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THINKING STYLES IN THE CONTEXT OF PSYCHOLOGICAL PERSONNEL ASSESSMENT

Validation of a New Thinking Styles Questionnaire

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ABSTRACT

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This study was conducted for initial validation of a new thinking styles questionnaire measuring intuitive and rational thinking styles. Thinking styles refer to individuals' typical ways of perceiving, thinking, solving problems and remembering, and the concept touches upon both personality and cognition. Intuitive thinking refers to affect-oriented thinking involving little effort and consideration, while rational thinking refers to analytical and effortful thinking characterized by the requirement for justification by logic and evidence. Intuitive and rational thinking styles have been shown to connect to various phenomena relevant to working life and to provide additional information beyond personality and intelligence measures, advocating for the addition of a thinking styles measure to psychological personnel assessment. The aim of this study was to assess the construct validity of the new thinking styles questionnaire by examining its factorial structure, internal consistency, and correlations with the Big Five personality traits. Additionally, the relationship between thinking styles and social desirability was investigated, as distortion in responses to a socially desirable direction is a relevant aspect to consider in the context of personnel assessment. Social desirability can be divided into impression management and self-deception, and this study assessed the relationships between thinking styles and these two social desirability types separately.

The data was collected as part of usual personnel assessment processes carried out by Psycon Ltd. in 2024. The sample (N=422) consisted of people seeking employment mainly in professional or manager level positions. Intuitive and rational thinking styles were measured with the first version of the new thinking styles questionnaire, and Big Five traits were measured with selected subscales from the Motivation Questionnaire. Social desirability was measured using two scales that combined social desirability items from different questionnaires. The participants filled out the questionnaires remotely in an online system. The factorial structure of the thinking styles questionnaire was investigated with explorative factor analysis, and the correlations with Big Five traits were investigated with Spearman's correlation test. The associations between thinking styles and social desirability were explored first with Spearman's correlation test, and linear regression analyses were conducted to check whether the associations differed by gender.

In line with the hypothesis, the questionnaire items loaded onto two distinct factors corresponding to rational and intuitive thinking. The two-factor structure was also robust across gender. For the correlations with Big Five traits, intuitive thinking was found to have a positive association with agreeableness and rational thinking with conscientiousness, as hypothesized based on earlier research. The other hypothesized Big Five associations could not be demonstrated in this study, while some unexpected associations were also found. The explorative investigation on the associations between thinking styles and social desirability revealed intuitive thinking to have a negative association with impression management and rational thinking to have a positive association with self-deception.

The findings of this study demonstrate the new thinking styles questionnaire to have a robust factorial structure, giving initial support for the use and further development of the measure. At the same time, further investigation is needed on the convergent and divergent validity. Additionally, the finding of differing associations between thinking styles and two social desirability types is valuable new information, as only very limited earlier research existed on the topic. The current study thus contributes to the field of personnel assessment research by addressing a gap in previous knowledge with these findings, encouraging future investigation for better understanding of how these phenomena relate to each other.

Keywords: thinking styles, intuitive thinking, rational thinking, social desirability, personnel assessment

The AI tools used in my thesis and the purpose of their use has been described below:

Name of the tool: ChatGPT-4o by OpenAI

Purpose of use and the part in which it was used: coding for data analysis in R, assistance in interpretation of R result outputs, creation of tables

I acknowledge that I am fully responsible for the entire content of my thesis, including the parts generated by AI, and accept accountability for any violations of ethical standards in publications.

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1 INTRODUCTION

The practice of measuring personality, cognition, and other psychological attributes to predict work performance and assess a person's suitability for a position dates back over a hundred years (Vinchur & Koppes Bryan, 2012). This is called psychological personnel assessment, which evaluates an individual's typical work behavior and suitability for a specific work position and environment, focusing not only on their professional competencies but also on their personality and other psychological attributes (Honkanen, 2005). The attributes assessed include, for example, cognitive capacity, cooperation skills, and styles of thinking and decision-making (The Finnish Psychological Association, 2019). The goal of psychological personnel assessment is to create knowledge that predicts job performance and thus aids the decision-making of the employer, most often as part of recruiting processes (Niitamo, 2003). In practice, the assessments are carried out employing multiple methods, such as self-report inventories, ability tests, simulation tasks and interviews (Honkanen, 2005). Ensuring the validity of all measures used in personnel selection is an issue of utmost importance (Scroggins et al., 2008), and thus validation is a fundamental procedure in new measure development.

Cognitive abilities and personality traits can be seen at the very core of psychological personnel assessment, as cognitive ability tests and personality inventories are one of the most commonly used measures (Honkanen & Nyman, 2001). Thinking styles, individuals' typical ways to perceive, think, solve problems and remember (Niitamo, 2001), seem to provide additional information on individual differences beyond these measures, while also demonstrating interesting connections to, for instance, task performance and leader-member exchange in work context (Alaybek et al., 2022; Allinson et al., 2001; Pacini & Epstein, 1999; Witteman et al., 2009). However, empirical research on thinking styles is still scarce, and despite their potential, no modern thinking style measures with established use in personnel assessment could be identified. This study thus contributes to the field of personnel assessment research with the aim to assess the validity of a new thinking styles questionnaire (Nederström, 2023), that is designed to be used as part of psychological personnel assessment in Psycon Ltd.

Additionally, this study addresses another gap in current knowledge due to very limited previous research by investigating whether any connection can be found between thinking styles and social desirability. Given that this study falls in the context of personnel assessment, social desirability, the distortion of responses into a socially desirable direction (Nederhof, 1985) is an

important aspect to consider. Socially desirable responding is a common response bias that affects the validity of research findings (Nederhof, 1985) and has been shown to both be more prevalent among job applicants than employees and to be able to alter the outcomes of a recruitment process (Griffith et al., 2007; Rosse et al., 1998). Social desirability can be dissected into self-deception, and impression management (Paulhus, 1984; Paulhus & Reid, 1991; Zerbe & Paulhus, 1987). Previous research on the relationship between thinking styles and social desirability is very scarce, and no previous publications assessing this connection on the detailed level of separating these two types of social desirability could be found. Therefore, in addition to examining the new thinking styles measure for the purpose of its initial validation, this study also investigates whether any connections can be found between thinking styles and the two types of social desirability.

