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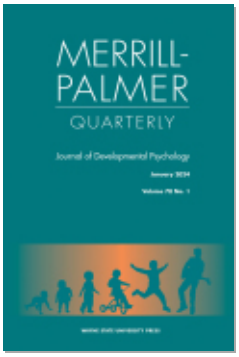

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Show Me How You Feel on Your Face: Preschool Children's Capacity to Modulate Emotional Expression

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Emotion regulation includes the ability to upregulate or enhance the emotional reaction and downregulate or suppress the emotional reaction in accordance with situational demands. However, children's use of enhancement strategies has been neglected, as has the examination of whether they can flexibly alternate between enhancement and suppression strategies. In the present study, we examine whether preschool children (N = 61) could intentionally enhance and suppress their emotional expression based on situational demands and its association with modulating their expression in a real-world situation requiring emotion regulation demands. Our findings provide initial evidence that 3-year-old children can enhance positive and negative emotional expressions when the situation demands, with the former being associated with more adaptive emotion regulation strategies in a social situation. The current study identifies expressive emotion enhancement as an emergent skill during the preschool period that may have broader implications for children's socio-emotional functioning.

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Emotion regulation, the ability to evaluate and modify one's emotional response to achieve a goal, is a key component of psychological well-being (Côté et al., 2010; Extremera & Rey, 2015; Levin & Rawana, 2022). A product of temperamental predisposition and socialization processes, emotion regulation undergoes rapid development during the preschool period and plays a crucial role in developmental outcomes (Eisenberg et al., 2010; Zalewski et al., 2011). Prior research has found that children's emotion regulation skills contribute to early academic success and cognitive school readiness (Brophy-Herb et al., 2013; Howse et al., 2003), promote social competence (Denham et al., 2003; Robson et al., 2020), and are inversely related to symptoms of psychopathology (for a review, see Compas et al., 2017). However, researchers have called for more comprehensive methods to capture the development of emotion regulation capacities and constructs in natural and different contexts (for a review, see Alarcón-Espinoza et al., 2022; Compas et al., 2017). The two primary components of emotion regulation, upregulation and downregulation, and their development during the preschool period make up one area that needs additional comprehensive methods.

Broadly, upregulation refers to strategies and processes individuals use to increase or enhance their emotional reaction, such as focusing on positive aspects of a situation. Downregulation refers to strategies and processes individuals use to decrease their emotional reaction, such as suppressing or inhibiting one's outward expression of an emotion (for a review, see Bonanno & Burton, 2013). Typically, researchers use parent report or observational measures to assess emotion regulation in young children, such as parent-child interactions, temperament assessments, and child behavior checklists (for a review, see Cole et al., 2004; Fombouchet et al., 2023). Furthermore, developmental studies that use behavioral observations often focus exclusively on the effects of downregulating negative emotions (Bosquet & Egeland, 2006; Carlson & Wang, 2007; Gilliom et al., 2002).

It is well established in the emotion regulation literature that particular up- and downregulatory strategies are more beneficial than others for a number of psychological and physiological health outcomes, such as differences in negative affect, social relationship quality and well-being, and reward responsivity (Campbell-Sills et al., 2006; Gross & John, 2003; Kelley et al., 2019). However, recent findings suggest the need to consider context and an individual's goals when determining whether an emotion regulation strategy is maladaptive or not, as its use and function benefits will differ across people and situations (Bonanno & Burton, 2013; Gross, 2015; Tull & Aldao, 2015). Therefore, the most adaptive strategy may be flexibility in emotion regulation, defined as the ability to downregulate

and upregulate emotions based on situational demands, one form of which is expressive flexibility, which involves suppressing or enhancing emotional expression in accordance with situational demands (Bonanno et al., 2004). Several studies have experimentally investigated within-individual variations of expressive flexibility in adults (Bonanno et al., 2004; Gupta & Bonanno, 2011; Hart et al., 2024; Maccallum et al., 2021; Pițur & Miu, 2020; Rodin et al., 2017; Southward & Cheavens, 2017; Westphal et al., 2010; Zhu & Bonanno, 2017), and a few have experimentally examined its existence in late childhood and early adolescent children (Son & Doan, 2023; Wang & Hawk, 2020; Wang et al., 2020). Expressive flexibility is important for later social-cognitive capacities that facilitate interpersonal functioning, such as the ability to express empathy. Expressing empathy involves evaluating, modifying, and outwardly expressing one's emotional response according to the situational demands to achieve one's goal (for a review, see Decety & Holvoet, 2021). Given that flexibility consistently emerges as a crucial component of overall health, adjustment, and life satisfaction (for a review, see Chen et al., 2018; Kashdan & Rottenberg, 2010), it is critical to examine whether expressive flexibility emerges in the preschool period, as it can provide insight into ways to promote its development.

