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Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology

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Abstract

Background—The aim of this study was to investigate longitudinal relations among child maltreatment, emotion regulation, peer acceptance and rejection, and psychopathology.

Methods—Data were collected on 215 maltreated and 206 nonmaltreated children (ages 6–12 years) from low-income families. Children were evaluated by camp counselors on emotion regulation and internalizing and externalizing symptomatology and were nominated by peers for peer acceptance and rejection.

Results—Structural equation modeling analyses revealed that experiencing neglect, physical and/or sexual abuse, multiple maltreatment subtypes, and earlier onset of maltreatment were related to emotion dysregulation. Lower emotion regulation (Time 1) was associated with higher externalizing symptomatology (Time 1) that contributed to later peer rejection (Time 2), which in turn was related to higher externalizing symptomatology (Time 2). Conversely, higher emotion regulation was predictive of higher peer acceptance over time, which was related to lower internalizing symptomatology controlling for initial levels of symptomatology.

Conclusions—The findings emphasize the important role of emotion regulation as a risk or a protective mechanism in the link between earlier child maltreatment and later psychopathology through its influences on peer relations.

Keywords

Emotion Regulation; Maltreatment; Peer Relations; and Psychopathology

Introduction

Maltreating families exemplify a toxic relational environment that poses considerable risk for maladaptation across diverse domains of development (Cicchetti & Toth, 2005). The enduring detrimental effects of child maltreatment on psychopathology are well documented: Mounting evidence suggests that maltreated children are at increased risk for internalizing and externalizing problems. In addition to increased rates of adjustment problems, maltreated children exhibit greater difficulties in regulating and differentiating affective experiences than do nonmaltreated children (Cicchetti, Ganiban, & Barnett, 1991). Research using both normative and high-risk samples indicates a significant link between problems of emotion regulation and child psychopathology; however, much remains to be learned about the processes by which emotion regulation is linked to psychopathology. The

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current longitudinal study investigates the role of emotion regulation in the development of internalizing and externalizing symptomatology among maltreated children, focusing on the mediating effects of peer relations.

In this study, emotion regulation is conceptualized as the ability to modulate one's emotional arousal such that an optimal level of engagement with the environment is fostered (Thompson, 1994). Consistent with the view posited by Cole, Michel, & Teti (1994), well-regulated children would have the ability to respond to the ongoing demands with a range of responses that are socially acceptable and sufficiently flexible to allow for spontaneity as well as inhibition of behavior. In contrast, children with emotion dysregulation would show excessive emotional reactivity and/or emotional deficits, including constricted emotions, attenuated empathy, and contextually inappropriate affective displays.

Emotion regulation may have implications for the etiology of internalizing and externalizing symptomatology. Cicchetti, Ackerman, and Izard (1995) argued that emotion regulation is critical both in initiating, motivating, and organizing adaptive behavior, and in preventing stressful levels of negative emotions and maladaptive behavior. Evidence supporting this proposition suggests that children with internalizing symptomatology, such as anxiety and depression, show emotional competence deficits including impoverished emotional awareness and dysregulated emotional expression (Eisenberg et al., 2001; Suveg & Zeman, 2004). Such emotion regulatory problems are also observed in children with externalizing symptomatology (Eisenberg et al., 2001; Hill, Degnan, Calkins, & Keane, 2006). In addition, prior investigations using normative samples have demonstrated that children with poor emotion regulation exhibit aggressive and undercontrolled behaviors in social interactions (Calkins, Gil, Johnson, & Smith, 1999; Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996) and experience isolation and rejection in peer contexts (Hanish et al., 2004).

From the perspective of attachment theory, securely attached children are able to use parents effectively to help regulate their emotions (Bowlby, 1969/1982). The sensitive caregiver's role is to modulate the infant's arousal, which could follow intense displeasure, fear, or frustration, by calming the infant and restoring him/her to a tolerable emotional state (van der Kolk & Fislir, 1994). Early child maltreatment presents a significant threat to the optimal development of emotional understanding and regulation, partly due to the absence of such sensitive interactions between the caregiver(s) and the child. In maltreating families, parents are less likely to be available to provide support and scaffolding when their children are upset, from which children can learn constructive strategies to regulate their emotional states. Maltreated children, particularly physically abused children, may experience overwhelming emotional arousal that leads to difficulties managing and processing negative emotionality. Indeed, existing literature indicates that maltreated children evidence numerous deficits in the recognition, expression, and understanding of emotions (e.g., see Camras, Sachs-Alter, & Ribordy, 1996 for a review).

The majority of prior studies examining the link between emotion regulation and psychopathology have used normative samples. However, findings from a few available studies using independent maltreated samples suggest that emotion regulation is important for understanding linkages between maltreatment experiences and socioemotional maladjustment. For example, Maughan and Cicchetti (2002) found support for the mediational role of undercontrolled/ambivalent emotion patterns linking maltreatment and children's anxious/depressed symptoms. Shields and Cicchetti (2001) showed that emotion dysregulation mediated the effect of maltreatment on peer victimization. Furthermore, a longitudinal study by Rogosch, Cicchetti, and Aber (1995) demonstrated that maltreated children's deficits in understanding of negative affect mediated the link between earlier physical abuse and later rejection by peers.