1.1 Thinking Styles

Thinking styles, also called cognitive styles, can be defined as consistent, characteristically preferred ways of processing and organizing information and experience (Messick, 1984). In cognitive psychology, thinking styles are examined simply as different modes of cognitive processing (Evans & Stanovich, 2013), and the research focus remains strictly on higher cognitive processes. However, in other areas of research, they are often conceptualized much more broadly. Thinking styles are seen to be at least closely connected to (Hodgkinson et al., 2008; Niitamo, 2001), or even a central part (Epstein, 1994, 2003) of personality. Niitamo (2001) defines thinking styles to be positioned at the intersection of personality and cognition and highlights them being conceptually independent from intelligence and cognitive capacity. Another classic definition of thinking styles by Messick (1969) conceptualizes them to "represent a person's typical modes of perceiving, remembering, thinking and problem solving", which Hodgkinson et al. (2008) note to be a similar function to that of personality traits. Considering this, how thinking styles have also been linked to personality and therefore also an individual's behavior in a broader sense, limiting the phenomenon to only cognition appears a rather one-dimensional approach. The term *thinking styles* is thus used in this thesis from here onwards.

The existing body of modern research suggests that thinking styles can be divided into two main categories corresponding to intuitive and rational thinking. Intuitive thinking, also named intuitive-experiential (Epstein et al., 1996) or reflexive (Lieberman et al., 2002), is generally

characterized as holistic, affect-oriented, and effortless (Epstein et al., 1996). Rational thinking, also called analytical-rational (Epstein et al., 1996) or reflective (Evans, 2010; Lieberman et al., 2002), is conversely characterized as analytic, logic-oriented, and effortful (Epstein et al., 1996). Despite easily being contrasted as each other's opposites, intuitive and rational thinking styles are not conceptualized as a bipolar continuum (Epstein et al., 1996), which would mean intuitive and rational thinking being the two opposite ends of one spectrum. Instead, the two thinking styles are seen as unipolar independent constructs, as this view is supported by both MRI imaging (Lieberman et al., 2002) and factor analysis in the construction and validation of earlier questionnaires designed to measure these two thinking styles (Epstein et al., 1996; Niitamo, 2001). Also in straightforward comparison, the two-factor model has consistently been found a more accurate conceptualization than the single bipolar dimension, both theoretically (Hodgkinson et al., 2009) and empirically (Akinci & Sadler-Smith, 2013; Hodgkinson et al., 2009; Hodgkinson & Sadler-Smith, 2003).

Next, I will discuss both intuition and rationality in more detail, while also connecting them to the most prevalent theoretical framework. The perhaps most prominent theory on the two thinking styles is the Cognitive-Experiential Self Theory (CEST; Epstein, 1994, 2003). CEST is an integrative theory of personality that defines thinking styles as an integral part of an individual's personality, sense of self and behavior. CEST talks of the thinking styles as independent but interactive systems; the (intuitive-)experiential, and the rational system (Epstein, 1994, 2003). According to CEST, these two systems operate in parallel and interactively, and behavior and conscious thought are the joint function of these systems. At the same time, there are empirically shown individual differences in the degree of relative dominance of either system; to which extent a person tends to rely on either an intuitive or a rational thinking style (Epstein et al., 1996).

Intuition and intuitive thinking are somewhat contested terms. The number of different definitions is beyond vast, but they do most often touch on similar aspects; the intuition process is typically characterized to involve little or no effort, conscious awareness, or deliberation (Betsch, 2008; Epstein, 2003; Hogarth, 2001). Another important aspect of intuition is its close link to affect. Betsch (2008) emphasizes the output of intuition to be affective: for example, the feeling of liking something, and this affective output then to function as a basis for judgement and decision-making. Expanding on this view, Hodgkinson et al. (2008) note in their review that many researchers also agree intuition to be characterized by strong trust in the intuitive feeling. Thus, the tendency to rely on intuitive thinking may often lead to decision-making where one is very confident with their choices that they base solely on this intuitive feeling, whether the feeling is drawn from the unconscious processing of previous experiences or personal preferences. Epstein (2003) emphasizes CEST to see intuition as an organized and adaptive system, in contrast to theories regarding unconscious

processing simply as specific heuristic rules and cognitive shortcuts (e.g. Evans & Stanovich, 2013; Tversky & Kahneman, 1973).

Rationality can be defined as "thinking, --- reasoning, --- or acting 1) in a way that is generally reliable and efficient for achieving one's goals 2) when one has a reason for what one does sanctioned by a normative theory" (Evans & Over, 2013). This definition recognizing two types of rationality is common in cognitive science (Stanovich, 2016) and sees rationality to have both a personal and an impersonal aspect (Evans & Over, 2013). In the context of thinking styles, the focus is typically on the second, impersonal kind of rationality: CEST characterizes rational thinking to require justification by logic and evidence and does not see it as an antecedent for goal-achieving (Epstein, 1994, 2003). In general, thinking style research simply characterizes rational thinking as a slow, deliberative, conscious and rule-governed way of processing information (Epstein et al., 1996; Evans, 2010; Hogarth, 2004), and the adaptiveness of each thinking style is largely context-dependent (Epstein, 1994, 2003; Hogarth, 2004).

Despite being relevant constructs for both cognitive and personality psychology, the two thinking styles have long been situated on "no-man's land" and have thus unfortunately received rather scarce research interest both fields (Niitamo, 2001). However, some earlier studies and meta-analyses do exist on thinking styles, particularly in relation to personality traits, cognition, and the work context. In efforts to determine the relevance of a new thinking styles measure to be used in psychological personnel assessment, it is necessary to go over this research to understand how intuitive and rational thinking styles relate to the aforementioned themes, and to examine whether they can provide additional information beyond already existing measures.

Previous research has consistently demonstrated the two thinking styles to link to the Big Five personality traits, although the specifics of these connections slightly vary. In general, the rational thinking style is most strongly positively related to openness and conscientiousness and inversely related to neuroticism (Pacini & Epstein, 1999; Sadowski & Cogburn, 1997; Witteman et al., 2009). The experiential thinking style connects positively to extraversion and agreeableness (Pacini & Epstein, 1999). It is worth noting that there are some differences between samples from different countries; for example, in some studies (Pacini & Epstein, 1999; Witteman et al., 2009) openness is found to be associated both with a rational and an intuitive thinking style. Thinking styles also clearly provide additional information not captured by the Big Five personality traits: the Big Five only explain a relatively small part of the variation of REI scores, ranging from 22% of the variance for rational thinking and 7% for intuitive thinking (Witteman et al., 2009) to 28–39% and 9–12%, respectively (Pacini & Epstein, 1999). Therefore, by assessing the two thinking styles, it is possible to gain information about dispositions distinct from the Big Five personality traits.