Modulating Emotional Expressivity: Enhancement and Suppression

Enhancement and suppression are two expressive-regulatory behaviors commonly referred to in the adult emotion regulation literature. Enhancement falls under the broad category of upregulation as it involves individuals augmenting or enhancing their outward emotional reaction to meet the needs of a situation. Suppression falls under the category of downregulation as it involves individuals reducing or detracting from their outward emotional reaction to meet a situation's needs (Bonanno & Burton, 2013). Enhancement and suppression are independent skills, with studies finding that daily emotional expression and daily suppression hold differential associations with markers of psychological adjustment (Cameron & Overall, 2018). However, mixed evidence exists on the adaptive and maladaptive outcomes of enhancement and suppression strategies.

Prior research has found the ability to modulate emotional expressions per situational demands to be more important for adjustment than reliance on any specific emotion regulation strategy (Bonanno, 2001; Bonanno & Burton, 2013). Bonanno et al. (2004) developed a within-subjects experimental paradigm to measure emotion regulation flexibility by providing situations during which participants alternated the expression of their

emotions to positive- and negative-valence images. In the initial study, college students viewed emotionally provocative images across three conditions with different instructions: to behave normally, to enhance their expression of the emotion the images elicited, or to suppress their expression of the emotion the images elicited. This design allows the researcher to alternate the context and measure the extent to which participants can intentionally modulate their expression of emotion by comparing the emotion expressed in the enhancement and suppression conditions to that of the baseline condition for both positive- and negative-valence stimuli. Nine studies have utilized this paradigm to systematically investigate the link between emotion regulation flexibility and psychological well-being in adults, suggesting that the degree to which adults can intentionally enhance or suppress the expression of emotions in a laboratory paradigm might account for variance in real-world social and psychological adjustment (Bonanno et al., 2004; Gupta & Bonanno, 2011; Hart et al., 2024; Maccallum et al., 2021; Pițur & Miu, 2020; Rodin et al., 2017; Southward & Cheavens, 2017; Westphal et al., 2010; Zhu & Bonanno, 2017). Three studies have also utilized this paradigm with late childhood and early adolescent populations, examining expressive-regulatory abilities and their relation to peer interactions and friendship quality and differences among cultures (Son & Doan, 2023; Wang & Hawk, 2020; Wang et al., 2020). However, to our knowledge, researchers have yet to utilize this paradigm to examine whether preschool-aged children can modulate their expression of emotion based on situational demands and whether such skills may relate to their real-world socio-emotional functioning.

From a developmental perspective, one consideration is that the extent to which preschool-aged children can modulate the expression of their emotions is limited, as such a capacity necessitates cognitive and behavioral skills as they dynamically work together (Cole et al., 2004). For example, emotions can help organize thinking and learning, while cognitive processes are necessary to regulate emotions (Bell & Wolfe, 2004; Carlson & Wang, 2007). The preschool period presents a window of opportunity for children to demonstrate emotion regulation flexibility as they undergo dramatic cognitive changes associated with emotion regulation, such as the theory of mind, language skills, and emotion knowledge (Conte et al., 2019; Ornaghi et al., 2019; Wellman et al., 2001; Yang & Wang, 2023). Prior research has found positive associations between language development, emotion knowledge, and theory of mind skills in children at this age (Conte et al., 2019).

Furthermore, executive function, which refers to a set of mental processes that aid in the self-regulation of cognition, emotion, physiology, and behavior, also develops rapidly and linearly between ages 3 and 5 (Blair

et al., 2020; Diamond, 2013; Garon et al., 2008; Kuhn et al., 2016). Prior research has found that during the same period in which executive function rapidly develops, it is interconnected with children's emotional expression and experience (Ferrier et al., 2014). Blair and Ku (2022) have defined self-regulation as a hierarchically integrated system consisting of five distinct components—cognitive, emotional, behavioral, physiological, and genetic. Blair and Ku considered the cognitive component, executive function, the highest level of self-regulation, developing later than its "lower"-level components. In its mature form, executive function can regulate the "lower"-level components (i.e., emotion, behavior, and physiology). The first step to examine the role of emotion regulation flexibility would be to examine the extent to which children can modulate their emotional expression based on situational demands during this developmental period when they exhibit such dramatic changes in processes associated with emotion regulation and whether this ability is associated with later socio-emotional functioning.