Developmental progression of emotion regulation over the first four or so years of life is heavily influenced by parenting behaviors. During preschool and school-age years, children continue developing emotion regulation skills as they encounter increasing socialization demands from peers as well as from family (Trickett, 1998). Children's emotion regulation skills may represent a mechanism by which skills learned in the family context translate to the peer realm (Parke & O'Neill, 1999). Children who are more adept at regulating negative emotions show higher social competence in peer interactions (Calkins et al., 1999). In contrast, poor regulation (i.e., attentional and behavioral control) skills are significant predictors of maladaptive social functioning and peer victimization in young children (Eisenberg et al., 1995; Hanish et al., 2004). Previous literature has also established links between children's problematic peer relations and later psychopathology (Deater-Deckard, 2001; Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). Given these implications, peer acceptance and rejection were hypothesized as mediating processes linking emotional regulation and internalizing/externalizing symptomatology.

To date, we have a very limited understanding of how different aspects of maltreatment experiences are differentially related to emotion regulation development. The features of the maltreatment experience – such as type, multiplicity (i.e., experiencing multiple subtypes), and onset – may have significant independent effects on child outcomes (e.g., Manly, Kim, Rogosch, & Cicchetti, 2001). Prior research on underlying biological processes of emotion-regulatory problems implies differential effects of maltreatment subtypes. For example, physically abused children display enhanced perceptual sensitivity to angry facial cues, whereas neglected children have difficulties differentiating between and responding to expressions of emotion (Pollak, 2008). Experiences of multiple maltreatment subtypes are related to higher levels of adult-reports on behavior problems and peer-reports on disruptive behaviors (Trickett, 1998). The age of onset of maltreatment may also be an influential factor for socioemotional adjustment. Children who were maltreated earlier in life report lower levels of perceived internal control and higher levels of behavior problems than children whose maltreatment began later (Bolger & Patterson, 2001b; Keiley, Howe, Dodge, Bates, & Pettit, 2001). In light of previous findings, we examined how the parameters of heterogeneous experiences of maltreatment may differentially contribute to the developmental pathways linking emotion regulation and psychopathology.

In the emotion regulation literature, no prior study has tested an integrative model that involves both peer relations and maladjustment in examining the roles of emotion regulation in the development of psychopathology. In the present study, we simultaneously considered multiple levels of risk and protective processes (i.e., child's emotion regulation, maltreatment in the family, and peer relations) eventuating in different psychopathological outcomes (i.e., externalizing and internalizing symptomatology). We used a prospective longitudinal design to evaluate the hypothesis that earlier maltreatment experiences (particularly more severe subtypes, multiple subtypes, and earlier onset) are related to deficits in emotion regulation (Time 1), which in turn are associated with later maladjustment (Time 2) directly and/or indirectly through negative peer relations (Time 2), taking into account initial levels of maladjustment (see Figure 1).

Method

Participants

The participants included 421 children (215 maltreated and 206 nonmaltreated) who attended a week-long day camp program for inner city children from economically disadvantaged families. Children ranged in age from 6 to 12 years ($M = 8.11$, $SD = 1.77$). Consistent with gender ratios in the maltreated population, there were more boys than girls (64% boys). Children were from diverse ethnic backgrounds: 61% African American, 30%

European American, 7% Latino, and 2% other ethnic groups. The children were primarily from economically disadvantaged families: 80% of the families fell into the two lowest socioeconomic strata defined by Hollingshead (1975). The majority of children (68%) lived in families headed by single parents, typically mothers. The sample included children who participated in the camp for two consecutive years. Preliminary analyses indicated that children who attended the camp for both years did not significantly differ on adjustment outcomes from children who did not have data at the 1-year follow-up.

Maltreated children had been identified through the County Department of Social Services (DSS). Assessment of maltreatment history was based on multiple informants that included mothers, child protective services workers, neighbors, and other community members. Nonmaltreated children were recruited from families receiving Temporary Assistance to Needy Families (TANF) because the majority of maltreating families were receiving such income supplements. The demographic characteristics of these families were highly similar to those of the maltreating families, enabling us to assess the independent effects of maltreatment beyond the influences of socio-economical adversity.

Procedure

After obtaining parental consent and child assent, children participated in a variety of recreational activities in groups of six to eight same-age and same-sex peers. Half of the children in each of the groups were maltreated and the other half were nonmaltreated. Each camp group was led by three camp counselors who were unaware of the children's maltreatment status. The counselors were trained on completing assessments based on their observations and interactions with the children in their respective groups.

Measures

Maltreatment Classification System (MCS)—Specific maltreatment experiences were coded from DSS records using the MCS (Barnett, Manly, & Cicchetti, 1993) by trained doctoral students and by clinical and developmental psychologists. The MCS provided operational definitions and specific criteria to designate different subtypes of maltreatment. Severity of each subtype was rated along a 5-point scale, with 1 indicating mild maltreatment to 5 indicating severe maltreatment of the specified subtype. *Emotional Maltreatment* involved extreme thwarting of children's basic emotional needs, such as the need for psychological security and for age-appropriate autonomy. *Neglect* was coded when a responsible adult failed to meet a child's needs for food, clothing, shelter, medical, dental, or mental health care, adequate hygiene, physical safety, or education. *Physical Abuse* involved injuries that were inflicted upon a child by non-accidental means. Finally, *Sexual Abuse* was coded when any sexual contact or attempted sexual contact occurred between a child and caregiver for the caregiver's satisfaction or financial benefit. In the present sample, 79% of maltreated children experienced emotional maltreatment, 76% were neglected, 41% had been physically abused, and 14% had been sexually abused. Consistent with the high co-occurrence of subtypes that are found in the literature, 71% of the maltreated children in this sample experienced two or more forms of maltreatment. Adequate reliability was obtained for each maltreatment subtype with kappas ranging from .78 to 1.00 for these subtypes.

