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Edited by Theodora Lightfoot-Rueda, Ruth Lynn Peach

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CHAPTER 3

Governing the Brain: New Narratives of Human Capital in Australian Early Childhood Education

Zsuzsa Millei

Becker (1964) at the University of Chicago originated the idea of human capital theory. In Becker's understanding of the theory the individual is repositioned—as an actor in the social world—in the market of behaviors. According to his theory, as a rational actor, the individual optimizes his or her own "profit" by accumulating those behaviors and skills that make him or her more desirable on the market. At the heart of the theory lies the possibility of perfecting the human (Luke, 1997). By translating behavior into economic terms, human capital theory enabled the systematic application of economic theory to social issues, such as unemployment or the issue of minorities who dominated in lesser-skilled occupations. While this theory construes the individual in terms of two components, first, genetic endowment and second, acquired set of aptitudes (Besley & Peters, 2007), more emphasis in policy making has been placed on how best to facilitate the acquisition of knowledge and aptitudes. Education, training, and parenting under the influence of policies using human capital reasoning became aligned with market goals and applied market terms, such as investment, return, competition, and so on.

Neuroscientific arguments gained increased significance in early childhood education and care (ECEC) discourse internationally, including policy, theory, and practice during the past decade (White, 2011). While human capital reasoning continued to provide a commanding rationale for policy efforts in early care and education (Press, Wong, & Sumsion, 2012), neuroscientific evidence offered new ways to legitimize policy on all parts of the political spectrum. It also offered authoritative evidence to underpin stakeholders' advocacy work. This

chapter is a critical engagement with the current popularity and uncritical uptake of neuroscience discourses in early childhood policy through some examples of Australian ECEC policy and practice. While neuroscience discourses offer uncontested power to arguments for the provision of early childhood education, it is also possible that these discourses will lead to unexpected outcomes. They potentially threaten the value placed on pedagogical work aimed at the acquisition of aptitudes and focus on bringing out genetic endowments of the individual leading to a new eugenic current. It might potentially lead to disinvestment from institutional delivery of care and education, and to a radical change in pedagogy and curricula that targets new capacities of the individual through pharmaceutical drugs and/or various novel technologies.

Human Capital and Neurosciences in Policy

Ball and Junemann (2012, p. 4) write that "governance networks bring into play particular kinds of expert knowledge, ranging from industrial psychology to auditing, which" inform and shape policy discourses by constructing policy problems and interventions in particular ways. Governance networks are made up of interdependent actors—often extra governmental entities—involved in delivering provisions based on the exchange of money, information, and expertise and rely on lasting ties and networks between expertise, reputation, and legitimation. In this context, policy discourses construct and position human subjects as actors and affected entities in particular ways according to the expert knowledges they draw upon and get shaped by. As human capital theory continues to be utilized in governance networks, it interacts with other expert knowledges, such as neuroscience, that gained reputation and legitimation recently (Kraft, 2012; MacNaughton, 2004) and reconfigured notions of the human subject as actors and affected entities in early years policy discourses.

As Ball and Junemann (2012, p. 3) explain, network structures define the agenda, including the problem and outcomes of policy networks. ECEC network structures in Australia include in both their "issue networks" and "tight policy communities" economists and neuroscientists or their representatives.[1] ECEC policy is shaped by neuroscience research quite explicitly since the Rudd and Gillard governments' "education revolution" agenda, which specifically focused on ECEC and intended to bring significant changes in education policy and practice to meet the challenges of the twenty-first century. The subsection of "education revolution," the ECEC agenda titled as *Investing in the Early Years—a National Early Childhood Development Strategy* (referred to as "Strategy" in the following text) released by the Council of Australian Governments in 2009 contains explicit references to neuroscientific evidence in a seamless whole with human capital theory to condition the future of the child:

> National effort to improve child outcomes will in turn contribute to increased social inclusion, human capital and productivity in Australia. It will help ensure Australia is well placed to meet social and economic challenges in the future and remain internationally competitive.
>
> Our understanding of the interactions between genetics and early childhood experiences has advanced through research in neurobiology which highlights the importance of the early years in shaping the architecture of the brain. (Council of Australian Governments, 2009, p. 4)

This Strategy served as the basis to write the new national curriculum and quality framework for the early years that radically reshaped policy, curriculum, and provision. Moreover, it shaped new kinds of ECEC actors—parents and educators as responsible for the neuro-health of children and children as "embrained" subjects (Lemke, 2005). As referred to in the Strategy, neuro-health

practices of families and caregivers condition the future of the child by setting "trajectories for learning and development throughout life" (Council of Australian Governments, 2009, p. 29). As part of scientific evidence, early brain development argues for "optimal" stimulation in the early years so that brain synapses and pathways develop to their optimal capacities. Evidence in regard to hardwiring and pruning processes taking place in the brain legitimates and provides powerful arguments for policy initiatives, funding, and intervention in many policy fields related to the early years. Intertwined with the future focus of human capital theory, neuro-health therefore became a part of ensuring Australia's competitiveness on the international market.

