Friendship stress buffering in young people with childhood adversity

König, M.

Chapter 2

Child Maltreatment and Victimization

Maximilian Scheuplein
Samantha Vermeulen
Anne-Laura van Harmelen
Lenneke Alink

Published in *Handbook of Clinical Neurology: Brain and Crime, 2023*

Abstract
It is estimated that up to 25% of all children growing up worldwide experience child maltreatment, making it a global emergency with substantial individual and public health consequences. This chapter addresses one of the most societally pervasive consequences of child maltreatment which is known as the "cycle of victimization". This concept depicts the increased risk of maltreated individuals to victimize others later in life, both within and outside the family environment. To understand the architecture of this victimization cycle, the chapter further sheds light on neurocognitive mechanisms aiding different forms of victimization and the buffering role of social support that could help break the cycle of victimization. Advancing our understanding of these complex and interrelated mechanisms will ultimately facilitate the design and implementation of more targeted early treatments and (preventive) interventions and support a move towards a safer society.

Keywords: child maltreatment, abuse, neglect, victimization, violence, intergenerational transmission, protective factors, social support

Introduction

On July 22, 2011, a single perpetrator detonated a bomb at the government headquarters in Oslo before attacking a youth camp on Utøya island, killing 77 civilians, of whom nearly half were under the age of 18. While every mass shooting is different, an alarming number of perpetrators, including the one in Norway, have a documented history of child maltreatment (Densley & Peterson, 2017, 2019; Syse, 2014). For example, various sources have reported about the Utøya perpetrator's early-life involvement with child protection services (CPS) as well as incidences of physical abuse (e.g., being beaten by the mother), sexual abuse (e.g., inappropriate sexual behavior by the mother), emotional abuse (e.g., mother explicitly wishing death on him on multiple occasions), and physical neglect (e.g., being left unsupervised for a prolonged period at an early age) (Olsen, 2016; Syse, 2014).

The World Health Organization (WHO) describes child maltreatment as abusive or neglectful experiences that occur to children under the age of 18. Those experiences include "all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power" (WHO 1999, pp. 14–15). Child maltreatment can be classified into five types: physical, emotional, and sexual abuse, and physical and emotional neglect. The global lifetime prevalence is estimated between 12 and 27% (Stoltenborgh et al., 2015), making child maltreatment a global emergency with substantial individual and public health consequences. Individuals who suffer child maltreatment are known to face life-long effects and challenges on different levels of their development, ranging from vulnerable cognitive and socio-emotional abilities to lower well-being and diminished mental and physical health (Norman et al., 2012; Vachon et al., 2015).

One of the most societally pervasive consequences of child maltreatment is the increased risk of victimizing others, both within and outside the family. Previous research on the intergenerational transmission of child maltreatment shows that offspring of parents who have personally experienced child maltreatment are at 2-3 times greater risk of experiencing maltreatment themselves compared to children of non-maltreated parents (Buisman et al., 2020; Madigan et al., 2019). In addition, the increased risk of (violent) crimes for individuals who have experienced child maltreatment has also been confirmed by empirical research (Salo et al., 2021).

This chapter outlines the link between child maltreatment and victimization within and outside the family environment whilst also shedding light on explanatory mechanisms and the buffering role of social support that could help

break the cycle of victimization (Figure 1). Advancing our understanding of these complex, interrelated pathways will ultimately facilitate the design and implementation of targeted early treatments and (preventive) interventions and support a move towards a safer society.