As one may expect, thinking styles have been of notable interest in the context of information processing tasks and decision-making. An intuitive thinking style has been shown to predict more and a rational thinking style fewer heuristic judgements (McElroy & Seta, 2003; Shiloh et al., 2002). Some studies find a rational thinking style to be negatively associated with susceptibility to framing effects in risky choice situations (Björklund & Bäckström, 2008; Smith & Levin, 1996). Partly conversely, Shiloh et al. (2002) found neither of these thinking styles to demonstrate any connection separately but scoring high or low on both thinking styles was positively associated with susceptibility to framing effects. A recent meta-analysis by Phillips et al. (2016) also demonstrated intuition to be negatively associated with decision-making performance (normatively correct responding) but positively associated with decision-making experience (e.g. speed, feeling of confidence, enjoyment), while rational thinking was positively associated with both. Overall, the associations between thinking styles and decision outcomes appeared to depend strongly on context: for example, the match between task characteristics and theoretical strengths of the thinking style (Phillips et al., 2016). This brings us back to psychological personnel assessment, where an individual's potential job performance in a role is predicted exactly in terms of matching the characteristics of a specific position in a particular organization (Honkanen, 2005). With thinking styles appearing especially relevant for making decisions, including a thinking style measure in personnel assessment could provide applicable information for positions where decision-making plays a significant role.

One recent meta-analysis (Alaybek et al., 2022) exists on the relation between thinking styles and workplace task performance, and it also demonstrated context-dependent connections between both thinking styles and task performance. In this meta-analysis, a rational thinking style was found to be positively related to task performance and this connection to be stronger in work environments with higher task complexity, higher importance of creativity, and higher time pressure. At the same time, intuition was shown to have a very small but positive connection to task performance, and this connection is higher in environments with higher task complexity. Thinking style seems to explain unique variance in task performance outside of the Big Five trait conscientiousness, as well as outside of general mental ability (Alaybek et al., 2022), again arguing for the relevance and potential of including a measure of thinking styles in the toolbox of psychological personnel assessment.

In work context, connections between thinking styles and themes such as leader-member exchange, entrepreneurial behavior, and job type have also been researched. One study (Allinson et al., 2001) suggests that more highly intuitive leaders may be less controlling, and more nurturing compared to their more rational counterparts, and that the degree of difference in cognitive styles of a leader and a member may influence the relationship of the manager-subordinate dyad. Another exploratory study (Allinson et al., 2000) demonstrated entrepreneurs of high growth firms to have a

more intuitive thinking style than middle and junior managers (but similar to senior managers and executives), linking successful identifying and exploiting of opportunities for growth and capital accumulation to an intuitive approach to information processing. When assessing individual differences in intuitive and rational thinking styles, Akinci & Sadler-Smith (2013) also observed some significant interactions between thinking styles and job type or job level in an occupational sample of police staff and officers. Consequently, they highlighted the idea that employee selection could focus on measuring intuition and rationality to better match individuals to different job types.

To conclude, previous research has illustrated how thinking styles link to at least decision-making and workplace task performance with context also playing an important role, and how directly assessing thinking styles provides additional information beyond at least the measures of the Big Five personality traits and intelligence. This information has the potential to be useful for evaluating a person's work behavior and suitability for specific work contexts. Therefore, it is evident that thinking styles would be relevant to evaluate separately as part of psychological personnel assessment, in addition to existing personality and ability measures.

Measuring Thinking Styles

When examining any new psychometric measure, it is relevant to consider other, previous measures developed for measuring the same attribute. In work context, the Cognitive Style Index (CSI; Allinson & Hayes, 1996) is perhaps one of the best-known measures. The CSI is a 38-item questionnaire that was designed specifically to be used in organizational research, with professional and managerial groups. However, it is based on the unitary view of thinking styles, placing intuitive and rational thinking styles at the opposite ends of one continuum. As further research on the inventory has consistently shown intuition and rationality to be better measured as two orthogonal constructs, the unitary conceptualization of rational and intuitive thinking proposed by the CSI has been advised to be abandoned (Akinci & Sadler-Smith, 2013; Hodgkinson et al., 2009; Hodgkinson & Sadler-Smith, 2003).

The Rational-Experiential Inventory (REI; Epstein et al., 1996; Pacini & Epstein, 1999) is nowadays one of the most widespread general measures of rational and intuitive thinking styles. Its theoretical background lies in CEST, and it follows the two-factor model. The original REI consists of a total of 40 items, distributed evenly between the two thinking styles and has been found a valid measure in both North American and several different European samples (Björklund & Bäckström, 2008; Pacini & Epstein, 1999; Witteman et al., 2009). Utilizing the REI as a baseline, Niitamo (2001)

also developed an original Finnish questionnaire Ajattelun tyylit (AT) to measure the two thinking styles. AT consists of 13 items for rational thinking and 16 for intuitive thinking and was found valid in a combined sample of personnel assessment participants, both applicants seeking admission to higher education and expert level job positions (Niitamo, 2001).

While these earlier measures have consistently been constructed according to and have reinforced the conceptualization of two main thinking styles, the possible subscales for each thinking style have varied considerably. For instance, in developing the REI further, Pacini and Epstein (1999) divided both styles into two same subscales: ability and engagement. They argued for the importance of differentiating between having the ability think rationally or intuitively, and then the actual reliance on and enjoyment of this specific thinking style. However, later research has deemed the ability and engagement subdivisions unwarranted (Akinci & Sadler-Smith, 2013; Hodgkinson et al., 2009). Additionally, this subdivision goes against the very conceptualization of thinking styles being separate from abilities. In the Finnish AT questionnaire (Niitamo, 2001), the subscales were set as control and logic for rationality, and imagination and intuition for experientiality. However, these subscales correlate rather highly with each other and differ noticeably from the conceptualization of thinking styles (as seen by the CEST and REI), while also not having their base established in any other previous research.

Psycon Ltd.'s new thinking styles questionnaire (Nederström, 2023) is being developed with an explorative approach. The objective is to develop a valid self-report measure, that can be used and provide additional valuable information in psychological personnel assessment. The AT questionnaire (Niitamo, 2001) was employed as a foundation when creating the questionnaire items, yet without wanting to limit the new measure to the same subscales. Following the most prevalent and well-established theoretical framework, the items were created for the two main scales, rational and intuitive thinking. However, as possible subscales for these two main scales have been subject to much more varied approaches, defining the subscales for this new measure already at the beginning of the development process was not seen as beneficial. The questionnaire consists of 45 items in total, measuring both intuitive and rational thinking styles, and also includes items measuring socially desirable responding.