To consolidate subtype groups for comparison purposes, a hierarchical classification system was used, based on the degree to which the subtype violates cultural standards and the relative frequency of the different forms of maltreatment. Accordingly, children who had experienced sexual abuse were categorized as sexually abused ($n = 29$). Children who had been physically abused but not sexually abused were included in a physical abuse group ($n = 70$). Children with neglect experiences but not physical or sexual abuse were classified as

neglected ($n = 89$). Children who had experienced emotional maltreatment alone were included in an emotional maltreatment group ($n = 27$).

To investigate the cumulative impact of multiple subtypes of child maltreatment, we used the number of maltreatment subtypes and classified the maltreated children into low (1~2 types; $n = 147$) and high (3~4 types; $n = 68$) number-of-subtype groups. In order to incorporate the information of onset of maltreatment experience, the presence of maltreatment of any subtype was ascertained according to the developmental period(s) during which the maltreatment occurred before the children first came to the camp, including infancy (0 to < 18 months), toddlerhood (18 months to < 36 months), preschool (3~5 years), and school age (> 5 years). This information was used to divide the maltreated children into two groups: earlier onset (infancy or toddlerhood; $n = 181$) and later onset (preschool or school age period; $n = 34$).

Emotion Regulation Checklist (ERC)—Counselors' ratings on the Emotion Regulation subscale (8 items) of the ERC (Shields & Cicchetti, 2001) was used to capture processes central to adaptive regulation, including socially appropriate emotional displays, empathy, and emotional self-awareness. The higher scores indicate a superior capacity to modulate one's emotional arousal such that an optimal level of engagement with one's environment is fostered. Both construct validity and discriminant validity have been demonstrated for the ERC (Shields & Cicchetti, 2001). Nevertheless, in order to avoid overlap between scores on the emotion regulation scale and the internalizing symptomatology measures, the item "seems sad or listless" was removed and the Emotion Regulation composite was generated by averaging the 7 items to indicate both regulation (high scores) and dysregulation (low scores). Cronbach's alpha for the emotion regulation composite was .83.

Peer Nominations—At the end of the week of camp, the children were taken for one-by-one interviews where they were asked to name a peer from the group whom they liked most, liked least, and who best fit behavioral descriptions (e.g., cooperative, disruptive) using a measure developed by Coie, Dodge, and Coppotelli (1982). The total number of nominations each child received from peers in each category was determined, and these totals were corrected for differences in group size by converting them to proportions of the possible nominations in each category. We used the nominations of 'most liked' as an indicator of peer acceptance and 'least liked' as an indicator of peer rejection to assess positive and negative experiences of peer relations, respectively.

Teacher's Report Form (TRF)—Children's internalizing and externalizing symptomatology were computed by averaging across counselors' ratings on the TRF (Achenbach, 1991). Two broadband dimensions of child psychopathology were used including externalizing symptomatology (e.g., aggressive behaviors, delinquent behaviors) and internalizing symptomatology (e.g., withdrawal, somatic complaints, anxiety-depression). Inter-rater reliabilities (intraclass correlations) were .81 for externalizing symptomatology and .65 for internalizing symptomatology.

Results

Table 1 shows means and standard deviations for study variables. Maltreated children, compared to nonmaltreated children, exhibited significantly lower levels of emotion regulation and higher levels of internalizing and externalizing symptomatology at both Time 1 and Time 2. With respect to peer relations, maltreated children had higher levels of peer rejection, and also had lower levels of peer acceptance with a marginal significance. Zero-order correlations are presented in the electronic appendix ([URL address here](#)). To examine demographic factors as potential covariates for adjustment outcomes, we tested associations

of child age, gender, ethnicity (minority vs. non-minority), parent living arrangements (married/living with partner vs. not), and socioeconomic status (two lowest Hollingshead SES levels vs. not) with internalizing and externalizing symptomatology (Time 1 and Time 2). SES was negatively correlated with Time 1 internalizing symptomatology ($r = -.14, p < .05$) and Time 2 externalizing symptomatology ($r = -.10, p < .05$). SES was not significantly related to adjustment outcomes when it was tested as a covariate in the hypothesized models; thus, it was not retained in the main analyses.

In order to investigate longitudinal relations of maltreatment, emotion regulation, peer acceptance and rejection, and internalizing and externalizing symptomatology, we conducted structural equation modeling (SEM) with a maximum likelihood estimation method. Of key interest was examining 1) the role of emotion regulation in linking earlier maltreatment experiences and later adjustment problems, and 2) mediational processes by which emotion regulation is related to later maladjustment through peer relations, after controlling for the initial levels of maladjustment. Three models were examined separately for the effects of maltreatment subtypes (i.e., dummy variables indicating subtype groups of emotional maltreatment, neglect, physical abuse, and sexual abuse), multiple subtypes (i.e., dummy variables indicating 1~2 vs. 3~4 subtypes), and onset (i.e., dummy variables indicating early vs. later onset). In each model, we used dummy variables indicating whether a child belonged to a certain maltreatment subgroup or not, with the nonmaltreated group as a reference group.¹