Current Study

The ability to up- and downregulate expressive emotion based on context is a powerful emotion regulation technique associated with better mental health functioning in adults (Côté et al., 2010; Levin & Rawana, 2022). There are fundamental gaps in the developmental literature, such as understanding whether children can intentionally enhance or suppress their emotional expression according to situational demands and the extent of that ability's association with their socio-emotional adjustment. The current study sought to address these gaps by administering the emotion regulation flexibility paradigm in a sample of preschool-aged children, as processes associated with emotion regulation develop rapidly during this age. The aims of the current study were (1) to assess the extent to which preschool-aged children could intentionally enhance and suppress their emotional expression in the emotion regulation flexibility task and (2) to examine whether the enhancement and suppression of emotional expression to the situation demands during the task was associated with children's regulation of their expressive behavior in a real-world social situation.

Method

Participants

The sample included 61 children (32 female) aged 3.5 years old (M = 3.54 years, SD = 0.12). All participants were from the Greater Boston metropolitan area and were recruited from a department-maintained database

of families who had expressed interest in participating in research, online advertising, and community recruitment events. Participating children were 63.9% European American, 8.2% African American, 8.2% Asian, 6.6% multiracial, and 13.1% Hispanic. An additional 27 children were enrolled in the study but excluded from analyses for the following reasons: technical difficulties (6 children), refusal to participate (10 children), choosing to end before the task was complete (5 children), and inattentiveness (6 children). The children included in the current analyses who had usable enhancement and suppression scores did not differ on the following demographics compared with the children excluded for not having usable enhancement and suppression scores: maternal education, $t(35) = -1.75$, $p = .089$; gender, X^2 ($n = 88$) = 1.03, $p = .311$; or race, X^2 ($n = 88$) = 0.55, $p = .457$. All children were fluent in English, full-term singletons, and had no known auditory, visual, neurological, or developmental disorders (see Table 1 for additional demographics).

General Procedure

The tasks utilized were part of a more extensive study approved by the Boston University Institutional Review Board. Upon arrival, the primary caregiver provided written informed consent. Children completed the emotion regulation flexibility task about an hour after arrival at the lab as part of a series of behavioral tasks.

Table 1. Demographic information

Demographic characteristic	Mean or percentage
Child Age (years)	
Mean (*SD*)	3.54 (0.12)
Child Ethnicity	
White non-Hispanic	63.9%
African American	8.2%
Asian	8.2%
Hispanic	13.1%
Multiracial	6.6%
Participating Parent Education	
At least a 4-year college degree	88.5%
Nonparticipating Parent Education	
At least a 4-year college degree	81.6%

Emotion Regulation Flexibility Procedure

We utilized an age-adapted version of the emotion regulation flexibility task modeled after procedures used with adult participants by Bonanno et al. (2004).

Stimuli

For the current version, we first selected images of emotional valence from the Internet and the standardized International Affective Picture System (Lang et al., 1999) based on previous images that have been used with children ages 3–6 years old (Berger et al., 2012; Solomon et al., 2012). We decided on 30 images, 15 positive valence and 15 negative valence. Additionally, we presented each positive image with an audio clip of a child laughing and each negative image with an audio clip of a child crying to elicit participants' emotional expressions further.

Task Structure

Stimuli were presented to children on a 20 × 13.5-in PC monitor using E-Prime 2.0. Children viewed three blocks of images, with each block containing five positive and five negative images (10 total images in each block) displayed in random order. The order of the blocks was also counterbalanced, and each participant was assigned to one of three possible versions. The participants were randomly assigned to receive enhancement or suppression instructions in two different orders for the last two blocks (see Procedure section below). Within each block, each target image was displayed for 8 s. An onset sound was played once the target image was displayed, and an offset sound was played at the end of the 8 s. An interstimulus symbol lasted 2 s before each target image appeared, during which a fixation image of a star was displayed to orient the child's attention to the screen.