1.2 Social Desirability

Social desirability can be defined as a distortion of responses into a socially desirable direction; claiming socially accepted and liked traits and denying undesirable ones (Nederhof, 1985). There is currently not one most widely accepted theoretical framework for social desirability. Paulhus and associates (Paulhus, 1984; Paulhus & Reid, 1991; Zerbe & Paulhus, 1987) have demonstrated social desirability to consist of two separate factors: self-deception (egoistic bias) and impression management (moralistic bias). Self-deception refers to the respondent giving honest answers but genuinely overestimating their own qualities, while impression management refers to the respondent deliberately aiming to present themselves in a favorable light with their responses (Barrick & Mount, 1996; Paulhus, 1984). This view would thus also imply both unintentional and intentional forms of social desirability to exist. Paulhus and John (1998) have later refined the theory, claiming the difference to not be about intentionality and the two types of social desirability to both be self-deceptive biases, just different in nature: one an egoistic bias (self-deception) and one a moralistic bias (impression management). Their view claims these biases to part of personality constellations, while some others (e.g. Ones et al., 1996) see social desirability to simply reflect differences in other personality variables. At the same time, many studies examining the effects of socially desirable responding assume social desirability as a unitary construct, and in personnel selection research, understanding specifically intentional faking has often been of interest (e.g. Goffin & Boyd, 2009). In any case, social desirability can be considered as one of the most common forms of response bias that affects the validity of research findings (Nederhof, 1985).

The context of personnel selection is one where social desirability plays a considerable role. Previous research has consistently shown socially desirable responding to be significantly higher among job applicants compared to those already employed (Griffith et al., 2007; Rosse et al., 1998; Stokes et al., 1993), and that social desirability can significantly affect which person is hired (Christiansen et al., 1994; Griffith et al., 2007; Rosse et al., 1998). Contrastingly, some previous research does question the necessity of measuring social desirability as part of personality testing in personnel selection, focusing on social desirability not affecting the predictive validity of personality tests (Barrick & Mount, 1996; Ones et al., 1996). However, despite social desirability not influencing specifically predictive validity, the found effects of social desirability on hiring decisions and construct validity should be focused on (Rosse et al., 1998), and the effects of socially desirable responding on personality test validity can also be elusive (Paunonen & LeBel, 2012). Socially desirable responding has been, and still is, a continuing concern as a response bias in self-report

measures, as it can confound the interpretation of self-reported personality, attitudes, and values, amongst other things (Paulhus, 2017).

There is little published data on the relationship between thinking styles and social desirability. Pacini and Epstein (1999) and Naito et al. (2004) both found no association between socially desirable responding and either thinking style. In both publications social desirability was seemingly measured as a unitary construct, but as this connection was not in the spotlight in either publication, there is no further information available on the social desirability scales used. Monacis et al., (2016) also found no association between thinking styles and social desirability. They used the Marlowe-Crowne Social Desirability Scale (MC-SDS; Crowne & Marlowe, 1960), which also deems social desirability a unitary construct and is directed towards measuring impression management. These few publications seem to be the only ones that have measured both social desirability and specifically the two thinking styles. Research on *decision-making styles* offers some additional data, also with social desirability having been measured with the MC-SDS. Thunholm (2004), found social desirability to be positively associated with a rational decision-making style and negatively with the intuitive style, as well as the two other styles (avoidant and spontaneous) relevant in said research. Using the same measures, Loo (2000) found only the rational style to have a statistically significant although low correlation with social desirability. It is relevant to note that while these are not the same rational and intuitive thinking styles as conceptualized by CEST, the rational and intuitive styles of the decision-making style framework do touch upon the same aspects. In any case, previous research on this relationship is very scarce and has produced mixed results, due to which there is no certain knowledge on how intuitive and rational thinking styles relate to the two different aspects of social desirability.

1.3 Research Questions and Hypotheses

The aim of this study is to assess the construct validity of Psycon Ltd.'s new thinking styles questionnaire by examining the factorial structure, as well as convergent and divergent validity. Both convergent and divergent validity will be assessed through connections to the Big Five personality traits. Based on previous research (Akinci & Sadler-Smith, 2013; Epstein et al., 1996; Niitamo, 2001), it is expected that the thinking style questionnaire items load onto two separate factors. As for the Big Five trait connections, a rational thinking style should demonstrate a positive relationship with openness and conscientiousness, and a negative relationship with neuroticism (Pacini & Epstein,

1999; Sadowski & Cogburn, 1997; Witteman et al., 2009). An intuitive thinking style should demonstrate a positive relationship with extraversion and agreeableness (Pacini & Epstein, 1999). These associations are set as the hypothesis as they have been demonstrated consistent by previous research. Other exact hypotheses for the rest of the associations between the thinking styles and Big Five traits are not set, as there have been varying or inconsistent findings. Additionally, the relationships between thinking styles and social desirability will be investigated. Whilst some previous studies have examined the relationship between thinking styles and social desirability with the latter measured as a unitary construct, there have been no previous studies that have investigated the relationship between thinking styles and the two different forms of social desirability: self-deception and impression management. The current study thus contributes to research in the field of personnel assessment by taking part in the development of a new measure through validation, as well as by investigating in more detail whether any link exists between thinking styles and socially desirable responding.

My research questions and hypotheses based on earlier research are as follows:

1. What factorial structure does the new thinking style questionnaire demonstrate?
Hypothesis 1: The questionnaire items load onto two factors corresponding to rational and intuitive thinking.

2. Do the rational and intuitive thinking styles, as measured by the new questionnaire, correlate with Big Five personality traits?
Hypothesis 2: A higher score on rational thinking style is related to higher openness and conscientiousness, and lower neuroticism. A higher score on intuitive thinking style is related to higher extraversion and agreeableness.

3. Is there any relationship between a rational thinking style and self-deception or impression management, or between an intuitive thinking style and self-deception or impression management?
No hypothesis is set due to the scarcity of previous research on the topic.

2 METHODS

2.1 Participants and Procedure

The data used in this study was collected between January and July of 2024, as part of the personnel assessments carried out by Psycon Ltd. The participants (N = 422) were thus people taking part in personnel assessment, typically as part of a recruitment process. The participants were employed or seeking employment mainly in professional or manager level positions. A total of 429 participants were included in the initial sample, but seven participants were excluded from the analysis due to missing gender data. 39% of the participants were women and 61% were men, while the mean age was 38.66 years (SD = 10.19 years). 19.7% of the participants were aged 18–29 years, 52.6% were 30–45 years, and 27.7% were 46 years or older.

