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Upbringing and Neuroscience. Embodied Theory as a Theoretical Bridge Between Cognitive Neuroscience and the Experience of Being a Parent

Chapter · June 2019

DOI: 10.1007/978-3-658-25517-6_13

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Abstract

Popularized neurodiscourse sharpens the scientization of parenting. It prescribes parents which parenting tasks ought to be done based upon results of neurocognitive research, turning the parental figure into a follower of expert driven neuroguidelines. Neuroparenting is illustrative hereof. Since neuroscientific knowledge has become integral to the ways in which people have come to think of and shape parenting, the question how the increasing presence of popularized neurodiscourse affects parents' experience in raising their children (Erziehung) seems pressing. Critical arguments have been brought forward from sociological and philosophical points of view. A critical pedagogical stance, however, seems missing. This chapter addresses this lacuna and proposes Embodied Theory to rethink the one-directional relation between cognitive neuroscience and the experience of being a parent, and its assumption of parents' "unknowing" cognition. In light of the theoretical framework on upbringing by Arendt and Van Manen, Embodied Theory seems promising. Its conceptualization of cognition holds the possibility to point at the historical, cultural and social embeddedness of parents' cognition, situating it in a broader know-how context. Secondly, it can bring in parents' embodied action in lived and meaningful experiences with children. As such, Embodied Theory serves as a reminder of the fact that parents always holistically enact the upbringing of their children, which somehow seems to be forgotten in today's popularized neurodiscourse.

Key words: cognitive neuroscience, neurodiscourse, parenting, upbringing, cognition, embodied action, representationalism, background knowledge, parental figure

Schlüsselwörter: Kognitive Neurowissenschaft, Neurodiskurs, Elternschaft, Erziehung, Kognition, Embodied action, Representationalismus, Hintergrundwissen, Elternfigur

Introduction

According to De Vos (2016), neurologization is what brings people to look at themselves and the world through the lens of neurodiscourse (p. 16), inciting them to shape their world on the basis of a brain perspective. This also applies for parents as they increasingly have to deal with arguments from cognitive neuroscience (Casper, 2015; Macvarish, 2016; Rose & Abi-Rached, 2013). Or as De Vos puts it: "neuroscientific knowledge has become integral to the ways in which we have come to think of, and give form to, education and parenting" (p. 30). Parents today are indeed faced with a vast array of informative and prescriptive advice about how to manage their parenting according to the latest scientific findings on children's development, the "best" ways to deal with this or that, etc. This scientization of parenting, already described by Ramaekers and Suissa in 2012, seems, thus, to be sharpened through the accompaniment of the neuro-prefix. In other words, advice to parents concerning child-rearing increasingly contains guidelines based upon results of cognitive neuroscience. One of the questions triggered by the increasing presence of this popularized neurodiscourse is how it affects parents in their experience of being a parent.¹ Critical arguments have already been brought forward from sociological (Macvarish, 2016) and philosophical (De Vos, 2016) perspectives. A critical pedagogical perspective, however, seems missing. This chapter addresses this lacuna by pointing at two observations, made while analyzing literature and popularized

¹ This chapter entails a theoretical reflection about the experience of being a parent (not an empirical one).

neurodiscourse,² and proposing an alternative to approach them. The first observation concerns the appearance of a one-directionality in the relation between neurocognitive research on the one hand and the practice of raising children on the other. Although the expressed goal of this one-directional relation is the child's optimal (neuro)cognitive development, an often unspoken assumption *in* this one-directionality is parents' "lacking" or "unknowing" cognition. This is the second observation. It seems that parents' cognition, like from experience, does not matter (enough) to be taken seriously, for it must be "upgraded" through a never ending professionalization cycle. In that cycle, parents must keep themselves neuroknowledgeable and -skillful in order to achieve the expressed goal of optimal (neuro)development in their child.³ A consequence of the observations is that some characteristics of the figure of the parent are altered. For it appears as an unknowing layperson in relation to neurocognitive research and its interpreters.⁴ Differently put, the figure of the parent appears as a dependent follower of whatever brain "evidence" that is picked up by popularized neurodiscourse, evolving, as such, into a "*parenter*" (Daly, 2013, pp. 227-228) and problem solver: a figure performing learned parenting tasks, directed to act in a specific way towards the specific goal of optimal brain development.