Results for Figure 2 indicated that neglect ($\beta = -.20, p < .05$), physical abuse ($\beta = -.17, p < .05$), and sexual abuse ($\beta = -.12, p < .05$) were associated with emotion dysregulation, which was predictive of concurrent levels of internalizing and externalizing symptomatology. The strength of the influences on emotion dysregulation was not significantly different among neglect, physical abuse, and sexual abuse, $\Delta\chi^2 = .12, \Delta df = 2, p = .94$. For longitudinal predictions, higher emotion regulation was predictive of higher peer acceptance over time, which was related to lower internalizing symptomatology (controlling for initial levels of symptomatology). The pathways between emotion regulation and later externalizing symptomatology were more complex. Examining indirect pathways between Time 1 emotion regulation and Time 2 externalizing symptomatology revealed that lower emotion regulation (Time 1) was associated with higher externalizing symptomatology (Time 1) that contributed to later peer rejection (Time 2), which in turn was related to higher externalizing symptomatology (Time 2). In addition, emotional maltreatment, physical abuse, and sexual abuse were predictive of higher Time 2 peer rejection, which was related to higher Time 2 externalizing symptomatology. Physical abuse was also predictive of Time 2 internalizing symptomatology after controlling for the initial levels of symptomatology.

Turning to the hypothesized model testing the effects of cumulative maltreatment subtypes (see Figure 3), experiencing more subtypes of maltreatment increased the risk of emotion regulation problems as indicated by significantly stronger impact of experiencing 3~4 subtypes ($\beta = -.24$) compared to experiencing 1~2 subtypes ($\beta = -.17$), $\Delta\chi^2 = 3.93, \Delta df = 1, p < .05$. Higher emotion regulation at Time 1 was predictive of lower internalizing symptomatology at Time 2, mediated through higher peer acceptance at Time 2. The link between Time 1 emotion regulation and Time 2 externalizing symptomatology involved a sequence of mediators: lower emotion regulation (Time 1) was associated with higher externalizing symptomatology (Time 1) that contributed to later peer rejection (Time 2), which in turn was related to higher externalizing symptomatology at Time 2 (after controlling for the initial levels of symptomatology). A significant direct association was

¹Mean differences of emotion regulation among those maltreatment subgroups are reported in the electronic appendix (*INSERT URL HERE*).

also found between lower emotion dysregulation at Time 1 and higher externalizing symptomatology at Time 2. In addition, both experiencing 1~2 subtypes and experiencing 3~4 subtypes were related to higher peer rejection at Time 2, and experiencing 3~4 subtypes was also directly related to higher externalizing symptomatology at Time 2.

The path estimates in the model involving maltreatment onset predictors in Figure 4 demonstrated that earlier onset was predictive of emotion dysregulation ($\beta = -.24, p < .05$), whereas later onset was not ($\beta = -.08, p = .11$). The impact of earlier onset on emotion dysregulation was significantly stronger than that of later onset, $\Delta\chi^2 = 19.95, \Delta df = 1, p < .05$. Consistent with the other two models described earlier, Time 1 emotion dysregulation was related to higher Time 2 externalizing symptomatology involving two sequential mediators of higher externalizing symptomatology at Time 1 and peer rejection at Time 2. Higher emotion regulation at Time 1 was predictive of lower internalizing symptomatology at Time 2, mediated through higher peer acceptance at Time 2. Additionally, earlier onset of maltreatment was predictive of higher peer rejection, which was further related to higher externalizing symptomatology.

We conducted additional tests to confirm our path analysis findings of mediational effects of peer acceptance and rejection in the prospective relations between emotion regulation and psychopathology. The significance levels of the indirect effects in the two-path (single-mediator) context were tested using Sobel's approximate significance tests (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The mediational effects of Time 1 emotion regulation on Time 2 internalizing symptomatology through Time 2 peer acceptance were marginally significant ($Zs = -1.88 \sim -1.92, p = .06$). Next, we performed product-of-coefficients tests using Delta method standard errors to test the significance levels of the three- or four-path mediated effects (Taylor, MacKinnon, & Tein, 2008). The results indicated that the three-path mediated effects (i.e., two mediators in series) between Time 1 emotion regulation and Time 2 externalizing symptomatology, via two mediators of Time 1 externalizing symptomatology and Time 2 peer rejection, were significant ($Zs = -2.45 \sim -2.59, p < .05$). Testing of the four-path mediated effects (i.e., three mediators in series) between maltreatment predictors and Time 2 externalizing symptomatology (involving three mediators of Time 1 emotion regulation, Time 1 externalizing symptomatology and Time 2 peer rejection) revealed stronger mediated effects for neglect ($Z = 2.07, p < .05$) and physical abuse ($Z = 2.00, p < .05$) compared to sexual abuse ($Z = 1.75, p = .08$). Significant four-path mediated effects were found for other maltreatment predictors including experiencing 1~2 ($Z = 1.98, p < .05$) or more ($Z = 2.18, p < .05$) subtypes, and experiencing maltreatment earlier in life ($Z = 2.28, p < .05$).

Discussion

The present study extends current knowledge about the role of emotional regulation processes in psychopathology by illustrating how risk and protective factors in family (i.e., abuse and neglect) and peer (i.e., rejection and acceptance) contexts contribute to the link between emotion regulation and child psychopathology. Our longitudinal analyses revealed that maltreatment risk factors — particularly neglect, physical and/or sexual abuse, multiple subtypes, and earlier onset — were related to emotion dysregulation which contributed to later internalizing and externalizing symptomatology directly as well as indirectly through negative peer relations.