The personnel assessments were conducted partly or entirely remotely, with the participants filling out the self-report questionnaires used in this study remotely and independently, as online questionnaires. During their assessment process, all participants had given their consent for their assessment results to be used as part of Psycon Ltd.'s research.

2.2 Measures

Intuitive and rational thinking styles were measured using Psycon Ltd.'s new thinking styles questionnaire (Nederström, 2023). The thinking styles questionnaire consists of 45 items in total, distributed between intuitive thinking, rational thinking, and social desirability. Each item is a statement, for which the respondent rates the accuracy on a four-point Likert scale (not true – partly untrue – partly true – true) and the items were then scored correspondingly on a scale 0–1–2–3. The 45 items are distributed as follows: 15 items targeting intuitive thinking (e.g. "I often know things that I can't explain to others"), 12 items targeting rational thinking (e.g. "I believe more in logic than I do in feelings"), and 18 items targeting socially desirable responding (e.g. "I never feel joy at someone else's misfortune").

For measuring social desirability to assess the relationships between thinking styles and social desirability, I utilized two new social desirability scales developed in Psycon Ltd. (Nederström,

2024), that both have 10 items and were built by combining the social desirability items from different measures, including the thinking styles questionnaire. Following Paulhus' (1984) theoretical framework, one of the scales measures impression management (e.g. "I have occasionally tried to make things look better than they actually are to protect my own interests", α = .82). and one self-deception (e.g. "I have liked all the people I have met", α = .79). Due to data availability limitations, for this study 9 items from the impression management scale and 8 items from the self-deception were used, reducing the Cronbach's alphas to .81 and .75, respectively.

The Big Five personality traits were measured with the Motivation Questionnaire, a self-report measure developed in Psycon Ltd. (Nederström, 2019) that targets different aspects of workplace behavior and personality and has been validated. As for the thinking style questionnaire, the items are presented as statements and the respondent rates the accuracy of each item on a four-point Likert scale (not true – partly untrue – partly true – true), then scored correspondingly on a scale 0–1–2–3. The questionnaire consists of 17 scales, two social desirability control scales and 15 to measure personality. All scales include also reversed items. The theoretical background of the questionnaire is a combination of Murray's (1938) taxonomy of needs, and the classification presented in motivation research by Chulef and colleagues (2001). As the Personality Research Form (PRF; Jackson 1984) is based on Murray's taxonomy of needs, the Motivation Questionnaire dimensions are partly equivalent to those of the PRF's. The scales of the Motivation Questionnaire have been cross-validated with the subscales of PK-5 (Tapaninen et al., 2007), a Finnish personality inventory measuring the Big Five traits.

In this study, Big Five personality traits were measured by using two subscales for each trait and then calculating a mean score for the Big Five trait. Extraversion was measured with the subscales *need for sociability and company* (e.g. "I really enjoy parties and other occasions where I can meet new people", α = .78) and *need to lead and decide* (e.g. "I want to avoid direct exercising of power" (rev.), α = .83). Neuroticism was measured with *worrying and self-criticism* (e.g. "If I have failed in something, I am dissatisfied with myself and my abilities for a long time" α = .83) and *optimism*, reversed (e.g. "I am very optimistic regarding my future", α = .75), Conscientiousness was measured with *conscientiousness* (e.g. "I try to carefully plan most of my projects in advance", α = .79), and *need for perfection and finishing* (e.g. "Persistence is my greatest virtue", α = .79). Agreeableness was measured with *need to coach and guide* (e.g. "I enjoy chances to guide and advice my friends", α = .76). and *empathy* (e.g. "It is not my duty to listen to other people's troubles" (rev.), α = .81). Finally, openness to experience was measured with *need for creativity and originality* (e.g. "I want my decisions to be as original and innovative as possible", α = .81) and *need for continuity and tradition*, reversed (e.g. "I value regularity and predictability in life", α = .80).

2.3 Data Analysis

The data was analyzed using the R statistical software (v4.1.2; R Core Team, 2021). Preparing and manipulating the data set by, for instance, filtering and creating new data subsets, was done using the package *dplyr* (Wickham et al., 2023), and the exploratory factor analysis was conducted using the package *psych* (William Revelle, 2024). I began the analysis with the exploratory factor analysis of thinking style questionnaire items, using principal axis factoring with the varimax rotation, as the thinking style factors were assumed to be orthogonal based on previous research. The factor analysis was also run separately for men and women to assess the robustness of the factorial structure across gender. After the factor analysis, thinking styles questionnaire items with loadings greater than 0.4 were picked for descriptive statistics and the rest of the analyses. The correlation analyses for thinking styles, Big Five traits, and social desirability were conducted using the non-parametric Spearman correlation test, due to the variables not being normally distributed. Finally, I used linear regression to examine whether the relationship between thinking styles and social desirability differed by gender. For this, I built four regression models to test the effects of thinking style and gender, as well as their interaction, on impression management and self-deception. Thus, in each model, the dependent variable was either impression management or self-deception, while thinking style (either intuitive or rational) and gender were set as the explanatory variables, with an interaction term included to assess whether the effect of thinking style on either social desirability was moderated by gender.

3 RESULTS

3.1 Descriptive Statistics

The full descriptive statistics for thinking styles, Big Five traits and social desirability types are presented in Table 1. As demonstrated by the Cronbach's alpha values, all scales had good or acceptable internal consistency. On average, the participants scored relatively high on impression management and conscientiousness. At the same time, the participants scored relatively low on intuitive thinking, neuroticism, and openness to experience.

Table 1

Descriptive Statistics for Study Variables

Variables	n	Range	M	SD	α
1. Intuitive Thinking	422	0–3	0.77	0.41	0.77
2. Rational Thinking	422	0–3	1.86	0.43	0.75
3. Extraversion	422	0–3	1.46	0.45	0.85
4. Neuroticism	422	0–3	0.84	0.36	0.83
5. Conscientiousness	422	0–3	2.06	0.31	0.79
6. Agreeableness	422	0–3	1.61	0.38	0.84
7. Openness to Experience	422	0–3	1.03	0.37	0.84
8. Impression Management	422	0–3	2.21	0.50	0.81
9. Self-deception	422	0–3	1.22	0.51	0.75

3.2 The Construct Validity of the Thinking Styles Questionnaire

Exploratory factor analysis (varimax rotation) revealed the thinking styles questionnaire items to load onto two distinct factors corresponding to intuitive and rational thinking, with eigenvalues of 4.28 and 2.01. All the items and their loadings are presented in Table 2. The lower limit for loadings was set at 0.4. The two-factor structure was clear, as every item loaded onto only one of the factors. The two factors together explained a total of 23% of the variance, with intuitive thinking explaining 13% and rational thinking explaining 10%. The two-factor structure was robust across gender, as the same factors emerged also in gender-specific factor analyses for men and women. All items loaded onto the same factors both for men and women, although some differences can be found in the loading strength of items. For instance, for men, items 34 and 21 had one of the strongest loadings (.57 and .55) for intuitive thinking, while for women these were on the lower end (.34 and .30), even staying below the 0.4 limit. For rational thinking, items 17 and 44 had loadings of .58 and .51 for men, while for women they were .46 and .61, respectively. The explained variance was quite similar across genders, with the explained variance being 22% for men and 26% for women.