From a pedagogical perspective, this seems problematic, for upbringing (Erziehung) as in Arendt's description (1954/2006) and pedagogical being with children (Van Manen, 1982) are being confined to the (effective) performance of parenting tasks in a neuroscientized practice of parenting. For Arendt, raising children is an intergenerational process in which parents act from a relation of care for the child as it develops as a living being, and care for the world (Arendt, 1954/2006, p. 182). In caring for the world, the parent assumes responsibility for the continuance of the world through paying attention to two elements: protecting the child from the world so that her own newness can come into existence, and protecting the existing world from the newness of the child, so that for instance traditions can be passed on to the next generation. The experience of being a parent in Arendt's view can, as such, be described as an experience in balancing between taking responsibility for the child on the one hand, and for the world on the other. In accordance with Van Manen (1982), being a parent is about little by little initiating the child into a world full of meaning. A question then can be "what it is, in relation to taking care of the child and the world, that makes a pedagogical difference in the activities with children?" It is not about just being together with children, or forms of togetherness in a relationship of practical actions between an adult and a child (Van Manen, 1982, p. 284; Langeveld, 1945/1983), both prevalent modalities of popularized neurodiscourse. It is rather about pedagogical being with children in the triad parent – child – world. An effectively managed neuroscientized practice of parenting, directed through popularized neurodiscourse based on neurocognitive research, seems to push aside the abovementioned question for it exclusively focuses on the child's optimal brain development.⁵ In sum, the relation from cognitive brain research and its results to the experience of being a parent, is not only one-directional, but also unbalanced.

² analyses of websites and books

³ Examples hereof can be found in Macvarish' (2016) book *Neuroparenting*. Another example can be found in Jolles' (2016) book *Het tienerbrein*. Jolles writes that "neurocommunication" is needed to disseminate and implement new insights into educational practices (p. 30). Parents (and teachers) ought to know more about the neurodevelopment of teenagers, to be able to attune to the dynamic of that development (p. 278). This is important, since child-rearing, for Jolles, concerns bringing children to "a fully grown brain" (p. 28, my translation). Focus ought to lie on the teenager's optimal "brainifying towards adulthood" (p. 28, my translation).

⁴ With "its interpreters" is meant all people that base their advice concerning parenting on neurocognitive results, whether that be neurocognitive researchers, psychologists, therapists, policy-makers, physicians, care workers, teachers, etc.

⁵ Illustrations hereof can be found via <http://users.telenet.be/psychcom-research/> where a Dutch "encyclopedia" about child-rearing, entitled *Parenting.be: (P)referential parenting and guidance from a to z* (my translation), can be read. Parents ought to ensure secure attachment and focus on avoiding stress and disturbances in the relationship with their child, not to influence the child's developing brain in a negative way or to cause brain trauma (see pp. 103-104, pp. 107-109). Quite precise terms tell parents how to act to achieve the child's optimal development: comfort the child, be patient, sensitive and supportive (p. 110), make use of "qualitative eye contact, voice and language, facial expressions" (p. 112, my translation) and so forth.

This chapter proposes Embodied Theory (E.T.) as presented by Varela, Thompson, and Rosch (1991),⁶ to address and rethink the pedagogically problematic and steering relation between neurocognitive research and the experience of being a parent. The proposal is a theoretical attempt to, firstly, consider the relation between neurocognitive research and the experience of being a parent in a more open, two-directional way. Secondly, it attempts to situate parents' cognition in a broader "know-how" context, which allows to sketch a phenomenologically richer dynamic of upbringing (Erziehung) again. It will be argued that from E.T., a broader understanding of the concept of cognition, in this case parents' cognition, is possible, and that, from that broader understanding, the relation between cognitive neuroscience and the experience of being a parent can become two-directional. As such, the chapter tries to contextually broaden popularized neurodiscourse, so that the figure of the parent can reappear as a *parent*, leading and initiating children into a meaningful society (Arendt, 1954/2006; Van Manen, 1982), and making judgements concerning children's upbringing based upon personal history and lived experience.⁷ In what follows, E.T. and its relation to dominant cognitive research will first be described. How E.T. broadens the understanding of the concept of cognition will be next. Theoretical aspects as well as a methodological way to study cognition from a broadened lens will also be delineated. After that, the connection between a broadened conceptualization of cognition and parents' cognition will be clarified, to, lastly, bring forward some conclusions.

