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Child maltreatment under the skin: Basal activity and stress reactivity of the autonomic nervous system and attachment representations in maltreating parents

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CHAPTER 1

GENERAL INTRODUCTION

General Introduction

Child maltreatment is a universally prevalent phenomenon (Stoltenborgh, Bakermans-Kranenburg, Alink, & Van IJzendoorn, 2015). In the Netherlands, 34 out of every 1,000 children were estimated to experience maltreatment in 2010, a prevalence rate similar to that of five years earlier (Euser et al., 2013). Child maltreatment includes physical and emotional abuse and neglect, as well as the infliction of sexual abuse, with (potentially) harmful consequences to the child (World Health Organization, 1999). In the past century, research on its etiology and sequelae was fostered by increased attention to the *battered child syndrome* (Kempe, Silverman, Steele, Droegemueller, & Silver, 1962) and studies have continued to focus mainly on abuse, particularly physical and sexual abuse. However, Kempe et al. (1962) already mentioned the common co-occurrence of physical neglect and abuse, an observation further emphasized by Fontana, Donovan, and Wong (1963). Nowadays, neglect is nevertheless still understudied, which is at odds with its relatively high prevalence. In the Netherlands, child neglect was found to be the most prevalent form of child maltreatment (Euser et al., 2013).

Child abuse and neglect increase the risk for detrimental developmental outcomes, short- and long-term, on a range of levels of functioning, including depression, maltreatment of one's own children, and cortisol dysregulation (Spinhoven et al., 2010; Pears & Capaldi, 2001; Alink, Cicchetti, Kim, & Rogosch, 2012, respectively). In sum, the occurrence of child maltreatment is not receding, it is liable to be transmitted from generation to generation, and it has severe consequences for child development. Research on its risk factors is therefore dire in order to inform intervention programs on foci of interest. The current thesis comprises an empirical study (Chapters 2, 3, and 4) and a meta-analysis (Chapter 5) aimed at assessing risk factors related to child maltreatment.

Risk factors for child maltreatment

Etiological studies have evaluated child factors, parent factors, family factors, and more distal environmental factors as potential sources of risk for child maltreatment. These wide-ranging factors were integrated into an ecological model that largely follows Bronfenbrenner's (1977) levels of ecology of human development (Belsky, 1980). In the model, *ontogenic development* refers to factors within parents that may lead to child maltreatment, such as the finding that having experienced maltreatment in childhood increases the risk for maltreating one's own offspring (e.g.,

Pears & Capaldi, 2001). The *microsystem* is the family setting and comprises risk factors like low marital satisfaction and low family cohesion (Stith et al., 2009). The *exosystem* refers to broader social structures that affect the child's direct environment. Low socioeconomic status of the family is an example of a risk factor that may be considered part of the child's exosystem. Abstract and more distal is the *macrosystem*, i.e., the beliefs and values of a (sub)culture, which shape the other ecological systems. Based on this perspective, an extensive ecological/transactional model was proposed in which the interaction of risk as well as protective factors within and across ecological levels dynamically determines whether child maltreatment actually occurs (Cicchetti & Lynch, 1993; Cicchetti & Valentino, 2006). This emphasizes that the occurrence of child maltreatment is not determined by single risk factors, but rather by intricate etiological pathways.

Currently, research is trying to assess the risk factors that play a role in this interactive model, and how much variance in child maltreatment perpetration they explain. In doing so, studies have mainly focused on parental risk factors (Stith et al., 2009, but see Jaffee et al., 2004). This seems prudent, given that parents, as perpetrators, are the main targets for interventions aiming to stop child maltreatment from occurring. This dissertation focuses on two parental risk factors: one on the psychophysiological level, namely autonomic stress reactivity (Chapters 2, 3, and 5), and one on the cognitive-affective level, namely parental attachment representation (Chapter 4).

Autonomic reactivity to infant crying

Parents from the general population have been found to respond to infant cries with increases in autonomic nervous system (ANS) activity (Del Vecchio, Walter, & O'Leary, 2009; Frodi, Lamb, Leavitt, & Donovan, 1978; Joosen et al., 2013a). This is functional, given that ANS activation enables caregiving behavior by mobilizing the body. For example, with increased heart rate, the blood is pumped through the circulatory system at a higher speed, providing organ tissues with more oxygen and nutrients such as glucose (Opie, 2004), necessary for energy consumption. Infants in distress are aroused and cry, thereby arousing the parent, which facilitates a behavioral caregiving response. Parental ANS reactivity has been attributed to physiological synchrony in parent-infant dyads and proposed to reflect feelings of empathy (Ebisch et al., 2012), while other studies suggest that it may be accompanied by feelings of aversion toward the cry (Del Vecchio et al., 2009; Frodi et al., 1978). One (rather forward) hypothesis could be that autonomic

hyperreactivity or *hyporeactivity* to infant crying may indicate excessive aversion and/or impaired empathic concern and lead to abusive and neglectful caregiving, respectively.