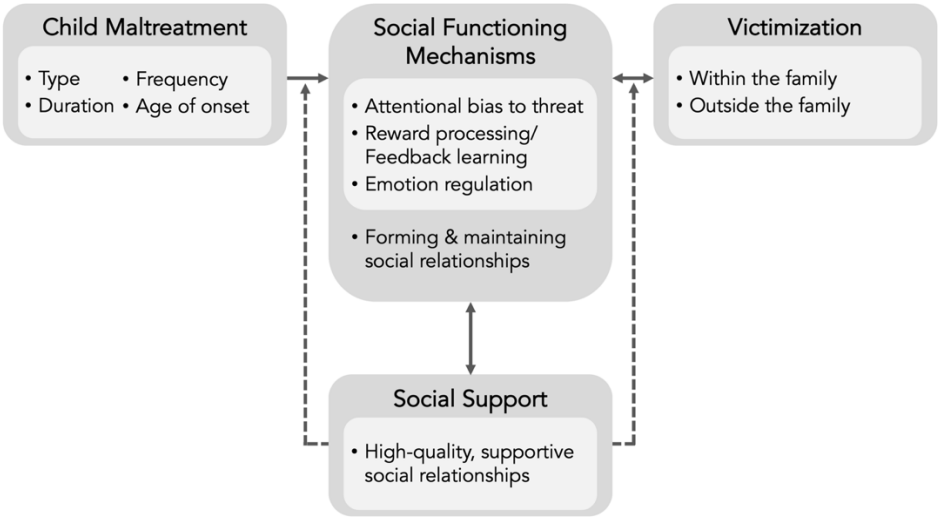

Figure 1. Social functioning mechanisms linking child maltreatment to victimization within and outside the family environment. Solid lines represent direct associations between maltreatment characteristics (e.g., type, duration, frequency, and age of onset) and explanatory social functioning mechanisms (e.g., attentional bias to threat, reward processing/feedback learning, and emotion regulation). Vulnerability in these aspects may increase the risk of victimization and impact on social functioning and social support. Dashed lines depict the buffering role of social support moderating the relation between child maltreatment and victimization.

Intergenerational Transmission of Child Maltreatment

Experiencing maltreatment during childhood can have a long-term impact on victimization across generations. This intergenerational transmission of maltreatment can be conceptualized from a victim-to-perpetrator and a victim-to-victim perspective (Madigan et al., 2019). According to the victim-to-perpetrator perspective, victims of child maltreatment are at roughly twice the risk of becoming perpetrators of maltreatment once they become parents (Widom, 1989a). The victim-to-victim approach states that children of parents who have been maltreated during their childhood are more likely to become victims of maltreatment themselves. However, according to this perspective their parents do not necessarily act as the perpetrators. For example, several studies have shown that children of mothers who have been sexually abused during their childhood, are at increased risk of being sexually abused by others (i.e.,

perpetrators are most often not their mothers) (e.g., Borelli et al., 2019; K. Kim et al., 2007). The intergenerational transmission of maltreatment hypothesis includes both perspectives (i.e., the victim-to-perpetrator and the victim-to-victim perspective), which are often studied together.

It has long been debated whether intergenerational transmission of child maltreatment actually exists or whether it is merely an artifact of methodologically flawed research (Ertem et al., 2000; Kaufman & Zigler, 1987; Thornberry et al., 2012). This debate led to a number of thorough meta-analyses testing the hypothesis of intergenerational transmission and its association with research quality (Assink et al., 2018; Madigan et al., 2019). The results confirmed that experienced maltreatment during childhood was related to increased risk of maltreatment in the next generation and that this finding is likely not due to methodological weaknesses of those studies. The risk for parents who have experienced child maltreatment to maltreat their own children was estimated to be 2-3 times higher than for non-maltreated parents (Assink et al., 2018; Madigan et al., 2019). In sum, recent meta-analyses support the notion of intergenerational transmission of child maltreatment. However, results also imply that, even though the risk of perpetration is increased, the majority of the maltreated parents do not continue the cycle of victimization.

The victim-to-perpetrator hypothesis was confirmed in a seminal study by Widom et al. (2015). This study was originally set up to focus on archival records to map criminal histories for individuals with and without child maltreatment reports. The study included 902 children with documented histories of abuse and neglect (between the years 1967 and 1971) and matched those with 667 non-maltreated children based on age, sex, race, and social background (Widom, 1989a). These groups were followed for about 40 years during which participants were interviewed and CPS records were searched. Using multiple sources of information, the study showed that parents with child maltreatment experiences were about twice as likely to be reported to CPS compared to the control group. Specifically, 21.4% of the maltreated parents were reported for child maltreatment versus 11.7% of the control group. The study further exposed distinct patterns between different types of child maltreatment. Parents who specifically experienced sexual abuse or neglect during their childhood were at increased risk of maltreating their own children. However, this was not the case for parents who experienced physical abuse. The same was found for perpetrated maltreatment, meaning that parents with histories of maltreatment were generally more likely to sexually abuse or neglect their children, but less likely to physically abuse their children.

Contrary to Widom et al.'s (2015) findings, meta-analytic studies yielded evidence for the transmission of specific types of maltreatment, specifically the

intergenerational transmission of physical abuse. Madigan et al. (2019) found that different types of experienced maltreatment increase the risk of the same as well as other types of maltreatment occurring in the next generation. For example, in case a parent has experienced physical abuse as a child, their offspring is at increased risk of experiencing physical abuse as well and other types of child maltreatment such as neglect, emotional and sexual abuse. Furthermore, Madigan et al. (2019) found that the transmission of child sexual abuse is stronger if the victim or perpetrator is female, however, this was the only type of maltreatment for which gender effects were found. In addition, little evidence was found for differential effects based on the age of the child at the time of the child maltreatment assessment.