The distinctive forms of child maltreatment were differentially related to emotion regulation and adjustment outcomes. Our data revealed that neglect, physical and/or sexual abuse had detrimental effects on emotion regulation development. This finding is congruent with prior research showing neglected children's poor emotional regulation skills (Egeland, Sroufe, &

Erickson, 1983; Shipman, Edwards, Brown, Swisher, & Jennings, 2005) and physically abused children's deficits in emotional understanding (Rogosch et al., 1995). In contrast, children who experienced only emotional maltreatment did not show significant differences in emotion regulation than nonmaltreated children. In our study, emotional maltreatment involved persistent or extreme thwarting of children's emotional needs including the needs for psychological security and acceptance. It appears that such dysfunctional care-giving behaviors are particularly detrimental to the development of one's self-system even more so than one's ability to regulate emotional arousals. For example, Kim and Cicchetti (2006) reported that emotional maltreatment, controlling for other subtypes of maltreatment, had a significantly negative impact on the development of self-esteem and also was predictive of increases in depression among school-aged children. Our finding does not suggest that the effect of emotional maltreatment was negligible. Rather, when emotional maltreatment co-occurred with other subtypes, the joint effects were related to greater risks for emotion dysregulation.

As has been suggested by researchers and theorists, parents and other caregivers play an important role in structuring, explaining, and regulating the emotional world of children (Thompson, 2008). For maltreated children whose environments are unpredictable and frightening, their caregivers are often unavailable to provide the much-needed structure and regulation. Rather, physically abusive parents lack impulse control, especially when aroused perhaps because they are biologically predisposed to overreact to stressful stimuli (Milner, 2000), and neglectful parents are socially isolated (Crittenden, 1985) and show low empathic capacity, with poor impulse control and low verbal accessibility (Shahar, 2001). Neglectful and/or abusive parents are less likely to model or teach perspective-taking skills important to the development of empathy or to provide the support and scaffolding necessary for the development of emotional awareness (Shipman et al., 2005). Living in a threatening environment laden with distress and conflict, physically and sexually abused children almost constantly experience high levels of arousal and vigilance. Such sustained exposures to stress may alter biological stress responses and eventually produce deficits in children's capacity to effectively regulate emotions (e.g., Gunnar & Quevedo, 2007).

Our results provide compelling information that helps enhance the existing knowledge regarding the differential effects of diverse maltreatment dimensions on emotion regulation and maladjustment beyond the global maltreatment effect. There was evidence for cumulative effects of experiencing multiple maltreatment subtypes on emotion regulation development. In addition, experiencing maltreatment early in life was predictive of impaired emotion regulation. Specifically, children who experienced maltreatment during infancy-toddlerhood showed significantly lower emotion regulation compared to nonmaltreated children, whereas children who experienced a later onset did not. The findings converge with prior research showing additive effects of multiple maltreatment types on psychosocial difficulties (Clemmons, Walsh, DiLillo, & Messman-Moore, 2007) and detrimental effects of maltreatment occurring early in life on later behavioral/psychological adjustment (Kaplow & Widom, 2007). Consistent with the organizational-transactional model of development (Cicchetti, 1991), our findings illustrate that during infancy and toddlerhood, maltreated children are more likely to develop insecure attachment relationships with their caregivers, leading to difficulties with emotion regulation, which in turn may place these youngsters in pathways to problematic peer relations and behavioral maladjustment.

The association between maltreatment and emotion dysregulation also may be explained by neurobiological changes in the brain and its biological stress systems resulting from early maltreatment experiences. Maltreatment seems to affect neurobiological structure and functioning (Cicchetti & Tucker, 1994) and thus may influence emotion regulation processes. Indeed, maltreated children exhibit dysregulation of the hypothalamic-pituitary-

adrenal (HPA) axis following social interactions, indicating impaired ability to cope with stressors (Tarullo & Gunnar, 2006). In addition, brain-imaging studies indicate that the prefrontal cortex and right temporal lobe were smaller in children with maltreatment-related PTSD than sociodemographically matched controls (Tupler & De Bellis, 2006). Collectively, these findings suggest that early neglect and abuse experiences may affect one's neurobiologically-based capacity to regulate affective states and modulate behavior responses to stressors.

This investigation represents the first study to examine the longitudinal relations between emotion regulation and psychopathology among maltreated children. Our findings suggested that emotion dysregulation was not only associated with high levels of internalizing and externalizing symptomatology at the concurrent time, but was also predictive of increases in internalizing and externalizing symptomatology at 1-year follow-up. The current study dovetails with others demonstrating the significant role of emotion dysregulation in the development of child psychopathology in normative samples (e.g., Cole et al, 1996; Eisenberg et al., 2001). Furthermore, our findings suggest complexity in the developmental pathways that link emotion regulation and psychopathology through peer relations: Being accepted or rejected by peers contributed to different pathways of internalizing and externalizing symptomatology.

Consistent with previous findings that emphasized emotion regulation skills as a significant protective factor for maladjustment among children (Gottman, Katz, & Hooven, 1996), children who showed better emotion regulation and displayed appropriate affective behaviors were better accepted by peers, and were more likely to show decreased internalizing symptomatology over time. Thus, the findings elucidate the processes by which adaptive emotion regulation exerts protective effects for the development of internalizing problems beyond the effects of maltreatment risk factors. Adaptive emotion regulation may have facilitated children's abilities to establish positive peer relationships by promoting prosocial attributes (such as perspective-taking and empathy) that are critical to their social competence. In turn, positive peer relations seem to mitigate risk for internalizing symptomatology.

