RESEARCH ARTICLE

INFANCY THE OFFICIAL JOURNAL OF THE INTERNATIONAL CONGRESS OF INFANT STUDIES WILEY

The terrible twos: How children cope with frustration and tantrums and the effect of maternal and paternal behaviors

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Abstract

Experimental *Frustration Procedures* with 158 children (15–39 months) of two-parent families were conducted, with each parent separately involved. We examined diverse characteristics of children's frustration and focused on specific behaviors of how children coped and parents supported them. In addition, external observers measured child attachment security (via *Attachment Q Sort*) toward the mother and the father during two home visits. Children with high attachment security became frustrated later and for a shorter time, and fathers, as compared to mothers, relieved these frustration patterns and reduced them. Although 22.2% children exhibited intense frustration responses up to tantrums, levels remained unaffected by child gender, but decreased with child age. Time-lag analyses revealed that children's *self-comforting* behaviors reduced frustration responses only by around 20%, but *self-distracting* (in younger children) and *pretend-playing* (in older children) by around 50% and 70%. Of the parent behaviors, *demonstrating* reduced children's frustration by up to 40% whereas *distracting and reframing* by around 60% (mothers) and 80% (fathers). In general, mothers tended to protect the child from distress, whereas fathers assisted the child in coping with frustration. However, if

mothers soothed and fathers encouraged, children's frustration intensified.

KEYWORDS
frustration intensity, tolerance and duration, child coping strategy, parent–child attachment

Frustration is a negative emotional reaction that relates to disappointment and anger. It might also cause temper tantrums early in child development, which are one of the common behavioral problems reported by parents of young children (e.g., Degnan et al., 2008; Rescorla et al., 2011). Tantrums typically start in the course of the second year when children are known to experience the "terrible twos." If they are frequent and prolonged, they might lead to manifestation of externalizing psychopathology in childhood (Belsky et al., 1996) and are therefore an item on a number of scales identifying externalizing child behaviors (see Achenbach & Ruffle, 2000). Understanding the interplay between frustration in children and their parents' responses can guide parents in managing tantrums. This understanding can support child prevention programs to deal with parenting throughout an important domain of children's emotional socialization (see Eisenberg et al., 1998).

Only a few researchers have explored tantrums and concomitant emotions in naturalistic situations (see Potegal, 2019). Nevertheless, many studies designed experimental situations to elicit frustration, mainly while the children were hindered from reaching a desired outcome (see Appendix 1 for an overview). It has been shown that the more difficult the anticipated outcome, the greater the frustration, and the more likely tantrums occurred. However, neither the ontogeny of frustration nor the conditions under which it occurs and disappears in early childhood are fully understood to date.

1 | CHILDREN'S COPING WITH FRUSTRATION

Children's frustration manifests in different negative emotions as observed by facial expression, vocalization, and body tension as well as negative behaviors ranging from protest to aggression (see Appendix 1; Potegal, 2019). Most importantly, however, frustration varies according to intensity and duration, which have both been related to the strength of frustration (e.g., Leerkes, & Wong, 2012), whereas the latency until frustration is displayed might reflect frustration tolerance (e.g., Braungart-Rieker et al., 1996). Furthermore, various child behaviors serve to cope with frustration, such as self-comforting, perhaps to inhibit the emerging arousal. However, with increasing age and maturing cognitive abilities, children use self-distraction and pretend play to reappraise the situation or solicit help from their parents (e.g., Braungart-Rieker et al., 2001; Ekas et al., 2013; Stifter & Braungart, 1995). The role of child gender, on the other hand, is much less clear. Studies suggest that during development, boys increasingly inhibit the expression of most emotions, whereas girls increasingly inhibit the expression of socially unacceptable emotions (e.g., anger). Because these differences may be a result of different socialization processes for boys and girls, researchers searched for parental styles in the socialization of emotion. They revealed inconsistent results as a function of different familial, sociocultural, and interpersonal roles to which parents want their children to adapt (e.g., Brody, 2006; Denham et al., 2010; Fivush et al., 2000; Weinberg et al., 1999).

2 | THE PARENT–CHILD RELATIONSHIP AS RELATED TO CHILD FRUSTRATION

The present study aimed to illuminate the behaviors of parents and their role in the context of child frustration. Attachment theory laid out the emotional interplay between children and their parents, which features an important mechanism: Parents, who are available in critical situations and who provide support to their children facing emotional challenges, have children whose moods are better regulated and are more emotionally competent (e.g., Cassidy, 2016; Schore, 2019). Thus, parents are not only important for how children manage negative emotions but also how children's emotional self-regulation for challenging situations develops. Through children's expectations on whether negative emotions are manageable and whether parents can support in managing them, children learn to adaptively express and manage their negative emotions in contextually appropriate ways (Cassidy, 1994; Kochanska, 2001; Kopp, 1989). Indeed, studies that explored children's frustration from an attachment perspective found that higher attachment security of the mother–child relationship was associated with less frustration (e.g., Braungart-Rieker et al., 2001; Diener et al., 2002; Leerkes & Wong, 2012; Roque et al., 2013; Smith et al., 2006).

3 | PARENTING BEHAVIORS IN THE CONTEXT OF CHILD FRUSTRATION

From an attachment perspective, parents should react to children's negative emotions in responsive ways. However, responsive parenting has been best defined across the first year of life (see De Wolff & van IJzendoorn, 1997), leaving later developmental periods undefined and contextually unspecified. Teasing apart the construct of parental responsiveness for later parenting, an age-dependent (Ahnert, 2005) and a domain-specific (Grusec & Davidow, 2010) approach to parent–child interaction was previously suggested. This means that responsive parenting might differently foster child emotional development during certain times and for certain emotional domains. For example, helping a child to overcome anxiety or pain might demand another type of responsiveness than helping to cope with frustration. Additionally, parents' prompt soothing might be adequate in helping a frustrated one year old, but not later on when a child is ready to cognitively reflect on challenges. Instead, the adequate parental response would be to assist the child in developing effective coping behaviors. Interestingly, recent reflections on parental sensitivity in the context of children's negative emotions (Mesman et al., 2012) argue that sensitivity is an iterative process (in contrast to static behaviors), by which parents deduce the child's needs (from all available contextual information) and try out different behaviors to alleviate children's negative emotions. Regarding children's frustration, results from research on emotional regulation (e.g., Eisenberg et al., 1998; Eisenberg et al., 2010) point to a broad repertoire of parent behaviors that successfully support children's self-regulatory skills in many emotional domains. Not surprisingly, a few studies on frustration showed that parent behaviors in the form of encouraging, distracting, and problem-solving significantly affected children's frustration beyond the first year (e.g., Calkins et al., 1999; Calkins, & Johnson, 1998; Grolnick et al., 1998; Spinrad et al., 2004). In contrast, no effects were found for soothing or any other physical comfort for the frustrated children in these studies.

These results, however, are based on mother–child dyads only. Insights into the ways in which fathers support their children in frustrating situations do not exist. Because fathers have been conventionally portrayed to excite, surprise, and encourage the child (e.g., Ahnert et al., 2017; Grossmann et al., 2002; Piskernik & Ahnert, 2019), whereas mothers have been shown to soothe but also to

teach their children (e.g., Gleason, 2005), we expected different parent behaviors toward children's frustration.