Together, the research outlined above indicates that, on the one hand, children of parents who have been maltreated during their childhood are at increased risk of being maltreated by others (victim-to-victim perspective). On the other hand, experiencing child maltreatment increases the risk of maltreating one's own children once victims become parents (victim-to-perpetrator perspective). However, even though maltreated parents are at increased risk of becoming perpetrators of maltreatment, which necessitates the development of targeted prevention and intervention programs, the majority of maltreated parents do not continue the cycle of victimization. In other words, parents who have experienced maltreatment are not destined to maltreat their own children.

Child Maltreatment and Victimization Outside the Family

The notion that being a victim of violence feeds the risk of becoming a violent perpetrator has received growing attention during the last couple of decades, partly due to incidences like the 2011 mass shooting in Norway (Jonson-Reid, 1998; Malvaso et al., 2016). Silver et al. (1969) were among the first to study this so-called "violence breeds violence" hypothesis and many researchers followed. For example, overwhelming rates of maltreatment experiences were found in delinquent youth populations (Kratcoski & Kratcoski, 1982; D. O. Lewis et al., 1979). While those studies depicted a strong association between being victimized as a child and becoming a violent perpetrator later in life, they also suffered from methodological limitations, potentially causing an overestimation of the true effects. Many of those studies relied on retrospective designs, used unrepresentative samples, and did not control for confounding variables such as social class differences (Widom, 1989a).

Fortunately, to date a couple of studies were able to overcome these limitations. One of these large-scale prospective longitudinal studies that offered valuable insights into the child maltreatment-offending relation as well as the intergenerational transmission of maltreatment (see previous paragraph) is the study by Widom (1989a). In this study, a large sample of individuals with

substantiated and validated reports of child maltreatment (i.e., abuse or neglect) were matched with a sample of non-maltreated controls. Official records and arrest data were later collected to obtain information about adult criminal behavior for both groups. Although the risk for offending behavior was 1.7 times higher for maltreated individuals (and 1.8 times in a recent meta-analysis by Fitton et al. (2020)) compared to non-maltreated individuals, the vast majority of maltreated adults did not have official records of criminal behaviors, suggesting that the child maltreatment-offending relation is weaker than initially predicted.

Follow-up studies on the same data collected by Widom (1989a) distinguished between different types of child maltreatment and their consequences for violent behavior (Nikulina et al., 2011; Rivera & Widom, 1990; Widom & Maxfield, 1996; Widom, 1989; Widom & Massey, 2015), which happens to be a popular line of research ever since (for a review, see Malvaso et al. (2016)). Despite its popularity, it is still unclear to what extent different types of maltreatment impact on the likelihood of becoming a violent perpetrator later in life. However, recent meta-analyses were not able to show clear differential effects for different types of child maltreatment in association with aggressive and non-aggressive antisocial behavior (Braga et al., 2017; Fitton et al., 2020). Given that subtypes often co-occur, which makes the interpretation of unique effects a lot more complicated (K. Kim et al., 2017; P. M. Sullivan & Knutson, 2000; van Berkel et al., 2020), it can be valuable to also consider contextual features (i.e., frequency, severity, and duration of maltreatment) to gain a clearer understanding of the child maltreatment-offending relation.

The Rochester Youth Development Study (RYDS; C. Smith & Thornberry, 1995) was the first longitudinal study to test for contextual effects. Based on a representative sample of 12-14-year-old American students, a significant association between a history of maltreatment before the age of 12 and delinquent behavior (officially- and self-reported) was found. Specifically, the strength of this association increased as the severity of the maltreatment increased. In other words, more extreme levels of maltreatment lead to higher rates of (violent) delinquency, lending support to the violence breeds violence hypothesis. This association remained significant after controlling for race, gender, socioeconomic status, and family structure and was also found for frequency and duration of maltreatment. In addition to contextual effects, the RYDS data enabled the investigation of how the victims' age at the time of maltreatment is related to later delinquent behavior. Studies that have used this dataset generally showed that maltreatment during adolescence is more strongly related to delinquent behavior compared to maltreatment during childhood (Ireland et al., 2002; Thornberry et al., 2001). However, using a new independent sample, Mersky et al. (2012) could not confirm these findings. Instead, they showed that a history of child maltreatment increases the risk for delinquent behavior at any age.