Embodied Theory: a critique of representational assumptions in cognitive neuroscience

E.T. as proposed by Varela, Thompson, and Rosch in their book *The embodied mind* (1991), is recognized as anchor theory for embodied cognitive science (Embodied cognition, 2015, para. 10).⁸ E.T. challenges and exposes the representational convictions of philosophy of mind and dominant cognitivism. E.T. formulates, as such, a critique, not of neuroscience as a whole (Meloni, 2011, p. 307), but of its underlying presuppositions and accompanying computational and representational theories of mind. These views traditionally regard the body as "peripheral to understanding the nature of mind and cognition" (Embodied cognition, 2015, para. 2). Embodied cognitive science however, adheres the idea that cognition depends on aspects of the body, other than the brain (Embodied cognition, 2015, para. 8). E.T. is inspired by phenomenological perspectives (Meloni, 2011) of Merleau-Ponty, Husserl, and Sartre, and attempts to infuse the neuroscientific study of cognition with them (Embodied cognition, 2015, para. 16). In addition, E.T. holds an epistemological argument with regard to dominant cognitivism, showing a more nuanced understanding of the concept of cognition. It proposes to neuroscientifically study cognition from an embodied, embedded and enacted perspective, and, equally, from people's experience. Its critique of dominant cognitivism is as such related to the clouding of human's experience, the search for conscious experience within the brain through a "neural microfocus", and the doctrine of representationalism (Meloni, 2011, p. 308-309). The following will briefly describe these issues.

The dominant conviction in cognitive (neuro)science is that a boundary can be drawn between the self and the rest of the world at the edge of the skull (Noë, 2009, in Meloni, 2011, p. 308). The brain is seen as if it were separated from the world. E.T. has shed its light on the problem of this neural microfocus (Noë, 2009, in Meloni, 2011, p. 308) as it pointed out that this focus keeps the experience of human beings blurred. Yet, it is experience which is central to any understanding of the mind (Thompson, 2007, p. 20). In line with Varela, Thompson, and Rosch (1991), authors as Noë (2009, in Meloni, 2011, p. 308) and Chiel and Beer (1997, in Meloni, 2011, p. 308)

⁶ When this chapter refers to E.T., it is always related to Varela, Thompson and Rosch (1991).

⁷ Though the child's optimal brain development will be mentioned in the chapter (since it is what popularized neurodiscourse expresses and aims toward), the focus does not lie there. Nor is the proposal about a so-called "better" study of the brain and cognition; every mentioned research field is left in its own value.

⁸ The Stanford Encyclopedia of Philosophy mentions three historical anchors for embodied cognitive science: (1) the work of Lakoff and Johnson in *Metaphors we live by* (1980), (2) Varela, Thompson, and Rosch's *The embodied mind* (1991), and (3) work on robotics and computationally intelligent action, analyzed by Andy Clark in *Being there: putting mind, world and body back together* (1997) (retrieved July, 24, 2017, via www.plato.stanford.edu/entries/embodied-cognition). Though embodied cognitive science, and, for instance, Varela and colleagues' (1991) perspective on enactive cognition, has been elaborated in several ways, stressing different features of the theory, this chapter only focuses on the theory as presented by Varela et al. (1991).

stress that the function of the brain can only be understood in the context of embodied existence, situatedness in an environment, and interaction with objects and situations (Meloni, 2011, p. 308). Put more technically: cognitive structures and processes emerge from recurrent sensorimotor patterns of perception and action. Sensorimotor coupling between the organism and environment modulates – but does not determine – the formation of dynamic patterns of neural activity. That, in turn, informs sensorimotor coupling again (Thompson, 2007, p. 20). In short, in E.T., the human mind emerges from embodied and embedded experiences. Or in other words, the mind has a strong relation to the body and its actions in its environment, in which it is situated and interactive with objects and other people in all kinds of situations. As Thompson (2007) writes: “you are a living bodily subject of experience and an intersubjective mental being” (p. 21). E.T. is also critical of representationalism. It does not adhere the dominant conviction of cognitivism and cognitive neuroscience that cognition is the representation of a pregiven world by a pregiven mind. It is rather the enactment of a world and a mind (Meloni, 2011, p. 308). Living beings are autonomous agents enacting or bringing forth their own cognitive domains (Thompson, 2007). Their nervous system is also an autonomous dynamic system. But – in contrast to what (neuro)cognitivism states – it does not process information in a computationalist sense, it creates meaning (Thompson, 2007, p. 19-20). A cognitive being's world is, as such, not a “pre-specified, external realm, represented internally by its brain, but a relational domain enacted or brought forth by that being's autonomous agency and mode of coupling with the environment” (Thompson, 2007, p. 20).