4 | FRAME AND RESEARCH GOALS OF THE PRESENT STUDY

The present study utilized a frustration procedure which was designed to resemble everyday experiences where children are unable to accomplish a difficult task. Similar to earlier experimental work (see also Bridges et al., 1997; Calkins & Johnson, 1998; Leerkes, & Wong, 2012), we chose a series of barrier tasks that began with a parent-passive episode where the child-based frustration and coping behaviors were captured, followed by a parent-active episode where parent behaviors (separately for mothers and fathers) could be observed to help children's coping. We addressed multiple research goals. *First*, we identified children's frustration and determined frustration tolerance, level, and span during all episodes. *Second*, we determined which behaviors children typically apply to cope with frustration across child ages and gender. We hypothesized that children older than two years are better able to control their frustration so that tantrums are less frequent at these ages (controlling for child gender). We thus postulated that older children more frequently use pretend play to cope with the situation, engage the parent in the situation, or use other attempts to reappraise the situation than younger children. *Third*, focusing on similarities and differences in parent behaviors, we explored how mothers and fathers supported their children in dealing with frustration. We expected that mothers tend to protect the child from distress, whereas fathers tend to assist children's coping. *Fourth*, we examined whether mother–child and father–child attachment played a role in children's frustration and whether attachment security was associated with types of parent behaviors (e.g., soothing). We hypothesized that children with high as opposed to low attachment security toward their parents would display less pronounced frustration. In particular, parents with secure attachment to their children would more likely use physical comfort as well as support adjusted to suit the context (like reframing the stressful situation, demonstrating ways out of it or distracting the child) in order to alleviate children's frustration. *Finally*, we investigated the efficacy of child coping and parent behaviors and used the time-series structure of the data to detect reductions in children's frustration responses. We relied on time frames of one to five seconds, which is according to common practice in past research on parent–child interactions (e.g., Beebe & Steele, 2013; Bigelow et al., 2010; Bornstein et al., 1992) and demonstrated the efficacy of different types of action–response patterns.

5 | METHOD

5.1 | Participants

The present study was conducted according to guidelines laid down in the Declaration of Helsinki, with written informed consent obtained from a parent for each child before any assessment or data collection. All procedures were approved by the Ethics Committee at the Medical University of Vienna (ECS 1710/2013. We recruited a sample of $N = 158$ healthy children ($n = 80$ girls) who were raised in two-parent families in Vienna and the surrounding state of Lower Austria. We invited children with a broad age range from 15.0 to 38.9 months ($M = 21.4$ month, $SD = 4.2$) to tape the developmental dynamic of emotional regulation during and beyond the second year of life.

Parents were representative of the highly educated middle class: Only 18% of mothers and 32% of fathers had completed no more than primary education and/or vocational training, 38% of mothers and 24% of fathers had completed high school, and 44% of both parents held a university degree. Mothers and fathers were on average 34.1 ($SD = 5.4$) and 36.9 ($SD = 6.3$) years old and worked for 20 ($SD = 11$) and 42 ($SD = 12$) hours per week, respectively.

5.2 | Overall procedure

At the parents' convenience, two research assistants visited the families twice at home with a mean difference of 19.2 ($SD = 15.7$) days between the two visits. During the first visit, they interviewed the parents on SES and social structure of the family, followed by a two-hour observation of one parent and the child to measure attachment security. Afterward, the *Frustration Procedure* took place with this parent. During the second visit, the other parent was observed to examine attachment after the *Frustration Procedure* with this parent was conducted (reversed order). Regarding parents' order within the study design, more mothers were observed during the first visit and therefore more fathers during the second visit. Thus, later statistical analyses controlled for parents' order, which, however, resulted in no effect in any of the analyses.

5.3 | Frustration procedure

The *Frustration Procedure* initially allowed the children to play with a jack-in-the-box for about one minute ($M = 62.2$ seconds, $SD = 14.5$) so that the child gained interest. A research assistant then took the toy away and locked it in a translucent plastic box of 10x10x10 inches. In the box, a circular hole (2.5 inch in diameter) was cut that was big enough for the child to reach into the box, but too small to take the toy out. Two test episodes followed: (a) a *parent-passive episode* which lasted on average $M = 123.9$ ($SD = 16.4$) seconds and was shortened if the child cried for 20 seconds, and (b) a *parent-active episode* ($M = 143.0$ seconds, $SD = 29.0$).

5.3.1 | Parent-passive episode

The parent-passive episode began when the assistant showed the toy locked in the plastic box and encouraged the child to engage with the toy. In the meantime, parents were instructed to fill out a questionnaire and not pay attention to the child.

5.3.2 | Parent-active episode

The parent-active episode started when the parents began to assist the child to deal with the toy in the box. Eventually, the research assistant terminated the episode, unlocked the toy, and handed it to the child.

The *Frustration Procedure* was videotaped and later coded by three research assistants using the software INTERACT (Mangold, 2015). The start and end of each episode were identified first. Then, children's frustration responses as well as defined child and parent behaviors (see below) were

measured on a second-by-second basis. Three assistants practiced using the measures until they achieved a reliability of 70% agreement. Although the software allowed for coding different measures simultaneously, the assistants captured children's frustration responses independently of all other behaviors (as recommended by Cole et al., 2004). In order to assess interrater reliability, 30 records were randomly assigned to all assistants. Kendall's coefficient of concordance (*W*) ranged from 0.79 to 0.92 for all codes and demonstrated high agreement.

5.4 | Measures

5.4.1 | Children's frustration

Children's frustration was identified based on a list of diverse frustration responses expressed by verbal expression (e.g., crying, whining, or yelling), negative facial expressions (e.g., frowning and pursing lips), and negative behaviors (e.g., protesting, hitting, or shaking the box aggressively). We determined occurrences and timing of the frustration so that diverse frustration indices such as *frustration tolerance*, *span*, *and level* could be later derived from each episode of the *Frustration Procedure*.

5.4.2 | Frustration tolerance

The time from the start of the episode until the onset of the first frustration response indicated the frustration tolerance in seconds.

5.4.3 | Frustration span

Frustration responses were detected, and their durations were summarized across each episode. We divided this measure by the total duration of the respective episode and thus provided the frustration span in percent of time.

5.4.4 | Frustration level

Frustration levels were rated using a Likert scale with scores ranging from 1 (no negative emotion at all) to 6 (highly intense negative emotion accompanied by vehement motor movement showing anger, rage or fury) for each episode. Level 5 and 6 were considered tantrums.

5.4.5 | Child and parent behaviors

To describe how children coped with frustration and how parents supported them, we marked timing and duration of the behaviors as defined below. We summarized the duration (in seconds) of each behavior across every episode and divided this by the overall duration of the respective episode. Each behavior was thus assessed per episode in percent of time.

5.4.6 | Child coping behaviors

We selected five child behaviors commonly shown in experimental research on children's frustration (see Appendix 1): (1) *Self-comforting* when the children engaged in repetitive actions or actions directed toward oneself (e.g., sucking hands, fingers or clothing, hair-twirling, holding objects close), (2) *Self-distracting* when the children redirected their attention away from the box and looked at or reached out for other objects, (3) *Escaping* when the children stood up from the chair to leave the task, (4) *Seeking help* when the children gazed at or moved toward the parent, stretched out their arms or asked for help, and (5) *Pretend-playing* when the children interacted with the toy, talked to and stroked the toy, and ascribed different meanings to the situation.

