, for instance emotion, flow or daydreaming. Each of these combinations may create different types of Knowledge Media.

For instance, Knowledge Media with an emphasis on emotion and mood may be seen as utilizing the emotional aspects and dimensions of structuring an object of perception to also create emotional effects. An example of this may be a challenging real-life experience in which one has to solve real problems which have real and immediate consequenses for oneself; and by solving these problems one may also generate strong positive emotions and good mood. This type of experience may be replicated to a degree when perceiving through media and communications technologies. Also, Knowledge Media may be made engaging. A website may be structured so that it facilitates the emergence of flow as well as the active and involved creation of problems inherent in the information. Knowledge Media may also be related to daydreaming, which may imply that one has real problems to solve, but in more ambiguous, polysemic and uncertain circumstances. For instance, certain types of mythical or mysterious information with real problems to be solved and learned may be used for such purposes. Once again, the further analysis of possible aspects of Knowledge Media and sources of discontinuity in perceptual processing are difficult to conceptualize without empirical studies. Hence, the study offers a broadened conceptual definition of Knowledge Media.

Knowledge Media are based on a particular way of structuring meaning units with a certain media and communications technology which facilitates knowledge creation. This happens via enhancing the making of meaning in a way which leads to tacit and/or explicit reflection and hence to rapid change in levels of meaning in the mind, which fundamentally changes the structures of knowledge. Knowledge Media may be seen as technologies, which take into account the dimensions of the perceiver and the object of perception and their interaction in a holistic manner. Knowledge Media are not strictly designed by a certain designer of software nor is it totally open to be used by the perceiver for radically manipulated interactions with symbolical information.

Hence, Knowledge Media are about creating a fruitful balance of the influences of the designer of software, the author of information and the perceiver in a manner which makes possible creative tensions and interactions of symbolical information and the perceiver. One example of Knowledge Media is to select and manipulate the topics and substance of information perceived and also contextualize a particular piece of symbolical information for a particular user automatically. Another example is to manipulate the form of symbolical information and ways of interaction to facilitate knowledge creation for a certain substance via emotion and flow. Knowledge Media also may allow for a dialogical and narrative, individual-centric exploration of the events of the world, and hence is easily manipulated by the user.

Knowledge Media may emphasize certain aspects of the mind, such as emotion, engagement and daydreaming. Emotion refers to response-based felt and/or personal meanings made based on quite tightly structured Knowledge Media as well as to more stable effects of mood. Daydreaming refers

to the use of loosely-structured information which allows for more polysemic and mythical creation of meaning and active fantasy. Flow implies the way of interaction with symbolical information and/or technological devices. Hence, emotion, daydreaming and flow may be intertwined with the effects on the mind of creation of new levels of meaning in knowledge creation with Knowledge Media.

