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CHAPTER 6

EPILOGUE
Epilogue

The studies in this dissertation focused on two parental risk factors for child maltreatment: autonomic nervous system (re)activity and attachment representation. Neglectful and abusive mothers were compared to a non-maltreating control group on their autonomic reactivity to infant crying using a standardized cry paradigm (Zeskind & Shingler, 1991) and on their state of mind toward attachment as measured by the AAI (George, Kaplan, & Main, 1985). The results described in Chapters 2 and 3 were not unequivocal, but overall suggested that maltreating mothers mainly showed less sympathetic reactivity to infant crying than non-maltreating mothers. Furthermore, as reported in Chapter 4, more maltreating than non-maltreating mothers had an unresolved state of mind regarding attachment, and they had lower coherence of mind.

Empirical study in context of meta-analysis

The association between child maltreatment perpetration and blunted autonomic (re)activity we found in our empirical study seemed in contrast with earlier literature (McCanne & Hagstrom, 1996). Therefore we conducted a meta-analysis including all available studies on this topic ($k = 12$). As reported in Chapter 5, maltreating parents and at-risk adults had higher ANS activity at baseline, but did not show significantly different autonomic reactivity to stressful stimuli. In light of these meta-analytic findings, are we to reconsider our earlier conclusion that maltreating mothers appeared to show sympathetic hypo-reactivity? As can be seen in Figure 1 of Chapter 5, the point estimate for skin conductance (SCL) reactivity in our empirical study ($g = -0.24$) lies outside the confidence intervals of the overall combined effect size for sympathetic reactivity (which almost solely consisted of SCL measures) in our meta-analysis ($g = 0.27$, CI 95% [-0.04, 0.58]). This means that the finding for SCL reactivity in our empirical study differed significantly from the meta-analytic result for sympathetic reactivity. In a random effects model, as we used in the meta-analyses, the sample of studies $k$ is considered a random sample from a population of studies (e.g., including those that have been done but are not represented, and those that have not yet been done), and the point estimate may be generalized to that population (Hedges & Vevea, 1998). The fact that the point estimate for SCL in our empirical study lies outside the CIs of the meta-analysis’ combined effect size indicates that our empirical study may not belong to the same population from which $k$ was sampled. This could be
due to the fact that child neglect perpetration characterized our sample, which was not the case for any of the other studies included in the meta-analysis. We also controlled for relevant potential confounders, such as maltreatment experienced by parents in their own childhood, where other studies had not. Hyporeactivity may therefore be a risk factor for child maltreatment even within the context of our meta-analytical findings. Our findings, and the contrast with those of previous studies, point to the need for future research to continue to aim for the distinction between neglectful and abusive parents in order to test whether autonomic hyporeactivity is associated with child neglect specifically.

Attachment
On the cognitive-affective level, an unresolved/disoriented (U/d) state of mind toward attachment was significantly more prevalent among maltreating than non-maltreating mothers. While discussing potentially traumatic experiences such as abuse or loss, U/d mothers displayed lapses of reasoning or discourse and did not remark upon those lapses. This state of mind therefore has distinct dissociative qualities, as conveyed in Chapter 4, i.e. the display of disrupted consciousness in the face of traumatic memories. However, not just the U/d state of mind but low coherence of mind in general is associated with disintegrated cognitive-affective processes. The narratives that receive low scores on coherence have been proposed to reflect multiple models of attachment (Main, 1991). For instance, an idealizing speaker displays a positive image of his/her attachment history on a semantic level, while actual experiences appear to have been negative. Speakers with preoccupied tendencies may talk compassionately about a caregiver one moment while displaying apparent anger the next, and often show remarkable oscillations in their evaluation of attachment experiences throughout the interview, without reaching one coherent narrative. Coherence of mind and attachment classifications may therefore be considered indicators of interviewees’ internal working model of attachment, which has its root in infancy (Bretherton & Munholland, 2008). Consistent with this notion, we reported in Chapter 4 how a comfort paradigm based on infants’ internal working model of attachment (Johnson, Dweck, & Chen, 2007) generated an autonomic response that distinguished unresolved and non-autonomous from resolved and autonomous mothers, respectively. Unresolved and non-autonomous attachment (as well as continuous U scores and low coherence of mind) were associated with a SCL decrease during an animated scene of a responsive caregiver-ellipse comforting a crying
infant-ellipse. This may reflect an emotional response of non-crying sadness (Kreibig, 2010) to the representation of an experience in contrast with their own.

**Causality**

The findings presented in this dissertation are correlational, precluding causal inferences. Etiological research on child maltreatment is characterized by the case-control design, since experimental manipulations to evoke maltreating behavior are not ethical (in humans). A well-designed twin study has evaluated the extent to which children evoke their own maltreatment, e.g., through the display of (inherited) antisocial behavior (Jaffee et al., 2004). Based on the fact that monozygotic (MZ) twin children share 100% of their early environment and genetic makeup, while dizygotic (DZ) twins share 100% of their environment but on average 50% of their genes, a higher concordance of child maltreatment within MZ pairs as compared to DZ twin pairs would indicate a (genetically mediated) child effect on maltreatment. They found that the within-twin pair co-occurrence of child maltreatment was similar for MZ and DZ twins, suggesting a negligible child effect on maltreatment.