5.4.7 | Parent behaviors

We defined five types of parent behaviors, building on previous research (see Appendix 1): (1) *Soothing* when the parent responded to the child's distress in a comforting and reassuring way (e.g., picked the child up, placed him/her on the lap, embraced or stroked the child), (2) *Distracting* when the parent redirected the attention of the child to another object, or talked about a topic the child would be interested in, (3) *Demonstrating* when the parent provided his/her approach for dealing with the box, often accompanied by verbal commentaries on how impossible it is to get the toy out, (4) *Encouraging* when the parent redirected the child to the box to motivate the child to take another approach and to keep on trying, and (5) *Reframing* when the parent initiated a new point of view on the situation, for example, discussed the situation, the feelings, and the possible solution regarding the toy in the box.

5.4.8 | Parent–child attachment

Attachments of the children to their parents were described based on the Attachment Q Sort (*AQS*: Waters, 1995). The AQS captures parent–child relationships in home environments and allows for ecological examinations. A group of research assistants was intensively trained for the AQS procedure using video training and live observations in preparation for the study. Two research assistants observed the parent–child dyads simultaneously for at least 2 hrs and rated the observation afterward individually. According to the test construction, the observer must sort 90 items into 9 piles (with 10 cards each) from "most descriptive" to "least descriptive" of the observed parent–child dyad. The sorting was then correlated with an expert's sorting provided for typical secure parent–child dyads, in German (Ahnert et al., 2012). The correlation resulted in AQS scores ranging from -1.0 to $+1.0$, with scores representing the extent of attachment security. The intra-class coefficient between the AQS scores of the two research assistants was high ($ICC = 0.91$), indicating excellent reliability. To ensure linearity across the distribution of AQS scores for later statistical analyses, the scores were treated with Fisher's *r*-to-*z* transformation (Fisher, 1915). As a basic result, mothers' ($M = 0.45$, $SD = 0.27$) and fathers' ($M = 0.42$, $SD = 0.31$) AQS scores did not differ (n.s.).

5.5 | Data handling and data analyses

The present study yielded a complex structure of data, consisting of hierarchically organized (i.e., each child had been observed in two *Frustration Procedures*, one with each parent) as well as

crossed data (i.e., parent-passive vs. parent-active episodes in each procedure). In addition, time frames were shifted up to 5 seconds across the procedure to explore whether and how child and parent behaviors were associated with the occurrence of frustration responses. Furthermore, many behaviors did not occur in all children and parents, meaning zero was a common value. This so-called zero inflation was highly skewed to the right and could impact the results if left unattended. In contrast, other data of the study were unproblematic (e.g., the Fisher-transformed AQS scores). For these reasons, we utilized generalized linear mixed models (GLMMs), which can (a) handle zero inflation, (b) model data of different distributional characteristics, and (c) take nested and crossed nature of data structures into account. We carried out *four different sets of GLMMs* in R (R Core Team, 2017) using the package glmmTMB (Brooks et al., 2017). Each set of GLMMs provided a similar structure, so that comparisons across these models later facilitated the interpretation of the results.

The *first set of GLMMs* explored children's frustration during the *Frustration Procedures* with mothers vs. fathers. We tested whether frustration tolerance, span, and level (1) differed among the various frustration episodes (i.e., with mother vs. father as well as during parent-passive vs. parent-active episodes) and (2) were associated with mother–child and father–child attachment. The *second and third set of GLMMs* examined child and parent behaviors during the two episodes of the procedure. We analyzed (1) whether a specific child behavior was prevalent in the presence of mother vs. father as well as during parent-passive vs. parent-active episodes, (2) whether maternal and paternal behaviors differed during the parent-active episodes, and whether (3) any specific child and parent behaviors were associated with attachment security. All three sets of GLMMs controlled for parents' *order* when the frustration procedure had been repeated (mother or father first) as well as *child age and gender*. The second and third sets of GLMMs additionally controlled for children's *frustration span and level* to mask their influences on the analyzed behaviors. Furthermore, all models were specified as random intercept models, allowing for unique intercepts for each child.

Finally, the *fourth set of GLMMs* explored the impact of child and parent behaviors on the occurrence of children's frustration responses. Adjusted from Ekas et al. (2013), we implemented a time-lag manipulation and utilized the primary database. Here, information on the occurrence of children's frustration responses, and child and parent behaviors during the two episodes of the frustration procedure, were available on a second-by-second basis. Therefore, we shifted child frustration responses up to five seconds and depicted them as time-lags: $t + 1\ s, …, t + 5\ s$. We then asked whether a particular behavior was associated with the occurrence of a frustration response up to 5 seconds later. Consequently, we computed a set of five GLMMs (one GLMM for each second). In order to control for initial frustration, we additionally included the occurrence of child frustration at t in each GLMM and tested whether collinearity was problematic, based on variance inflation factors (VIFs) as suggested by Fox and Weisberg (2018).

Moreover, to illustrate how much a particular child or parent behavior reduced or reinforced the occurrence of a frustration response, the corresponding coefficient (*B*) was converted into odds ratio (OR) by exponentiation *B*. As suggested by Rodriguez et al. (2018), *B* was transformed to percentage change (in %) by subtracting 1 from *OR* and multiplied by 100. As a result, negative percentage changes denoted a reduction and positive changes an increase of frustration responses. Post hoc comparisons between effects of child, maternal, and paternal behaviors were subsequently calculated by Wald chi-square tests (Fox & Weisberg, 2018) to determine whether the compared behaviors differed significantly.

6 | RESULTS

6.1 | Children's frustration

We *first* inspected children's frustration tolerance, span, and level in the parent-passive and parent-active episodes across the *Frustration Procedures* (see Table 1, first block). In parent-active episodes, frustration tolerance was lower ($ß = -0.68$, $p < .001$) and frustration levels higher ($ß = 0.26$, $p < .001$) than in parent-passive episodes, suggesting an increase of children's frustration across the procedure. In addition, inter-correlations between the different frustration indices yielded that frustration tolerance was negatively correlated with span ($r_s = -.63$, $p < .001$) as well as level ($r_s = -.31$, $p < .001$), and frustration span and level held a positive association ($r_s = .35$, $p < .001$). This suggests that children who were frustrated more easily experienced more intense frustration and for a longer time.

Second, children revealed higher frustration tolerance ($ß = 0.70$, $p < .001$) and shorter frustration span ($ß = -0.23$, $p = .027$) in procedures with fathers as compared with mothers. Frustration levels, however, did not differ when the procedures with both parents were compared. Nevertheless, 22.2% of the children reached high frustration levels in form of tantrums at least once throughout the procedures.

Third, whereas father–child attachment was not predictive of children's frustration, mother–child attachment quality predicted frustration tolerance ($ß = 0.20$, $p = .011$) and span ($ß = -0.15$, $p = .010$). This suggested an association between children's secure attachment to the mother and higher frustration tolerance as well as shorter frustration span. Frustration level, however, was not affected by attachment security or by child gender. It was linked to child age ($ß = -0.15$, $p = .020$) though, with older children displaying lower frustration levels (see Table 2).

