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Differential Associations of Threat and Deprivation with Emotion Understanding in

Maltreated Children in Foster Care

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Abstract

Children in foster care are a remarkably heterogeneous group regarding their adaptation, and disrupted emotion understanding is one of the processes that may lead to differential outcomes in them. Previous research has found different effects for abused and for neglected children in emotion recognition. However, very few studies have analyzed more complex forms of emotion understanding in maltreated children while considering different adversity dimensions. The present study analyzed associations between threat and deprivation exposure and different facets of emotion understanding in a sample of maltreated children in foster care. The sample comprised 51 children from 4- to 9-years old ($M = 7.07$, $SD = 1.63$) in non-kin foster care in Spain. We used the Test of Emotional Comprehension to measure emotion understanding, and maltreatment reports to measure exposure to threat and deprivation. Threat exposure predicted enhanced external emotion understanding after controlling for age, vocabulary, and deprivation, particularly understanding emotions based on desires. Deprivation predicted worse external emotion understanding. Our findings reinforce the limits of cumulative risks models for understanding foster children's developmental outcomes and the value of assessing separately adversity dimensions when possible, given the variable relations of threat and deprivation exposure with social cognitive development.

Keywords: Emotion understanding; Early adversity; Dimensional model of adversity and psychopathology; Maltreatment; Foster care

Differential Associations of Threat and Deprivation with Emotion Understanding in Maltreated Children in Foster Care

Children in foster care show are a remarkably heterogeneous group, in part due to their variable experiences of adversity previously to their entry into care and how key psychological mechanisms are affected by these experiences (Goemans, van Geel, & Vedder, 2018). A fruitful avenue for research is to focus on those psychological mechanisms that may partially explain poor adjustment in this population, or, conversely, may foster resilience (Rutter, 2000). One of such mechanisms is emotion understanding (EU; de Rosnay, Harris, & Pons, 2008; Denham et al., 2003). Despite its potential as an intervention target, studies on more advanced EU beyond emotion recognition and in older ages than preschool age are rare in children exposed to early adversity. Furthermore, there is evidence that different types of adversity may affect differentially EU-related dimensions (Luke & Banerjee, 2013; Pollak, Cicchetti, Hornung, & Reed, 2000). Following these lines of inquiry, the aim of our study was to analyze EU in a sample of children in foster care exposed to early adversity from 4 to 9 years-old, in particular the associations of threat and deprivation—two dimensions of adversity—with different facets of EU.

Emotion Understanding

EU is the area of social cognition devoted to understanding, predicting and explaining emotions in ourselves and others, in which emotions are treated as an object of knowledge (Denham, 1998; Pons, Harris, & de Rosnay, 2004). It includes several aspects that progress in childhood from less to more complexity. According to the model of Pons and colleagues (Pons et al., 2004), around five years old, children can recognize the basic emotions, understand their situational causes or understand how emotions are related to personal desires, which has been named the external component of EU. At age seven, most children

understand the mental nature of emotions, the relation of personal beliefs or memories with them, and how a person can hide his or her real emotion while displaying another one, also named the mental component of EU. From age eight or nine, they begin to grasp more complex aspects like the potential to experience ambivalent or mixed feelings, to self-regulate emotions, or the influence of morality on emotional reactions, also known as the reflective component of EU (Pons et al., 2004). The Test of Emotional Comprehension (TEC) was developed by Pons and colleagues to capture these different components of EU, and the studies carried out so far have confirmed this hierarchical and progressive nature of EU development across preschool-age and middle childhood (Pons et al., 2004; Tenenbaum, Visscher, Pons, & Harris, 2004).

The development of EU is related to the quality of caregiving, including the security of attachment (Laible & Thompson, 1998) and the mental-state talking of the caregiver (Dunn, Brown, & Beardsall, 1991). Shaped by these early social influences, EU predicts later social competence with peers (Denham et al., 2003; Trentacosta & Fine, 2010). Given the relevance of early socialization for EU development, it is to be expected that neglect, abuse and other forms of inadequate caregiving impact the development of EU.

