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Wait and See: Observational Learning of Distraction as an Emotion Regulation Strategy in 22-Month-Old Toddlers

Johanna Schoppmann[1] · Silvia Schneider[1] · Sabine Seehagen[2]

Abstract
Emotion regulation strategies have been linked to the development of mental disorders. In this experiment, we investigated if imitation is an effective way of learning to increase the usage of the emotion regulation strategy 'distraction' for 22-month-old toddlers. Toddlers in two experimental conditions participated in two waiting situations intended to elicit frustration, with a modeling situation between the first and the second waiting situation. In the modeling situation, toddlers observed how either a familiar model (parent) or an unfamiliar model (experimenter) demonstrated the use of distraction as a strategy to cope with a frustrating situation. Toddlers in an additional age-matched control condition did not witness any modeling between the two waiting situations. Analyses revealed that toddlers in both experimental conditions combined distracted themselves more in the second waiting situation than did toddlers in the control condition. There were no differences with regard to the familiarity of the model. These results suggest that providing structured observational learning situations may be a useful way to teach toddlers about the use of specific emotion regulation strategies.

Keywords Emotion regulation · Toddlers · Temperament · Imitation · Distraction

The scene of a screaming toddler in the queue at the supermarket, evoking judging looks from both customers and employees, and finally embarrassed parents buying the desired sweets - this and similar scenarios are common in the daily life of young families. Learning to regulate both behavior and emotions is a fundamental developmental task for young children. The degree to which it is mastered can have life-changing consequences.

Most mental disorders start early in life (Kessler et al. 2005); 50% of them have an onset before 14 years of age. Seventy-five percent start before the age of 24 (Kessler et al. 2005). It has been suggested that poor emotion regulation skills could be a key factor in the development and maintenance of internalizing and externalizing disorders in childhood (e.g., Feng et al. 2009; Gust et al. 2015; Hannesdottir and Ollendick 2007; Helmsen and Petermann 2010; Schmitt et al. 2012; Suveg and Zeman 2004). Therefore, understanding and facilitating emotion regulation in the first years of life might be crucial in the prevention of later mental health problems. According to Gross (1998, 2014, 2015) emotion regulation is a process by which people shape which emotions they have, when they have these emotions und how they experience or express emotions. Emotion regulation can influence up-regulation and down-regulation of positive and negative emotions and is assumed to be applied both in automatic and effortful processes (Gross 2014, 2015).

There is evidence of an association between dysfunctional emotion regulation and both anxiety and depressive disorders (e.g., Aldao et al. 2010; Hannesdottir and Ollendick 2007). Furthermore, dysfunctional emotion regulation strategies are related to externalising symptoms and future peer rejection in 6- to 12-year-olds (Kim and Cicchetti 2010). In a longitudinal study, 5-year-olds with high anger intensity and low regulation of positive emotion had more externalizing problems at 8 years of age, whereas 5-year-olds with high anxiety and low anxiety regulation had more internalising problems three years later (Rydell et al. 2003). Several prospective studies linked dysfunctional emotion regulation strategies with symptoms of emotional psychopathology in longitudinal designs (Abela et al. 2012; Aldao and Nolen-Hoeksema 2012; McLaughlin et al. 2011). Moreover, children who have already been

✉ Sabine Seehagen
sabine.seehagen@rub.de

[1] Department of Psychology, Ruhr-Universität Bochum, Massenbergstraße 9-13, 44787 Bochum, Germany

[2] Present address: Department of Psychology, Ruhr-Universität Bochum, Universitätsstraße 150, 44801 Bochum, Germany

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diagnosed with a mental disorder show difficulties concerning the inhibition of emotion expression, poor control of emotion and nonnormative expression of emotion (Thompson and Calkins 1996). Looking specifically at the first years of life, toddlers' emotion regulation mediates the relation between supportive parenting and low levels of externalizing problems and separation distress, and high social competence in both 18- and 30-month-old toddlers (Spinrad et al. 2007). Moreover, both emotion regulation strategies and emotional reactivity in 24-month-old toddlers predict conflict and cooperation with peers. Distress to frustration, when accompanied by high venting or high focal-object focus, is significantly related to conflict with peers. However, distress to frustration is not significantly related to conflict with peers when accompanied by distraction, mother-orientation or self-focused behaviors (Calkins et al. 1999). Furthermore, first evidence exists that dysfunctional emotion regulation may be an important feature and mechanism in the transmission of mental disorders like Borderline Personality Disorder (Eyden et al. 2016). Taken together, maladaptive emotion regulation strategies appear to be the precursor and to go hand in hand with unfavorable, and clinically relevant, developmental outcomes in childhood.

The process of learning to regulate one's emotions begins in early infancy and develops throughout childhood and adolescence (Silk et al. 2003; Steinberg 2005). Within the first few months of life, infants suck their thumb or turn their heads to soothe themselves and avoid overstimulation, respectively (Kopp 1989). From around 5 months of age, infants use communicative means like seeking eye contact in order to interact with their caregiver (Kopp 1989). Generally, in the first year of life infants' emotions mainly function as a behavioral regulator for the caregiver: regulating someone else who, in turn, helps the infant to regulate his or her emotions. This type of regulation has been referred to as *interpsychological regulation* (Friedlmeier and Holodynski 1999). Parents usually react immediately to their infant's cries for hunger or need for sleep and hence regulate their infant's emotions. Infants are thought to steadily learn from their parents how to react when an emotion arises. With the transition from infancy to toddlerhood, the requirements for emotion regulation often change markedly for both toddlers and their parents. In their second year of life, toddlers have developed all prerequisites to master a limited number of emotion eliciting situations on their own. Gradually changing to *intrapsychological regulation*, toddlers now no longer rely on their caregivers' support for every emotional situation (Friedlmeier and Holodynski 1999). For example, by the age of 12 to 18 months, toddlers independently find new ways to interact with objects to alleviate their discomfort when the caregiver is not available (Kopp 1989).