6.2 | Child coping behaviors and correlates

During the *Frustration Procedure*, child behaviors like *Pretend-playing*, *Self-distracting*, and *Escaping* in particular were very infrequent and thus displayed considerable zero inflation. In contrast, *Self-comforting* and *Seeking for help* were the most common behaviors to aid the children in overcoming frustration (see Table 1, second block). We *first* investigated how the diverse child behaviors were associated with frustration span and level. As a result, frustration span was negatively associated with *Self-comforting* ($ß = -0.15$, $p = .022$), *Self-distracting* ($ß = -0.24$, $p = .045$), and *Pretend-playing* ($ß = -0.50$, $p = .005$), suggesting that less frustrated children more often pretend-played as well as comforted or distracted themselves. Furthermore, frustration levels were positively associated with *Self-comforting* ($ß = 0.46$, $p < .001$), *Self-distracting* ($ß = 0.65$, $p < .001$), *Escaping* ($ß = 0.46$, $p < .001$), and *Seeking for help* ($ß = 0.29$, $p < .001$), which lasted longer the more intense the frustration was. Associations with child age revealed that *Self-distracting* was more prevalent in younger children ($ß = -0.31$, $p = .037$) and *Pretend-playing* in older (which was a significant trend: $ß = 0.25$, $p = .060$). Girls displayed more *Self-comforting* ($ß = 0.32$, $p = .043$) but less *Pretend-playing* ($ß = -0.79$, $p = .018$) than boys did (see Table 3).

Second, there were hardly any differences when we compared child behaviors across parent-active and -passive episodes. Only *Self-distracting* was more common in parent-active than -passive episodes ($ß = 1.08$, $p < .001$).), and children's *Seeking for help* ($ß = -0.26$, $p = .011$) and *Pretend-playing* ($ß = -0.70$, $p = .014$) were more prevalent in the presence of the mother than father.

Third, mother–child attachment revealed no association with any of the child behaviors. However, father–child attachment was associated with *Seeking for help* and *Escaping*, showing that children

TABLE 1 Descriptive statistics of children's frustration, child, and parent behaviors during frustration procedure with mother or father present in two episodes

	Mother present						Father present					
	Episodes: Parent-passive			Parent-active			Parent-passive			Parent-active		
	ZI	Mean	SD	ZI	Mean	SD	ZI	Mean	SD	ZI	Mean	SD
Children's frustration												
Frustration tolerance		23.66	30.8		14.64	28.3		36.54	37.9		30.41	47.3
Frustration span		53.30	32.9		63.82	41.8		43.00	34.1		50.17	38.9
Frustration level		2.87	1.2		3.18	1.4		2.76	1.2		3.13	1.4
Child coping behaviors												
Self-comforting	0.25	13.70	14.2	0.27	14.39	15.1	0.21	15.93	15.2	0.24	15.65	16.7
Self-distracting	0.84	4.08	3.1	0.64	16.1	19.7	0.85	8.48	7.8	0.61	15.09	15.8
Escaping	0.75	8.58	9.4	0.62	6.49	7.2	0.68	10.13	8.1	0.52	11.16	11.9
Seeking for help	0.27	5.87	5.8	0.22	5.20	5.3	0.33	4.79	4.4	0.32	4.96	5.4
Pretend-playing	0.93	5.36	4.6	0.86	7.41	8.9	0.91	5.36	4.6	0.83	7.01	6.9
Parent behaviors												
Soothing				0.43	15.28	17.1				0.30	9.25	9.0
Distracting				0.89	17.84	22.0				0.87	12.48	13.7
Demonstrating				0.31	8.83	8.4				0.30	9.25	8.1
Encouraging				0.67	7.38	9.8				0.64	9.20	10.3
Reframing				0.83	12.7	11.4				0.85	12.2	8.8

Note: ZI represents the proportion of zero inflation (i.e., % of non-occurrence). Mean and SD are calculated based on the zero-removed data. Statistical differences are shown in Table 2.

TABLE 2 Children's frustration tolerance, span, and level during a frustration procedure and correlates

	Frustration tolerance[a]			Frustration span[a]			Frustration level[b]		
	β	SE β	Sig.	β	SE β	Sig.	β	SE β	Sig.
(Intercept)	**−1.91**	0.17	<0.001	**−0.95**	0.10	<0.001	−0.14	0.12	0.246
Parents' order	−0.09	0.18	0.605	−0.05	0.11	0.617	−0.20	0.13	0.127
Parent present (father)	**0.70**	0.18	<0.001	**−0.23**	0.11	0.027	0.02	0.13	0.906
Episode (active)	**−0.68**	0.10	<0.001	0.03	0.06	0.616	**0.26**	0.07	<0.001
Child age	0.10	0.07	0.135	−0.06	0.05	0.287	**−0.15**	0.07	0.020
Child gender (girl)	−0.02	0.15	0.891	0.04	0.11	0.734	0.03	0.14	0.809
Mother–child AQS	**0.20**	0.08	0.010	**−0.15**	0.06	0.010	−0.05	0.07	0.479
Father–child AQS	−0.06	0.07	0.440	0.05	0.06	0.357	0.03	0.07	0.676

Notes: Error distributions of the models were determined using likelihood-ratio tests.

[a]Negative binomial distribution for frustration tolerance and frustration span.

[b]Gaussian distribution of errors after a square-root transformation due to right skewed data. Significant estimates are bolded.

with higher attachment security *sought for help* ($\beta = 0.12$, $p = .048$) or *escaped* from the situation ($\beta = 0.30$, $p = .003$) more often (see Table 3).

6.3 | Parent behaviors and correlates

Whereas *Reframing*, *Distracting*, and *Encouraging* were infrequent (displaying high zero inflation), *Soothing* and *Demonstrating* occurred most commonly (see Table 1, third block). We *first* examined how parent behaviors were associated with children's frustration span and level. Frustration span was related to *Distracting* ($\beta = -0.62$, $p = .019$), suggesting a shorter frustration span in children whose parents distracted them. Frustration levels, however, were positively associated with *Soothing* ($\beta = 0.36$, $p < .001$), *Distracting* ($\beta = 1.25$, $p < .001$), and *Encouraging* ($\beta = 0.70$, $p < .001$), suggesting the more intense the frustration was, the more parents encouraged, distracted, and soothed the child (see Table 4).

Second, we investigated whether mothers and fathers differed in their behaviors. There were no differences in parental behavior, even if child gender was taken into account. However, both parents *encouraged* ($\beta = -0.32$, $p = .025$) the younger children more. *Third*, when we analyzed attachment security, only *Soothing* was associated with mother–child attachment, in a way that mothers *soothed* more in a mother-dyad with high security (indicated by high AQS scores); $\beta = 0.22$, $p = .046$. In contrast, none of the paternal behaviors were associated with father–child attachment (see Table 4).