Conceptualizing the Developmental Effects of Early Adversity for Foster Children

Children in foster care have been typically exposed to various forms of early adversity, among them caregiver disruptions, prenatal exposure to drugs, or maltreatment (Fisher, 2015; Turney & Wildeman, 2017). Children in non-kin foster care (when the foster caregivers do not have a previous relationship with the child) seem to have experienced more cumulative adversity than children in other types of family placements as kinship care (when the foster caregivers are relatives or have a previous relationship with the child; Ehrle & Geen, 2002; Palacios & Jiménez, 2009). Consequently, this type of placement entails

challenges for foster caregivers who care for children exposed to severe adversity.

Understanding the developmental consequences of early adversity, therefore, is key for developing adequate interventions and supporting foster caregivers (Fisher, 2015).

One of the most dominant approaches to conceptualize the effects of early adversity on development has been the cumulative risk model, in one form or another (Felitti et al., 1998; McEwen, 2000). In this approach, different adverse childhood experiences (neglect, physical abuse, parental discord or caregiver mental health difficulties, among others) are treated as equivalent, and it is the accumulation of them which predicts maladaptive outcomes. The effects of cumulative stress are conceptualized as causing deficits and dysregulation in developmental systems (McEwen, 2000).

More recently, some authors have gone further by taking a more nuanced approach, in which complex adverse childhood experiences can be divided by underlying dimensions. The Dimensional Model of Adversity and Psychopathology posits that the adversity dimensions of deprivation (lack of species-expected social and cognitive input) and threat (presence of atypical learning experiences related with traumatic violence) can be measured separately and have distinct consequences on emotion, cognitive, and neurobiological systems (Lambert et al., 2017; Machlin et al., 2019; McLaughlin & Sheridan, 2016; Milojevic et al., 2019). Deprivation results in reduced abilities for complex cognitive functions due to the lack of adequate scaffolding and interactions with caregivers, whereas threat involves changes in neural circuits related with fear learning, emotion regulation and reactivity to negative affective stimuli (Lambert et al., 2017; Machlin et al., 2019; Milojevic et al., 2019). Another recent advancement regarding the conceptualization of the developmental effects of early adversity is to consider early stressful rearing conditions as causing not merely cognitive deficits and dysregulation, but also as regulating and shaping developmental systems toward patterns of functioning that are adaptive in stressful environments—even though they may

come with long-term costs such as anxiety or aggression due to social information processing and attention biases (Ellis, Bianchi, Griskevicius, & Frankenhuys, 2017).

Early Adversity and Emotion Understanding

These two critiques of the cumulative risk model have been empirically illustrated by the research of Pollak and colleagues on the effect of maltreatment on emotion recognition. They found that physically abused children (but not neglected ones) showed an attentional bias toward detecting anger in facial expressions of emotion, which could be adaptive if growing up in a physically abusive environment, whereas neglected children showed a general deficit in emotion recognition (Pollak et al., 2000). The finding of enhanced detection of some emotions in children exposed to physical abuse and violence have been replicated in several other studies (Ardizzi et al., 2015; da Silva Ferreira, Crippa, & de Lima Osório, 2014), although some early studies did also find a general deficit in emotion recognition among abused children (Camras et al., 1988; During & McMahon, 1991). However, studies in which both neglect (as a form of deprivation exposure) and abuse (as a form of threat exposure) have been tested separately are rare. Furthermore, it was found in a large population-based study that adversity exposure did not predict emotion recognition deficits, although the measurement of adversity based on parent reports was a limitation in this study (Dunn et al., 2018).

The line of research of emotion recognition by facial emotion processing is framed within an affective neuroscience tradition. Albeit not unrelated, more advanced forms of EU are typically tested through vignettes and hypothetical situations related to emotions (Pons et al., 2004). Using this kind of tasks, previous studies have found that preschool-aged, post-institutionalized children showed deficits in EU, predominantly in aspects like understanding the external causes of emotion, emotion recognition, or affective perspective-taking (Barone