In this chapter, I analyze the ways in which neuroscientific discourses entangled with human capital theory have reshaped or are reshaping the notion of the human subject and affected entity in ECEC policies and practices. What are or could be the possible consequences of these entanglements for the government of different sections of population? This timely analysis follows developments in which neurosciences already effectively shape educational knowledge production and the very nature of the child to be educated and cared for. They offer novel ways to think about and problematize education and care often turning back to biological theories and eugenic arguments (Edwards, Gillies, & Horsley, 2013; Rose & Abi-Rached, 2013).

Methodological Considerations

Governmentality is a complex term coined by Foucault (1991). Briefly, it is about "how we think about governing others and ourselves in a wide variety of contexts" (Dean, 1999, p. 209). Governmentality or governmental rationality refers to particular "mentality[ies]" of rule. Foucault signals the emergence of a distinctive mentality of rule that became the basis for modern liberal politics making the freedom of the individual the target of government. Different mentalities offer different ways to think about governing individuals and are associated with

various avenues, or technologies, for their regulation in the form of policies or ritualized and routinized institutional practices, that is, regimes of practices. It presupposes understandings of the governed subject. These constitutions assume certain capacities, attributes, orientations, and statuses of its subjects. The provision of ECEC, with its associated policy and pedagogical and curriculum regimes, is considered a technology for the regulation of conduct in order to align it with changing aims of governing.

Human capital theory's future-oriented focus makes it a strategy for governing the population toward certain ends by connecting goals of education with a future societal aim. At the same time it also serves as a *technology of anticipation* with its cost-benefit analysis that seeks "to bring some aspects [of the future] about and to avoid others" (Rose & Abi-Rached, 2013, p. 14). To demonstrate how human capital theory changed its shape, constructed shifting notions of the human subject, and affected entity in policy, I provide a short historical review of models of human capital in Australian education policy. These models draw on Luke's (1997) analysis. I demonstrate how developments in (expert) knowledge production and its uptake in policies altered the ways in which the human capital model constructed problems, made them intelligible, and shaped interventions. I briefly point to what understandings of human being, child subjects, or "natural foundations" these interventions were administered through, offering some examples for these narratives from historical Australian ECEC policies. Then, by using the same analytical strategy, I describe the knowledge production associated with the neurosciences and draw out some considerations as to their possible effects when they entangle with human capital theory. Thus, the "findings" in this chapter are speculative and they aim to trouble the mostly unproblematic uptake and unfettered promotion (Sripada, 2012) of neuroscientific discourses in ECEC globally in general and in the Australian context in particular (see

exemptions, e.g., Corrie, 2000; Einboden, Rudge, & Varcoe, 2013, in the health area; MacNaughton, 2004; Pykett, 2012, on geographies of contemporary educational practice; and Sumsion & Grieshaber, 2012, in the Australian ECEC).

Expert knowledge has power effects and shapes what is possible to say, think, and do in relation to the child (Foucault, 1972). Expert discourses construct particular notions of "the child" as the subject of education and care. They define the child's capacities (or the lack of thereof) and assign techniques to effect those to reach particular goals. The inclusion of neuroscientific knowledge into ECEC has made visible particular biological processes, such as brain activity or hormone levels, which I explain in more detail later in this chapter. This inclusion reconfigured (Sripada, 2012) the educational and care knowledge of the human body and biological processes, and made them the target of regulation. For example, it is not only the biological needs of the child, such as eating, toileting, resting, and so on that are targeted by care practices but seemingly hidden processes of the body, such as brain activities and stress levels. Neuroscientific knowledge therefore reconfigured the child as the subject of education by visualizing and assigning novel neural and biological capacities to them that were previously not considered in policy and practice. Mirroring these changes, educators are also changing to facilitate optimal brain development and stimulate hormonal and neural processes.

Luke (1997) borrowed Deleuze and Guattari's idea of the "machine" to understand the human subject in human capital theory "as a generic, infinitely perfectable industrial-era machine" (p. 5). The metaphor of the machine becomes useful for emphasizing how different forms of governing mandates shape both the subject (the individual) and the working of the machine (by assigning capacities and related actions), simultaneously producing particular power effects on the conduct of the individual (Foucault, 1991). Foucault's analytics of government

established a close link between forms of power and processes of subjectification and forms of knowledge underpinning them. In this perspective governmentality stresses the close link between technologies of power, technologies of subjectivation, and forms of knowledge (1991).