Toddlers are able to use several emotion regulation strategies, for example, parent orientation or seeking comfort with transitional objects (Kopp 1989). Another commonly used strategy is distraction, which is the focus of the present study. In 12-month-old infants, re-orientation of attention towards a neutral stimulus, in contrast to the stimuli that elicited negative emotions, helps to reduce negative arousal (Braungart and Stifter 1991). Throughout their second year of life, toddlers increase their toy exploration and learn to reorient their attention toward other objects in their environment even when in distress (Grolnick et al. 1996). The ability to distract oneself is correlated with both better compliance and reduced anger (e.g., Calkins and Johnson 1998; Kochanska et al. 2001; Peake et al. 2002). In a study on anger regulation (e.g., snack delay), shifting attention away from the source of frustration was associated with a decrease in anger (Gilliom et al. 2002). A further study showed that toddlers successfully used distraction in frustrating situations (e.g., toy removal) but not in fear-eliciting situations, especially when parents were constrained and did not interact with their toddlers (Roque and Veríssimo 2011). Hence, distraction seems to be an adaptive emotion regulation strategy in toddlers in frustrating situations. From a developmental psychopathology perspective, increasing the use of adaptive emotion regulation strategies like distraction early in life could be important for at least two reasons. First, enhancing toddlers' ability to cope with emotionally challenging situations might contribute to their resilience to mental health issues later in life. Second, and relatedly, later in life, toddlers who acquire age-adequate adaptive strategies to cope with situations that are a common source of frustration at that age might be more likely to successfully master further developmental tasks related to emotion regulation that build on early-acquired strategies. Both might contribute to the prevention of mental disorders.

Although there is some documentation on age-related changes, research is scarce on the acquisition of emotion regulation strategies in infancy and toddlerhood. For example, how do infants and toddlers improve their use of particular strategies? Which circumstances facilitate or hinder the learning process? In other words, very little is known about potential learning mechanisms that underlie changes in infants' and toddlers' use of different emotion regulation strategies. However, this is an important requirement for the development of theory driven and successful prevention strategies in clinical child psychology.

Imitation is a widely used form of learning for infants and toddlers (Barr and Hayne 2003). New patterns of behavior can be acquired either through direct experience or through imitation and observational learning (Bandura and McClelland 1977). Imitation is efficient as it reduces the need for trial and error learning or independent problem solving. It is so far unknown whether imitation is a helpful mean for toddlers to learn emotion regulation strategies. If so, it is possible that toddlers are more likely to learn better from some models than from others. In the present study, we tested whether toddlers modulate their use of an emotion regulation strategy through

imitation after observing models who varied in their degree of familiarity (i.e., parent vs. experimenter).

The role of sensitive parenting in facilitating emotion regulation is immense (e.g., Diaz and Eisenberg 2015; Feldman et al. 2011). Parents communicate norms and expectations regarding occasions for self-regulating, and moreover have the task to model and teach methods for regulation (Diaz and Eisenberg 2015). Morris and colleagues posited that children learn emotion regulation through observational learning, modeling and social referencing in the family context (Morris et al. 2007). Moreover, children whose parents coach them about emotions are able to regulate their emotions more successfully than those whose parents do not coach their children about emotion (Morris et al. 2017). Considering the important role of parents for the development of emotion regulation, parent models might be particularly effective when toddlers are given the opportunity to learn emotion regulation strategies through imitation.

In the present study, we tested whether toddlers' use of a particular emotion regulation strategy, namely distraction, can be shaped by imitation. Distraction seems to be an adaptive strategy in overcoming frustration (Gilliom et al. 2002) and thus, might be of particular relevance for the prevention of externalizing disorders. In addition, we examined whether the rate of imitation varies as a function of familiarity of the model. In exploratory analyses, we were interested in additional factors that may relate to the learning of adaptive emotion regulation strategies, as there are marked individual differences in the development and usage of emotion regulation strategies. Temperament plays a crucial role in the ability of children, as well as adults, to regulate one's emotions. One important factor determining self-regulation capabilities is effortful control, which, in turn, strongly depends on the executive aspects of attention, including selective attention towards or away from the stimuli and inhibition of a dominant response (Posner and Rothbart 2000; Rueda et al. 2005). Specifically, effortful control is defined as the ability to suppress a dominant response in order to perform a subdominant response (Posner and Rothbart 2000; Rothbart and Bates 1998). Effortful control is stable over time (Kochanska et al. 1998; Kochanska et al. 2000) and seems to be directly linked to emotion regulation abilities. For example, it is negatively correlated with 3-year-old children's early disruptive behaviour (Olson et al. 2005). Considering that effortful control is only one of the many facets of temperament, there are likely to be substantial differences in emotion regulation between children with different temperaments (Phillips and Shonkoff 2000). Another important temperamental variable with respect to emotion regulation is surgency (Putnam et al. 2006). High-surgent children are prone to anger and are typically characterized by high positive affect, activity level and impulsivity and low shyness and withdrawal (Dollar and Stifter 2012). In a study with 4.5-year-old children, emotion regulatory behaviors moderated the relation between surgency and aggression (Dollar and Stifter 2012). Hence, temperament seems to be an important factor that can either facilitate or prevent desirable outcomes when dealing with emotion-eliciting situations. However, although temperament in children has been researched extensively, surprisingly little is known about its role in the acquisition of emotion regulation strategies.