& Lionetti, 2012; Fries & Pollak, 2004; Tarullo et al., 2015). Research with children who suffered family neglect instead of institutionalization has also shown poorer external EU in neglected children than in community controls (Edwards, Shipman, & Brown, 2005), even after controlling for language skills (Sullivan, Bennett, Carpenter, & Lewis, 2008). Children exposed to multiple types of maltreatment beyond neglect—including physical maltreatment—have also been found to show poor EU (Luke & Banerjee, 2013; Pears & Fisher, 2005a; Shipman & Zeman, 1999; Smith & Walden, 2001). A recent study analyzed the associations between threat and deprivation adversity and social-cognitive dimensions (both theory of mind and EU) among children aged 8-16. Violence exposure predicted poorer EU, which was unrelated to poverty and emotional neglect as a form of deprivation (Heleniak & McLaughlin, 2019). These researchers remarked that future research in this area should focus on how specific aspects of adversity disrupt specific aspects of social cognition.

Despite the advancements presented by the reviewed studies, there are still relevant issues that remain unanswered in this area. The studies on the EU development of children exposed to early adversity beyond preschool age are very limited, and few of them address more advanced forms of EU than the most basic, external aspects of EU. The absence of studies analyzing more advanced forms of EU in children exposed to early adversity raises other related questions, particularly if threat and deprivation exposure show distinct associations with different facets of EU beyond emotion recognition, as Heleniak and McLaughlin pointed out (2019).

A study tackling these issues could be informative for several reasons: it would provide information on the possible socio-cognitive deficits of maltreated children in foster care beyond preschool age, which could inform interventions preventing social behavior difficulties. In fact, a qualitative study found that foster caregivers viewed socio-cognitive difficulties as a relevant mechanism for explaining foster children's peer relationship

problems (Luke & Banerjee, 2012). The analysis of the distinct associations of the dimensions of threat and deprivation with different facets of EU could shed further light on the variable relations between different adversity dimensions and social-cognitive development.

Aims

Our aim in this study was to extend previous work on the EU of children in foster care exposed to maltreatment following these lines of inquiry. To this end, we analyzed EU in a sample of 4- to 9-years-old children in non-kin foster care. We also tested the associations of threat and deprivation with EU and its different facets, after controlling for language skills. We expected that deprivation would predict poorer EU, even after controlling for language. Regarding the effect of threat, the previous literature was not very consistent, so we did not have a specific prediction.

Method

Design

The current study presents results from a broader project focused on foster children's socio-emotional and cognitive development and family processes within non-kin foster families (placements in which the foster caregivers are not direct relatives of the foster children) in Andalusia (South of Spain). The eligibility criteria for recruitment was foster children aged between 4 and 9 years old, non-kin foster families, absence of a severe disability in the foster child, and at least five months having elapsed since the beginning of the current placement.

Ethical Statement

The research project was reviewed and approved by an independent ethical board, the regional government's Ethics in Biomedical Research Committee (guided by the Helsinki Declaration). Further approval was obtained from child protective services and local foster care agencies. Informed consent forms were signed by the main foster caregivers and verbal assent for participation in the study was obtained from the children (when applicable).

Participants

The final sample comprised 51 foster children between 4 and 9 years old ($M = 7.07$, $SD = 1.63$); 27 of them were girls (52.9%). Their age of entry into care ranged between 0 and 7 years and 9 months ($M = 3.67$ years, $SD = 2.00$), and they had been between 5 months and 8 years in their current foster placement at assessment ($M = 2.24$ years, $SD = 2.06$). Out of 65 potential participants meeting the study inclusion criteria, six were not able to participate because the foster care caseworkers declined participation due to other assessments or transitions going on. Another seven children did not participate because their foster caregivers refused to participate due to lack of time or stressful circumstances. Attrition analyses did not reveal any differences in available parameters (age of entry into care, age, and gender) between participating and non-participating children ($n = 13$). One foster child was excluded after participation due to not complying with the study inclusion criteria after examination of records. The foster children had antecedents of maltreatment and other kinds of early adversity, and came from birth families with multiple risk factors, as is usual in this population.

Procedure

The foster families received a two-hour home visit by two trained psychologists. While the main foster caregiver answered a semi-structured interview and a battery of questionnaires with one researcher, the child completed different socio-emotional and

cognitive assessments with the other researcher, including the TEC. We collected information on the foster children's pre-placement experiences, child protective records and birth family from the foster children's case records with the assistance of the foster care agencies.