The prospective relation between emotion dysregulation and externalizing symptomatology involved more complicated indirect pathways. The significant indirect effects of emotion dysregulation on later externalizing symptomatology were mediated by two variables acting in turn – contemporaneous externalizing symptomatology and subsequent peer rejection. Some researchers have found that peer rejection has detrimental effects on subsequent adjustment (e.g., Dodge et al., 2003), whereas other researchers have demonstrated the contribution of externalizing problems to peer rejection (e.g., Bolger & Patterson, 2001a). Our results bring together both lines of research and further delineate how peer rejection contributes to the progression of externalizing symptomatology among children with emotion dysregulation. More specifically, maltreated children — particularly those who experienced the subtypes of neglect, physical and/or sexual abuse, multiple subtypes, and earlier onset — are more likely to have difficulties regulating emotions and show greater externalizing problems compared to nonmaltreated children. Because of disruptive and aggressive behaviors, they are more likely to be rejected by peers. Being deprived of important socialization experiences that positive peer interactions afford, those children become more vulnerable to stress and show increasingly higher levels of externalizing symptomatology. It is notable that processes that relate emotion regulation to psychopathology operate differentially for internalizing and externalizing symptomatology. It appears that the direct effects of emotion regulation at a concurrent time are stronger for internalizing symptomatology than externalizing symptomatology. In addition, the knowledge of concurrent levels of externalizing behaviors is crucial for understanding the

longitudinal effects of emotion regulation through peer rejection, whereas emotion regulation was directly related to later peer acceptance which was related to internalizing symptomatology. It should be reminded that internalizing and externalizing symptomatology often co-occur and the current study did not examine the co-occurring symptoms. More importantly, our findings of the longitudinal mediations help us to see that troubled parent-child relationships may lead to an emerging aberration in the organization of affective processes, which later results in problematic peer relations and further exacerbates psychopathology.

Some limitations of this study should be noted. First, the data, albeit longitudinal, are correlational. Thus, no firm conclusions can be drawn regarding causality in relations among the variables. Second, the cell sizes of the maltreatment subtype groups were too small to permit tests of interactions to examine whether the hypothesized relations among study variables vary by gender, and whether the effects of maltreatment onset vary depending on maltreatment subtype. Third, even though this study used multiple informants (e.g., DSS records, peers, and counselors), the use of additional informants (e.g., self-reports and parent ratings) in future studies is recommended to preclude possible biases resulting from shared method variance. It is possible that concurrent associations between emotion regulation and internalizing/externalizing symptomatology may have been overestimated because the behaviors were assessed by the same group of raters, whereas our findings of the longitudinal associations between emotion regulation and maladjustment should not have been affected by possible informant effects because those variables were reported by different sets of raters. Fourth, another important avenue for future research is to examine underlying genetic and neurobiological mechanisms involved in linking emotion regulation and child psychopathology (e.g., Deater-Deckard, Petrill, & Thompson, 2007). Finally, given gender differences in the effects of maltreatment on psychopathology and in the link between emotion regulation and children's adjustment, further work is necessary to gain a better understanding of gender differences in the prospective relations among maltreatment, emotion regulation, and psychopathology.

The findings of this investigation represent a significant stride in articulating emotional and social processes that contribute to the development of psychopathology. Our results offer insights toward developmentally informed models of the links between early adversity and subsequent maladjustment by specifying how emotion regulation and psychopathology outcomes are related to variations in maltreatment experiences, including subtypes, multiplicity, and onset. The findings also imply pathways to resilience in maltreated children by illustrating the protective effects of emotion regulation in relation to internalizing symptomatology that were exerted through enhancing peer acceptance. Furthermore, the findings highlight the importance of attending to peer relationship factors in intervention efforts for children with emotion regulation problems. Both prevention and intervention initiatives can be directed towards fostering opportunities for maltreated children to learn adaptive emotion regulation skills and then to apply such skills in social interactions with peers.

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Appendix A-1. Correlations among emotion regulation, peer relations and psychopathology

	1	2	3	4	5	6
Time 1						
1. Emotion regulation	-					
2. Externalizing symptomatology	-.44*	-				
3. Internalizing symptomatology	-.57*	.35*	-			
Time 2						
4. Peer acceptance	.19*	-.07	-.14*	-		
5. Peer rejection	-.22*	.28*	.19*	-.29*	-	
6. Externalizing symptomatology	-.22*	.60*	.14*	-.10*	.33*	-
7. Internalizing symptomatology	-.24*	.15*	.40*	-.19*	.16*	.35*

Note. $N = 421$.