In the present study, 22-month-old toddlers participated in two waiting situations that reliably induce anger at this age (Cole et al. 2011). Between these two situations, toddlers in two experimental conditions witnessed either how the experimenter or their parent experienced a similar waiting situation and modeled the use of distraction as a strategy to deal with the wait. Toddlers in an additional age-matched control condition did not participate in an observational learning episode between the two waiting situations. Our main question of interest was whether toddlers' use of distraction across the two waiting situations would vary as a function of the condition. We predicted that only toddlers in the experimental conditions who had observed a model would increase their use of distraction in the second waiting situation. Although parents are thought to be important for teaching emotion regulation to their children, the literature on action imitation from differently familiar models in infancy is less conclusive (e.g., Devouche 2004; Seehagen and Herbert 2010). Thus, we did not formulate a specific prediction regarding the effectiveness of the parent versus experimenter model. As a secondary question, we examined the relations between the use of distraction and toddlers' temperament. Here, our main question of interest was whether the temperament dimensions negative affectivity, surgency, and effortful control were related to toddlers' use of distraction in the waiting situations.

Method

Participants

The final sample consisted of $N = 66$ full-term 22-month-old toddlers ($n = 32$ males; sample mean age: 21.73 months; range: 21.4–22.73 months). The sample size was determined a priori by a power analysis using G*power (Faul et al. 2007), assuming a medium-sized interaction effect in the main Analysis of Variance (ANOVA). An additional $n = 14$ toddlers were tested but not included in the analyses due to experimenter error ($n = 2$), refusal to participate ($n = 1$), inattention during the modeling situation that is, failure to look at the stimulus during the model's demonstration ($n = 5$), parental interference ($n = 5$), or parental failure to meet the minimum standards for modeling in the parent model condition ($n = 1$).

Fifty-nine toddlers participated with their mothers and $n = 7$ toddlers participated with their fathers. The age of the parent ranged from 24 to 45 years for mothers ($M = 34$) and from 24 and 63 years for fathers ($M = 36$). Seventy percent of mothers and 65% of fathers had a university degree. Sixty-eight

percent of toddlers were only children. Participants were recruited via public birth registers. Specifically, all parents living in the city of Bochum who had a child born within a particular time window received a letter outlining the university's research program on child development. The letter invited parents to register their interest in participating in the research program with their child online or via letter. Parents who provided their details were called when their child was in the appropriate age-range for the present study. Parents were given a verbal description of the study on the phone and could then decide whether they would like to arrange an appointment. Each participating toddler received a small toy and a certificate as well as the snacks and the present that were part of the waiting situations. Each parent received 5 EUR as a reimbursement for travel costs. Study procedures were approved by the local Ethics Committee of the Faculty of Psychology, Ruhr-Universität Bochum (2014, number 147). All parents provided informed written consent prior to participation.

Design

In a between-subject design, toddlers were randomly assigned to one of the three conditions, parent model, experimenter model or control condition. Toddlers in all three conditions participated in two waiting situations where they had to wait for a desirable object (i.e., either a snack of the parent's choice, or a wrapped gift). Each toddler waited once for a snack and once for a gift. Order of objects was counterbalanced. Toddlers in the parent model and experimenter model condition participated in a modeling situation between the two waiting situations, as described below. Toddlers in the control condition played between the two waiting situations and did not participate in a modeling situation.

Materials

Desirable Objects (Waiting Situations) The parents chose one out of five snack options: raisins, cookies, smarties, winegum, or pretzels. The snack was presented on a red napkin on a plastic plate. The present had the shape of a big bonbon. It was wrapped in red wrapping paper with white dots. One yellow bow was attached to the wrapped gift. Inside the wrapping paper was a small ball.

Toys Three different sets of toys were used throughout the experiment. Set 1 and 3 were used during the waiting situations and the order was counterbalanced. They both consisted of a toy to build a tower and of an animal making sounds. Set 2 was used during the modeling situation (or the free-play session in the control condition, respectively) and consisted of a butterfly toy and a stacking toy (Fig. 1). Selection of the toys was guided by previous studies that used similar waiting tasks (e.g., Bridges et al. 1997; Grolnick et al. 1998) and by the purpose of the present study: On the one hand, the toys should not be too attractive so that toddlers' attention would not easily divert from the waiting situation to the toys at hand. On the other hand, the toys needed to afford some means to engage with them so that toddlers could indeed use them to distract themselves. Hence, we opted against using very bland or broken toys as had been done in some previous research (e.g., Cole et al. 2011). Moreover, there were picnic toys (1 kettle, 4 cups, 4 plates, 4 spoons on a tablet and magnetic wooden fruits and vegetables that could be cut with a wooden knife) used in a baseline free play situation.

Phantasy Object (Modeling Situation) In the modeling situation, there was a box containing a phantasy object designed specifically for research purposes and not commercially available (i.e., an object made from styrofoam, painted in blue). This object was hence unknown to all toddlers in the study and labeled "dela" by the model (max. Length = 22 cm, max. Width = 18 cm, Fig. 2).

Questionnaires

Mental State Assessment Toddlers' mental state at different points during the procedure was rated by the accompanying parent using an adapted version of the 'Multidimensionaler Befindlichkeitsfragebogen (MDBF)'. This questionnaire assesses a person's mental state using a list of adjectives. It contains the scales 'Good-Bad-Mood', 'Wakefulness-Tiredness' and 'Calm-Agitated' (Steyer et al. 1997). The scales 'Good-Bad-Mood' and 'Calm-Agitated' were used in the present study. Each scale consists of 8 items with scores varying between 8 and 40 points in total (5-point Likert scale with answers ranging from 'not at all' to 'very'; example for the scale Good-Bad-Mood: 'While my child was waiting for the snack, he/she felt content'). A high score indicates calmness and a good mood, respectively. Re-test reliability lies

Fig. 1 Display of toy sets. Toy sets 1, 2 and 3 (from left to right)

Fig. 2 Display of the waiting object 'Dela' in the Box

between $r = 0.69$ and $r = 0.86$ and Cronbach's Alpha between $\alpha = 0.73$ and $\alpha = 0.89$ (Steyer et al. 1997). In the present sample internal consistency ranged from $\alpha = 0.82$ to $\alpha = 0.95$.