6.4 | Behavioral impact on children's frustration

A time-lag approach was utilized to test whether certain child and parent behaviors led to a reduction (or perhaps an increase) of children's frustration. We therefore simultaneously included all behaviors

TABLE 3 Child coping behaviors during a frustration procedure and correlates

	Self-comforting			Self-distracting			Escaping			Seeking for help			Pretend-playing		
	β	*SE β*	*Sig.*	*β*	*SE β*	*Sig.*	*β*	*SE β*	*Sig.*	*β*	*SE β*	*Sig.*	*β*	*SE β*	*Sig.*
(Intercept)	**−2.50**	0.15	<0.001	**−3.65**	0.38	<0.001	**−2.94**	0.35	<0.001	**−3.13**	0.11	<0.001	**−3.01**	0.31	<0.001
Frustration span	**−0.15**	0.07	0.022	**−0.24**	0.12	0.045	−0.04	0.09	0.653	0.06	0.05	0.266	**−0.50**	0.18	0.005
Frustration level	**0.46**	0.08	<0.001	**0.65**	0.16	<0.001	**0.46**	0.11	<0.001	**0.29**	0.06	<0.001	−0.23	0.19	0.239
Parents' Order	−0.11	0.16	0.496	0.07	0.41	0.858	0.10	0.53	0.852	−0.03	0.03	0.295	−0.16	0.24	0.515
Parent Present (father)	0.21	0.16	0.191	0.08	0.42	0.847	0.16	0.54	0.767	**−0.26**	0.10	0.011	**−0.70**	0.28	0.014
Episode (active)	0.03	0.11	0.785	**1.08**	0.24	<0.001	0.01	0.16	0.980	−0.14	0.09	0.140	0.50	0.29	0.087
Child Age	0.11	0.07	0.135	**−0.31**	0.15	0.037	−0.01	0.10	0.977	−0.02	0.06	0.763	0.25	0.13	0.060
Child Gender (girl)	**0.32**	0.16	0.043	−0.21	0.28	0.459	0.13	0.18	0.477	0.07	0.12	0.566	**−0.79**	0.34	0.018
Mother–Child AQS	−0.02	0.09	0.780	−0.35	0.19	0.075	−0.03	0.10	0.791	−0.10	0.07	0.133	−0.07	0.18	0.684
Father–Child AQS	−0.12	0.08	0.111	0.31	0.17	0.068	**0.30**	0.10	0.003	**0.12**	0.06	0.048	−0.01	0.15	0.941

Notes: Error distribution of models were determined using likelihood-ratio tests; negative binomial distribution for all models. Significant estimates are bolded.

TABLE 4 Parent behaviors during a frustration procedure and correlates

	Soothing			Distracting			Demonstrating			Encouraging			Reframing		
	β	SE β	Sig.	β	SE β	Sig.	β	SE β	Sig.	β	SE β	Sig.	β	SE β	Sig.
(Intercept)	**−2.28**	0.26	<0.001	**−3.02**	0.52	<0.001	**−2.33**	0.17	<0.001	**−3.71**	0.53	<0.001	**−2.30**	0.34	<0.001
Frustration span	0.08	0.09	0.411	**−0.62**	0.26	0.019	0.05	0.09	0.530	0.06	0.15	0.682	−0.29	0.22	0.181
Frustration level	**0.36**	0.11	<0.001	**1.25**	0.22	<0.001	0.17	0.09	0.059	**0.70**	0.17	<0.001	0.17	0.21	0.425
Parents' Order	−0.39	0.31	0.218	−1.22	0.72	0.091	0.04	0.23	0.858	−0.69	0.85	0.420	0.15	0.38	0.690
Parent Present (father)	0.14	0.33	0.681	0.73	0.76	0.337	−0.12	0.24	0.621	0.93	0.84	0.270	−0.01	0.42	0.971
Child Age	−0.05	0.09	0.789	0.24	0.20	0.224	0.01	0.07	0.977	**−0.32**	0.14	0.025	0.04	0.15	0.786
Child Gender (girl)	−0.38	0.20	0.053	−0.58	0.33	0.074	−0.11	0.16	0.490	−0.13	0.33	0.701	−0.28	0.35	0.417
Mother–Child AQS	**0.22**	0.11	0.046	0.09	0.27	0.745	0.03	0.09	0.741	0.01	0.19	0.942	−0.26	0.15	0.073
Father–Child AQS	−0.06	0.10	0.526	−0.21	0.30	0.487	−0.11	0.08	0.156	0.25	0.19	0.183	0.17	0.14	0.224

Notes: Error distribution of models were determined using likelihood-ratio tests; negative binomial distribution of errors for all models. Significant estimates are bolded.

in a final set of five GLMMs predicting frustration responses within time frames of up to 5 s. Variance inflation factors (VIFs) ranged between 1.00 and 1.29, indicating that multi-collinearity posed no problem.

In general, results yielded that a frustration response at *t* was: (1) highly linked to frustration responses in the following five seconds (*B*s ranging from 5.47 to 2.36, all *p*-values < .001), (2) more prevalent in the *parent-active* than in the *parent-passive* episode, and (3) less likely in the presence of fathers than mothers (see Table 5).

Second, when we evaluated the impact of child behaviors on frustration responses, time-lag analyses revealed that *Self-comforting* (*B*s ranging from −0.23 to −0.26, all *p*-values < .001), *Self-distracting* (*B*s ranging from −0.64 to −0.81, all *p*-values < .001), and *Pretend-playing* (*B* ranging from −1.20 to −0.89, all *p*-values < .001), all reduced subsequent frustration responses in the course of the procedure (see Table 5). In more detail, *Self-comforting* reduced by up to 23%, *Self-distracting* by up to 56% and *Pretend-playing by* up to 70% of the frustration responses during the subsequent 5 s (see Figure 1). Post hoc comparisons revealed that *Self-comforting* was less efficient than *Self-distracting* (*Wald* ranging from 9.75 to 47.04, all *p* < .01) and *Pretend-playing* (*Wald* ranging from 9.49 to 15.03,
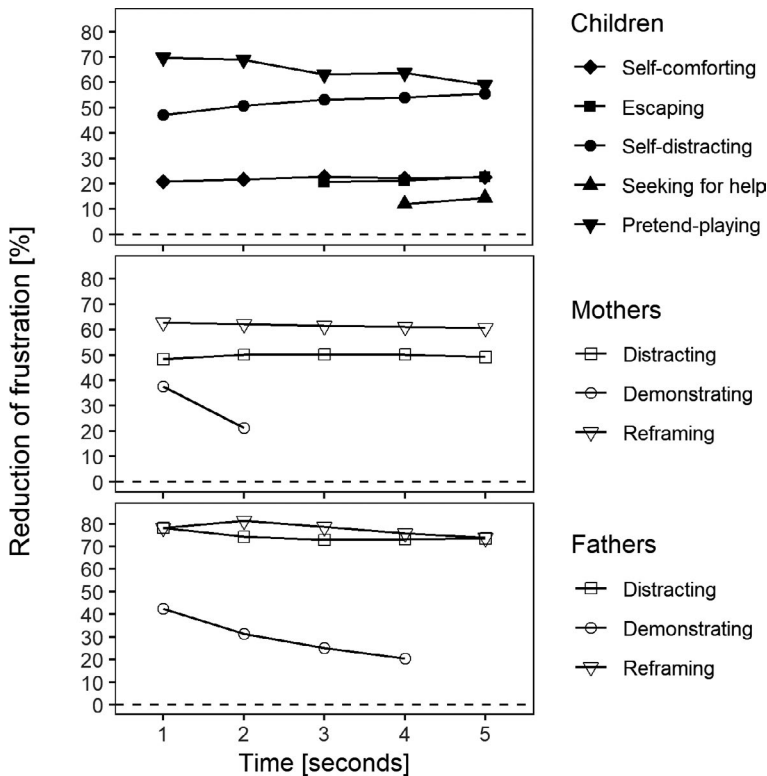