The plausibility of a causal role of parental factors in child maltreatment may be inferred from relevant animal studies with experimental designs. For instance, rat dams naturally differ in the extent to which they lick, groom, and nurse their pups from an arched-back position (licking, grooming, arched-back nursing; LG-ABN). Low levels of LG-ABN behavior may be considered the rat equivalent of child neglect. The adult offspring of low LG-ABN mothers show increased physiological stress reactivity (Liu et al., 1997) and become low LG-ABN mothers themselves (Francis, Diorio, Liu, & Meaney, 1999). Cross-fostering experiments showed that both stress responses and maternal care were behaviorally rather than genetically transmitted across generations, since it was the rearing (not the biological) mother’s behavior that was associated with pups’ subsequent fearfulness and LG-ABN levels (Francis et al., 1999). Natural variations in maternal care can also be further manipulated, such as by regularly handling rat pups for short amounts of time, which increases levels of LG-ABN behavior (see Meaney, 2001, for a review). Handling of pups not only increased maternal care in naturally low LG-ABN rat dams (generation F1), but the effects extended to the maternal care of the handled, adult offspring (F2), and even to their non-manipulated offspring (F3), who showed normative levels of behavioral stress reactivity (Francis et al., 1999).
These experiments point to a causal role of parental factors in child maltreatment, and further show the close link between stress responses and parenting behavior through their parallel mechanism of transmission.

As an alternative to the definition of a cause as both necessary and sufficient for its effect, the philosopher J. L. Mackie (1965) proposed the INUS condition, positing that a causal factor is an insufficient but non-redundant part of a condition that is itself unnecessary but sufficient (INUS) for the result. Applied to child maltreatment, this means that for a particular group of people, the INUS condition under which maltreatment occurs refers to a constellation of risk factors that is unnecessary (i.e., a different constellation of risk factors might lead to child maltreatment for other people) but sufficient (i.e., it leads to child maltreatment), and each risk factor in the constellation is insufficient (i.e., does not singularly cause child maltreatment) but non-redundant (i.e., without it, child maltreatment would not occur in these people) (Munro, Taylor, & Bradbury-Jones, 2013). This is consistent with the ecological/transactional model of multicausal pathways to child maltreatment, as outlined in previous chapters (Cicchetti & Valentino, 2006). The alternative definition does not imply that we can now ascribe a causal role to the risk factors we found in our study and meta-analysis, but it suggests that causality does not require them to be necessary or sufficient for child maltreatment to occur. According to these views, autonomic dysregulation as well as unresolved attachment and incoherence of mind may be considered part of the cumulative condition under which certain parents maltreat their children.

Conclusion

This dissertation has shown that dysregulation of the ANS may constitute a risk factor for child maltreatment in three different ways: through blunted reactivity to infant crying and anomalous disconnections between ANS components (empirical study; Chapters 2 and 3), and higher ANS baseline activity (meta-analysis: Chapter 5). The latter may indicate a state of chronic arousal in maltreating/at-risk parents, possibly reflective of the relatively stressful circumstances in which they live. The results of our empirical study (Chapters 2, 3, and 4) remarkably pointed to dissociative coping tendencies on different levels of functioning. First of all, the pattern of blunted ANS responsiveness to infant crying seems in line with mothers’ behavioral disengagement. The maltreating mothers in our sample were predominantly neglectful, the inability, to an extreme extent, to offer their child(ren) affection, security,
and stability characterizing their problems in many cases. On the cognitive-affective level, the U/d state of mind also suggests dissociative coping with traumatic experiences. Overall, this pattern of dissociative coping provides an important addition to the traditional aggressive model of child abuse (Knutson, 1978) and broadens our understanding of the nature of child maltreatment.

The multiple pathways that mark the etiology of child maltreatment provide the clinician with many potential intervention targets. Increased ANS baseline activity, blunted ANS reactivity to child signals, and attachment representation may be among those targets. Over the course of the dissertation we have made suggestions for intervention programs based on our findings. Maltreating mothers with a U/d state of mind may require trauma processing before an attachment-based, maternal behavior-focused program like the Video-feedback Intervention to promote Positive Parenting (VIPP; Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2007) can be effective (Moran, Pederson, & Krupka, 2005). It is currently not known whether interventions aiming at maltreating parents’ physiological stress regulation can lead to reduced child maltreatment perpetration, and caution is warranted in suggesting practical implications of our findings. The multiple associations between ANS functioning and child maltreatment in our empirical study and meta-analysis, however, identify it as a focus point of interest. Therefore, a new dimension for randomized controlled trials would be the addition of an ANS regulation component to existing intervention programs to assess if it increases their effectiveness. This would provide not only more theoretical insight into the causal role of ANS functioning in child maltreatment but may also improve clinical prospects.