An enlarged understanding of the concept of cognition through Embodied Theory

According to Varela, Thompson, and Rosch (1991), Anglo-American analytical philosophers regard “meaning” as a fixed relation between words and the world via an objective, representational model (p. 149), as in dominant cognitivism. Continental philosophers, however, (even when contesting assumptions underlying hermeneutics) keep on discussing how “knowledge depends on being in a world that is inseparable from our bodies, our language, and our social history” (p. 149). It is in this subjective, context-dependent experience model that the embodiment paradigm is situated. Knowledge, in this paradigm, is the result of an ongoing interpretation that emerges from the capacity of understanding, which is rooted in a biological embodied structure, yet at the same time lived and experienced within a domain of consensual action and cultural history (p. 150). Consequently, it is the lived, experienced and embodied capacity of understanding that enables people to make sense of the world. In this view, meaning includes patterns of embodied experience and preconceptual structures of one's sensibility (how one perceives, orients himself, and interacts with other objects, events or persons) (Johnson, 1987, in Varela et al., 1991, p. 150). These patterns, however, do not remain private or peculiar to the person who experiences them. It is rather the community that helps interpreting what is experienced, by which the patterns become “shared cultural modes of experience” that help thinking about “a meaningful, coherent understanding of our world” (Johnson, 1987, in Varela et al., 1991, p. 150). Next to conceptions of interpretation and knowledge, E.T. also relies on Merleau-Ponty's (early) work on perception. According to this work, perception is not only embedded within and constrained by the surrounding world (like when a person's movement or behaviour is influenced by the external world), it also contributes to the enactment of the surrounding world (like when a certain stimulus is perceived because the person's movement or behaviour is guided towards the stimulus) (Varela et al., 1991, p. 174). Taken together, in E.T., the concept of cognition is described as embodied action, in which both world and perceiver specify each other (p. 172). “Embodied”, because cognition depends on the kinds of experience that come from having a body with various sensorimotor capacities, which are themselves embedded in a more encompassing biological, mental and cultural context. “Action”, because this word emphasizes that sensory and motor processes (perception and action) are fundamentally inseparable in lived cognition and evolve together (p. 172). In other words, human cognitive structures emerge from a continual “enacting the world” and through processes of recurrent sensorimotor patterns in which, in an intertwined way, action and perception guide each other.

Importantly, according to Varela, Thompson, and Rosch (1991), what helps cognition to deal with unexpected situations in daily life is common sense or background knowledge, which is difficult, and perhaps impossible to package into explicit, propositional knowledge, or “knowledge that”. “Knowledge how”, referring to background know-how,⁹ seems to be based on the accumulation of experience in a vast number of cases. It also seems to be necessary for even the simplest cognitive action (p. 148). Still, it is exactly the unmanageable ambiguity of background knowledge that is taken for granted and largely left behind in cognitive study of the brain (p. 148). If our lived world does not have predefined boundaries, then it is unrealistic, thus Varela et al., to expect to capture background knowledge or commonsense understanding in the form of a representation understood as a representation of a pregiven world. If researchers wish to recover background knowledge, then it is necessary to invert the representational attitude, by treating context-dependent background knowledge as the very essence of creative cognition, not as a residual artifact (p. 148). This attitude bypasses, in other words, both the idealistic representational perspective on cognition (the idea that the cognitive system projects its own world, of which its apparent reality is a reflection of the internal laws of the cognitive system; “representation” denotes the projection of a pregiven inner world here), as the realistic representational perspective (the idea that the world out there has pregiven properties that exist prior to the image that is casted on the cognitive system; “representation” here is used to recover what is pregiven in the outer world) (p. 172). In sum, the concept of cognition is regarded from an embodied, embedded, and enacted perspective in which background know-how has been assigned an important role.