Temperament The 'Early Child Behavior Questionnaire' (ECBQ) is a parent-report measure of temperament in 1.5- to 3-year-old children with adequate internal consistency for all scales and moderate inter-rater reliability for most scales (Putnam et al. 2006). In the present study, the German translation of the very short form with 36 items and 3 broad scales was used. The three scales were 'Surgency/Extraversion', 'Negative Affectivity' and 'Effortful Control'. Parents rated their toddler's behavior over the last two weeks on a 7-point Likert scale ranging from '1 - never' to '7 - always' (example for the scale Negative Affect: 'While in a public place, how often did your child seem afraid of large, noisy vehicles?'). Parents were asked to complete the questionnaire while toddlers participated in the waiting situations. In the present sample Cronbach's alpha was acceptable for all three scales (Negative Affect: $\alpha = 0.59$; Surgency: $\alpha = 0.62$; Effortful Control: $\alpha = 0.69$).

Set-Up and Procedure

Set-Up Each toddler was assessed individually in a laboratory at Ruhr-Universität Bochum. In the laboratory, there was a table with two chairs, a play mat with a few age adequate toys and two cushions, and a wall-mounted shelf (at a height of 1.40 m). On the shelf, there was a box hidden underneath a blanket containing the dela. There was a lamp attached to the shelf, shining light onto the wall directly underneath the shelf. There were laminated scripts for the modeling situation attached to the wall next to the shelf. In the corners of the room, there were three cameras partially hidden behind curtains.

Arrival and Warm-Up Upon arrival, parents and toddlers were greeted by the experimenter who accompanied them to the laboratory. During a warm-up phase, the experimenter informed the parent about the study procedures verbally and in writing. The parent had the opportunity to ask questions, provided written informed consent and then selected the toddler's favorite snack. In the meantime, the experimenter played with the toddler until he/she had settled in. This phase usually lasted about 10–15 min.

Baseline Situation and Instructions A 4-min baseline situation followed during which the parent and the toddler engaged in a free play session with picnic toys. This phase was included to obtain a measure of toddlers' affect during a regular period of play. The experimenter was absent during this time and monitored the situation on a monitor from an adjacent control room. Immediately afterwards, the parent was asked to rate the toddler's mental state for the first time. The experimenter then instructed the parent in more detail about their required behavior in both waiting situations and, for participants in the model conditions, in the modeling situation.

Waiting Situation 1 After clearing the toys from the baseline situation and bringing in new ones (Set 1 or 3), the experimenter played with the toddler for 2 min to familiarize the toddler with the new toys. The experimenter then told the toddler she would get something for him/her and briefly left the room. The experimenter returned either with a snack or a gift and showed this to the toddler. If it was a snack, the toddler was allowed to eat one single item; if it was a gift, the toddler was allowed to touch the wrapped present. The experimenter then claimed to have forgotten something outside, placed the object on the shelf (outside of the toddler's reach) and explained to the toddler that this was a snack (or a gift, respectively) for the toddler and that the toddler would receive it once the experimenter returned. The experimenter announced that she would return once the light on the wall switched from red (the present color) to green. The experimenter then left the room and monitored the situation on a monitor from an adjacent control room. The parent had been instructed to remain passive when addressed by the toddler and to state that he/she did not have time for he/she had to fill out the questionnaires. If the toddler engaged in forbidden activities (e.g., manipulating the cameras), the parent was asked to intervene and then return to the questionnaires. After 2 min, the experimenter returned, inconspicuously switched the light to green using a remote control, and the toddler received the object. The parent then rated the toddler's mental state during the waiting situation.

Modeling Situation The modeling situation occurred between the two waiting situations and its procedure varied as a function of condition. In the experimenter model condition, the experimenter played with the toddler on the play mat for 2 min while the parent sat on a chair at the table. The experimenter also had a laminated script on the floor with her that contained the instructions for the modeling situation. She then pointed to the shelf and wondered aloud what was under the blanket. Once she had gained the toddler's attention, she got

up and went to the shelf to look. The experimenter explained that it was a dela and that she would very much like to touch it. At this point, the previously instructed parent intervened and told the experimenter that she would have to wait until the light under the shelf turned green. The experimenter told the toddler that she did not like waiting, but that time went faster when she played. She then returned to the play mat and played with the toys. After 45 s she pointed to the shelf. The experimenter told the toddler that she would like to have the dela and that she was annoyed because she had to wait. Then she said that playing made her feel better during the wait, and she continued playing. After another 45 s, she repeated the same gesture and sentences. After another 45 s, the experimenter inconspicuously switched the light to green. She exclaimed how happy she was that the light was green, went to the shelf, took the dela and investigated it together with the toddler. Finally she stated how she disliked waiting, but that time had gone by so much faster while she was playing. She put the dela back on the shelf and exchanged the toys to start with the second waiting situation.

The modeling situation in the parent model condition was equivalent, with reversed roles for the experimenter and the parent. Here, the parent sat on the play mat and played with the toddler, whereas the experimenter seated herself at the table and appeared to read the questionnaires. The parent said the sentences described above and showed the toddler the dela, whereas the experimenter said that the parent had to wait until the light turned green before she could touch it. The experimenter timed the modeling situation and signaled to the parent as to when he or she should make the next statement. If the parent missed the signal (i.e., the experimenter cleared her throat), the experimenter asked the parent to say the sentences. After the modeling situation, the parent returned to the table and the experimenter put the toys away.