Reflecting on the literature about the child maltreatment-offending relation within and outside the family clarifies that this relationship is not deterministic. Instead, this association is influenced by a complex interplay of individual, social and contextual factors. Moreover, research shows that there is a broad transmission of different types of maltreatment, indicating that it is not (only) the specific behavior that is transmitted but that broader mechanisms are at stake. In order to be able to break the cycle of victimization within and outside the family, it is crucial to better understand these factors and possible mechanisms that can help explain the maltreatment victim-victimizing relation. Selected mechanisms that could explain the effect of early-life maltreatment experiences on parenting behaviors include neurophysiological, information-processing, and developmental psychopathology models (Alink et al., 2019). These will be discussed in the following paragraphs.

Mechanisms Connecting Child Maltreatment and Victimization

Several models exist that can help explain how child maltreatment increases the risk of victimization across the life span. The ecological-transactional perspective on child maltreatment as well as the developmental psychopathology framework suggest that "normative developmental processes" can be elicited by providing a child with an age- and stage-appropriate "average expectable environment" (Cicchetti & Valentino, 2006; Sroufe & Rutter, 1984). However, failure to do so (e.g., exposing the child to maltreatment) can impede development and subsequently lead to transgressive behaviors (e.g., victimization) later in life.

Child maltreatment is a chronic stressor for the victims and chronic activation of the stress system leads to allostatic load, which describes an accumulation of stress response built up in the body (McEwen, 1998). When the human body undergoes allostasis, brain activity shifts from higher order cognitive activation to lower order salience/threat activity (Oei et al., 2012). In addition, this stress exposure activates the hypothalamic–pituitary–adrenal (HPA) axis and the immune system, which subsequently leads to the release of stress hormones (cortisol) and pro-inflammatory markers (cytokines) into the blood stream. Initially, this is an adaptive response that prepares the body to fight or flight. However, on the long-term, a high allostatic load can detrimentally affect neurochemical processes, behavioral responses, and (neuro)physiology. For example, animal studies have shown that early-life stress is associated with alterations in neural morphometry of the animal brain due to, for instance, suppression of neurogenesis and/or neuronal cell-death (Arnsten, 2009; Lupien et al., 2009; Radley et al., 2004; Sanchez et al., 2001). Through this mechanism, chronic stress in the context of child maltreatment is thought to seriously affect the developing brain.

Latent vulnerability and adaptive calibration models suggest that the impact of child maltreatment experiences on the developing brain may aid adaptive behavior in order to survive and reproduce in such high-stress environments. However, as soon as the environment is no longer threatening, such adaptations might create vulnerability to future mental health problems (Del Giudice et al., 2011; McCrory & Viding, 2015). Three latent vulnerability factors are relevant in this respect: an increased attentional bias to threat, reduced reward processing/feedback learning, and emotional (dys)regulation (McCrory & Viding, 2015). These processes eventually place maltreated individuals at risk for maladaptive behavior, including impaired social functioning, and together may underlie the risk for victimization later in life.

Attentional Bias to Threat

Attentional biases reflect an individual's tendency to direct attention to stimuli that match their thoughts and feelings. In the context of child maltreatment, it may be adaptive to rapidly detect threat, such as angry facial emotions of parents. However, over time and in different circumstances this bias to threat could lead to dysfunctional emotions and behavior. Previous work has indeed shown a link between exposure to maltreatment and attentional bias to threat (da Silva Ferreira et al., 2014). Children with a history of maltreatment more rapidly detect and classify emotional faces as threatening. For instance, physically abused children were found to display a response bias towards angry facial expressions, whilst neglected children showed more difficulty discriminating between facial emotions (Pollak et al., 2000). On a neural level, this can be explained by a hyperresponsivity of the amygdala, which is often found in individuals, who were victims of child maltreatment (Hein & Monk, 2017; van Harmelen et al., 2013). The amygdala is a brain region involved in the primary processing of emotional faces, salience detection, fear conditioning and emotional memory (Bremner et al., 2005; Davis & Whalen, 2001; Onur et al., 2009; Todorov & Engell, 2008).

Although adaptive and protective in the context of high stress, an increased attentional bias to threat is thought to contribute to victimization (Crick & Dodge, 1994; Lemerise & Arsenio, 2000; N. V. Miller & Johnston, 2019). For example, an over-attribution of hostile intentions to others' actions might elicit preemptive behavior (e.g., aggression). Hence, parents who attribute hostile intent (i.e., negative parental attributions) towards their child's behavior can be at increased risk for harsh and abusive parenting (Beckerman et al., 2018; Irwin et al., 2014). Furthermore, it has been shown that hostile attributions are a mediating factor for the association between child maltreatment and reactive aggression (Richey et al., 2016), which is why hypervigilant responding to threat might be one potential mechanism linking a history of child maltreatment with victimization later in life.