For the analysis performed in this chapter I have found Fejes's (2006, p. 697) concept of the "educable subject" helpful. The educable subject expresses the relationship between a particular mandate, rationality of governing, where the subject is constructed as the target of this particular form of regulation that is directed on certain capacities. The subject is understood according to the same rationality. For example, if the subject is characterized by stress level or choice, regulation aims to govern the stress level or choice of the subject. I have also adapted Fejes's (p. 698) questions for the purpose of my analysis: How are educable subjects constructed as beings with certain capacities (or the lack of thereof) and what are they to become? What kinds of techniques have been created to govern these subjects? How does human capital theory interplay with neuro-health knowledges in the construction of the educable subject? How can care and education be speculatively imagined for these child subjects? My analysis is not based on a comprehensive analysis of discourses in a marked area and era, or on a full review of literature, rather it offers a review and speculative creation of a series of possible scenarios to explore and critique (and destabilize) the possible effects of neuro discourses in ECEC.

Three Historical Models of Human Capital

In Luke's (1997) iteration the first model of human capital was most prevalent during the Dawkins era (1987–1992) in Australia. Educational narratives, by drawing on social scientific knowledge in regard to social structure and disadvantage, constituted particular subjects as "unskilled" and "disenfranchised" *due to their social position* in society. The aim of governments was to ensure the future competitive productivity of these workers and their social

mobility through some form of compensatory education. The *Strengthening Australia's Schools* document (Dawkins, 1988) stated that a national effort must produce a skilled and reliable workforce to reform the economy. Most efforts were focused on the upper end of schooling and resulted in a decrease in funding for preschool (Ailwood, 2004). The reasoning of this model goes back to the social planners of the 1960s in the United States, who also initiated Head Start programs, which were mirrored in Australian early childhood education as compensatory education during the 1970s (Millei, 2008). For example, the *Nott Report* in Western Australia summarizing the state and need for ECEC expresses the need to compensate for "many under-privileged, mentally and physically retarded children and children whose need for pre-school education is so pressing but who are for a variety of reasons not in a position to avail themselves of it" (Education Department of Western Australia, 1972, p. 2). Its counterpart, the *Fry Report*, initiated the support of migrant and Aboriginal communities to establish their own preschool centers "in which the program is partially orientated to their cultural and linguistic heritage" (Australian Pre-schools Committee, 1974, p. 221). Hence, lack of participation in society and workforce was understood on structural terms related to one's belonging to a particular social group. The individual was constructed on social categories based on these divisions and associated "deficits." Education focused on the identification, quantification, and categorization of lack and the filling of that lack as a social and economic project. Educational funding aimed toward the reorganization and redistribution of knowledge.

The second narrative described by Luke (1997) repositions deficits generally onto all human subjects. It does so by removing their belonging to certain social categories. With the perception that certain types of knowledge and skills were necessary for the purposes of industry, this way of thinking reshapes our understanding of the *subject in terms of the possession or lack*

of specific skills necessary for employment, making that individual productive or not. People were now seen in terms of their ability to adapt to these needs. The introduction of outcomes-based education exemplifies this discourse where potentials (and deficits) were articulated in clear standards: outcome-based education offered "potential in the clear articulation of 'what's important' and the commitment to ensuring that all groups of students, regardless of their class, gender, race, ethnicity, physical 'ableness', and so on, are expected to achieve at high levels on a common curriculum" (Willis & Kissane, 1995, p. 3). Education and training became closely intertwined. Outcomes were defined as matched with employment requirements and discursive markers from management were used such as "targets," "benchmarks," "reporting," and "outcomes" (Taylor, Rizvi, Lingard and Henry, 1997). The compensatory model of "equality of opportunity" turned to "equity of access and participation" for all (Marginson, 1993).

In ECEC, compensatory education shifted to the need for early intervention coupled with early investment and return based on the aim to increase individual employability and savings on welfare spending (Millei, 2008). The aim of education became to deposit or strengthen these employment related skills in all children, linking education with ensuring economic reform/outcomes by increasing individual skill levels for employment requirements. The child subject was reconstituted as the future employable worker.