In the control condition, the experimenter played with the toddler for a total time of 5 min. This was the equivalent duration toddlers in the two model conditions spent between waiting situations (i.e., 2 min of initial play followed by 3 min of observing the model wait).

Waiting Situation 2 The second waiting situation was identical with the first waiting situation. The toddler received a different toy set, either the gift or snack depending on which one had been given in the first waiting situation. The parent then also rated the toddler's mental state during the waiting situation. This second rating was not further analyzed in the context of the present study.

Data Coding and Inter-Rater Reliability

The questionnaires were scored according to author instructions. The procedure was video recorded by three cameras and coded using the software Interact which allows frame-by-frame analysis of video recordings (Version 9, Mangold International). To obtain baseline values of affect, the last 2 min of the picnic free play session with the parent were coded with regard to affect. During the waiting situations, the duration of affect and distraction were coded. Negative affect was coded when the toddler was crying, whining, trying to leave the room or performing forbidden activities. Distraction was coded as consisting of both verbal and behavioral indicators. Detailed information on the coding schemes can be found in Table 1. Coding schemes were based on the existing literature (e.g., Cole et al. 2011; Diener and Mangelsdorf 1999; Roque and Veríssimo 2011). For example, Diener and Mangelsdorf (1999) classified four different types of emotion regulation strategies in their sample of 18- and 24-month-olds: mother-related strategies, disengagement of attention strategies, dealing with stimulus strategies and redirection of action strategies. In the present study, we focused on distraction which is part of the disengagement of attention strategies. Talking to parent or body-oriented self-soothing strategies (e.g., thumb sucking) were considered to be mother-related strategies or redirection of action strategies, respectively, and were hence not considered as distraction.

For the preparation of the waiting situations, we coded whether the toddler looked to the shelf when the desirable object (snack or gift) was placed there. During the modeling situation, we coded the number of scripted key phrases stated by the model, the number of times the toddler looked at the model while the model was stating the key phrases, and the number of times the toddler looked to the shelf when the model pointed to it. For a participant to be included in the final sample, the model was to state the key phrases at least twice and the toddler was to look to the shelf at least once when the model pointed to it.

We sought to take into account individual differences between toddlers and asked whether there were relations between the toddlers' temperament and their behavior during the waiting situations. Specifically, we were interested in exploring correlations between the toddlers' acquisition of distraction, negative affect and use of distraction in each waiting situation with the three temperamental scales Surgency, Negative Affectivity and Effortful Control. To study how temperament dimensions were related to changes in toddlers' use of distraction, we calculated a difference score in distraction by subtracting duration of distraction in the waiting situation 1 from duration of distraction in the waiting situation 2. We did not have priori hypotheses. Instead we aimed to explore these relations to inform potential future research.

The experimenter coded all videos. Three independent raters (graduate students in psychology) who were blind to the participants' conditions coded both waiting situations of 54% of the participants. An intra-class correlation coefficient was calculated for affect and distraction. The following rules of thumb were applied: > 0.9: Excellent, > 0.8: Good, > 0.7:

Table 1 Description of Coding Schemes for Negative Affect and Distraction

Code	Description
Verbal Negative Affect	crying, screaming, whining
Tries to Leave Room	trying to open door and hence leave situation: Door needs to be touched and attempted to be pulled open with force or door handle needs to be pulled down (if toddler is too small: time of maximal bodystretch counts) OR aggressive beating against the door; gentle knocking is not coded
Forbidden Behaviour	toddlers show forbidden behaviour in a situation (baseline or waiting situations) which has previously been prohibited by their parents (e.g., touch cameras, pull parent's hair, hide behind curtain). This behavior is only coded if parent has verbally forbidden the child to behave like this. Starts with touching the forbidden stimuli
Verbal Distraction	looks to the object that is being spoken to or of at the same time (e.g., looking at toy and saying 'duck'), words with focus on the waiting situation (e.g., snack, lamp) are not coded here
Behavioral Distraction	simultaneously: toddler touches an object with a body part, looks at it and either moves the object or his/her own body. Periods of holding a toy in hand while walking and not looking at it at the same time are not coded.

Acceptable, > 0.6: Questionable, > 0.5: Poor, and < 0.5: Unacceptable (George and Mallery 2003). Ratings for distraction were good (ICC = 0.84), and ratings for negative affect were also good with ICC = 0.89.

Results

Manipulation Check and Preliminary Analyses

First, we checked whether the waiting task induced negative affect. This was necessary because in order to be able to observe emotion regulation, negative emotion needs to be present. A paired t-test across the entire sample indicated that there was a significant increase in negative affect from baseline to the first waiting situation (see Table 2 for *M*s and *SD*s), $t(65) = -3.98$, $p < 0.001$, $d = 0.49$. Thirty-nine out of the 66 toddlers (59%) showed an increase in negative affect. Parental ratings of toddlers' mental state during baseline and the first waiting situation corroborated the behavioral data: A paired t-test across the entire sample showed that parents rated their toddlers' mood as significantly worse during the first waiting situation compared to baseline (good mood-bad mood scale, $M_{baseline} = 37.11$, $SD = 3.40$; $M_{waiting\ situation1} = 33.21$; $SD = 6.65$), $t(65) = 4.71$, $p < 0.001$, $d = 0.58$. Moreover, the calm-agitated scale of the MDBF was rated differently with regard to the two situations, with toddlers being more agitated in the first waiting situation than in the baseline situation (calm-agitated scale, $M_{baseline} = 34.91$, $SD = 4.76$; $M_{waiting\ situation1} = 29.12$; $SD = 7.45$), $t(65) = 6.40$, $p < 0.001$, $d = 0.78$.