In the late 1970s research first tested whether maltreating parents showed greater ANS responses than control parents to infant stimuli such as crying (Disbrow, Doerr, & Caulfield, 1977; Frodi & Lamb, 1980). This hypothesis was in line with the irritable, aggressive model of child physical abuse (Frodi & Lamb, 1980) and most studies therefore focused on abusive parents or participants at-risk for abuse (e.g., Crowe & Zeskind, 1992; Wolfe, Fairbank, Kelly, & Bradlyn, 1983). A review concluded that while findings among and within studies also showed inconsistencies, they mainly suggested that autonomic hyperreactivity is a risk factor for child (physical) abuse (McCanne & Hagstrom, 1996). Although a few samples included neglectful parents (Disbrow et al., 1977; Friedrich, Tyler, & Clark, 1985), subgroups may have been too small to detect differential autonomic functioning underlying child abuse and child neglect. Conceptually, autonomic hyporeactivity is compatible with the omission of caregiving behavior which characterizes neglect, just as hyperreactivity is compatible with the aggression which marks child physical abuse. A complication in the attempt to discern differential autonomic reactivity patterns for child abuse vs neglect is that types of maltreatment often co-occur (Euser et al., 2013). Still, a distinction between (combinations of) subtypes is important, since different intervention approaches may be optimally suited for parents biologically at risk for child abuse and those at risk for neglect.

State of mind toward attachment

Another subliminal factor that may pose a risk for child maltreatment is state of mind with respect to attachment. It is usually measured with the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) as a measure of the mental representation adults have regarding the relationship with their own parents. The AAI focuses in particular on salient moments in interviewees' early childhood, such as when they were ill, injured, or upset, to get a sense of their parents' typical attachment behavior on those occasions. These episodic memories are compared with how interviewees describe the relationship with their parents on an abstract, semantic level (e.g., "good", "loving"). The pattern of (in)consistencies between the semantic and episodic descriptions in combination with discourse characteristics (e.g., length and orderliness of answers) are considered indicative of the speaker's coherence of mind (Main, Goldwyn, & Hesse, 2003). Overall, three

organized states of mind can be discerned: autonomous, dismissing, and preoccupied. Autonomous speakers are coherent, with a high consistency between semantic and episodes descriptions, and an active collaboration with the interview process; dismissing speakers are not coherent, blocking the recall of episodic memories while not admitting to negative experiences on a semantic level; and a preoccupied state of mind is mainly inferred from speakers' overly lengthy and disorderly answers, often expressing anger at their caregiver(s). Finally, the AAI includes questions on experiences of child physical, sexual, or extreme cases of emotional abuse and experiences of loss (through death). When such experiences are present, the narrative is also coded for "lapses of reasoning or discourse", indicative of an unresolved/disoriented (U/d) state of mind (Main et al., 2003). Such lapses may manifest in many ways, e.g., an experience of abuse may be described in detail and later be denied, or discussions of someone's death may excessively invade other parts of the interview.

Individuals' attachment representations have been shown to predict their own parenting quality (Bernier, Matte-Gagné, Bélanger, & Whipple, 2014; Van IJzendoorn, 1995), with the U/d state of mind being a risk factor for anomalous parental behavior (Madigan et al., 2006). However, no studies to date have compared a representative sample of abusive and neglectful parents to a control group on the prevalence of U/d. This potential risk factor is of interest because it incorporates not only the traumas parents have experienced, but also their state of mind toward those traumas. Although experiencing childhood maltreatment increases the odds of becoming a maltreating parent, it is estimated that about two-thirds of maltreated individuals do *not* go on to maltreat their own offspring (Egeland, Jacobvitz, & Sroufe, 1988; Pears & Capaldi, 2001). Focusing on parents' state of mind toward trauma such as childhood abuse may result in a smaller (albeit fortunate) transmission gap. Indeed, disintegrated narrations of childhood experiences have been found to significantly account for the intergenerational perpetuation of child abuse (Egeland & Susman-Stillman, 1996).