Reward Processing and Feedback Learning

Sources of reward in a maltreating family environment can be scarce and unpredictable. Reduced anticipation of reward, therefore, may lower the likelihood of continued disappointment and as such represents a positive adaptation in a volatile and uncertain environment. Indeed, both human and animal research have shown that chronic stress exposure early in life can lead to long-term alterations in reward-related behaviors (Birn et al., 2017; Hollon et al., 2015), mediated by changes in the ventral striatum, a subcortical brain structure that plays a role in reward processing and learning (Hanson, Hariri, et al., 2015). Furthermore, research in maltreated children and adolescents (8-14 years) demonstrated reduced sensitivity towards (monetary) rewards (Guyer et al., 2006) as well as a blunted anticipation of rewarding cues on a behavioral and neural level (Dillon et al., 2009).

Reward processing also plays an important role in parenting behaviors. For instance, infant cues, including those of distress, have been found to activate parental reward neurocircuitry (limbic brain regions, striatum, and orbitofrontal cortex), which in turn promotes caregiving responses (Ferrey et al., 2016). This motivated attention to their child's socio-emotional cues is an important driver for sensitive caregiving behavior. Therefore, parents with impaired reward processing (possibly due to their early-life experiences) may lack motivation to attend to their child's needs, which ultimately can put the child at risk for experiencing maltreatment (Strathearn, 2011).

Altered reward processing has also been found to be associated with aggressive behavior. For example, adolescents (16-18 years) with aggressive conduct disorder showed, compared to controls with no conduct disorder, an altered activation in brain regions associated with reward processing (among others in the amygdala and ventral striatum) whilst viewing others in pain (Decety et al., 2009). In other words, highly aggressive youth may enjoy hurting others, which together with an impoverished ability to downregulate one's emotional arousal (see next paragraph) can put them at an even greater risk for victimization (i.e., aggression).

Reward processing is also involved in how individuals learn from feedback, which when growing up in an adverse home environment is either available as an excess of negative feedback and/or a lack of positive feedback. This shapes the way a child incorporates such information and consequently adjusts their behavior. Feedback learning relies in part on the hippocampus (K. C. Dickerson & Delgado, 2015), and early-life stress (e.g., child maltreatment) has been found to reduce hippocampal volume, activation and learning performance (Riem et al., 2015; Schwabe & Wolf, 2012). In support of these findings, child maltreatment has been related to learning difficulties (Hart et al., 1997), impaired spatial working

memory (Majer et al., 2010), impoverished verbal fluency, and reduced cognitive flexibility (Savitz et al., 2008). Children and adolescents (2-17 years) with such (learning) difficulties are known to be at greater risk of experiencing victimization (e.g., bullying, physical abuse, and neglect), which according to the violence breeds violence hypothesis, will also impact on the likelihood of becoming a violent perpetrator later in life (Klomek et al., 2016; Turner et al., 2011). In other words, individuals who have experienced child maltreatment are at greater risk to develop, for example, learning difficulties, which once again put them at greater risk of victimization as well as engaging in (violent) delinquent behavior later in life. Together, altered reward processing and feedback learning might be two additional mechanisms that can put maltreated children at risk for maladaptive behavior, including victimization in later life.

Emotion Regulation

The ability to modulate one's emotional arousal (i.e., emotion regulation) is important to be able to respond in a socially acceptable manner to ongoing environmental demands. Poor emotion regulation capacity has been linked to behavioral problems (e.g., internalizing and externalizing symptoms), which can in part be explained by an impoverished ability to downregulate and/or reappraise threat and stress responses (J. Kim & Cicchetti, 2009; Sheppes et al., 2015). According to attachment theory, securely attached children can use caregivers effectively to help learn how to regulate their emotions (Bowlby, 1982). However, in the case of child maltreatment, the absence of a caregiver, who is structuring, explaining, and regulating the emotional world of their child, poses a threat to the optimal development of emotion regulation, which ultimately puts the child in jeopardy of developing psychopathology and behavioral problems (Alink et al., 2009; J. Kim & Cicchetti, 2009).

To identify proximal risk factors for psychopathology and behavioral problems, a study by McLaughlin, Peverill, et al. (2015) investigated how child maltreatment influences neural processes underlying emotion regulation during a time of sensitive neurobiological development. The study showed that maltreated adolescents (13-19 years) exhibited heightened amygdala reactivity in response to viewing negative emotional stimuli. However, this elevated emotional reactivity was also regulated to a greater degree through prefrontal regions causing a down-regulated amygdala comparable to activations observed in non-maltreated adolescents. Whilst in this study maltreated adolescents could successfully modulate their increased vigilance to (negative) emotional stimuli, these findings also shed light on the mechanisms putting maltreated individuals at greater risk for developing aberrant patterns of emotion regulation.