Measures

EU. We used the Test of Emotional Comprehension to assess EU, which was designed to be administered to children between 3 and 11 years old (Pons et al., 2004). This measure is based on stories depicted in vignettes in which the child must guess the protagonist's emotion. The stories are presented verbally to the child with the aid of cartoon scenarios, who must then choose the correct emotion depicted in four cartoon facial expressions of different emotions (see Figure 1 for a sample vignette of the measure). The child's choice was written by the evaluator and coded later as correct or incorrect (for more details on the administration of the TEC see Pons et al., 2004).

[FIGURE 1 AROUND HERE]

The situations are arranged in a hierarchical order of increasing difficulty following nine components: I) recognizing emotions in facial expressions, II) understanding the external causes of an emotion, III) understanding of emotions based on personal desires, IV) understanding of emotions based on personal beliefs (similar to a false-belief task), V) understanding the effect of a reminder in an emotion, VI) understanding how to regulate emotions, VII) understanding the potential to hide emotions, VIII) understanding mixed emotions, and IX) understanding moral emotions.

The TEC can be scored in two different ways. First, with a 0-9 total score summing its nine components, with one point for each component successfully answered. It can also be scored by sets of increasing difficulty with three components each. The first, labeled *external*, includes the first three components: recognizing emotions, understanding the external causes

of emotions, and desire-based emotions. The second set is named *mental* and it focuses on the relation of mental processes and emotions. It includes understanding belief-based emotions, the effect of a reminder on emotions, and the distinction between expressed and felt emotion (Components IV, V, and VII). The last set is named *reflective* and includes understanding strategies to regulate emotions, the possibility of experiencing mixed emotions, and the effect of morality on emotions (Components VI, VIII, and IX). The three components in each set are summed, providing a 0-3 score for each set. A total score summing all the components (0-9) is also provided by the measure. We used both the sets (external, mental, and reflective) and the total score in this study. The measure has been used with Spanish at-risk and community samples before (Román, Palacios, Moreno, & León, 2013; Fidalgo, Tenenbaum, & Aznar, 2018). Internal consistency in our study was in the range found in previous studies using the TEC ($KR-20 = .64$; Fidalgo et al., 2018).

Vocabulary. We used the expressive vocabulary subtest of the Kaufman Brief Intelligence Test (K-Bit; Kaufman & Kaufman, 1990) to assess vocabulary as an index of language development. This test comprises 45 progressively more difficult items, scored as incorrect (0) or correct (1). Standardized scores for age and gender are provided with the measure.

Threat and deprivation scores. To construct the threat and deprivation scores, we used data from systematized maltreatment reports completed at the child's entry in the Child Protective Services. These maltreatment reports follow a regional system of classification of maltreatment indicators including the most common categories of maltreatment (Observatorio de la Infancia de Andalucía, 2011). For each category, there are several indicators scored in a dichotomic way (0 = "not present", 1 = "present").

We selected the indicators for the threat and deprivation scores following previous empirical works and the theoretical definitions of threat and deprivation (Lambert et al., 2017; McLaughlin & Sheridan, 2016). The 17 items selected for the threat score included indicators of physical and emotional/verbal abuse, whereas the 21 selected for the deprivation score were mainly of physical, cognitive, and emotional neglect (see Supplementary material). The items in each scale were summed to obtain a continuous score of threat and deprivation, with higher scores representing higher exposure to each adversity dimension. Both scales showed good reliability (threat scale $\alpha = .82$, deprivation scale $\alpha = .81$).

Sociodemographic, adversity, and placement covariates. Information about several potentially confounding sociodemographic, adversity and placement variables was collected from the foster children's case records. The collected information was about prenatal risk factors (prenatal exposure to drugs and premature birth), birth caregiver risks (presence of mental disorder or disability, substance abuse, and delinquency records or stays in prison), all coded dichotomically (risk factor not present or lack of information = 0, risk factor present = 1). Data on placement variables (age of entry into care, number of months in current foster placement, number of placements moves, and number of months in residential care) and on the educational level of the main foster caregiver was also gathered. This last variable was coded as follows: 1 = "no formal education", 2 = "elementary education", 3 = "secondary education/high school", 4 = "professional training", and 5 = "college degree".