FIGURE 1 The impact of child coping behaviors, maternal, and paternal behaviors on the reduction of children's frustration. Note: The abscissa depicts the subsequent time after which a particular behavior in the context of child's frustration is expressed. The ordinate represents the likelihood of a reduction in child's frustration over five seconds by displaying a particular behavior. Two examples: (1) If the children self-comforted themselves, the likelihood of their frustration is reduced by 20% for at least the next five seconds. (2) One second after which fathers had demonstrated how to handle the situation, the likelihood of child's frustration is reduced by 40%, which, however, declined over the next three seconds to only 20%, and even disappeared after five seconds, so that the children were again as frustrated as during the first second

TABLE 5 Time-lag analyses on children's frustration as related to child and parent behaviors

	Frustration at $t + 1$				Frustration at $t + 2$				Frustration at $t + 3$				Frustration at $t + 4$				Frustration at $t + 5$			
	B	SE B	Sig.	Exp(B)	B	SE B	Sig.	Exp(B)	B	SE B	Sig.	Exp(B)	B	SE	Sig.	Exp(B)	B	SE B	Sig.	Exp(B)
(Intercept)	−2.76	0.06	<0.001	0.06	−2.04	0.06	<0.001	0.13	−1.66	0.07	<0.001	0.19	−1.41	0.07	<0.001	0.24	−1.24	0.07	<0.001	0.29
Frustration at t	5.47	0.04	<0.001	238.13	4.01	0.03	<0.001	55.21	3.22	0.02	<0.001	25.11	2.71	0.02	<0.001	15.01	2.36	0.02	<0.001	10.55
Parent (father)	−0.24	0.04	<0.001	0.79	−0.24	0.03	<0.001	0.78	−0.25	0.03	<0.001	0.78	−0.25	0.03	<0.001	0.78	−0.25	0.03	<0.001	0.78
Episode (active)	0.12	0.04	0.003	1.12	0.11	0.03	<0.001	1.12	0.10	0.03	<0.001	1.11	0.09	0.02	<0.001	1.10	0.08	0.02	<0.001	1.08
Child Coping Behaviors																				
Self-comforting	**−0.23**	0.06	<0.001	0.79	**−0.25**	0.05	<0.001	0.78	**−0.26**	0.04	<0.001	0.77	**−0.25**	0.04	<0.001	0.78	**−0.26**	0.04	<0.001	0.77
Self-distracting	**−0.64**	0.12	<0.001	0.53	**−0.71**	0.09	<0.001	0.49	**−0.76**	0.08	<0.001	0.47	**−0.78**	0.08	<0.001	0.46	**−0.81**	0.07	<0.001	0.44
Escaping	0.07	0.11	0.549	1.07	−0.15	0.08	0.073	0.86	**−0.23**	0.07	0.002	0.79	**−0.24**	0.07	<0.001	0.79	**−0.26**	0.07	<0.001	0.77
Seeking for help	0.17	0.10	0.092	1.18	−0.04	0.07	0.569	0.96	−0.11	0.06	0.104	0.90	**−0.13**	0.06	0.034	0.88	**−0.16**	0.06	0.006	0.86
Pretend-playing	**−1.20**	0.31	<0.001	0.30	**−1.17**	0.24	<0.001	0.31	**−1.00**	0.21	<0.001	0.36	**−1.02**	0.19	<0.001	0.36	**−0.89**	0.18	<0.001	0.41
Maternal Behaviors																				
Soothing	−0.03	0.12	0.794	0.97	0.06	0.09	0.490	1.07	0.16	0.08	0.051	1.17	**0.25**	0.08	0.001	1.29	**0.37**	0.07	<0.001	1.45
Distracting	**−0.66**	0.25	0.008	0.52	**−0.70**	0.19	<0.001	0.50	**−0.70**	0.17	<0.001	0.50	**−0.70**	0.16	<0.001	0.51	**−0.68**	0.16	<0.001	0.51
Demonstrating	**−0.47**	0.14	<0.001	0.62	**−0.24**	0.11	0.024	0.79	−0.12	0.09	0.184	0.88	−0.01	0.09	0.869	0.99	0.08	0.08	0.341	1.08
Encouraging	0.10	0.23	0.654	1.11	0.27	0.17	0.122	1.30	0.24	0.15	0.120	1.27	0.22	0.14	0.113	1.25	**0.27**	0.14	0.047	1.32
Reframing	**−0.99**	0.24	<0.001	0.37	**−0.97**	0.19	<0.001	0.38	**−0.95**	0.17	<0.001	0.39	**−0.94**	0.16	<0.001	0.39	**−0.93**	0.15	<0.001	0.39
Paternal Behaviors																				
Soothing	−0.13	0.15	0.405	0.88	−0.17	0.12	0.146	0.85	−0.20	0.10	0.053	0.82	−0.16	0.10	0.101	0.85	−0.14	0.09	0.142	0.87
Distracting	**−1.52**	0.49	0.002	0.22	**−1.36**	0.38	<0.001	0.26	**−1.30**	0.34	<0.001	0.27	**−1.32**	0.32	<0.001	0.27	**−1.33**	0.31	<0.001	0.26
Demonstrating	**−0.55**	0.16	<0.001	0.58	**−0.38**	0.12	0.001	0.69	**−0.29**	0.10	0.005	0.75	**−0.23**	0.10	0.017	0.79	−0.11	0.09	0.230	0.90
Encouraging	**0.71**	0.23	0.002	2.03	**0.56**	0.18	0.001	1.75	**0.58**	0.16	<0.001	1.78	**0.52**	0.14	<0.001	1.67	**0.50**	0.14	<0.001	1.65
Reframing	**−1.53**	0.46	<0.001	0.22	**−1.68**	0.37	<0.001	0.19	**−1.54**	0.33	<0.001	0.21	**−1.42**	0.30	<0.001	0.24	**−1.34**	0.28	<0.001	0.26

Note: Significant estimates of the behaviors are bolded.

all $p < .01$), whereas *Pretend-playing* and *Self-distracting* were similarly effective (n.s.). Interestingly, *Escaping* and *Seeking for help* reduced frustration responses after a certain delay, that is, *Escaping* (by up to 23%) after three, and *Seeking for help* (by up to 14%) after four seconds (see Figure 1).

Third, when we investigated parent behaviors, *Distracting* (B s ranging from −1.52 to −0.66, all p-values $< .01$) and *Reframing* (Bs ranging from −1.68 to −0.93, all p-values $< .001$) were found to be most efficient in reducing children's frustration responses: *Distracting* and *Reframing* by up to 50% and 63% by the mothers, as well as by up to 78% and 81% by the fathers (see Table 5; Figure 1). However, the Wald test was not significant for both types of behaviors from either parent, indicating no significant difference in efficiency (not as the values of the percentage changes suggested). Furthermore, *Demonstrating* yielded low reductions of children's frustration (by up to 40% either by mother or father) and faded out after 2 (mother) and 4 s (father). Most surprisingly (and only presented in Table 5, not Figure 1), mothers' *Soothing* was associated with increased frustration responses by up to 45% ($B_{t+4} = 0.25$, $p = .001$; $B_{t+5} = 0.37$, $p < .001$) and fathers' *Encouraging* (Bs ranging from 0.71 to 0.50, all p-values $< .001$) by up to 100%. Thus, maternal *Soothing* and paternal *Encouraging* appeared to exacerbate children's frustration.