Several studies have confirmed that dysfunctional patterns of emotion regulation in maltreated children (McLaughlin et al., 2020; Shields & Cicchetti, 2001; Teisl

& Cicchetti, 2007) are often accompanied by heightened emotional responses (e.g., aggression) to potential threats in the environment. For example, altered emotional regulation was found to mediate the relation between experiencing child maltreatment and aggressive behavior problems (e.g., bullying and victimization) during childhood (P. M. Cole & Zahn-Waxler, 1992; Shields & Cicchetti, 2001; Teisl & Cicchetti, 2007). Moreover, meta-analytic evidence suggests that problems in anger regulation are a key risk factor for child maltreatment (Stith et al., 2009). Together, altered emotion regulation as a consequence of child maltreatment can increase the risk of developing psychopathology and aggressive behavioral problems, highlighting the importance of exploring emotion (dys)regulation as a mechanism linking child maltreatment and victimization.

Social Functioning

The ability to perform and fulfil normative social roles (i.e., social functioning), relies in part on the mechanisms described in the previous paragraphs (i.e., threat reactivity, reward anticipation/feedback learning, and emotion regulation). As such, vulnerability in these aspects may lead to maladaptive social functioning (McCrory et al., 2019). Indeed, individuals with a history of child maltreatment are thought to generate more stress given their increased likelihood to encounter (socially) stressful events (also known as the stress generation model; McCrory et al. (2019)). Consequently, those individuals have greater difficulties forming and/or maintaining high-quality relationships that can help buffer against future stress (Benedini et al., 2016; Gerin et al., 2019; McCrory et al., 2019; van Harmelen et al., 2016).

Forming positive, high-quality social relationships during childhood is particularly important for the mental well-being of adolescents with a history of early-life adverse experiences (van Harmelen et al., 2017). It is therefore not surprising that being socially rejected is a potent risk factor for adjustment problems later in life (Coie & Cillessen, 1993). Experiencing social rejection is central in the context of child maltreatment. It has not only been found that adolescents with a history of child maltreatment are more sensitive to peer rejection on a behavioral and neural level (van Harmelen et al., 2014) but alarmingly maltreated individuals are also more likely to be rejected by their peers in the first place (Bolger & Patterson, 2001). These rejection experiences consequently induce a magnified sensitivity towards future rejection. Specifically, individuals with high rejection sensitivity tend to predict, perceive, and show particularly enhanced distress towards social rejection (DeWall et al., 2009; Riva et al., 2012).

Children who have experienced maltreatment (specifically physical and/or sexual abuse) have been found to be at increased risk for victimization by peers as well

as are more likely to bully others (Shields & Cicchetti, 2001; van Harmelen et al., 2016). These findings are in line with stress susceptibility models, which suggest that child maltreatment contributes to an increased psychiatric vulnerability to future (social) stress (Gerin et al., 2019). Moreover, work by DeWall et al. (2009) on the path between social rejection and aggression has shown that excluded individuals have an increased tendency to attribute hostile intent towards others actions (hostile cognitive bias). Ultimately, social stress vulnerability and generation may increase the likelihood of peer rejection and victimization (Benedini et al., 2016; Gerin et al., 2019; McCrory et al., 2019; van Harmelen et al., 2016), which is why maladaptive social functioning might in part explain how experienced child maltreatment aids later victimization and aggressive behavior.

Social Support Buffers the Impact of Child Maltreatment

Not all individuals with a history of child maltreatment will victimize others, which suggests that those individuals benefit from protective (or resilience) factors. Those factors may modulate mechanisms associated with maltreatment related vulnerability (e.g., increased threat reactivity, lower reward anticipation/feedback learning, and dysfunctional emotion regulation), ultimately aiding resilient functioning in the aftermath of child maltreatment (Ioannidis et al., 2020; Kalisch et al., 2019; W. A. Walsh et al., 2010).

Social stress buffering models argue that social support can buffer the negative effects of stress on physical and mental health (Gunnar, 2017). Specifically, a social partner can reduce the physiological impact of stress on the body through attenuating the release of stress hormones (e.g., cortisol), which ultimately may help lower the risk of mental health difficulties (Hostinar et al., 2014b). In line with these models, it was found that friendship and family support reduce depressive symptoms in adolescents with a history of maltreatment (van Harmelen et al., 2016). Additional research has shown that high-quality social relationships influence the development of emotion regulation skills, which act as a protective factor moderating the relation between child maltreatment and psychopathology (Alink et al., 2009; Fritz, de Graaff, et al., 2018; Fritz, Stochl, et al., 2020; Ioannidis et al., 2020).