Correlation analysis revealed intuitive thinking to have statistically significant, moderate positive correlations with neuroticism, openness to experience and agreeableness, and a weak

negative correlation with conscientiousness. Rational thinking had a moderate positive correlation with conscientiousness, and significant albeit weak negative correlations with agreeableness and openness to experience. All correlations between the two thinking styles and Big Five traits are presented in Table 3.

Table 2

Results From a Factor Analysis of the Thinking Styles Questionnaire

Thinking Styles Questionnaire Item	Factor loading	
	1	2
Factor 1: Intuitive Thinking		
Item 45. I often experience things that cannot be explained.	**.58**	
Item 1.	**.56**	
Item 43.	**.54**	
Item 42.	**.54**	
Item 14.	**.50**	
Item 29.	**.48**	
Item 12.	**.46**	
Item 3.	**.46**	
Item 34.	**.46**	
Item 19.	**.44**	
Item 21.	**.43**	
Item 9.	.38	
Item 15.	.37	
Item 7.	.34	
Item 5.	.24	
Factor 2: Rational Thinking		
Item 40. I believe more in logic than I do in emotions.		**.55**
Item 44.		**.55**
Item 39.		**.54**
Item 17.		**.52**
Item 37.		**.52**
Item 36.		**.51**
Item 25.		**.49**
Item 35.		**.43**
Item 27.		.37
Item 33.		.36
Item 23.		.23
Item 31.		.17

Table 3

Spearman Correlations for Thinking Styles and Big Five Personality Traits

Variables	1.	2.	3.	4.	5.	6.	7.
1. Intuitive Thinking	–						
2. Rational Thinking	–0.25***	–					
3. Extraversion	–0.03	–0.12*	–				
4. Neuroticism	0.45***	0.03	–0.32***	–			
5. Conscientiousness	–0.23***	0.36***	–0.22***	0.11*	–		
6. Agreeableness	0.38***	–0.29***	0.21***	0.13**	–0.06	–	
7. Openness to Experience	0.39***	–0.28***	0.38***	0.05	–0.51***	0.29***	–

* p < .05, ** p < .01, and ***p < .001

Note. Big Five traits were measured with selected subscales of the Motivation Questionnaire.

3.3 The Relationship Between Thinking Styles and Social Desirability

The correlations between the two thinking styles and two types of social desirability are presented in Table 4. Intuitive thinking had a significant yet weak negative association with impression management, and no association with self-deception. Rational thinking had significant although weak positive associations with both impression management and self-deception. The two types of social desirability in themselves had a moderate, positive association. Linear regression to test whether gender affects the relationships between the two thinking styles and two styles of social desirability found no significant interactions between thinking style and gender ($p > .18$ for all four models).

Table 4

Spearman Correlations for Thinking Styles and Social Desirability Types

Variables	1.	2.	3.	4.
1. Intuitive Thinking	–			
2. Rational Thinking	–0.25***	–		
3. Impression Management	–0.27***	0.13**	–	
4. Self-Deception	–0.02	0.25***	0.47***	–

* p < .05, ** p < .01, and ***p < .001

4 DISCUSSION

This study was conducted as part of the development process of a new thinking styles questionnaire designed to be used in a personnel assessment context, with the aim to examine the construct validity of the new questionnaire. Thinking styles are relevant to evaluate in personnel assessment as they connect to personality, cognition and different work life phenomena, while providing information not captured by the Big Five personality traits and intelligence. The construct validity of the new questionnaire was assessed through conducting an explorative factor analysis of the questionnaire items, examining internal consistency, and testing the correlations between thinking styles scales and the Big Five personality traits. Additionally, the relationship between thinking styles and social desirability was investigated. Based on earlier research, the hypotheses were as follow. First, the thinking style questionnaire items were expected to load onto two factors corresponding to rational and intuitive thinking. Second, rational thinking was hypothesized to relate to higher openness and conscientiousness, and lower neuroticism, while intuitive thinking was hypothesized to relate to higher extraversion and agreeableness. For the relationship between thinking styles and social desirability no hypothesis was set due to scarcity of previous research. The results showed the questionnaire items to load onto two factors as hypothesized, but the correlations between thinking styles and Big Five traits partly differed from those expected. For thinking styles and social desirability, statistically significant albeit weak correlations were found, with intuitive thinking having a negative association with impression management and rational thinking having a positive association with self-deception. In this section, I will discuss the findings of this study further and

provide potential explanations, as well as examine the limitations of the study and present suggestions for future research.

4.1 The Construct Validity of the Thinking Styles Questionnaire

According to the results of this study, the new thinking style questionnaire demonstrates a clear two-factor structure, as hypothesized based on earlier research (Akinci & Sadler-Smith, 2013; Epstein et al., 1996; Niitamo, 2001). The new measure thus has a factorial structure equivalent to previously validated thinking style measures, capturing the expected dimensions of intuitive and rational thinking. This is consistent with the previously established theoretical framework, as the existing body of modern research presents intuitive and rational thinking as the two main categories of thinking styles (Epstein et al., 1996; Lieberman et al., 2002; Niitamo, 2001). Using principal axis factoring with the varimax rotation, each question loaded clearly onto only one of the factors, always corresponding to the thinking style it was initially designed to measure. Items not reaching the set loading limit were discarded, leaving a decent and a rather even number of items for both scales: eleven for intuitive thinking and eight for rational thinking. The factor structure was also robust across gender, with the same two factors emerging also both for men and women separately.

The percentage of variance explained was relatively low for each factor (23% total), meaning the results suggest these factors only capture a rather small portion of the overall variance in responses. Comparing with previous measures, the amount of variance explained by the REI has varied from approximately one third (Pacini & Epstein, 1999; Witteman et al., 2009) to nearly half (Epstein et al., 1996), while the earlier Finnish questionnaire by Niitamo (2001) reached a similar percentage as the measure used in the current study. One possible explanation for this could be sample characteristics, as the samples for both Niitamo's validation study and the current one were from a personnel assessment context and the identified factors remain theoretically meaningful. The new questionnaire also demonstrated acceptable internal consistency for both scales of the final included items, with similar Cronbach's alpha values to those of Niitamo's questionnaire.