7 | DISCUSSION

The present study involved children ranging in ages between 15 and 40 months, which is a time when children learn how to manage negative emotions in an appropriate manner. We elicited frustration in these children through an experimental procedure, composed of parent-passive and -active episodes. We described children's frustration, investigated how children cope, and how parents help them to overcome the frustration. Unlike previous research that studied single characteristics of frustration solely (e.g., Braungart-Rieker et al., 1996; Diener et al., 2002) or aggregated them to a composed measure (e.g., Bridges et al., 1997; Calkins & Johnson, 1998), the present study explored frustration tolerance and span, as well as frustration levels.

Of the sample, 22.2% children displayed high frustration levels in the form of tantrums at least once throughout the procedures, regardless of parent-active or parent-passive episode. This confirms past research by Braungart-Rieker et al. (2001) and Ekas et al. (2013) and demonstrates a robust characteristic that is nearly independent of individual influences of parenting. The tantrums, however, were less pronounced in older than in younger children, confirming reports on decreasing intensity of negative emotions (Grolnick et al., 1998) and of anger levels during the first 3 years of life (Kochanska, 2001). In contrast, frustration tolerance and span were not associated with child age in previous research (see Bridges et al., 1997; Calkins & Johnson, 1998; Kochanska et al., 1998), as was the case in the present study. Frustration tolerance and span varied within parent-passive and -active episodes of the procedure and thus evidenced the power of parental influence when children cope with frustrations.

7.1 | Children's coping behaviors

In times of frustration, children often comforted themselves, which appeared in equal frequencies and duration across all episodes of the procedures. This suggests that children's *Self-comforting* might be a basic mechanism toward emotional self-control over the frustration. Using time-lag analyses, *Self-comforting* proved to reduce the occurrence of frustration responses by up to 23%, however, which was not as effective as other child behaviors. But, *Self-comforting* can be seen as a way to suppress the arousal which might help other child behaviors to facilitate coping (e.g., Spinrad et al., 2004).

When children realized that they could not solve the problem on their own, they approached their parents for help. They sought for help from their mothers more than their fathers, which is, however, understandable if mothers spend more time at home and are the primary caregivers. In contrast, children less frequently used *Self-distracting* and *Pretend-playing* during the frustration procedures. Interestingly, these behaviors were much more effective than *Seeking for help* or simply *Escaping* the situation as they reduced frustration responses by up to 70%. That *Self-distracting*, in particular, was applied by younger and *Pretend-playing* by older children (as a trend) is in line with previous research (e.g., Ekas et al., 2011; Kopp, 1989) that refers to children's growing cognitive abilities.

7.2 | The impact of parent behaviors on children's frustration

The fact that children's frustration tolerance and span were more pronounced in episodes where a parent was engaged suggests that parent–child interaction and parent–child relationships are a cornerstone of children's coping with frustration. Interestingly, children's frustration emerged faster and lasted longer in episodes with the mother than the father. This pattern, however, was moderated by attachment security, which seemed to additionally reduce the frustration. That is, the higher attachment security, the later and shorter the children's frustration response. Although attachment security in mother–child dyads did not differ from father–child dyads, the study failed to similarly link father–child attachment (perhaps due to the less pronounced frustrations in the father–child dyads). Nonetheless, the importance of attachment for the emotional development in young children could be demonstrated. The present results confirmed that children more easily inhibit negative feelings in the presence of a secure base (e.g., Cassidy, 1994).

While only a few experimental studies on children's frustration involved both parents (see Braungart-Rieker et al., 2001; Bridges & Grolnick, 1998; Bridges et al., 1997; Diener et al., 2002; Ekas et al., 2011, 2013), none of them investigated the behaviors comparatively between mothers and fathers. We investigated several types of parent behaviors, of which *Demonstrating* and *Soothing* were most common. Time-lag analyses, however, revealed that *Demonstrating* did not constantly reduce children's frustration. It reduced frustration responses by 40% at the beginning, but increasingly lost this effect and disappeared after five seconds. The children were then just as likely to show frustration as before. On the other hand, *Soothing* (foremost by mothers) and *Encouraging* (primarily by fathers) even reinforced frustration. Perhaps when children were aroused or even throwing a tantrum, they might have perceived their mothers' soothing as inadequate because they had already recognized that their self-comforting behaviors were unsuccessful. The *soothing* mothers might thus have discouraged the children, eventually causing even more frustration. Remarkably, Grolnick and colleagues (1998) argued that sensitive mothers risk undermining children's opportunities to develop regulatory skills on their own. Similar processes might have occurred through fathers' *Encouraging*. In the face of the unsolvable dilemma of the *Frustration Procedure* (where it was unrealistic to move the toy out of the box), encouraging fathers amplified children's frustration; children must also have perceived them as inadequate.

The different parental attempts to down-regulate children's frustration might be explained by the gender gap in parents' own emotion socialization. Women are found to value emotional support more than men, whereas men might value problem-solving more than mothers, even in emotionally charged situations (see e.g., Baker et al., 2011; Eisenberg et al., 1998). However, the idea that the gender gap in parents' own socialization spills over to a gender gap in parenting girls vs. boys could not be confirmed. Previous studies found no differences in parental emotional supports for boys and girls (Spinrad et al., 2004), and the present study showed only minor differences. That is, parents distracted

sons more often than daughters, presumably to compensate for the fact that boys comforted themselves less often than girls did. Most importantly, however, parents' *Distracting* and *Reframing* were most effective in reducing frustration responses by up to 80%.

7.3 | Summary and limitations

This study aimed to describe the interface of child and parent behaviors in frustration situations. To our knowledge, it is the first study that comparatively explored maternal and paternal behaviors and related them separately to young children's efforts to overcome frustration, which must be seen as a domain-specific challenge characterized by specific socialization mechanisms and outcomes (see Grusec & Davidov, 2010). As children take on an increasing role as initiators of interactions with their parents (in particular from the second year onwards), the parent–child relationship is important. We demonstrated that children with high attachment security showed less frustration responses and also less with fathers than mothers. Behavioral details revealed that children often comforted themselves, perhaps to regulate the arousal. In addition, younger children distracted themselves, whereas older children actively coped, which might point to cognitive maturation over time. In addition, mothers and fathers pursued different approaches to help children to reduce frustration. Whereas fathers relied on cognitive assistance for children's own efforts to cope, mothers tried to protect the child from distress and soothed them. However, when the parents distracted and reframed, they were eventually most effective in reducing children's frustration.

To create a comprehensive picture of the dynamics of children's frustration, however, we would have had to link all features of child and parent behaviors together and analyze them in a common statistical model; but this was restricted due to sample size. Interestingly, the most effective behaviors against frustration were seldom used, whereas the least effective were frequent. One can speculate that children and parents used the less effective behaviors initially and moved to the more effective subsequently. For example, children started with self-comforting (to regulate arousal) in order to later distract themselves or play. Likewise, parents started to demonstrate or soothe (helping the child to regulate the arousal) in order to subsequently distract or reframe the situation (help the child to develop coping strategies). This idea of sequentially used behaviors to cope with frustration might be supported by common sense that distracting and reframing only work if frustration intensity is low: While a child is having a tantrum it is impossible to reason with him or that he finds a solution on his own. Furthermore, it is obvious that child and parent behaviors complement each other with self-comforting, self-distracting and pretend-playing from the child and soothing, distracting, and reframing from the parents. Consequently, social learning processes might be activated, where the child increasingly learns how to deal with the frustrating situation from the more effective distracting/ reframing approaches of their parents. Compared to mothers, fathers relieved the frustration pattern, as children became frustrated later, for a shorter time and with a reduced frustration rate.