* $p < .05$

Appendix A-2. Comparison of Emotion Regulation Based on Maltreatment Subgroup Membership

	<u>Emotion Regulation</u>		<u>Contrasts</u>
	<u>M</u>	<u>SD</u>	
<i>Maltreatment subtypes^a</i>			SA, PA, NG < NM
Nonmaltreated (NM, n = 206)	3.03	.47	
Sexual Abuse (SA, n = 29) ^b	2.81	.41	
Physical Abuse (PA, n = 70)	2.82	.42	
Neglect (NG, n = 89)	2.81	.46	
Emotional Maltreatment (EM, n = 27)	2.92	.46	
<i>F (df)</i>	5.77 *	(4, 416)	
<i>Number of maltreatment subtypes^a</i>			LO, HI < NM
Nonmaltreated (NM, n = 206)	3.03	.47	
Low (1~2; LO, n = 147)	2.87	.45	
High (3~4; HI, n = 68)	2.73	.40	
<i>F (df)</i>	13.12 *	(2, 418)	
<i>Onset of maltreatment^a</i>			EO < NM
Nonmaltreated (NM, n = 206)	3.03	.47	
Earlier onset (EO, n = 181)	2.81	.43	
Later onset (LO, n = 34)	2.90	.49	
<i>F (df)</i>	11.43 *	(2, 418)	

Note.

^aSignificant difference by maltreatment groups by Tukey range tests ($p < .05$).

^bA linear contrast was tested for SA vs. NM ($t = 2.48, p < .05$). Letters for Contrasts designate groups that are significantly different at the .05 level.

*
 $p < .05$.

Key points

- Prior research indicates a significant link between emotion regulation problems and children's maladjustment; however, much remains to be learned about the processes by which emotion dysregulation is linked to psychopathology.
- Our findings indicated significant effects of experiencing neglect, physical and/or sexual abuse, and earlier onset of maltreatment, as well as cumulative effects of multiple subtypes on emotion dysregulation. Emotion dysregulation was associated with higher externalizing symptomatology that contributed to later peer rejection, which in turn was related to higher externalizing symptomatology. Higher emotion regulation was predictive of higher peer acceptance over time, which was related to lower internalizing symptomatology.
- The findings highlight the importance of attending to peer relationship factors in intervention efforts for psychopathology among children with emotion regulation problems. Both prevention and intervention initiatives can be directed towards fostering opportunities for maltreated children to learn adaptive emotion regulation skills and then to apply such skills in social interactions with peers.

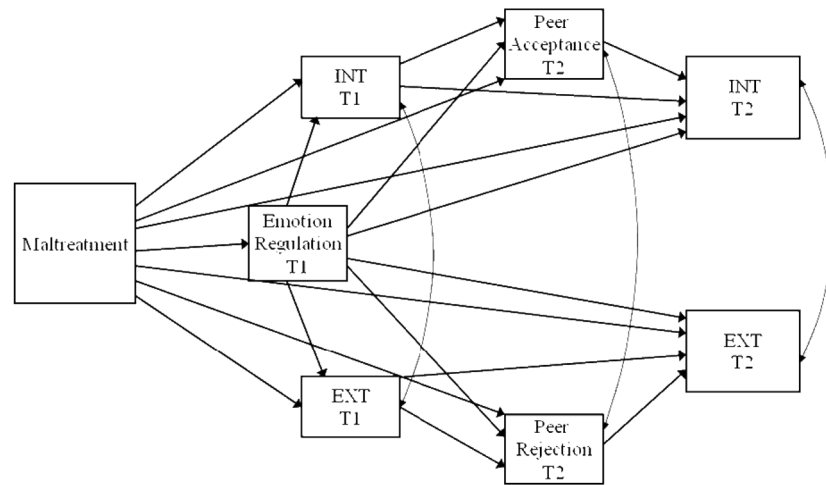


Figure 1. The proposed model for longitudinal relations among maltreatment, emotion regulation, peer relations, and internalizing (INT) and externalizing (EXT) symptomatology. T1=Time 1; T2=Time 2.

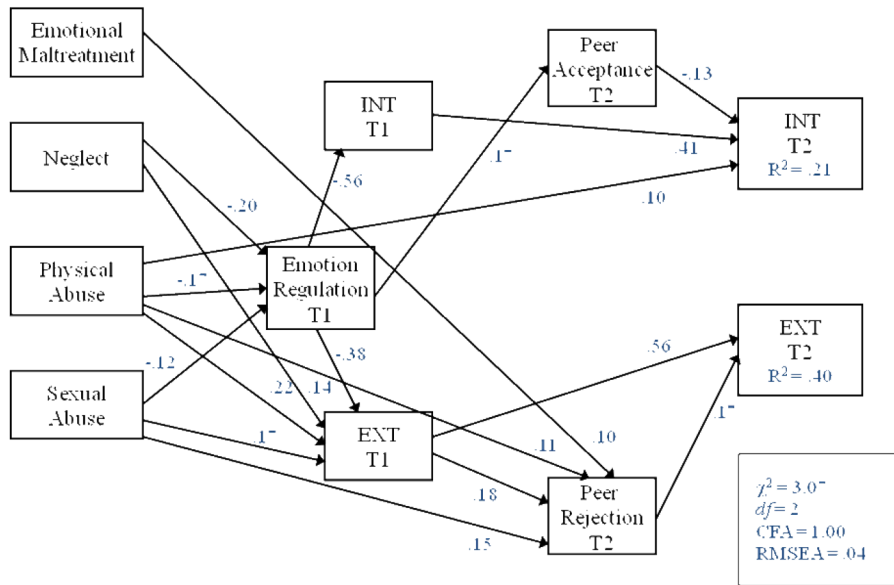


Figure 2. Maximum likelihood estimation (standardized coefficients) of longitudinal relations among maltreatment subtypes, emotion regulation, peer relations, and internalizing (INT) and externalizing (EXT) symptomatology. Only significant regression coefficients are displayed. T1 = Time 1; T2 = Time 2.