Neurophenomenology as a methodological approach to study cognition from its broader understanding

As described, E.T. has phenomenological underpinnings. E.T.’s methodological approach, neurophenomenology, also has phenomenological underpinnings to “give human life a full account” (Varela, 1996, p. 345). According to Thompson, Lutz and Cosmelli (2005), neurophenomenology belongs to the “new current of phenomenological philosophy”,¹⁰ that emerged in Europe and North America. It goes back to Husserl’s phenomenological philosophy, yet is influenced by cognitive science and analytic philosophy of mind, fields to which it also aims to contribute (p. 41). Introduced by Varela (1996), neurophenomenology takes a special (though also critiqued) place in the relation between phenomenological conceptualizations of embodiment and cognitive neuroscience.¹¹ For Varela, neurophenomenology is about a neuroscientific research program that intends to combine modern cognitive science and a phenomenological approach to human experience (p. 330). This particular neurophenomenological position can, according to Varela, not be ascribed to some kind of sub-lineage or phenomenological school. It rather represents Varela’s “own synthesis of phenomenology in the light of modern cognitive science and other traditions focusing on human experience” (p. 335). Neurophenomenology’s working hypothesis is that phenomenological accounts of the structure of experience and their counterparts in cognitive science relate to each other through reciprocal constraints. Key point is that “both domains of phenomena have equal status in demanding a full attention and respect for their specificity” and that through that, bridges, challenges, insights and contradictions between them can be explored (p. 343). The novelty of Varela’s neurophenomenological approach to the neuroscientific study of the mind, is that “first-person accounts should be an integral element of the validation of a neurobiological proposal, and not merely coincidental, or heuristic information” (p. 344). So, neurophenomenological methodology does not want to push phenomenal experience into abstraction (p. 345), but attempts to draw in the “primacy of human experience and its direct, lived quality”, referring to Husserl (p. 335). Put more concretely, in a neuroscientific

⁹ In Varela (1999), more can be read about his view on this distinction and how he understands background know-how.

¹⁰ “Neurophenomenology” stands in contrast with “neurophilosophy”, which is rooted in analytic philosophy (Churchland, 1986, 2002, in Thompson, Lutz, & Cosmelli, 2005, p. 42).

¹¹ The relation between phenomenological conceptualizations of embodiment and cognitive neuroscience has been described from various viewpoints by several scholars already (see for example Gallagher & Zahavi, 2008a/b; Francesconi & Tarozzi, 2012; Lutz, & Thompson, 2003; McInerney, 2013; Rupert, 2015; Thompson, 2007/2011/2015; Varela, 1996).

study of cognition with a neurophenomenological methodology, the participant will give an account of his or her experience while his or her brain is studied within the study's framework. This account is considered of equal value next to the neural data, in order to help interpret them and to come to a richer, more nuanced understanding of (the participant's) cognition.

Cognition as embodied action connected to parents' cognition

Considering parents' cognition through Varela, Thompson, and Rosch's (1991) lens, would imply that their cognition would not be regarded any more as operating in a representational context that is pregiven and known. As when, idealistically seen, the parent would "know" all the defined elements in the context of child-rearing and would project this pregiven inner world onto the context of family life; or when, realistically seen, all defined elements in the context of child-rearing would be "known" elements out there and recovered by the parent's mind – which is precisely how popularized neurodiscourse seems to be operating. Taking the viewpoint of embodied cognition, by contrast, would entail another view on parents' cognition, with four main implications. The first two implications show a different conceptualization of parents' cognition from the epistemological point of view of E.T., suggesting an altered mode for the study of parents' cognition.¹² The third implication shows what the different epistemological view on parents' cognition might imply for parents in their experience of being a parent and the upbringing of their children (Erziehung). How the enlarged view on parents' cognition reshapes the characteristics of the parental figure will be described lastly.