Data Analysis Plan

First, descriptive data for the EU and vocabulary scores were presented. When available, they were compared with standardized norms as a reference point or using students' *t* for means comparison. There were no missing data in the sample. Before the main analysis using multiple linear regressions, we conducted Pearson bivariate correlations to

evaluate potentially confounding factors, including all the sociodemographic, adversity and placement variables. None of the variables were related to any of the dependent and independent variables except for number of months in current foster placement, which was a confounding factor for mental EU and was controlled for in the relevant analysis.

Then, four multiple linear regression models with each EU score (external, mental, reflective, and total EU) as a dependent variable followed; age, vocabulary and other covariates were entered in the first step of the models, and the threat and deprivation scores were added in the second step to see if they explained additional variance. Assumptions of collinearity, independence of errors, normality, homogeneity of variance and linearity for multiple linear regression were satisfactorily met following examination of appropriate parameters and graphs.

When an EU set showed a significant association with either threat or deprivation, we conducted partial Pearson correlations controlling for age, language and the other adversity variable (threat or deprivation) between each of the three components in that EU set and the related adversity variable. Several variables violated the normality assumption. We conducted non-parametric partial Spearman correlations and compared it with the results obtained when conducting partial Pearson correlations. The comparison of Pearson and Spearman correlations coefficients showed no statistical differences between each pair of coefficients (Lenhard & Lenhard, 2014), so we presented the parametric partial Pearson correlations in the Results.

Results

Descriptive Data of Main Variables

The mean level of total EU in the sample of foster children was 6.43 ($SD = 1.92$), which was not significantly different compared with normative data from the measure's

standardization, community sample ($M = 5.80$, $SD = 1.73$; $t(69) = 1.28$, $p = .206$; see Pons, Harris, & de Rosnay, 2004). External EU was the set with the best performance ($M = 2.61$, $SD = 0.66$), followed by mental EU ($M = 2.06$, $SD = 0.84$) and, in the last place, reflective EU ($M = 1.76$, $SD = 0.91$). The vocabulary score of the foster children was also in the normative range ($M = 96.39$, $SD = 13.70$) according to the K-Bit Spanish standardization norms. The threat score showed a range between 0 and 8 and a mean of 2.27 ($SD = 2.10$), whereas the deprivation score ranged between 0 and 18 and its mean was 4.37 ($SD = 4.37$).

Adversity Dimensions and EU

The correlation matrix of the variables included in the regression models are shown in Table 1. The standardized coefficients, R^2 , and F of step one and two, as well as the change in R^2 and F for the four multiple linear regression models predicting EU scores are presented in Table 2. All regression equations were significant, both in the first and second steps. However, only in the model predicting external EU did the inclusion of the threat and deprivation variables result in a significant change in R^2 .

[TABLE 1 AROUND HERE]

Our preliminary analysis of Cook's D to detect outliers pointed to one outlier in each one of the models predicting external, reflective, and total EU (all were of legitimate origin). The repetition of the analyses after deleting the outlier in each case showed that it did not significantly change the results in the first two cases, so we chose not to drop them. In the model predicting total EU, after deleting the outlier, the effect of deprivation on total EU drastically lowered, so we decided to drop the outlier in this model (Osborne & Overbay, 2008).

As expected, age significantly predicted higher external, mental, reflective and total EU, indicating that the older children performed better in the EU task. Vocabulary was

positively related to all EU sets and to the total EU score. Regarding threat and deprivation, they were significant predictors only with external EU, in opposite directions: the threat score was positively related with external EU—indicating that higher threat scores were associated with better external EU in the sample—, whereas the deprivation score was a significant predictor of poorer external EU.