Empirical study

The current thesis is comprised of an empirical study (Chapters 2, 3, and 4) and a meta-analysis (Chapter 5). For the empirical study, we recruited a sample of maltreating mothers through a mental health clinic, where they received therapy that focused on their parenting problems. The clinic consists of several subdivisions with treatment programs for a wide range of psychiatric disorders in different age groups, each located

in the area of Rotterdam, the Netherlands. Some mothers were inpatients, temporarily living with their children (and sometimes their partner) in an apartment unit under the supervision of therapists. Others were part of an ambulatory treatment program, which required them to attend group therapy with their child(ren) three full days per week over the course of six weeks. Some mothers had been referred by Child Protective Services (CPS) and had one or several of their children under consideration for out-of-home placement. Others had sought help on their own initiative. Participating mothers who were in therapy at the clinic gave us consent to access their family files, which had been created by the clinic's administrative services and contained CPS referrals and family histories, among other documents. These files allowed us to substantiate the occurrence of child maltreatment. All available documents were coded for incidents of physical and emotional abuse and neglect perpetrated by the mother.

Maltreating families have lower socioeconomic status, on average have more children, and experience more parenting stress compared to other families (Stith et al., 2009). Comparison groups need to be matched on these variables, or otherwise these variables need to be accounted for in statistical analyses, or they may confound research findings. As becomes clear from the previous paragraph, the lives of maltreating mothers were (temporarily) dominated by their intense contact with mental health services. For this reason we recruited a comparison group of mothers attending a different subdivision of the same mental health clinic, where their children were in therapy; this subdivision was dedicated to children with a developmental or learning disorder. Although these mothers were not in therapy themselves, their lives were also affected by having to attend the clinic regularly. The fact that at least one of their children had a developmental or learning disorder made their caregiving challenge comparable to that of the maltreating mothers, who also had at least one child with a clinical diagnosis (which we verified via their family files). Their socio-economic status was more comparable to that of the maltreating group than if we had drawn a control group from the general population. Overall, this qualifies as a high-risk control group. With these mothers we conducted an interview to verify the absence of incidents of child maltreatment. In sum, they were comparable to the maltreating group on many important aspects, but differed on maltreating behavior.

Research appointments were made at the clinic's location familiar to mothers. This was done to facilitate their participation, and had the advantage that the test environment was more natural than an unknown

lab setting would have been. Testing was done by our research assistants, who were all women under 30 years. During the first appointment mothers participated in three standardized computer paradigms: a cry paradigm consisting of infant cry sounds of different pitches (Zeskind & Shingler, 1991); an attachment-based comfort paradigm with several animated video clips of caregiver-child separation and reunion (Johnson, Dweck, & Chen, 2007); and a handgrip task. Results on the latter have been reported by Compier-de Block et al. (2015). Throughout the paradigms we assessed mothers' autonomic reactivity using cardiovascular measures and skin conductance. During the cry paradigm we additionally collected saliva samples multiple times, from which we assayed the salivary enzyme α -amylase, another ANS index. We tested whether maltreating and non-maltreating mothers differed in their autonomic responses to the cry sounds. Results for cardiovascular measures and skin conductance are reported in Chapter 2, and findings for salivary α -amylase are described in Chapter 3. During the second appointment we conducted the AAI with mothers (George et al., 1985). We tested whether attachment representation was related to maltreatment status as well as autonomic responses to the comfort paradigm (Johnson et al., 2007). This part of the study is reported in Chapter 4.

Narrative review and meta-analysis

Several scholars have argued that we set too much scientific store by results from traditional significance testing (e.g., Cumming, 2014; Ioannidis, 2005). Our knowledge of a certain research field may be biased in a number of ways, such as through selective publishing, or studies being underpowered. These scholars have argued for different statistical approaches to social science, and emphasized the importance of meta-analysis as a tool for cumulative evidence (Rosenthal & DiMatteo, 2001; Van IJzendoorn & Kroonenberg, 1988). From this perspective we should "appreciate any study as part of a future meta-analysis" (Cumming, 2014, p. 27). Chapter 5 of this thesis presents a narrative review and meta-analysis on autonomic baseline activity and autonomic stress reactivity in maltreating parents or participants at risk for abuse. We selected relevant studies conducted between 1977 and 2015, including the empirical study outlined above, thereby placing it immediately in the perspective of the research field. This enables us to test whether our results are representative for findings in this field, and to offer some specific insights if they differ from previous findings.