Firstly. Considering parents' cognition from the concept of embodied cognition would mean to regard parents' cognition within their world of family life and child-rearing. Parents' cognition in this view will depend on the kinds of experience parents have, coming from having their body with its sensorimotor capacities, and being embedded in their own, more enveloping context of mental events, family life, and culture. Secondly. Studying parents' cognition would imply to take into full account parents' context-dependent background knowledge, since this is considered to be the essence upon which their cognition is created. Differently put, while parents' "unknowing" cognition (as assumed in popularized neurodiscourse) seems to be related to "not being knowledgeable about certain representational knowledge of parenting", in the embodied, embedded and enacted understanding of cognition, parents' cognition seems to be "knowing already" – referring to the context-dependent background knowledge that every parent has, and from which she is acting every day in meaningful experience with children. A neurophenomenological approach of parents' cognition would imply, then, to fully integrate parents' first-person and experiential accounts into the neurological study of their cognition,¹³ and treat their first-person accounts as a validation of the study's neurobiological proposal. Thirdly. From the idea that parents' cognition is to some extent always already knowing and the idea of parents' embodied cognition operating through *a possible* viable pathway (in contrast to a specific pregiven pathway (Varela, Thompson, & Rosch, 1991, p. 205)), E.T. leaves room for parents' own agency and pedagogical potential in issues of upbringing. Not only can parents direct their (or their children's) action and attention to what they think is meaningful in the upbringing of their children, taking the idea of a viable pathway seriously implies that there is no one specific object of attention to which action needs to be directed to. This entails that parents, according to their intentionality, can construe their world of family life, upbringing, and the relation with their child(ren) in ways that are far more open and diverse than promoted by popularized neurodiscourse. In other words, through the conceptualization of embodied cognition, parents can *themselves* give form again to the upbringing of their children. This, again, reshapes the picture of the parental figure, that does not have to appear anymore as a dependent and unknowing layperson in relation to the newest

¹² Which could also be applied to the study of the child's cognition.

¹³ There is a growing body of neuroscientific research studying parents' brains in relation to parenting. See for example: Feldman (2015), Kim (2016).

results of dominant neurocognitive research. The figure of the parent does not have to go along anymore with imposed (scientized) representational parenting paths. In contrast, fourthly, it can reappear as an initiating, leading figure (Arendt, 1954/2006), while enacting its own world with regard to bringing up children (Erziehung) (Van Manen, 1982). From the concept of embodied cognition, parents' enactment in upbringing involves bringing forth meaning about (issues of) upbringing from a biological, social and cultural background of understanding. In other words, through their lived experience and ongoing interpretation, parents make sense of their world of upbringing together, in accordance to their embodied activity, and within their socio-cultural historical context. Parents' cognition thus shifts from "being the capacity to solve a problem" (Varela, Thompson, & Rosch, 1991, p. 207) to having the capacity to holistically enact and, simultaneously, "enter a shared world of significance" (Varela, Thompson, & Rosch, 1991, p. 207) within the family.

Conclusions

Nowadays, matters of child-rearing are also being investigated through a neural lens. As Pickersgill (2013) writes, in recent years "neuroscientists have come to be concerned not solely with the neurological but with sociality" (p. 324). In itself, this does not necessarily have to be problematic, if greater account were taken of a number of issues. A few examples thereof: research settings and construction of results could be explicated more clearly (like in van Aalderen, van Atteveldt, & Grol, 2015). Researchers and neuroscience's interpreters could be clearer about the temporality of the results – not claiming them to possess ontological truth, as for instance happens in neuroparenting discourse (see Macvarish, 2016). What also could be clarified is the results' dependency on highly specialized technology, which is itself in constant evolution (Fias, 2017, p. 79), and on marketing strategies (think of the ways in which funding is assigned to certain academic projects, for instance through the declaration of the years 1990 to be the "Decade of the Brain", or the 21st century to be the "Century of the Brain" and the current millennium the "Millennium of the Mind" (Aldrich, 2013)). Neurocognitive's own (research) history could be illustrated more (it does not come from nowhere, as showed by Leidlmair (2009), and Baker (2015)). That and how the neurosciences are popularized for advocacy reasons, and (mis)used to make political claims (for critical accounts thereof, see Vandebroek, 2017; Macvarish, 2016) could equally be highlighted more. If so, parents would perhaps be able to perceive neurocognitive results as only one of many possible ways to look at their child and the world. If so, parents would perhaps be able to associate popularized neurodiscourse with current neurophilia, or differently, people's fascination for neurology (Fuller, 2012; Smeyers, 2016). If so, it would perhaps entail parents to get a grip on substantial arguments to remain critical whenever neurovocabulary is used, such as on websites, in books, or in particular situations in their own life. Yet, such contextualization of neurocognitive research and discourse remains largely hidden for parents, as are the implicit assumptions about (parents') cognition, contributing to the one-directional relation from dominant neurocognitive research to the experience of being a parent.