[TABLE 2 AROUND HERE]

Among the components within the external EU set (emotion recognition, external cause and desire), threat showed a positive partial Pearson correlation of medium size ($r = .32, p = .026$) with the desire component after controlling for age, vocabulary and the deprivation score. The partial correlation of threat with the recognition component ($r = .20, p = .165$) and with the external cause component ($r = .23, p = .114$) were non-significant. Higher deprivation was significantly associated with worse performance in the desire component ($r = -.46, p = .001$), whereas in the case of recognition ($r = -.25, p = .093$) and external causes ($r = -.23, p = .119$) the correlations were non-significant.

Discussion

In this article, our aim was to analyze EU in foster children exposed to early adversity more comprehensively than in previous works. Specifically, we tested the associations of distinct dimensions of early adversity, threat and deprivation, on the different aspects of EU to see if they showed an association beyond that of language, and if that relation was different depending on the adversity dimension. Our results showed that threat and deprivation showed distinct associations with the most basic aspect of EU, external EU; after controlling for age and language, threat exposure predicted better external EU and deprivation exposure predicted worse external EU. Neither threat nor deprivation exposure predicted mental, reflective or total EU.

The descriptive analyses showed that the foster children did not show differences at a group level with children from the measure's standardization sample with a comparable mean age, nor did they show deficits in vocabulary skills. The lack of an appropriate control group, however, limits this comparison. Some studies with other early-adversity exposed children have shown that emotion recognition was not seriously delayed in the children, and it has been argued that the school context and the peer relations may partially compensate for poor caregiving in this domain (Moulson et al., 2015). Negative findings on the relation between adverse experiences and emotion recognition have also been reported in the large study by Dunn and colleagues (2018).

Although they apparently did not show deficits in EU at a group level, our main interest was to determine within-group variability in EU outcomes, specifically how threat and deprivation adversity were related to various aspects of EU. Deprivation in the form of neglect was a significant predictor of worse external EU, which is composed by the components of accurately recognizing emotions, identifying situational causes of emotion (e.g., a person will feel happy if she receives a gift) and understanding that emotional reactions are related to personal desires (e.g., if a person likes lettuce, he will be happy if he has lettuce for lunch; Denham, 1998; Pons et al., 2004). It was noteworthy that this effect stood after controlling for the children's language development, known to be delayed in neglected children (Pears & Fisher, 2005b). Neglecting caregivers have been found to provide less support to their children's emotional displays, engage in less emotional discussion and report more negative emotion, undermining the children's opportunities for learning about emotions and, consequently, their EU development (Edwards et al., 2005), as other previous studies have also found (Fries & Pollak, 2004; Sullivan et al., 2008). It is not clear why deprivation was related with external EU but not with mental and reflective EU,

although it may be related to the higher importance of language in more advanced forms of social cognition (Harris et al., 2013).

The most intriguing finding was that, in contrast to what was found with deprivation, threat predicted better external EU. A speculative plausible explanation may be related to an adaptation to an abusive family context, following Pollak and colleagues' finding of enhanced detection of anger in children exposed to physical maltreatment, but not in neglected ones (Pollak et al., 2000). The threat score comprised indicators of physical and emotional/verbal abuse such as bruises, using extreme punishments, threatening the child, chronic domestic violence, or putting the child in dangerous situations to create fear in him or her. Considering that the effect found was mainly based on the component of understanding the relations between a person's desires and his or her emotional reaction, such hostile parenting behaviors may have enhanced the children's cognitive appraisal of the emotional reactions of a person based on his or her desires. Although this explanation seems theoretically plausible, replication with larger samples and more complex study designs would be necessary to confirm this finding. Information on the valence of the emotions attributed by the children may add useful information for testing the proposed hypothesis.

Limitations and Future Directions

Certainly, the design of our study does not allow us to determine the direction of effects of our findings. It is possible that those children with poorer EU may elicit more deprivation in their caregivers; however, the extensive evidence on the role of parental socialization practices as predictors of EU and social cognition suggests a parent-to-child-effect as the preferred interpretation (Edwards et al., 2005; Luke & Banerjee, 2013). The small sample size is a general limitation of this study, especially when considering effect sizes of small magnitude. Another major limitation was that the lack of a control group

limited the comparison of the foster children's level of EU with that of typically developing children.