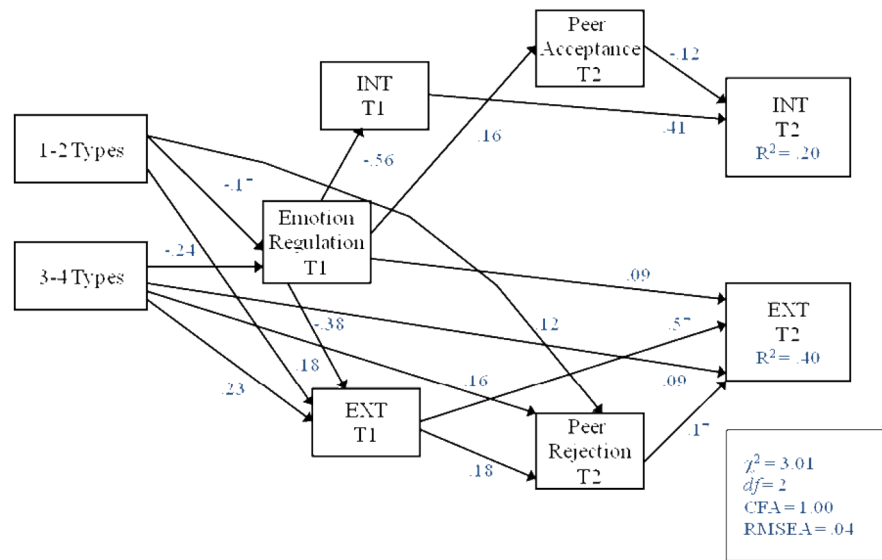


Figure 3. Maximum likelihood estimation (standardized coefficients) of longitudinal relations among multiple types of maltreatment, emotion regulation, peer relations, and internalizing (INT) and externalizing (EXT) symptomatology. Only significant regression coefficients are displayed. T1 = Time 1; T2 = Time 2.

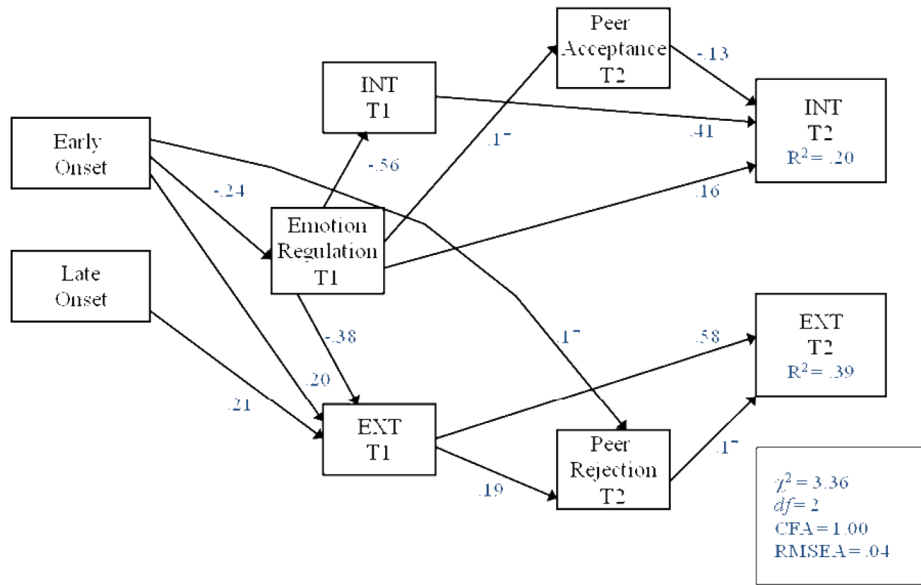


Figure 4. Maximum likelihood estimation (standardized coefficients) of longitudinal relations among onset of maltreatment, emotion regulation, peer relations, and internalizing (INT) and externalizing (EXT) symptomatology. Only significant regression coefficients are displayed. T1 = Time 1; T2 = Time 2.

Table 1

Descriptive Statistics for Maltreatment Subtypes and Comparison of Maltreated and Nonmaltreated Groups on Emotion Regulation, Peer Relations, and Maladjustment

Variables	Maltreated (n = 215)		Nonmaltreated (n = 206)		t
	M	SD	M	SD	
Emotional maltreatment (severity 1~5) ^a	3.58	1.25			
Neglect (severity 1~5) ^a	3.23	1.03			
Physical abuse (severity 1~5) ^a	2.70	1.00			
Sexual abuse (severity 1~5) ^a	3.00	.85			
Emotion regulation at Time 1	2.83	.44	3.03	.47	4.67*
Externalizing symptomatology at Time 1	57.22	9.54	51.30	8.30	-6.79*
Internalizing symptomatology at Time 1	53.20	8.93	50.03	8.28	-3.77*
Peer acceptance at Time 2	-.06	.93	.12	1.05	1.90(*)
Peer rejection at Time 2	.26	1.10	-.22	.86	-4.96*
Externalizing symptomatology at Time 2	57.34	10.49	52.80	9.31	-4.69*
Internalizing symptomatology at Time 2	53.45	9.01	51.31	7.32	-2.67*

Note. Severity scores were calculated among maltreated children who experienced the corresponding subtype; thus, n = 170 for emotional maltreatment, n = 164 for neglect, n = 87 for physical abuse, and n = 29 for sexual abuse.

* p < .05;

(*) p = .06.