Second, we examined toddlers 'attention and models 'adherence to the script during the modeling situation. As there was no modeling situation for toddlers in the control condition, this analysis included only toddlers from the parent model and the experimenter model conditions. All toddlers in the final sample (100%) looked at the shelf when the stimulus was placed there in preparation of the waiting situation. This was, in fact, an inclusion criterion (cf. participants section). There was no difference in the number of scripted key phrases used by the model between the experimenter model and the parent model condition, suggesting an equivalence in quality of the modeling, $t(42) = 0.53$, $p = 0.598$.

Main Analyses

Our main question of interest was whether toddlers can learn the emotion regulation strategy distraction through modeling. There was a numerical increase in the duration of distraction from waiting situation 1 to waiting situation 2 in both model conditions and a numerical decrease of distraction in the control condition (cf. Figure 3, Table 2). To assess whether there was a significant difference between the three conditions in toddlers' use of distraction across the two waiting situations, we conducted a 2 (Waiting Situation: 1, 2) × 3 (Condition: Experimenter Model, Parent Model, Control) mixed-model ANOVA. There was no main effect of waiting situation, $F(1,63) = 0.39$, $p = 0.553$, $\eta_p^2 = 0.01$. There was a marginally significant main effect of condition, with $F(2,63) = 3.10$, $p = 0.052$, $\eta_p^2 = 0.09$. Furthermore, there was no significant waiting situation by condition interaction, $F(2,63) = 2.36$, $p = 0.103$, $\eta_p^2 = 0.07$.

To determine whether the behavior of toddlers in the combined model conditions differed from that of toddlers in the control condition, we collapsed the data from the parent model and experimenter model conditions in the next step. Descriptively, duration of distraction in the first waiting situation was very similar for the model conditions ($M = 30.81$ s, $SD = 21.70$) and the control condition ($M = 27.96$ s, $SD = 20.83$). A numerical change in the duration of distraction in the second waiting situation can be seen for the model conditions ($M = 38.14$ s, $SD = 23.58$) and the control condition ($M = 19.68$ s, $SD = 18.13$). We then conducted a 2 (Waiting Situation: 1, 2) × 2 (Condition: Model Conditions, Control Condition) mixed-model ANOVA. There was no significant

Table 2 Duration of Negative Affect and Distraction in Seconds

Condition	*M* (Baseline)	*SD* (Baseline)	*M* (WS1)	*SD* (WS1)	*M* (WS2)	*SD* (WS2)
Duration of negative affect						
Experimenter model	0	0	6.51	15.75	8.06	16.64
Parent model	0.34	0.16	10.48	19.38	10.31	15.68
Control group	0	0	5.30	8.43	5.38	8.82
Duration of distraction						
Experimenter model	n/a	n/a	31.17	24.54	39.93	26.85
Parent model	n/a	n/a	29.46	18.94	36.35	20.26
Control condition	n/a	n/a	27.96	20.83	19.68	18.12

main effect of waiting situation, $F(1,64) = 0.02$, $p = 0.895$, $\eta_p^2 = 0$. But there was a significant main effect of condition, $F(1,64) = 5.87$, $p = 0.018$, $\eta_p^2 = 0.08$. As indicated by the means reported above, toddlers in the model conditions exhibited distraction for a longer time than toddlers in the control condition. This main effect was qualified by a significant waiting situation by condition interaction effect, $F(1,64) = 4.88$, $p = 0.032$, $\eta_p^2 = 0.07$. Post-hoc independent t-tests revealed no significant difference in duration of distraction between the model conditions and the control condition in the first waiting situation $t(64) = 0.51$, $p = 0.611$, $g = -0.013$. However, there was a significant difference in distraction between the model and the control condition in the second waiting situation, with toddlers in the model condition using distraction significantly longer than toddlers in the control condition, $t(64) = 3.22$, $p = 0.002$, $g = -0.84$. Post-hoc paired t-tests revealed a marginally significant increase in the use of distraction across the two waiting situations in the model conditions, $t(43) = -1.76$, $p = 0.085$, $d = -0.027$, and no significant difference in the control condition, $t(21) = 1.45$, $p = 0.161$, $d = 0.31$.

Exploratory Analyses: Associations between Use of Distraction and Toddlers' Temperament

A MANOVA revealed that there were no differences in the assessed temperament dimensions among the three conditions, $F\ (6,122) = 1.33$, $p = 0.250$; Wilk's $\Lambda = 0.881$, partial $\eta^2 = 0.06$. Descriptive statistics are shown in Table 3.

There were no significant correlations between the temperament scales effortful control and negative affect and the use of distraction (ranges from $r = 0.01$ to $r = 0.23$), except for the duration of negative affect in the second waiting situation and the temperamental scale negative affectivity in the control condition ($r = -0.53$, $p = 0.012$). The higher toddlers scored on negative affectivity, the less negative affect they showed in the second waiting situation. We found a significant positive correlation between surgency and distraction in the second waiting situation in the experimenter model condition ($r = 0.44$, $p = 0.041$), no significant correlation in the parent model condition ($r = -0.17$, $p = 0.455$) and a significant negative correlation in the control condition ($r = -0.51$, $p = 0.017$, cf. Table 4).