The results of the correlation analysis between the two thinking styles and the Big Five traits to assess convergent and divergent validity demonstrated associations only partly as hypothesized. In alignment with previous research (Pacini & Epstein, 1999; Sadowski & Cogburn, 1997; Witteman et al., 2009), intuitive thinking was found to be positively associated with agreeableness, and rational

thinking with conscientiousness. At the same time, other hypothesized associations could not be demonstrated, and the current study also found some unexpected associations. When interpreting the results, it is relevant to note differences both in themes emphasized in the new thinking styles questionnaire versus in the REI, and in the scope of the subscales used to measure Big Five traits in this study, compared to traditional Big Five measures such as the NEO-FFI (Costa & McCrae, 1989). Next, I will discuss the results and present possible explanations, most of which find basis in the difference in measures used.

This study found openness to experience to have a moderate positive association with an intuitive thinking style, and a negative association with a rational thinking style. This finding is interesting, as it contrary to previous studies (Pacini & Epstein, 1999; Sadowski & Cogburn, 1997; Witteman et al., 2009) that have consistently found rational thinking to be positively associated with openness. Some of the previous studies (Pacini & Epstein, 1999; Witteman et al., 2009) did find also intuitive thinking to have a weak positive association with openness. However, this result of rational thinking having a negative association has not previously been described. A likely explanation for this can be found in the two subscales that were used to measure openness in this study: need for creativity and originality, and need for continuity and tradition (reversed). The need for creativity and originality subscale touches on preference for creative, visionary and out-of-the-box thinking. Including items such as "When solving a problem, I prefer to use my imagination more than logic" and "I always try to do things in a new and creative way even when I can't rationally justify it", it is to not much surprise that individuals with a higher score on rational thinking would score lower on this scale. At the same time, the positive association between intuitive thinking and this subscale is not too unexpected. In comparison, the NEO-FFI subscales for openness are aesthetic interests, intellectual interest and unconventionality. Especially intellectual interest, with items targeting the enjoyment of intellectual and theoretical thinking, can be seen to align well with rational thinking (earlier also called "need for cognition"). This aspect of intellectual interest missing and the overall difference in the subscales selected to measure openness could explain these associations found.

One hypothesized connection that this study did not demonstrate is the positive association between intuitive thinking and extraversion. The lack of this connection could be due to the new questionnaire targeting intuition more generally compared to the REI. The original REI intuition scale (Epstein, 1996) has a strong emphasis on interpersonal intuition; half of all the intuition items refer to intuitive feelings about people specifically (e.g. "My initial impressions of people are almost always right"). In comparison, the new questionnaire focuses on general intuitive thinking (e.g. "I often know things that I can't explain to others"). The type of interpersonal intuition REI emphasizes,

feeling confident in one's intuitive "hunches" about other people, could more specifically be what connects positively to extraversion rather than intuitive thinking more generally.

Alternatively, the lack of association could also be explained by the scope of the two extraversion subscales, need for sociability and company and need to lead and decide. In this study the need to lead and decide subscale, targeting dominance in social situations and decision-making, makes up half of the extraversion scale. In comparison, the NEO-FFI extraversion subscales are positive affect, sociability and activity. Seen as the intuitive thinking style has been linked to emotional expressivity (Pacini & Epstein, 1999), and self-report measures of empathy and social popularity (Norris & Epstein, 2011), the typically reported positive association with extraversion could be due to positive and emotionally present social engagement and activity, rather than social dominance. Thus, the possible positive connection between intuitive thinking and need for sociability and company could also be left unseen due to the need to lead and decide accounting for other half of the extraversion scale.

For rational thinking, this study found an unexpected, moderate negative association with agreeableness. This finding could be explained by the rational thinking scale in the new questionnaire having a different emphasis compared to that of the REI. The REI rationality items very much target a personal preference for and enjoyment of rational, deliberative thinking (e.g. "I prefer my life to be filled with puzzles that I must solve" and "I find little satisfaction in deliberating hard and for long hours" (rev.)). In comparison, the new questionnaire rationality items do not target personal enjoyment of deliberative thinking, but more a personal need for logical justification (e.g. "I don't believe anything without a logical reason") and overall valuing of a matter-of-fact approach (e.g. "People should daydream less and focus on concrete problems"). Especially the latter, valuing unemotionality and practicality, could provide an explanation for the negative association with agreeableness.

Also for this association, another likely explanation can be drawn from one of the two subscales used to measure agreeableness. The empathy subscale includes a considerable number of items that also target the personal prioritization of, and importance given to emotions. Items such as "I'm not very interested in other people's feelings, and prefer a matter-of-fact approach (rev.)", "I aim to minimize the effect of emotions when making important decisions (rev.)", and "I rather listen to my sense than my emotions (rev.)" highlight this aspect of centering emotions in a broader context. This aspect being negatively associated with rational thinking, that deprioritizes emotions especially in decision-making, is thus of little surprise. In comparison, the NEO-FFI measures more directly and simply nonantagonistic and prosocial orientation, with items targeting being liked, being considerate of others, and preferring cooperation over competition.

Another important and unexpected finding was the positive association between intuitive thinking and neuroticism, as it was the highest correlation found between any thinking style and Big Five trait and had not been described in previous research (Pacini & Epstein, 1999; Witteman et al., 2009). In this study, neuroticism was measured using the worrying and self-criticism subscale, and the reversed optimism subscale. While both of these are relevant scales for measuring neuroticism, this specific optimism scale does, in a way, also target optimistic locus of control with several items. Examples of items like these are "As long as you know what you want, it is easy to find a suitable job" and "I believe in destiny more than in people having an influence (rev.)". To compare, the NEO-FFI measures neuroticism by simply targeting self-reproach and negative affect. Noting that intuition is characterized by strong trust in an intuitive feeling (Hodgkinson et al., 2008), these type of thoughts about chance playing the largest role in how things turn out, instead of thinking optimistically with a strong locus of control, could be more present in individuals relying more on intuitive thinking. At the same time, the subscales leave the finding of rational thinking having no association with neuroticism instead of the hypothesized negative association unexplained.