In the third narrative about human capital theory, "national economic survival and competition in the world economy have come increasingly to be seen as questions of cultural reconstructions" in terms of enterprise and the "acquisition and use of so-called entrepreneurial qualities" (Peters, 2001, p. 60). This knowledge—enterprise culture—constitutes *creativity and entrepreneurship as important aspects of the subject* reflecting the context of risk and knowledge society and mechanisms for risk and knowledge management. Constructed as being part of the

international knowledge economy and culture, industrialized nations were concerned about assurances against risks in changing international markets—for example, quality assurance, monitoring, regulation, centralized planning, and evaluation—that were seen to be secured by individuals' creativity and entrepreneurship. *Backing Australia's Ability* uses this rationale the following way: "A road of high growth based on the value of our intellectual capital, we need to stimulate, nurture and reward creativity and entrepreneurship" (Commonwealth of Australia, 2001, p. 2). These new discourses also constituted a novel type of school leaver, "an economic citizen that was better attuned to the requirements of an enterprise culture" (Marginson, 1997, p. 154). For example, the *Guidelines for the Identification of Best Practice in Early Childhood Education for Four to Eight Year Olds* (*Guideline*) promotes "positive attitudes towards risk taking" (Rice, Shortland-Jones, & Meney, 2001, p. 8). The child is constituted by the *Guideline*'s discourses as being able to choose between activities that best support her educational advancement, as being able to shape and govern her own capacities and competencies through her own will and choice, and as being an autonomous and lifelong learner (Millei, 2008). The second edition of the *Guideline* (Rice, Shortland-Jones, & Meney, 2006) introduces the idea of *career development for early childhood*. Against dominant discourses that position young children as innocent and needing protection, this document repositions children as part of adult world who from the beginning of their lives learn to and are liable to succeed. The *Guideline* explicates this idea this way:

> Career development involves actively taking charge of one's learning/work/life destiny in a complex, changing world. It is about creating the life one wants to live and the work one wants to do. An integral component of this process is self-management through ever-changing contexts and circumstances of an individual's life and work journeys. (p. v)

As was well summarized by the words of the *Curriculum Framework*'s (for Western Australia incorporating the early years): "All students need to attain [these outcomes] in order to become lifelong learners, achieve their potential in their personal and working lives and play an active part in civic and economic life" (Curriculum Council, 1998). Human capital theory through individual enterprise and creativity sought to mitigate risk for economic competitiveness of the nation.

Neurosciences and Biopolitics

The National Agenda for Early Childhood (*Agenda*) (Commonwealth of Australia, 2007) in Australia was the first national collaborative approach for ECEC among state governments, departments, the nongovernment sector, and the community that created a vision and framework for the early years. The *Agenda* lays down priorities for "evidence-based and coordinated action which will result in improved health, learning, and emotional and social wellbeing of children, both during the early years and over the course of their lives," extending the agenda and policy initiatives to an approach integrating education with health and well-being (p. 16). The creation of a national framework for ECEC contributed to a strong economic program as it was placed under the national productivity agenda. It aimed to increase efficiency and reduce spending by overseeing and coordinating the various sectors engaged in "child work," by preempting the future overspending on welfare in areas of health and social security.

Scientific discourses, especially research conducted on early brain development by McCain and Mustard (McCain & Mustard, 1999; Mustard, 2002) or the study of Shonkoff and Phillips (2000), were also included in the *Agenda* as well as in other related policy discourses to support economic arguments and to emphasize the great role that the parents and the community play in children's development and well-being. Thus the regulation of ECEC was extended to

new players in its governance network (Ball & Junemann, 2012). The use of brain research as a "regime of truth" and associated authority," as MacNaughton (2004) argues, helped to legitimate the need for ECEC. Against the "noisiness" of social research with humans in which the context and complex nature of the subject alters research findings to a great extent, brain research simplifies findings into linear causality. It articulates that optimum brain development ensured by the most favorable physical and personal environment results in productive and healthy adulthood. Other factors, such as social disadvantage, acting upon adult productivity are not considered or are disregarded in these arguments.

As I have demonstrated in the three models, human capital theory provided the basic link between particular desired human behaviors, their acquisition, and economic aims. As human capital theory mixed with particular knowledges—social compensation, industry skills (early intervention), or enterprising culture—different models were produced that constructed the problem, subjects of the problem, the learner and the child, the solution (attempt), and outcome in particular ways. So what are the effects when neuroscientific discourses entangle with human capital theory?

Neurosciences and their sibling fields of biomedicine and biosciences, target and expand knowledge from the person as an entity to the internal processes of the body. While human capital theory has targeted certain aptitudes of the individual, neurosciences help to make visible the internal mechanisms of the body for regulation. For example, while so far creativity was attributed to the individual, it became possible to conceive of it as a particular operation of the human brain. Thus these new imaginings of the person shape novel subjects and ways to govern individuals or the population en masse.