We measured maltreatment from child protection services administrative records, which is a well-established way of measuring maltreatment in research (Barnett, Manly, & Cicchetti, 1993). The availability of such a detailed third-party information, which is not retrospective but completed at the child's entry in the child protection system, have allowed us to construct continuous scores of threat and deprivation exposure with the potential to capture differences along severity of exposure. Nevertheless, the information substantiated in child protection records may be that one most easily proved by social workers, rather than a full account of the children's lived experience. For example, previous research has shown that substantiated and unsubstantiated cases for maltreatment in child protection services do not differentiate with regard to later health outcomes or risk for later reports of maltreatment (Kohl, Johnson-Reid, & Drake, 2009; Kugler et al., 2019). Therefore, some information relevant for understanding the children's maltreatment experiences may have been missing. Other studies assessing older children have relied on interview or self-report measures such as the Violence Exposure Scale for Children or the Childhood Trauma Questionnaire (Heleniak & McLaughlin, 2019). It is possible that different methodologies in the measurement of maltreatment exposure are related with the variable findings regarding adversity exposure and social cognition in different studies.

In future studies, it would be important to incorporate a control group, either a low-risk, community sample or other group of children exposed to early adversity. Although our study included a broader age range than most previous studies focused on preschool-aged children, studies in later developmental stages would be interesting to follow on the consequences of early adversity on social cognition. An interesting venue for research is to study in more detail the hypothesis of how certain aspects of EU in children exposed to threat

may be related to the pattern of hypervigilance and bias to anger cues believed to be adaptations to a maltreating environment (McCrory, Gerin, & Viding, 2017).

Conclusions and Implications for Practice

In sum, although the foster children did not show apparent deficits at a group level in EU, our within-group analyses provided further evidence that early adversity experiences characterized by significant threat and those characterized by deprivation show different associations with EU skills. Our main findings have some relevance both for theory and for practice. Regarding theory, they highlight the limits of cumulative risk models in research with children exposed to early adversity. The opposite relation of the adversity dimensions of threat and deprivation with some aspects of EU reinforce the value of differentiating between different types of adverse experiences when possible, also in research on psychological mechanisms (Lambert et al., 2017; Milojevich et al., 2019). Although the variable effects of adversity dimensions on social cognition seem established, the specific role of adversity dimensions seems rather inconsistent. Future research could expand these research findings assessing the differential effects of threat and deprivation exposure on social cognition in larger samples of children in foster care or in other populations of children exposed to early adversity.

Regarding practice implications, even though the co-morbidity between different kinds of adverse experience is the norm, our findings reinforce the idea that a one-size-fits-all approach for intervention with foster children exposed to early adversity is not adequate. Given the efficacy of different interventions in improving socio-cognitive skills (Sprung, Münch, Harris, Ebesutani, & Hofmann, 2015), preventive interventions informed by the children's past experiences could be a meaningful way to help foster children exposed to early adversity develop the necessary skills to navigate social contexts.