These results further add to the debate on age-dependent and domain-specific parenting approaches (Ahnert, 2005; Grusec & Davidov, 2010). They suggest that the developmental domains around frustration with the negative concomitant emotions demand specific parenting in order to successfully influence child behavioral adjustment. We suggest to incorporate research outcomes on emotional regulation (see Eisenberg et al., 1998, 2010) into the framework of attachment theory by specifying responsive parenting in terms of children's frustration. Empathetic approaches (i.e., soothing), which is the central advice from attachment theory for small children who are unhappy, have proven to be insufficient in helping a child to overcome frustration beyond the second year of life. Instead, parents might be successful in supporting their frustrated children through cognitive means.

Although the present research successfully dealt with a complex data set by utilizing state-of-the-art statistics, the results must be discussed with regard to some limitations. *First*, frustrations and tantrums were provoked by an experimental procedure, typical for many day-to-day situations, in which frustration in young children can occur in the presence of their parents. This, however, can be quite different with non-parental figures and other contexts, such as care providers in public child care centers. *Second*, several aspects of children's frustration were left unnoted, for example, child temperament, which influences expressions of negative emotions in children and may moderate how parents adjust their behaviors accordingly (e.g., Li et al., 2014). *Third*, child behaviors might be culturally shaped, so that the efficacy to help the child overcome the frustration might substantially differ across cultures (e.g., He et al., 2013). *Finally*, investigations of the underpinning physiological processes and genetic correlates of children's frustration would improve our understanding of the conditions under which children's frustration and frustration management (of children and their parents) can evolve.

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Appendix 1

Child coping and parent behaviors during laboratory procedures provoking frustration in young children

[†]Authors (Year)	Sample (Ages)	Frustration procedures	Episodes	Child coping behaviors	Parent behaviors
Kramer and Rosenblum (1970)	N = 25 (12 m)	**Barrier:** child was faced with a desired object behind plexiglass window or in a transparent container	Mother-passive	Attempting to engage, keeping up visual attention etc.	
Rothbart, Ziaie, & O'Boyle (1992)	N = 66 (3–13.5 m)	**High Chair:** child was set on high chair unable to leave	Mother-passive	Avoiding, orienting toward mother, loosing attention, self-soothing etc.	
Braungart-Rieker and Stifter (1996)	N = 87 (5–10 m)	**Toy Removal:** when child played, the toy was removed and placed out of reach but within the child's sight	Mother-passive	Avoiding, communicating etc.	
Buss and Goldsmith (1998)	N = 148 (6–18 m)	**Barrier**	Mother-passive	Loosing attention, withdrawing, exploring, redirecting activities etc.	
Stifter et al. (1999)	N = 90 (5–18 m)	**Arm Restraint:** child's arms were holding down with neutral facial expression and no communication	Mother-passive	Avoiding, communicating etc.	
Smith et al. (2006)	N = 154 (24 m)	**Barrier** and **High Chair**	Mother-passive	Talking to/reaching out for mother etc.	Attachment security

†Authors (Year)	Sample (Ages)	Frustration procedures	Episodes	Child coping behaviors	Parent behaviors
Calkins and colleagues (1998, 1999)	N = 73 and 56 (18 and 24 m)	**Barrier, High Chair** and **Food Delay:** child was limited to obtain food before the delay period was over	Mother-active	Self-comforting/-distracting, orienting toward mother etc.	Controlling/correcting, encouraging, preemptively interfering, facilitating etc.
Calkins et al. (2004)	N = 346 (6 m)	**Barrier** and **Arm Restraint**	Mother-active	Willing to engage with mother etc.	Interacting sensitively/intrusively, encouraging physically (stroking, tickling etc.)
Spinrad et al. (2004)	N = 43 (>18 m)	**Toy Removal** and **Disappointment Task:** Small objects were ranked according to child's desire to possess them; child was rewarded by a less desirable object after the task	Mother-active	Seeking comfort, self-distracting, reevaluating etc.	Soothing, distracting, requesting, granting requests, reframing, explaining, bribing, demonstrating etc.
Grolnick et al. (1996)	N = 37 (24 m)	**Gift/Food Delay**	Mother-passive vs. active	Self-soothing/-distracting, exploring, searching for mother etc.	
Grolnick et al. (1998)	N = 140 (12–32 m)	**Gift/Food Delay**	Mother-passive vs. active	Requesting to be picked up, involving mother in play etc.	Engaging in play, redirecting attention, reassuring, soothing etc.
Diener and Mangelsdorf (1999)	N = 94 (18–24 m)	**Toy Removal** and **Food Delay**	Mother-passive vs. active	Self-soothing/-distracting, referencing toward mother, seeking help, leave-taking, avoiding etc.	
Leerkes and Wong (2012)	N = 98 (16 m)	**Barrier**	Mother-passive vs. active	Self-soothing/-distracting, seeking proximity/ help at mother, withdrawing, exploring etc.	Attachment security

†Authors (Year)	Sample (Ages)	Frustration procedures	Episodes	Child coping behaviors	Parent behaviors
Roque et al. (2013)	N = 55 (18–26 m)	**Toy Removal**	Mother-passive vs. active	Self-soothing/-distracting, seeking proximity/ help at mother, leave-taking, avoiding, exploring etc.	Attachment security
Braungart-Rieker et al. (2001)	N = 94 (4 m)	**Still-Face-Procedure:** parent stopped interacting with the child and maintained a neutral facial expression	Mother vs. father - passive only	Self-comforting, vocalizing toward parent etc.	Parental sensitivity, attachment security
Diener et al. (2002)	N = 185 (12/13 m)	**Competing Demand:** child was left with a busy parent (filling in questionnaires) and no toys were in the room	Mother vs. father - passive only	Self-soothing/-distracting, engaging parent in interaction, leave-taking etc.	Attachment security
Ekas et al. (2011)	N = 135 (20 m)	**Parent-Ignore-Toddler-Situation** which is similar to the Still-Face-Procedure	Mother vs. father - passive only	Self-soothing/-distracting, vocalizing toward parent etc.	
Bridges et al. (1997)	N = 64 (12–14 m)	**Gift/Food Delay**	Mother vs. father - passive vs. active	Self-soothing, making efforts to retrieve the object, engaging parent in interaction, wondering around the room etc.	
Bridges and Grolnick (1998)	N = 52 (12–25 m)	**Gift/Food Delay**	Mother vs. father - passive vs. active	Exploring, self-soothing, engaging parent in interaction, searching for comfort by parent etc.	
Ekas et al. (2013)	N = 135 (3–7 m)	**Still-Face-Procedure**	Mother vs. father - passive vs. active	Self-soothing/-distracting, high-intense motor activities etc.	

† Studies are selected which focused on early childhood only.