Since government moved into new areas, such as the regulation of the population's biological processes and aims to control and enhance the population to multiply and increase the capacities of the body to be more productive, Foucault's notion of biopolitics needs to be reconsidered. Biopolitics treats the "population" as a mass with biological characteristics and particular kinds of pathologies that give rise to specific knowledges and techniques for its regulation. In biopolitics life appears as the object of political strategies and takes as its subject the human body and its biological processes. According to Foucault, a biopolitics of the human race began to emerge as the state became concerned with the population as a commodity that needed to be governed so as to protect, preserve, and fortify it and its capacities (Foucault, 1978). Children's bodies are understood as a biological resource, where the aim of government is to control the health and welfare of the population so that overall productivity can be increased. In particular, biopower (2007) and discourses of childhood exert a futurity in relation to children (Jenks, 1996), since it concerns their future well-being as economic citizens (Popkewitz & Bloch, 2001). Biopower carries a specifically biological aspect as it is concerned with increasing the body's utility, and therefore the health, well-being, and productivity of the population, through the acquisition and development of particular capacities. Biopower is exercised over young bodies so that their productivity and individuality are constituted in ways that are connected with issues of national policy, including economic processes.

However, neuro- and biomolecular knowledges go beyond the borders of the body and open new spaces for intervention that not only alter metabolic processes (e.g., enabling better concentration/attention) but also their programming. As Lemke proposes, biopolitics needs to be reconsidered to understand the current constellations of power. Lemke (2005, p. 6) citing Rheinberger (1996, S. 25) argues, "For the first time, it is on the level of instruction that

metabolic processes are becoming susceptible to manipulation. Until that point was reached, medical intervention, even in its most intrusive physical, chemical and pharmacological forms, was restricted to the level of metabolic performance." It is no longer about taking Ritalin and making the child less "agitated" but about alleviating the cause entering into and reprogramming the child's mind. By reshaping notions of the individual that are now represented in the form of manipulable biological processes, new governing mandates attach themselves to existing techniques for the regulation of bodies and minds, such as those of the "psy" sciences (psychology, psychiatry, etc.) (Rose, 1989). Like the changes psychology effected in our way of thinking throughout the twentieth century, neurosciences, biomedicine, and biosciences form a "new regime of truth about our nature as human beings" (Rose & Abi-Rached, 2013, p. 227) and potentially reconfigure and make intelligible otherwise individual and collective problems.

By the turn of the twenty-first century, neurosciences became a repository of hope, attaching to many "sites and practices that were colonized only earlier by psychology"—such as child development or learning theories—from early childhood education to child rearing and began to transform them in significant ways (Rose & Abi-Rached, 2013, p. 9). Neurosciences reconceptualized personhood with the idea of the neuromolecular (describing the brain's anatomy and physiology), plastic (brain's mutability across life span), and visible brain (made possible by animal research and visualization technologies) (2013). In biomedicine and biosciences "life itself" became manipulable (Franklin, 2000). Rose and Abi-Rached argue that developments in neurosciences, biochemistry, and biomedicine finally provided evidence that the *brain is the home of the mind* and contributed to the *materialization of the mind in the brain*. The neuromolecular vision of the brain materialized cognition, emotion, or volition as biophysical, chemical, and electrical processes that the brain performs. They rearticulated the knowable

capacities of the brain and created possible interventions, for example, through psychiatric pharmacology that has the capacity to alter DNA sequences or epigenetic makeup.

Due to its links with eugenics, the often-critiqued field of psychiatric genetics reached new understanding that overcame genetic inheritances by describing "changes in single bases in the DNA sequences" and how those might lead to "susceptibility to certain diseases or response to particular drugs" (Rose & Abi-Rached, 2013, p. 11). Neuroplasticity removed the notion of structural limitations due to fixed genes and introduced the *dimension of time* from fertilization through the following decades of life. Notions of synaptic connection formation and "rewiring" not only reinvigorated rehabilitation from brain damage but also produced new regimes of truth for the early periods of life. Moreover, as Rose and Abi-Rached (p. 12) further explain, "Epigenetic arguments sought to establish the ways in which *experience 'gets under the skin' at the level of the genome itself*." Intrauterine and early childhood experiences are considered fundamentally life shaping allowing environmental aspects, such as "optimal maternal care," to be passed down for generations. Neurogenesis proved this link by providing evidence about the production of nerve cells after the first year of life as an effect of environmental experiences. Visual imaginaries of the brain provided insights not only into its structure but also into the its functioning. These were then linked to mental processes and mental states from happiness to political allegiance (2013).