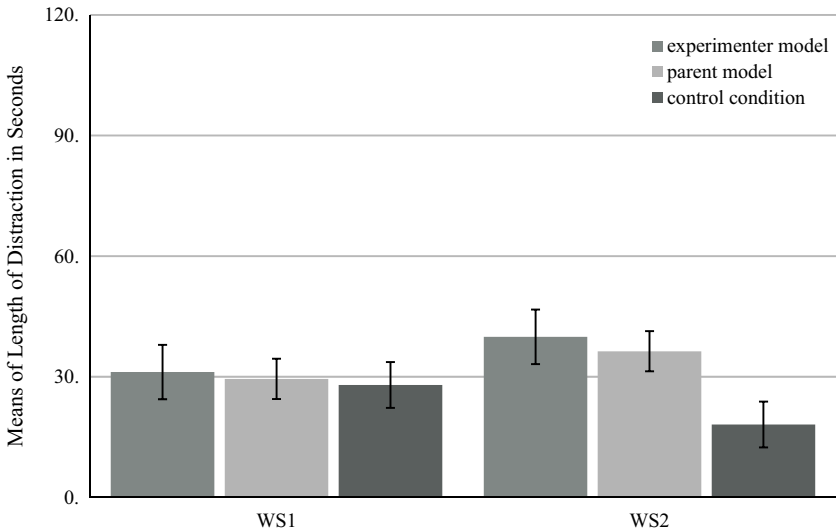

Fig. 3 Duration of distraction (in seconds) in the three conditions across the two waiting situations (WS1; WS2). Error bars represent SE of M

Table 3 Descriptive Statistics on the Temperamental Scales for each Condition ($n = 22$). Toddlers were rated on a 7-point Likert scale ranging from '1 - never' to '7 - always'

	Experimenter condition		Parent condition		Control condition	
	M	*SD*	*M*	*SD*	*M*	*SD*
Negative affect	3.07	0.73	2.80	0.63	2.75	0.54
Surgency	5.32	0.51	5.20	0.55	5.35	0.63
Effortful control	4.90	0.53	4.63	0.68	4.72	0.64

Discussion

In the present study, we examined the role of imitation for the use of distraction as a strategy for regulating emotion in 22-month-olds. To our knowledge, this study is the first attempt to experimentally investigate a possible learning mechanism of emotion regulation strategies in toddlers. Our main finding was that toddlers who had seen a model demonstrating the use of distraction subsequently used this strategy significantly more than toddlers in a control condition who had not seen the modeling.

This finding shows that 22-month-old toddlers are able to modify behaviors that are more complicated than simple motor actions through imitation. This finding could be a cornerstone for future research in this area and, maybe more importantly, suggests a method of teaching toddlers how to regulate their emotions. Waiting is an everyday activity for toddlers, and parents or early childhood educators could be advised not only to tell children to wait or to distract themselves with toys but to actually model this behavior. This technique could eventually be used to support children's learning about how to regulate their emotions at an early age and might hence be relevant for their mental health development. In addition to potentially helping to prevent the emergence or worsening of psychopathology in vulnerable children, a good ability to employ adaptive emotion regulation strategies might enhance mental well-being and social relationships in typically developing children. For example, children's ability to regulate their emotional responding is linked to socially appropriate behavior, popularity with peers, and to the expression of sympathy and helping others (e.g., Eisenberg and Fabes 1992). It has also been suggested that children who are able to regulate their emotional arousal are likely to cope constructively and controlled (Eisenberg and Fabes 1992).

There were no significant differences in distraction between toddlers in the experimenter and parent conditions. Hence, modeling distraction might be a successful teaching method that can be implemented by other adults than the parents. On the one hand, this finding is in accordance with the literature regarding the imitation of motor actions from models differing in their familiarity to the toddler where no consistent effect of model familiarity has been found in the second year of life (e.g., Devouche 2004). On the other hand, however, parents are thought to play an important role in the development of emotion regulation (Diaz and Eisenberg 2015; Morris et al. 2007, 2017). One reason for our finding may be that the laboratory context played a role in toddlers' decision-making process as to whom and how to imitate. In the present study, the experimenter was likely perceived to be confident, knowledgeable, and in charge in the laboratory setting, greeting the participants and guiding toddlers and parents through the procedure. The toddlers may have attributed reliability and competence to the experimenter model, factors that influence the likelihood of infants' and young children's imitation behavior (e.g., Poulin-Dubois et al. 2011; Zmyj et al. 2010). Results might differ when a similar experiment is conducted either at home, where the experimenter is clearly a guest, or in a laboratory setting when a completely unfamiliar experimenter acts as the model. Due to prior interactions in the laboratory in the present study, like the warm-up, the experimenter had already established a certain familiarity with the toddler.

The significant difference between the combined model conditions and control condition was driven by toddlers in

Table 4 Pearson Correlations of the Temperamental Scales of the ECBQ (Surgency = S, Effortful Control = EC, Negative Affectivity = NA) and Durations of Distraction, Difference in Distraction over the Two Waiting Situations and Negative Affect in the Second Waiting Situation (WS2) Within Each Condition, n = 22

	Experimenter condition			Parent condition			Control condition		
	S	EC	NA	S	EC	NA	S	EC	NA
Duration of distraction (WS2)	*0.44**	0.28	0.11	−0.17	0.21	−0.10	−0.51*	−0.37	−0.08
Duration of difference in distraction	0.29	0.27	0.13	−0.08	0.01	0.02	−0.25	−0.20	−0.22
Duration of negative Affect (WS2)	−0.39	−0.37	0.05	0.31	−0.06	0.10	0.32	0.30	−0.53*

*= *significance at* $p < 0.05$

the model conditions exhibiting more distraction than toddlers in the control condition in the *second* waiting situation. Numerically, distraction increased in the model conditions and decreased in the control condition. As far as we know, there has been no systematic study on how toddlers deal with repeated challenging situations or on their ability to employ emotion regulation strategies under such circumstances. The present finding suggests that toddlers do not consistently apply the same strategy for the same amount of time when frustrated repeatedly in case they are not taught to or reminded to use this strategy. This fluctuating usage of emotion regulation strategies could lead to a reduced application of adaptive emotion regulation strategies for toddlers who are regularly frustrated in their every-day life. Using less adaptive regulation may, in turn, even lead to more frustrating situations as their environment may react less adequately to their needs (Burke et al. 2008), and may have a negative impact on the parent-toddler relationship (e.g., Papoušek and von Hofacker 1998; Räihä et al. 2002). Relatedly, it is possible that toddlers' stress levels increase when they are repeatedly frustrated, and that they are therefore less able to apply an adaptive emotion regulation strategy if a model does not remind them immediately before the situation. This hypothesis could be tested in a similar study that could include cortisol measures.