Procedure

Children were seated approximately 22 in from the monitor and filmed from a video camera positioned in their line of vision. A female experimenter guided the children through the task. We adapted our procedures from Bonanno et al. (2004), following the same block design but adjusting the instructions appropriately for our sample age. The first block was always the baseline condition to avoid any prior influence of up- or down-regulating emotions. Before starting the baseline block, the child was

presented with a welcome screen, while the experimenter turned on the video camera and began recording the child's natural reactions. The experimenter then gave the following instructions to the child: "For this game, we are going to look at some pictures! Keep your eyes on the screen; the blue star means a new picture is coming, so make sure you pay attention and look at each picture."

The subsequent two blocks were the enhancement and suppression conditions (order counterbalanced across participants). In the enhancement condition, the experimenter gave the following instructions to the child:

> Now this time, I am going to show you some more pictures. When you look at each of these pictures, I want you to show me how you feel on your face so I can see what you are feeling. If the picture makes you feel happy or sad, show me as much as you can on your face so I can see what you are feeling.

In the suppression condition, the experimenter instructed the child:

> Now this time, I am going to show you some more pictures. When you look at each of these pictures, I want you to hide what you feel on your face so I can't see what you are feeling. If the picture makes you feel happy or sad, hide the feeling on your face as much as you can so I can't see what you're feeling.

Prompts were standardized across all participants, and the experimenter did not model behaviors during the enhancement or suppression conditions. After providing the instructions for each block, the experimenter directed the child to the screen before starting the block, which began with the 2 s interstimulus symbol followed by the onset sound and first target image. During each block, the experimenter sat quietly next to the child. If the child asked questions, the experimenter re-explained the instructions to the child and redirected them back to the computer.

Coding

Two observers, blind to the order of the conditions and the emotional valence of each image, coded the videotapes of children's emotional expressions. Coders rated the children's positive emotional response and negative emotional response to each 8 s trial on scales ranging from 1 (*no negative/positive emotion*) to 5 (*extreme negative/positive emotion*), a rating scale adapted from Bonanno et al. (2004). The original rating scale was used with adults and ranged from 1 to 7. However, we reduced the

scale for the current version to 1 to 5 based on our pilot observations that 3-year-old children showed a more restricted range of emotional expressions. Coders watched each videotape on mute because the audio provided information about the block instructions and the positive or negative audio clips accompanying each target image. To ensure that coders were blind to the trial's block condition and emotional valence, a separate research assistant who was not a coder segmented each trial in advance so coders would know the start and end of each trial to observe without audio. We constructed descriptions of each rating to help guide the coders (see Table 2 for descriptions of positive and negative ratings). Intraclass correlation coefficients (ICCs) were calculated to assess interrater reliability for positive and negative ratings for the three blocks: block 1 positive ratings,

Table 2. Positive and negative emotional expression rating descriptions

Score	Description
Positive Emotional Expression Rating	
1	No indication of any change from child's natural baseline face
2	Any indication of a brief slight smile, one–two occurrences of a brief slight smile, or eyebrows raised in a positive manner
3	Slight smile for 5 s or more or three or more occurrences of a brief slight smile
4	One–two occurrences of a wide teeth-showing or no-teeth-showing smile (can be brief)
5	Two or more occurrences of a wide teeth-showing or no-teeth-showing smile (can be brief) or a wide teeth-showing or no-teeth-showing smile lasting over 5 s, laughing
Negative Emotional Expression Rating	
1	No indication of any change from child's natural baseline face
2	Any indication of a nose wrinkle, furrowed brow, or brief slight frown
3	One–two or more instances of a nose wrinkle, furrowed brow, or brief slight frown; intensity of behavior higher than a 2 rating
4	Even if brief, any higher-intensity (from a 3 rating) frown or furrowed brows
5	Furrowed brows, scrunched-up face, high-intensity negative expression (does not have to be long in duration)

ICC = .93; block 1 negative ratings, ICC = .85; block 2 positive ratings, ICC = .86; block 2 negative ratings, ICC = .81; block 3 positive ratings, ICC = .95; block 3 negative ratings, ICC = .82.

Computations of the following variables were adapted from Bonanno et al. (2004). We averaged positive and negative ratings for each participant separately for each condition, creating six variables: positive baseline, negative baseline, positive enhancement, negative enhancement, positive suppression, and negative suppression.