While these findings and their interpretations are highly contestable, overall they have provided a "belief that we can see the mind in the living brain" (Rose & Abi-Rached, 2013, p. 13). The visualization of the mind made the brain a logical target for the governance of individual conduct and the formation of new concepts of personhood. The explanatory power of neuroscience and biosciences provide a knowledge base, new notions of personhood, and

imagination of the future to mix with human capital. They make life and reasoning attached to the brain (and mind) itself an additional target for policy interventions that result in reconceptualization of policy agendas and practical prescriptions.

By the twenty-first century, as Rose and Abi-Rached (2013, p. 14) argue, (the industrial North) societies have

> moved from the risk management of almost everything to a general regime of futurity. The future now presents us neither with ignorance nor with fate, but with probabilities, possibilities, a spectrum of uncertainties and the potential for the unseen and the unexpected and the untoward.

Governments thus engaged with the "government of the future" and contemporary problematizations of the brain and life became central to notions of futurity and the canvassing of social and economic problems. Entwined with human capital theory, the alteration of biological processes has the potential to provide some intervention, prevention, or calculation to prepare for uncertain futures.

Governing the Brain through ECEC and Families

In current international early childhood discourses (White, 2011), "brain research" puts forward the view that optimal early brain development necessitates quality early education to stimulate synaptic growth. The external environment impacts on neurobiology and influences the health and well-being of young children. Therefore "optimal stimulation" is vital (Shonkoff & Phillips, 2000). The importance of early brain development is often linked to international economic competitiveness.

In these discourses, the plasticity of the human brain is understood as an "economic resource," where the biology and genetics of individuals represent "raw (biological) materials" and correct nurturing practices are linked to ensure the vitality of the nation in a volatile future. And those who have immediate influence on healthy pregnancy and optimal brain stimulation during the earliest days and months, including entire families but especially mothers, become protagonists (Edwards et al., 2013) to reach economic and governmental ends or to provide some predictability for the future. As so vividly described by Edwards and her colleagues, prenatal courses and parenting education are also reshaped by these knowledges to govern mothers' conduct:

> Pregnant women and new mothers are the explicit targets, reflecting the resurgence of old and highly contentious tenets of attachment theory . . . The quality of care is claimed to be reflected in the anatomical structure of the child's neural circuits with sensitive mothers producing "more richly networked brains." (p. 5)

Neuroscience discourses also decode sociality in biological terms, since it is argued that early social relations, including most importantly pre- and postnatal relationships, are coded in genetics (based on epigenetic research findings on rat mothers that engage in high or low amounts of licking/grooming and arched-back nursing of their pups); thus these codes are passed on to future generations (Fish, Shahrokh, Bagot, Caldji, Bredy, Szyf, & Meaney, 2004).[2] This coding enables the capacity for living in groups; therefore, parents should understand that earliest interactions have ramifications also for generations to come. Parents are asked to learn to understand their minds, including their empathy, emotionality, fairness, and commitment to others to pass "optimal" relations down to the next generations and consequently "to maximize the mental capital and moral order of society as a whole" (Rose & Abi-Rached, 2013, p. 22).

This form of parenting requires particular forms of self-awareness from parents. Since the process of hardwiring the brain is hypothesized to be finished by three years of age, there is a need for very early "optimal care" and intervention, which in turn infuses much policy and practice literature and focuses on families and most prominently early maternal care and relationships. In particular, narrow ideas about rigid "critical" or "sensitive windows" of development are overemphasized, where lack of a certain type of parental stimulation early on in a child's first years is posed as causing permanent stunting in many areas graphically represented by images of the "pruned" brain. In sum, ideas and visuals attached to the neuromolecular, plastic, and visible brain provide avenues to intervene on the brain and the mind and therefore produce new targets and techniques of governing the individual and population that are attached to existing forms of interventions, such as those offered by the "human sciences," including early education and most particularly optimal parenting.

Neuroscience cannot provide instant solutions for the classroom. Therefore applied research bridges the gap between laboratory and classroom settings to find ways to increase "mental capital" (Howard-Jones, n.d.; Howard-Jones & Fenton, 2012, p. 121). Neuroeducation at John Hopkins University or at the University of Bristol works on developing new techniques to intervene in the brain. Academic research in ECEC also plays an active role in translating neuroscientific findings into classroom applications in areas of intervention ranging from learning theory and development to social problems. A good example is the special issue of *Early Education and Development* 23(1) in 2012 themed " Perspectives in Early Development and Education" that "provides the opportunity to acquire enlightening new perspectives on familiar topics such as learning and cognition, socio-emotional development and self-regulation, reading and mathematics, the effects of poverty, early intervention, schoolreadiness, and