Knowledge Media are event-centric, which means they are oriented towards an understanding of the events of the world. Basically, the ideal would be to understand real events of the world and not imagined events. The aim of such Knowledge Media is to facilitate 'true and deep understanding' of the events of the world for a particular perceiver, which may allow for the making of 'richer meaning' than what has been previously possible in the era of the traditional mass media. This possibility for making richer meanings may lie in multi-sided personalization of symbolical information based on the principle of psychological resolution. For instance, with information describing some event, different people can have different 'channels' or continuums of discontinuity which lead to more in-depth understanding of the event. Knowledge Media may present the event so that it fits the 'discontinuity-channel' of a particular perceiver to enable a creative making of meaning. At the more sociological level, true and deep understanding of the world may over time lead to high-quality
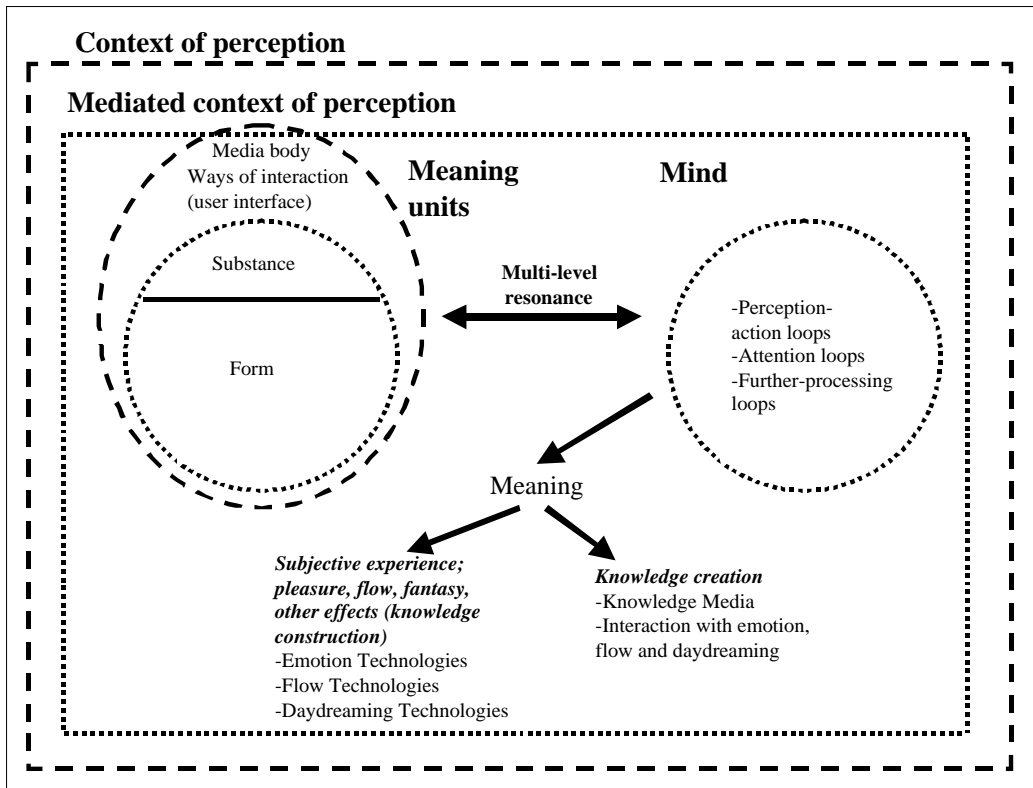


Figure 13. Central elements of mind-based media and communications technologies.

social knowledge. Widely shared and accumulated social knowledge may then lead to harmony, or more creative polysemy of meanings in a society. Different types of Knowledge Media and other mind-based media and communications technologies are summarized in Figure 13.

In Figure 13 the study introduces a schematic layout of the basic elements of mind-based media and communications technologies. Modern media and communications technologies may allow for a large number of different types of flexible, personalized symbolical information packages to be made for different perceivers. The main feature of such packages is the close interaction of elements of media and communications technologies conceptualized by the resonance of meaning units and elements of mind. Emotion-, Flow- and Daydreaming Technologies may be roughly hypothesized to lead to pleasure, flow, fantasy and other types of effects in the mind depending on the technology used. This does not create new knowledge. Hence, Knowledge Construction Technologies may be seen more as technologies related to subjective experience, as they may allow experiential effects to emerge. Knowledge Creation Technologies are seen in the study as Knowledge Media which include the dimensions of emotion, flow and daydreaming into different variations of Knowledge Media.

Figure 13 then acts as a summary of the theoretical and conceptual developments of the study on the complex relationship of mind and modern media and communications technologies in perception. It also  constitutes a possible experimental research agenda for further studies on mind-based media and communications technologies. The main focus of such an agenda would be to systematically seek out the most important relationships of the central elements of mind and media and communications technologies which may be open to empirical studies.

# 7. Discussion

The contributions of the study are now briefly discussed. Then, some aspects of further empirical studies will be introduced. Finally, some implications of results of the study are presented as the creation of breathing interfaces of mind and world.

The study has made contributions in the area of describing perceptual processing and making of meaning with modern media and communications technologies. These contributions include i) creating a model of perceptual processing and making of meaning; ii) conceptualizing tacit meaning, especially felt meaning; iii) conceptualizing modern media and communications technologies and linking the form of symbolical information to felt meaning; and iv) introducing an approach to mind-based design of media and communications technologies.

In the area of perceptual processing the study has contributed by creating a model of mind in perception as consisting of three loops of processing. The study has also introduced a field-based approach to making of meaning; Meaning Interfaces. This reflects the emergent and complex relationships of mind and world. It also allows one to focus on the sources of variability of meaning. Further, the principle of resonance between sensory mechanisms and features of objects of perception reflect the complex interactions of mind and world. The study has also to a degree provided a sketchy and preliminary synthesis of direct and indirect theories of perception.