Disappointing Gift Task

Children completed the Disappointing Gift task, a behavioral paradigm with good validity and interrater reliability that is designed to measure children's ability to inhibit negative expressions upon receiving an undesirable gift (Cole, 1986; Ip et al., 2021; Ip et al., 2023). Gift-giving is one way in which children are taught social obligations regarding the suppression or enhancement of emotion, as the exchange of gifts can aid in forming and maintaining relationships (Tobin & Graziano, 2011). The experimenter presented eight toys to the child and asked the child to rank the toys from their favorite to their least favorite. The items included a variety of toys appropriate for preschoolers and a miscellaneous item such as a wood chip, which most children selected as their least desirable gift (Carlson & Wang, 2007). The experimenter then informed the child that they would be given a gift, having been primed by the experimenter to expect to receive their highest-ranked gift. Instead, another experimenter gave the child a wrapped package containing their least desirable gift—children's reactions to receiving their least desirable gift were video recorded for 60 s. At the end of the task, children were told that there had been a mistake and were given their favorite toy as a gift to take home.

The video recordings were coded by two independent coders in Noldus Observer software utilizing the coding scheme of Hudson and Jacques (2014). Each child received a score on each of four response categories: facial expressions (e.g., frowning), vocal intonations (e.g., emitting negative noise), verbal utterances (e.g., asking for their favorite gift), and behavioral responses (e.g., shoulder shrug). Children received a score from −2 to +2 for each of these categories. Stronger responses received a score of +/−2, while subtle responses received a +/−1. For example, a child showing a full frown received a score of −2 for facial expressions, but a child showing a slight smile received a score of +1. Neutral or equally mixed reactions received a score of 0. A total score was calculated by averaging all four scores. Higher scores indicated more positive responses to

the disappointing gift, indicating that the children could inhibit negative expressions to a greater extent. The two coders were trained to a reliability threshold of .80 kappa, and 20% of videos were double coded to assess interrater reliability, yielding an overall kappa of .82.

Analysis Plan

In the preliminary analyses, we assessed group differences between male and female children in all conditions using independent samples *t*-tests. We then conducted a repeated-measures analysis of variance with the condition as a within-subjects factor and version as a between-subjects factor to examine whether children's performance in each condition (baseline, enhancement, suppression) differed depending on the stimuli or condition order they were assigned. Post hoc analyses followed up significant main effects using Bonferroni corrections for multiple testing. If there were any significant differences by gender, stimulus version, or order of conditions, that variable would be included as a covariate in further analyses.

In the primary analyses, we first tested whether children successfully enhanced their emotional expression compared with their baseline emotional expression and whether they successfully suppressed their emotional expression compared with their baseline emotional expression. We conducted paired sample *t*-tests between the following four pairs: positive baseline and positive enhancement, negative baseline and negative enhancement, positive baseline and positive suppression, and negative baseline and negative suppression. We then used Pearson correlations to examine how children's performance in the different conditions was related to their monitoring of their expressive behavior to regulate emotion during the Disappointing Gift task. Finally, to examine unique contributions to children's monitoring of their expressive behavior, any variables significantly correlated with Disappointing Gift task scores were entered in a linear regression.

Results

Preliminary Analyses

There were no gender differences in any emotion regulation flexibility variables, and it was removed as a covariate in further analyses. The repeated-measures analyses of variance found no main effect of version or instruction order and no significant interactions with any emotion regulation variables, and they were also removed from further analyses.

Extent of Intentional Enhancement and Suppression

A paired samples *t*-test comparing positive baseline (M = 2.50, SD = 1.02) to positive enhancement (M = 3.05, SD = 1.16) showed a significant difference between these two conditions such that children successfully enhanced their emotional expression to positive-valence images compared with their emotional expression to positive-valence images during the baseline condition, $t(60) = -3.86$, $p < .001$, $d = -.50$. Similar results were found when comparing emotional expression to negative-valence images in baseline (M = 1.54, SD = 0.54) with those in the enhancement condition (M = 2.13, SD = 0.95), indicating that children also successfully enhanced their emotional expression to negative-valence images, $t(60) = -5.09$, $p < .001$, $d = -.65$. Therefore, children successfully enhanced their emotional expression on instruction for both positive and negative stimuli (Figure 1).