Before implementation, our findings need to be replicated and extended to other age-groups. In addition, future research is needed to determine which components of the modeling (e.g., language, gestures, motoric behavior) are most important for conveying the message that distraction is helpful to the observing child. It remains an open question whether toddlers could transfer the modeled strategy to a different situation where distraction might be a useful emotion regulation strategy, too. It has been shown that imitation across changes in cues such as context and stimuli is challenging for toddlers (Barnat et al. 1996; Hayne et al. 2000; Hayne et al. 1997). Hence, a future study could explore whether toddlers also use distraction in a different context after modeling (e.g., different physical context or different type of frustrating situation). Moreover, our sample consisted mostly of well-educated parents who showed interest in child research as they voluntarily participated in the study. The results might differ in families with a different socioeconomic background, especially with regard to anger expression (Costello et al. 2003). However, it should be noted that the focus of the present study was on the effect of modeling on use of distraction. While there might be differences in the expression of negative emotions like anger between toddlers from different backgrounds, to our knowledge there is no strong empirical or theoretical rationale for assuming that the effect of modeling would be different in more disadvantaged populations. This presents an intriguing question for future research.

Furthermore, future research could investigate how the effectiveness of the modeling can be optimized. For example, how often does the behavior in question ideally need to be modeled? Does the identity of the model matter for long-term retention? Is modeling still effective when several toddlers are present during the modeling? Does the application of the strategy itself help or could the positive experiences and feedback prevent a developing psychopathology? If further studies confirm that modeling as an adaptive emotion regulation strategy is indeed an effective way of teaching its application to toddlers, longitudinal designs could investigate whether this type of intervention might help to prevent psychopathology. Such studies could also help to clarify whether specific subgroups of toddlers and families would especially benefit from such an intervention. Given that most, but not all toddlers (i.e., 59%) showed an increase in negative affect in the first waiting situation in the present study, the question arises whether such an intervention might be especially helpful for toddlers who are prone to react frustrated and, furthermore, whether the familiarity of the model could play a more prominent role in such a subsample. On average, the toddlers in our study showed fairly brief periods of negative affect. Our aim was to explore the potential value of observational learning for toddlers' emotion regulation. Hence, we aimed to create conditions that would likely enable them to exhibit evidence of learning by inducing some, but not overwhelming, frustration. Kopp (1989) suggested that toddlers who are very frustrated are no longer able to regulate their affect. Future studies could explore whether toddlers who are relatively mildly frustrated are better able to attend to the behavior of the model compared to toddlers who experience more pronounced frustration. Our study sample was too small to conduct meaningful analyses on subgroups.

With regard to temperament, we found significant correlations with the temperamental scale surgency and the usage of distraction in the second waiting situation. In the experimenter model condition, the relations with surgency could be explained by the temperament of high-surgent toddlers who are quick to approach and open to new experiences (Dollar and Stifter 2012) and who followed the unfamiliar model (experimenter) more closely than low-surgent toddlers who are rather shy and withdrawn. In the control condition, high-surgent toddlers may have shown less distraction because they might tend to get more frustrated and active in repeated waiting situations. Future research could test these hypotheses by having toddlers participate in several waiting situations and by coding their behavior with regard to frustration and activity level in relation to their temperament. In contrast to the literature on effortful control, no correlations were found between this temperamental scale and affect or emotion regulation strategies. Effortful control is supposedly relatively rudimentary in the first three years of life and develops thereafter rapidly at age 3 to 4 (Eisenberg et al. 2010; Rothbart and Bates 2006). Diaz and Eisenberg (2015) propose that 'EC probably is, at best, moderately related to the process of emotion regulation in the first 2 years of life, whereas the relation of EC to effective emotion regulation in a given context is likely to be more marked thereafter and perhaps change more during periods of rapid emergence of EC' (p. 39). Hence, effortful control may be too

rudimentary at 22 months of age to relate to the emotion regulation strategies displayed in the present study.

It should be noted that we mostly found low and non-significant correlations between the temperamental scales and distraction and between the temperamental scales and negative affect, respectively. Given the small number of significant correlations and the modest group sizes ($n = 22$) further studies will be needed to determine if the observed significant relations occur reliably or whether they were chance findings.

In sum, the present study explored a new way of teaching emotion regulation strategies to toddlers, which may be relevant when advising parents or nursery educators on how to teach toddlers to deal with frustrating situations. Further studies are needed to investigate the scope and limitations of the paradigm regarding aspects such as the suitability for a range of age-groups, generalization and retention of a learned strategy, role of toddlers' stress level for learning, and the child's temperament. While the present sample consisted of typically developing toddlers, our findings have clear clinical relevance, as deficiencies in emotion regulation are thought to be at the core of common childhood mental disorders. Hence, facilitating the use of adaptive emotion regulation strategies as early as in toddlerhood might be a promising avenue in the prevention of mental disorders or, put differently, in the promotion of long-term mental well-being. As a next step we will investigate (1) whether children of parents with mental disorders show dysfunctional emotion regulation strategies in frustrating situations and (2) if we can change dysfunctional emotion regulation in these children by using imitation as a mechanism of change.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent All parents provided written informed consent prior to participating in the present study.

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