However, little is known about the neurobiological stress mechanisms that may underlie this relation. For example, a pre-registered, systematic literature review has identified only two studies that directly examined whether friendship support buffers neurobiological stress responses in young people (10-24 years) with a history of childhood adversity (Scheuplein & van Harmelen, 2022). One study tested these mechanisms in previously institutionalized adolescents and found that high-quality friendships at age 12 can buffer the negative effect of blunted sympathetic nervous system reactivity on peer problems at age 16 (Tang et al., 2021), whereas the other identified study was limited by an underpowered sample

of well-functioning adolescents (Fritz, Stretton, et al., 2020). Studies that have investigated social stress buffering in individuals without a recorded history of childhood adversity showed that those with greater levels of perceived social support had reduced neural activity (dorsal anterior cingulate cortex and anterior insula) as well as diminished cortisol responses following social exclusion (Eisenberger et al., 2007; C. L. Masten et al., 2012). However, future research is needed to further investigate these effects in individuals with a history of childhood adversity.

Meta-analytic evidence suggests that safe, stable, and nurturing relationships are critical for breaking the intergenerational transmission of maltreatment (Schofield et al., 2013). In other words, improving social support could lead to a reduction of intergenerational transmission of maltreatment, which ultimately could lower the risk of victimization within and outside the family environment.

Conclusion and Future Directions

Experiencing maltreatment during childhood may have a lasting impact on an individual's life trajectory as well as on society at large. Ample evidence suggests that victims of maltreatment are at increased risk for developing psychopathology, getting victimized by others (e.g., bullied), and becoming violent perpetrators themselves (Alink et al., 2009; Buisman et al., 2020; Salo et al., 2021). In this chapter, we outlined the link between child maltreatment and victimization within and outside the family environment and highlighted explanatory mechanisms and the buffering role of social support that could help break the cycle of victimization. The concepts and mechanisms presented in this chapter are modeled in Figure 1.

In the first half of the chapter, we have shown that experiencing maltreatment during childhood can have a long-term impact on victimization across generations. It is clear that experiencing child maltreatment increases the risk of maltreating one's own children once victims become parents (Madigan et al., 2019). Moreover, we have elaborated on the notion that being a victim of violence feeds the risk of becoming a violent perpetrator later in life (violence breeds violence hypothesis) (Silver et al., 1969).

In the second half of the chapter, we have demonstrated that child maltreatment impacts on various interrelated neurocognitive mechanisms aiding different forms of victimization. First, we highlighted that a dysfunctional attentional bias to threat can lead to hypervigilant and aggressive responding (Richey et al., 2016). Second, it was discussed that altered reward processing and feedback learning are known features of maltreatment-related psychopathology, which can lead to maladaptive behavior (e.g., aggression) in novel environments (McCrory et al., 2017). Third, poor emotion regulation capacity was found to link to internalizing

and externalizing symptoms which can in part be explained by an impoverished ability to downregulate and/or reappraise threat and stress responses (J. Kim & Cicchetti, 2009). Partially as a result of these processes, children with a history of child maltreatment are at increased risk for developing maladaptive social functioning, to experience victimization by peers, and to victimize others (McCrory et al., 2019; Shields & Cicchetti, 2001).

An important factor for mitigating the impact of child maltreatment on social functioning mechanisms is a positive and supportive social environment, which can ultimately lower the risk of violent behaviors not only now but also in the next generation. However, we have also shown that individuals who have experienced child maltreatment are more likely to struggle with creating and sustaining this protective social environment.

To break the cycle of victimization, we argue for a greater translation of knowledge about the neurocognitive processes that underlie social functioning (e.g., threat processing, reward processing/feedback learning, and emotion regulation) and that are evidently impacted by child maltreatment. It is necessary to intervene early and focus on improving these neurocognitive processes in order to strengthen social functioning and as a result minimize or even eliminate the risk of victimization later in life. Behavioral interventions targeting social cognitive processes, especially the encoding and interpretation of social cues, represent promising treatment approaches (McLaughlin, DeCross, et al., 2019; Waters & Craske, 2016). For example, by teaching 16-18-year-old juvenile offenders how to positively reframe ambiguous social cues, Ren et al. (2021) were able to show a significant reduction in hostile attribution bias and self-reported aggression. Given that transgressive behaviors (e.g., victimization) are often triggered through the interpretation of other's hostile intent it is powerful to observe that similar low-cost interventions in children (4-9 years) (van Dijk et al., 2019) and adults (Osgood et al., 2021) also reported reduced hostile attribution biases as well as mitigation effects on aggressive behaviors. Furthermore, behavioral activation treatment has been found to effectively improve reward-related functioning (e.g., approach motivation or reward valuation) in clinically depressed adolescents (12-18 years) (McCauley et al., 2016) and adults (18-60 years) (Dimidjian et al., 2006). However, despite its effectiveness, only a few studies have explored the benefits of this intervention in individuals with adverse early-life experiences (Berkowitz et al., 2011; McLaughlin, DeCross, et al., 2019) and more research is needed to establish its effectiveness in reducing victimization later in life.