teaching practices" (Twardosz & Bell, 2012, p. 1). Conferences, popularizing presentations, and workshops organized on the various interlinkages, such as between media and technology and brain science, are translating these connections to parents and practitioners in a popular but nonetheless simplistic and deterministic format, for example, "Parents want their children to have a healthy lifestyle with healthy food, exercise and a wide range of valuable experiences, but often forget that healthy neural development must take into account screen time and the impacts on the wiring of developing brains."[3] Similar conferences that offer better utilization of the mind's capacities ("Change your brain for a better life" to "Maximize your motivation and performance" or "brain gym") building on neuroscientific evidence and combined with positive psychology or mindful awareness (Zelazo & Lyons, 2012) are many. Ever broader audiences are recruited to attend, from psychologists to educators, from doctors to lay people.[4] Similar content is taken up in training programs that aim to "raise public awareness about new findings in brain research and to educate everyone who has an impact on the early life of . . . children about the important implications of this knowledge"[5] or that directly develop programs for the educators of young children, such as the MindUp program funded by The Hawn Foundation[6] and popularized by the Benevolent Society in Australia[7] to train teachers in primary and preschool education. However, as Pykett (2012) warns, teachers become "mechanic[s] of the brain" and their pedagogical and content expertise turns out to be less valuable than the superior expertise of the brain scientist.

Regulation of Very Young "Neuro-Citizens"

Neurosciences re-created humans as "subjects of [novel] deliberations and decision that opened also new space of hope and fear . . . around genetic and somatic individuality" (Rose & Novas, 2002, p. 36). The idea of "somatic individuality" accounts for direct relations between body and

self. By providing descriptions and judgments, for example, about blood pressure, heart rhythm, or blood cholesterol, biomedical languages moved from scientific discourse into the lay expertise of citizens. They also convey a new responsibility to add such factors to the list of things individuals are responsible for controlling in order to become "productive citizens." Similarly, biogenetic and neuroscientific truths are also being translated into ideas of personhood that extend somatic individualization into forms of "neuro individualization." As Novas and Rose continue their explanation,

> Like earlier languages—that of intelligence, or that of "hormones"—these genetic languages render visible to others and to oneself aspects of human individuality that go beyond "experience," not only making sense of it in new ways, but actually reorganizing it in a new way and according to new values about who we are, what we must do, and what we can hope for. (2000, p. 488)

In this way, techniques developed earlier in "psy" sciences for the regulation and self-fashioning of the person (Rose, 1989) have spread to the somatic self and now are "gradually extending from the body to the embodied mind—the brain" (Rose & Abi-Rached, 2013, p. 22) or the embrained individual. The optimization of brain functioning or mental capital through psychology, psychiatry, and pharmaceutical products is a growing trend and is written about in relation to education (for the latest, see Harwood and Allen's [2014] or for earlier, see Graham [2007]). The screening of a brain's physiological "malfunctioning" and the administration and later self-administration of drugs provide ways to avoid delinquency in school and criminality later in life.

Biomedicine and biosciences also provided ways to redefine mental capital as written in genetic codes. This includes the genetic makeup of a person and also the experiences of previous

generations inherited through epigenetics. Mental capital is understood as the potential for either "optimal" brain development and functioning given optimal stimulation or "genetic susceptibility" to particular diseases attacking the brain. Genetic susceptibility creates new categories of individuals as "the asymptomatically ill" (Novas & Rose, 2000, p. 496) where the body is conceived as "molecular software that may be read or rewritten" (Lemke, 2005, p. 5). Genetic susceptibility potentially leads to stigmatization, minoritization, and the creation of a new "underclass" (Novas & Rose, 2000) where this recalibration of disadvantage removes any societal responsibility. As suggested by Corrie (2000) and Einboden and colleagues (2013, p. 563), "the production of children as subjects of social value, figured as human capital, investments in the future, or alternatively, as waste" based on their parents' and educators' capacity to exploit or "waste" their children's "critical periods," might reconstruct children from particular backgrounds as irredeemable to society (Corrie, 2000). This vision also offers politicians new ways to argue with neuroscience to avoid class connections or categorization of people (Edwards et al., 2013). Thus, neuroscience offers ways to overcome class differentials in the governing of the population by moving into the biological processes of the body that seemingly equalize all humans.