This chapter proposed E.T. to rethink the steering one-directional relation between cognitive brain research on the one side, and the experience of being a parent, on the other. The proposal was a *theoretical* attempt to, firstly, consider the relation between neurocognitive research and the experience of being a parent in a more open and two-directional way. Secondly, it was an attempt to situate parents' cognition in a broader know-how context, through which it seemed possible to sketch a phenomenologically richer dynamic of upbringing (Erziehung). The embodied, embedded and enacted cognition paradigm appeared to encompass parents' socio-cultural and historical situatedness from which parents can enact their world of family life, in contrast with the dynamic in a neuroscientized practice of parenting (i.e. the performance of specific parenting tasks in light of the child's optimal brain development). It seemed that a broader, contextualized understanding of parents' cognition is possible, and, that from this understanding, the relation between the experience of being a parent (Erziehung) and cognitive neuroscientific research can be perceived more openly. It was shown that the assumption that parents' cognition

would be “unknowing” is related to a representational logic (present in dominant neurocognitive research and popularized neurodiscourse), and that, from the embodiment paradigm this assumption no longer holds. In addition, it also appeared that the relation between the experience of being a parent (Erziehung) and cognitive neuroscience can be approached in a two-directional way, instead of a one-directional steering way. For neurocognitive research, studying parents’ cognition, can itself, in accordance with the embodied cognition paradigm and a neurophenomenological methodology, be informed, valued, and perhaps, in its conceptualizations of cognition even be shaped by parents’ experience and first-person accounts in matters of child-rearing. As such and finally, the chapter tried to contextually broaden current popularized neurodiscourse, in which the figure of the parent is asked to neglect its background know-how¹⁴ and appears as a parenter (Daly, 2013). Instead, the parental figure could reappear as a parent, who *can*, also from its background know-how, lead and initiate children into a meaningful society (Arendt, 1954/2006; Van Manen, 1982).

Of course, some remarks can be brought forward. It seems, to begin with, very plausible that both representational knowledge as background know-how will be brought in by parents while being engaged in upbringing. This chapter acknowledges that, but focused on background knowledge in an attempt to open up the steering relation between dominant neurocognitive research and the experience of being a parent, and, to show that parents’ cognition can be considered broader than its representational level alone (the extent to which one is neuroknowledgeable for instance). Secondly, there is of course a difference between neurocognitive research and popularized neurodiscourse imparted by its results. This chapter didn’t focus on these differences, since its target was the relation from neurocognitive research to the practice of being a parent, situating popularized neurodiscourse within that relation. Thirdly, the chapter does not want to disavow the value and informative usefulness of dominant neurocognitive results. Only, it strived for nuance with regard to the illusion that these results would hold ontological truth or would be *the explanation* concerning matters of child-rearing and parent-child relationships. Representational logic in the context of brain research and child-rearing is not neutral, certainly not when it starts prescribing *all* parents how to think and act. So, a call goes out to all players in the popularized neurodiscourse field involved in matters of child-rearing (such as policymakers, parenting practitioners, and scholars) to be very attentive to how results of cognitive neuroscience are communicated, meticulously check sources, write and speak conscientiously, and perhaps, hold a more open attitude towards non-representational logic. Also, if we do not want to choose the path of a fully neuromechanized way of child-rearing, it might be worthwhile to explore different options in conducting research, as this chapter has attempted.¹⁵

¹⁴ As is stated in neuroparenting discourse (see Macvarish, 2016).

¹⁵ To my knowledge so far, neurophenomenological study of cognition has not yet been related to parents’ cognition in matters of child-rearing.

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