In tacit meaning, the study has concentrated on the role of unconscious processing in making meaning. Specifically, the study has concentrated on conceptualizing felt meaning as a tacit meaning. The conception of felt meaning and the mechanisms of influences of felt meaning on subjective experience and knowledge have been conceptualized. The aim has been to show that a more abstract, presentational, non-linguistic and existential, open meaning may exist based on the complex interaction of mind and world.

The form of symbolical information as linked to felt meaning has been conceptualized. The study has discussed the basic properties of modern media and communications technologies as objects of perception. The form of symbolical information as producing connotative meanings similar to felt meaning has been emphasized. With personalization, the possibilities of semi-systematically varying the form of symbolical information to indirectly influence felt meaning and consequently subjective experience and/or knowledge has been presented. The study then presented the elements of meaning units inherent in modern media and communications technologies and related them to the form of symbolical information and consequent possible influences on felt meaning.

Mind-based media and communications technologies have been conceptualized as based on the capability to semi-systematically vary immediate meanings produced as a result of the interaction of mind and media and communications technologies. The principle of psychological resolution based on individual-centric meaning units has been introduced. This enables the observation of the relationships of meaning units and an individual perceiver. These relationships have been conceptualized as multi-level resonance. This means that the features of an object of perception resonate with the different loops of perceptual processing in making meaning. Principles of confirmation

and challenge of mind and media and communications technologies were discussed as basis of balance of challenge/confirmation and multi-level resonance.

The study then introduced various types of mind-based technologies, such as Emotion, Daydreaming and Flow Technologies. These are based on the object of perception not challenging previous knowledge, which indirectly allows for other types of effects to emerge, such as felt and personal meanings. They may then change subjective experience. Also, the study discussed Knowledge Media as based on knowledge creation.

The study is not strictly positioned in any particular existing field of research. Parts of the study are related to the tradition of research of media effects. Other parts are related to perceptual psychology and psychology of experience and learning. Technology-related issues of the study are related to such emerging research areas as cognitive technologies, or the use of computers as extensions of the mind as well as to systems design. However, the contributions of the study in the four areas discussed make the study quite unique. The subjective point of view of the perceiver as a source of meaning-based and psychological effects-based systems design is uncommon, albeit complex.

The study has then provided various new concepts, a theoretical framework of perception and preliminary descriptions of mind-based media and communications technologies. This is the strength of the study. However, the study has been based on literary sources, rather than original experiments and unique empirical data. Still, some results of relevant empirical studies have been used within the study to add more strength to the conceptual conclusions and various stages of theoretical reasoning.

Even though the presented frameworks and concepts may be fascinating, they much need empirical evidence to better conceptualize them further and to find proof of some of the suggested mechanisms of influence of meaning. Also, practical matters of designing modern media and communications technologies may be helpful to investigate regarding further studies. Hence, a design-based approach to the practical possibilities of manipulating meaning units in modern media and communications technologies may be needed. This would imply that one may systematically and creatively experiment with different types of designs of form for the same substance of symbolical information. As symbolical information embedded in modern media and communications technologies is a creative work of an author, or at least partly based on it, then the creative processes of authoring and designing symbolical information can not be neglected. This emphasizes the complex nature of symbolical information as a psychological stimulus. Hence, conducting experimental studies on the influence of abstract, less complex, elementary features of meaning units may to a degree be possible, but it may not lead to the 'ultimate designs' of symbolical information.

Further studies based on the contribution of the study may be based both on the ways of creatively exploring the dimensions of meaning units with design-based and art-based approaches to media and communications technologies as well as on empirical studies. This may be further combined with investigating the creative process of authors of symbolical information, such as journalists, and their conceptualizations of the form of symbolical information they produce. These three approaches may then produce a more coherent picture of the complexity of symbolical information as an object of perception in the everyday lives of the perceivers.