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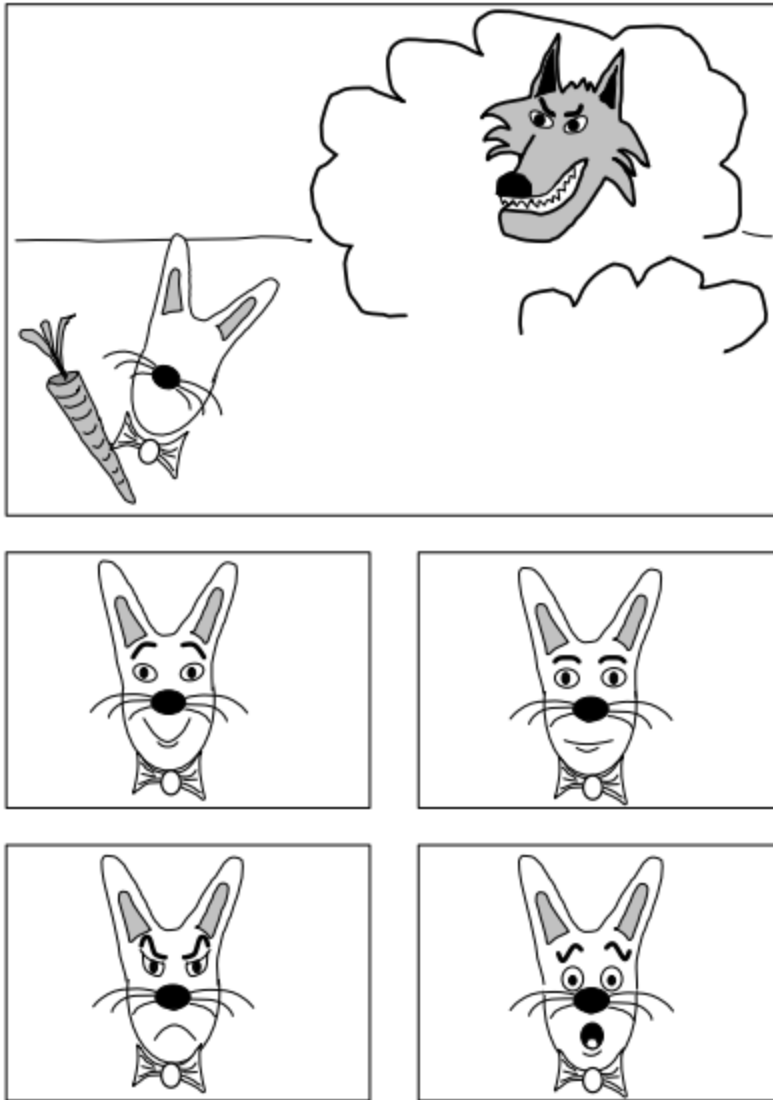
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Figure 1



Sample vignette from the TEC including cartoon facial emotion outcomes (adapted from Pons et al., 2004). Component IV (belief). In this component, the child is told that the rabbit is eating a carrot and helped to understand that the rabbit is not aware of the wolf hidden in the bush. He or she is then asked how the rabbit feels. The correct answer is happy (similar to a false-belief task).

Table 1.

Correlation matrix of covariates, adversity scores and EU scores

	1.	2.	3.	4.	5.	6.	7.	8.
1. Age								
2. Vocabulary	-.20							
3. Time in current placement (months)	.46**	-.02						
4. Threat	-.21	-.17	-.39**					
5. Deprivation	-.31*	-.20	-.22	.47**				
6. External EU	.46**	.29*	.22	-.04	-.52**			
7. Mental EU	.57**	.25	.32*	-.24	-.35*	.55**		
8. Reflective EU	.42**	.18	.11	-.06	-.20	.37**	.44*	
9. EU total	.61**	.30*	.27	-.14	-.43**	.76**	.83**	.79**

Note: EU = Emotion understanding.

** $p > .01$, * $p > .05$.

Table 2

Summary of regression analyses predicting EU scores by threat, deprivation and covariates

Variables	External EU		Mental EU		Reflective EU		Total EU	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	β	β [95 % CIs]	β	β [95 % CIs]	β	β [95 % CIs]	β	β [95 % CIs]
Age	.54***	.45*** [.23, .67]	.64***	.61*** [.32, .85]	.48***	.49** [.21, .77]	.68***	.68*** [.43, .85]
Time in current placement	-	-	.03	.03 [-.22, .31]	-	-	-	-
Vocabulary	.39**	.34** [.12, .56]	.38**	.36** [.12, .58]	.28*	.29* [.02, .56]	.43***	.44*** [.20, .60]
Threat		.34** [.11, .57]		.00 [-.24, .30]		.12 [-.18, .41]		.20 [-.02, .41]
Deprivation		-.47*** [-.71, -.23]		-.09 [-.31, .27]		-.05 [-.35, .26]		-.13 [-.39, .11]
R^2	.36	.54	.47	.48	.25	.26	.50	.54
F	13.40***	13.46***	13.85***	8.17***	8.05**	4.07**	23.23***	12.97***
ΔR^2		.18		.01		.01		.04
ΔF		9.03***		.28		.31		1.86

Note: EU = Emotion understanding.

Bolded values indicate 95 % confidence intervals that do not include zero in step 2 of the regression models.

*** $p < .001$, ** $p < .01$, * $p < .05$