Another promising treatment approach, specifically for individuals with a history of child maltreatment, is trauma-focused cognitive behavioral therapy (TF-CBT). Among other things, TF-CBT targets heightened emotional responsiveness to

negative stimuli through cognitive reappraisal strategies (e.g., positively reinterpreting emotional stimuli) (Dorsey et al., 2017; McLaughlin, Peverill, et al., 2015). Cognitive reappraisal has been proven to be an effective tool to treat externalizing and internalizing problems in at-risk youth (7-15 years) (Weisz et al., 2017) as well as to modulate arousal and negative emotional reactivity in maltreated children and adolescents (Dorsey et al., 2017; McLaughlin, Peverill, et al., 2015). On a broader level, school-based social and emotional learning (SEL) programs have been successful in enhancing students' behavioral adjustment (i.e., increased prosocial behavior as well as reduced conduct and internalizing problems) through teaching, for example, how to recognize and manage emotions, appreciate the perspectives of others, and maintain positive social relationships (for a thorough meta-analysis see Durlak et al. (2011)). Many of those interventions are promising treatments designed to be flexibly administered in young at-risk populations. However, these interventions may benefit from a stronger focus on the whole range of social functioning mechanisms connecting child maltreatment and victimization.

Even though there is substantial evidence supporting the various neurocognitive mechanisms that we have described, several important aspects are still not fully understood. For example, due to inconsistencies in the literature, it is unclear how type, duration, and frequency of maltreatment as well as age of exposure link to atypical behavioral and neurobiological functioning. Timing of maltreatment also seems to be important. For instance, the life cycle model of stress suggests that across development, brain regions undergo different windows of vulnerability (Lupien et al., 2016). Hence, there might be sensitive periods of development during which the effects of child maltreatment are particularly detrimental (see sensitive periods theory; Teicher & Samson (2016)). This notion has been confirmed in retrospective studies, showing that, for example, hippocampal alterations appeared to be particularly affected by maltreatment exposure during early childhood (3-5 years), whilst amygdala alterations were linked to exposure during early adolescence (10-11 years), and prefrontal cortical deficiencies were related to exposure during mid adolescence (14-16 years) (Andersen et al., 2008; Teicher et al., 2018). However, these findings require further empirical support. A meta-analysis has, for example, shown that the association between child maltreatment and reductions in hippocampal volume was strongest when maltreatment was reported during middle childhood and early adolescence, rather than early childhood (Riem et al., 2015). Furthermore, the literature on how timing of maltreatment affects victimization is inconsistent and merely relying on retrospective designs, which makes it difficult to estimate the frequency as well as to pinpoint the period when maltreatment took place. Therefore, prospective studies are needed to gain a more applicable understanding of the association between maltreatment characteristics (e.g., age of exposure, duration, and frequency) and later maladaptation.

Experiencing maltreatment during childhood will likely have a lasting impact on an individual's life trajectory as well as on the society at large. To give an example, the nonfatal child maltreatment lifetime costs in the U.S. were estimated at $830,928 (2015 USD) per victim and based on investigated incident cases the estimated annual costs for society were considerably higher, estimated at $2 trillion (Peterson et al., 2018). If we consider the indirect effects that maltreatment has on lives of others, as described in this chapter, the costs would likely be much higher. This underscores the need for early detection and intervention approaches to target the mechanisms connecting child maltreatment and victimization. Therefore, the ultimate goal should be to break the cycle of victimization and thereby pave the way for a healthier and more secure society.

Further Readings

- Paper by Buisman et al. (2020) on the intergenerational transmission of child maltreatment. https://doi.org/10.1371/journal.pone.0225839
- Paper by Ioannidis et al. (2020) on the complex neurobiology of resilient functioning after childhood adversity. https://doi.org/10.1186/s12916-020-1490-7
- Paper by Currie & Tekin (2012) on the cycle of child maltreatment and the link to future crime. http://dx.doi.org/10.3368/jhr.47.2.509
- Summary information of 2091 studies that have investigated the consequences of child maltreatment. Provided by the WHO: https://apps.who.int/violence-info/child-maltreatment/