Consequently, direct and exact empirical studies may be fruitfully based only on real-life stimuli. Hence, endlessly varying some basic elements of the form of symbolical information within the sometimes narrow approaches of experimental psychology may produce some evidence of psychological influences of form of symbolical information, but perhaps not in a rich enough manner. Rather than to describe a series of well-defined empirical studies which logically would follow the argumentation of the study, emphasis is placed on the inherent complexity of symbolical information as a creative work of an author/designer. Symbolical information in media and communications technologies may not be art, as discussed, but similar ways of expression may be used as in works of art. This gives a key role to the authors and designers of symbolical information.

Based on more holistic experimentation with the design-space of varying form of symbolical information, it may then be that some new, qualitative principles of systems design may be reached. Hence, one may discuss the design of user-centering systems, in which the tension between mind and symbolical information, or mind and author/designer and world, is reflected in a complex manner.

User-centering systems are systems which take into account the unique perspective of each individual embedded in context, the complex and emergent relationship of mind and media and communications technologies and the role of technology as mediating perception, knowledge and interaction with the world. Such systems may be based on a harmonic balance of the influence of the system and the needs, motives or other dimensions of the perceiver as co-determining meanings. The system then is designed in a way which allows the designer of the system to analyze, predict and manipulate meaning units and hence to a degree the meanings of a given perceiver. At the same time, the perceiver may manipulate the system at will which makes the system easy and comprehensible. This interaction of different 'sources of wisdom' in perceivers, designers and authors for how the system should be designed and how it should operate may then enable creative and unique systems to be created. This means many individuals may have differing software systems at their disposal when perceiving/acting in the world through media-and communication technology.

Hence, a user-centering system is designed as an open, complex system. This implies that the aim of the design of the system is not directly to create a specific, immediate psychological effect on a particular perceiver. Rather, the aim of the design of such a system would be to allow the emergence of certain types of multi-level resonances between media and communications technologies and the perceiver. Within this resonance, the perceiver and the system interact in a continuum of resonance, which may influence meanings in a creative, open and non-deterministic manner. This means that the design of a user-centering system may have to take into account the creative nature of meaning-making in perceivers. By delicately manipulating the processes of perception and the subjective experiences of particular perceivers in time and space via meaning units, creative tensions between the system and the perceiver may be reached.

Hence, creativity is not embedded in innumerable calculations of an adaptive system, or in artificial intelligence trying to respond to the perceiver in a human manner. Rather, open, creative, symbolic and polysemic meanings may be made based on the input of creativity from the authors and design-

ers of symbolical information as well as from the creative processes of meaning making in the individual perceiver. The role of a user-centering system would then be to act as a stage or field of tension, confirmation and challenge between various sources of creativity which influence the making of meaning in the perceiver. This personalized, evolving, fluid and partly abstract stage then acts as the integrator of a field of forces which meet within it.

These creative forces, when meeting in aesthetic and ethical ways, may then enable the creation of individualized breathing interfaces of mind and world. Breathing interfaces would allow for the emergence of pure, abstract and harmonious meaning, which may shade the consequent perception of symbolical information through media and communications technologies. User-centering systems may act as integrating the meeting of creative forces and influences on meaning in such a way as to allow for the emergence of a peaceful background feeling of an open, deep, breathing interface of mind and world. Hence, one may speak of resonance-based, ethical and aesthetic, creative fields of shading the meaning of symbolical information.

It may be then said that by allowing for the creation of various bandwidths, modes and interactions of resonance between mind, technology and world, different types of breathing interfaces based on the user-centering approach may be created. Hence, the question of design of modern media and communications technologies is partly taken out of the context of rule-based, closed systems or artificial, machine intelligence. Instead, the sensitive forces of creativity and tension in making meaning are brought into the foreground. Hence, the design of technology is approached in profoundly human terms as the design of resonating objects. Wide access of a large number of individuals to such technologies may then create a new type of mind-world relationship over time and space, and possibly even create a new type of community between people. This would allow for a fundamentally different way of being or existence of perceivers in relation to the world and each others when compared to the present, often narrowly mass-designed and commercially-influenced media and communications technologies which mediate the relationship of mind and world. Breathing interfaces would change our perception of the world, our knowledge of the world, and our way of existence in general as embedded in harmonious resonances over time and space.

The creation of such resonating, breathing interfaces of mind and world may then be a qualitatively new direction for the design of modern media and communications technologies.

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