Additionally, the possibility of cultural differences and other sample characteristics influencing the results must be considered. The participants of this study were mainly Finnish, while the earlier studies mentioned here had either American, Dutch or Spanish samples. Witteman et al. (2009) did also report the associations between thinking styles and the Big Five traits to partly differ between their Dutch and Spanish samples, as well as highlighting some differences between their results and those of Pacini and Epstein (1999), who used a North American sample. Additionally, both of these previous studies used samples composed of university students, while the current study conducted in a personnel assessment environment, thus having a sample with a wider age range and consisting of people applying to professional and manager level positions. Thus, the difference in the cultural background, age, and other sociodemographic characteristics of participants in this study compared to the studies used for setting the hypotheses must be noted as a source of uncertainty, and the findings must be interpreted with caution.

Altogether, the new questionnaire demonstrated a theoretically meaningful two-factor structure, aligning with the dimensions of intuitive and rational thinking similar to previous research and earlier thinking styles measures such as the REI and the Finnish AT questionnaire (Epstein, 1996; Niitamo, 2001). At the same time, new emphases on how the new questionnaire targets intuitive and rational thinking can be noted. These differences, sample characteristics and differences in the Big Five measures used in this versus previous studies are all relevant aspects to consider when assessing convergent and divergent validity as approached through Big Five correlations in the current study.

4.2 The Relationships Between Thinking Styles and Social Desirability

The results of the current study suggest intuitive thinking to have a weak but statistically significant negative association with impression management, but no association with self-deception. Contrastingly, rational thinking was found to have a weak but significant positive association with self-deception, and to a lesser degree with impression management. As no significant interactions were found between thinking style and gender, the results of this study suggest gender to not influence the relationship between thinking styles and social desirability.

Intuitive and rational thinking having differing associations with impression management and self-deception is a particularly interesting explorative finding. The earlier, scarce research did not provide enough basis for setting hypotheses, so the results address a clear gap in previous knowledge. For possible explanations of found associations, I wish to highlight Paulhus' and John's (1998) emphasis of the two fundamental values, agency and communion, and the two corresponding motives, power and approval, that they see to exist behind self-deception and impression management. They conceptualize impression management as a moralistic bias of seeing oneself as an unrealistically good member of society and is based on the need of communion and motive of *approval*. As an intuitive thinking style has been found to positively link to favorable relationship beliefs and to be inversely related to distrust of others and intolerance (Pacini & Epstein, 1999), one possible explanation for the negative association between intuitive thinking and impression management could be a lesser need for approval. Meanwhile, self-deception is an egoistic bias of seeing oneself as exaggeratedly talented or intelligent and socially notable, based on the need of *agency* and motive of *power* (Paulhus & John, 1998). Considering that Pacini and Epstein (1999) found a rational thinking style to be positively related to ego strength, and favorable basic beliefs about the self and the world, rational thinking having a positive association also with the egoistic bias of self-deception is perhaps not too surprising.

4.3 Strengths, Limitations, and Future Research

A key achievement of this study was the initial validation of a new measure, following a standard psychometric approach by both conducting explorative factor analysis and assessing convergent and divergent validity through correlation analysis. The sample was from the same personnel assessment

context where the new measure is intended to be used, and all measures used in this study had appropriate internal consistency, with the reliability coefficient values ranging from highly acceptable to good. Additionally, the exploratory achievement of this study regarding the relationship between thinking styles and social desirability should be mentioned. The current study is one of the first to examine the relationship between thinking styles and social desirability, especially in detail by separating impression management and self-deception, the two different types of social desirability.

The generalizability of the results is subject to some limitations. First, despite the measures all demonstrating acceptable reliability, it is worth noting that they are all measures designed for the personnel assessment purpose, that is to say, to assess personality variables from the perspective of work behavior. For instance, having used the Big Five measures derived from a work personality inventory does significantly affect the comparability with other validation studies where standard Big Five inventories such as the NEO-FFI were used. This, unfortunately, ended up hindering the accurate assessment of convergent and divergent validity to a rather notable extent.

As the study was conducted in a personnel assessment context also in terms of the sample used, the results may not be applicable to the general adult population. The sample of this study consisted of adults seeking employment in mostly professional and manager level positions, which naturally does not represent the entire adult population. Additionally, the gender distribution of the sample was unequal, with there being a larger proportion of men compared to women. This may also affect the generalizability of the findings, as, for instance, the factor analysis revealed some significant differences between gender groups in the loadings for some questionnaire items. The sample used in this study was also comprised of mainly Finnish participants. As explained previously, this may make the results not fully comparable with those of earlier studies, seeing as also previously there have been noted to be differences between samples from different countries (Witteman et al. 2009).

This initial validation confirmed the two-factor structure of the new thinking styles questionnaire, but further development and validation of the measure are needed. First and foremost, more investigation is needed to further assess the convergent and divergent validity of the new questionnaire. The Big Five trait associations found in current study were only partly aligned with the hypotheses, possibly due to the difference in measures used. Further analysis of the associations between the thinking styles and the Big Five trait subscales separately could give insight into whether the earlier hypothesized explanations drawn from the subscales' items are valid, and in general paint a clearer picture of how the two thinking styles relate to different aspects of work personality and behavior. Future research on the convergent and divergent validity should be carried out by

employing, to the degree possible, more standard Big Five measures for the results to have better comparability with those of earlier studies.

Further research could also examine other interesting and relevant connections, for instance, how the two thinking styles relate to performance in ability tests, specifically the answering speed and accuracy. This could provide insight on whether the two thinking styles as measured by this questionnaire reflect the two types of thinking, fast and slow, as conceptualized more often in cognitive psychology (e.g. Evans & Stanovich, 2013) and whether or not they connect to cognitive abilities. Other relevant connections to explore could be the performance in individual simulations, specifically ones assessing information searching and decision-making, or different aspects of participation style in teamwork simulations.

4.4 Conclusion

This study investigated the construct validity of a new thinking styles questionnaire measure designed to be used in a personnel assessment context. The findings indicate the new measure to have a robust factorial structure that captures the two dimensions of rational and intuitive thinking, which gives initial support for the use and further development of the measure. Further investigation is required on convergent and divergent validity of the measure. The Big Five associations found in this study were only partly in line with hypotheses that were based on previous research. As this could at least partly be due to differences in the Big Five measures used, the importance of further investigation with measures more similar to those used in previous research is highlighted. The current study also explored the connections between the two thinking styles and two different types of social desirability, revealing an intuitive thinking style to have a negative association with impression management and a rational thinking style to have a positive association with self-deception. These findings of thinking styles relating differently to social desirability biases contribute to the field of personnel assessment and thinking styles research by addressing a gap in previous knowledge, encouraging further research for a more profound understanding of how thinking styles relate to both social desirability and other phenomena relevant in the context of personnel assessment.

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