Interventions to safeguard the mental capital of the nation can then be targeted as intervention at the molecular or genetic level coupled with the development of a whole array of medical and educational assessment regimes, including the mobilization of children's self-actualization by making both them and their parents responsible for their genetic makeup and environmental circumstances. In this way, the governing of parents' and children's conduct targets their choices and prudence or lack of it, following a "somatic" or "neuro" ethics (Novas & Rose, 2000; Rose & Novas, 2002). Through neuroeducation, particular pedagogies and

curriculum have been and are being designed that educate about correct choices by linking them to possible scenarios, and make families, educators, and children responsible to make the right choices by creating solid foundations keeping in sight the probabilities, possibilities, and the unexpected in their lives.

For those who are not "asymptomatically ill," the same strategies offer ways to maximize their potential, as John Bruer notes. As soon as early years advocates promoted the first three years of life as critical for brain development, middle-class parents became consumers of brain-based products and activities that would help their children to achieve educationally (in Edwards et al., 2013). Moreover, somatic techniques, such as neurofeedback that provides "conscious" control learned by identifying signs of optimal brain functioning with the help of electronic gadgets, assume direct links for the governing of the mind through self-regulation. As a seventh grade student expresses on the MindUP website, "It is a way to focus your mind, calm down and reflect on a situation when you need to make a choice."[8] These links re-create human will and decision making into choices based on sensations and visual images coming from one's body.

Discussion

In summary, in this chapter I laid out the shifting logics according to which expert knowledges and human capital theory have worked in tandem to tie together particular behaviors acquired through education and the market. This pushes individuals to become "useful" members of their society and to facilitate the nation's economic goals. I examined how these discourses utilize particular constructions of the "human," the person to be educated and governed through policies, to prepare the analysis in the second part of this chapter in which I argued that neurosciences not only provide new expert knowledges to reconceptualize the person in terms of human capital theory but also effect a shift in the government of the individual where the

biological processes become the target of regulation instead of human capacities described in aptitudes.

Based on neuroscientific expert knowledges, in new narratives of human capital, parents (predominantly mothers) and children (persons and biological raw materials) themselves are the protagonists (with some help from educators) to have or build solid genetic or neural foundations and to make choices in the hope of effecting the probable, possible, or the unexpected in their lives. Foundations for mental capital are to be built through a neuro/somatic ethics by creating optimal environments that have the potential to affect subsequent generations as well as the current ones and by targeting molecular processes through mind training or drugs. Through a particular futurity and responsibility for the next generations to come, the goal of these self-governing techniques are to ensure a moral society for the future and the creation of mental capital to fund the very capacities required to act in an undescribable future to come. In an interactive manner between human capital theory and the neurosciences, human capital theory shifts from the acquisition of aptitudes to the acquisition of those behaviors that fund the genetics of current and future generations, safeguard against futures written in genetic susceptibility, and through regulation and self-government ensure the molecular and "mindful" access to the human mind. In return, neurosciences will be expected to provide more avenues and practical strategies by working together with applied sciences, such as health, education, and so on for the effective regulation of the population and individuals applied through policy.

To finish I tie together all the threads developed in the chapter by restating them after each other to be able to draw a conclusion. There is a new focus on self-monitoring and the training of our brains/minds where younger and younger children are required to develop self-awareness of brain functions—or the actual functioning of their mind. Parenting becomes crucial

in children's brain development due to the sensitive period tied to the period of intrauterine life and birth to three years of age. People who are socially or economically disadvantaged are rethought as individuals whose "condition" derived from "non-optimal" brain environments or their susceptibility that makes them "asymptomatically ill." These reconfigurations taken together in narratives of human capital and the purpose of education might ultimately lead to the devaluation of and further disinvestment from institutional ECEC. This might be coupled with the overvaluation of maternal care, maternal education and self-government, and a radical change in pedagogy and curricula for a healthy and well-funded brain—our brain capital.

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[1] For example, the new Ministerial Advisory Council for Child Care and Early Learning was established on July 26, 2014, to discuss strategic policies for ECEC by representing a range of perspectives (https://education.gov.au/news/ministerial-advisory-council-child-care-and-early-learning). Membership includes Ms. Naomi Wilson who is a biofeedback practitioner utilizing scientific findings of neuroscience (http://www.bcia.org/i4a/pages/index.cfm?pageid=3524_).

[2] Popularized, for example, in http://discovermagazine.com/2013/may/13-grandmas-experiences-leave-epigenetic-mark-on-your-genes

[3] http://childrenandmedia.org.au/events/accm-conference

[4] http://www.mindanditspotential.com.au/

[5] http://www.brainwave.org.nz/

[6] http://thehawnfoundation.org/mindup/

[7] http://benevolent.org.au/think/doing-things-differently/shaping-brains/mindup

[8] http://thehawnfoundation.org/mindup/