A paired samples *t*-test comparing emotional expression to positive-valence images in the baseline condition (M = 2.50, SD = 1.02) with those in the suppression condition (M = 2.75, SD = 1.13) found no significant difference between them, $t(60) = -1.89$, $p = .06$, $d = -.24$, indicating that children did not successfully change their positive emotional expression when asked to suppress emotion. A paired sample *t*-test comparing emotional expression to negative-valence images in the baseline condition (M = 1.54, SD = 0.54) with those in the suppression condition (M = 1.90, SD = 0.82) found a significant difference between these two conditions, $t(60) = -3.10$, $p = .003$, $d = -.40$. However, the results were in a contradictory direction,

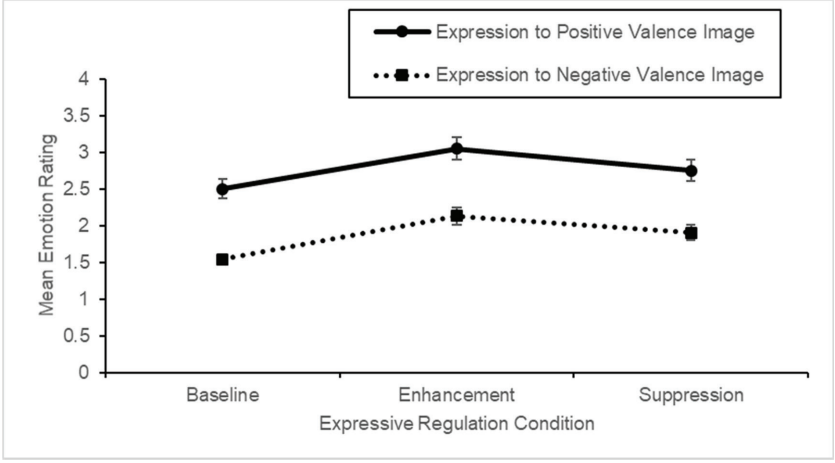

Figure 1. Mean ratings of emotion expressed by children to positive- and negative-valence images across the three expressive-regulated conditions. Higher ratings indicate greater emotion.

such that children were enhancing their negative emotional expressions during the suppression condition compared with the baseline condition. These findings suggest that the children did not successfully demonstrate the capacity to suppress their emotional expression after instruction (Figure 1). Therefore, an overall emotion regulation flexibility score was not computed, and subsequent analyses focused on baseline and enhancement scores.

Associations Between Emotion Regulation Flexibility and Disappointing Gift Scores

We then examined whether children's emotional expressivity during baseline or enhancement conditions was associated with regulating expressive behavior in a realistic situation, measured by the Disappointing Gift task. Pearson correlations indicated that less emotional expression during negative baseline conditions ($r[59] = -.27$, $p = .04$) and more emotional expression during positive enhancement conditions ($r[59] = .32$, $p = .01$) were related to a higher score on the Disappointing Gift task. Scores for the Disappointing Gift task were then regressed on negative baseline and positive enhancement to assess the unique contributions of these variables. The overall model was significant, $F(2, 58) = 5.98$, $p = .004$, and explained 17.6% of the variance in the Disappointing Gift task. Negative baseline ($\beta = -.27$, $p = .03$) and positive enhancement ($\beta = -.32$, $p = .01$) each uniquely contributed to children's scores on the Disappointing Gift task. Therefore, less spontaneous negative emotionality and more positive emotion when the situation demanded in the emotion regulation flexibility task were associated with children monitoring their expressive behavior to a greater extent in a realistic situation, as measured by the Disappointing Gift task.

Suppression Post Hoc Analyses

During the suppression condition of the emotion regulation flexibility paradigm, 21 children used their hands to cover their faces, turned their faces away from the computer, or put their faces on the table. After they exhibited such a behavior, the experimenter repeated the instructions and, in cases where the child covered their face, asked them to keep their hands on the table. However, 12 of the children repeated the behavior at least once during the suppression condition, with the proportion of trials displaying such a behavior averaging 44.1% ($SD = 2.19$). We speculated that since the suppression condition instructions contained the word "hide," some children were following directions in a literal manner and

misinterpreting the meaning of the suppression instructions. We examined whether children who did not demonstrate hiding behavior (n = 40) could suppress the expression of their emotions during the condition. Figure 2 illustrates the mean emotion expressivity scores in the

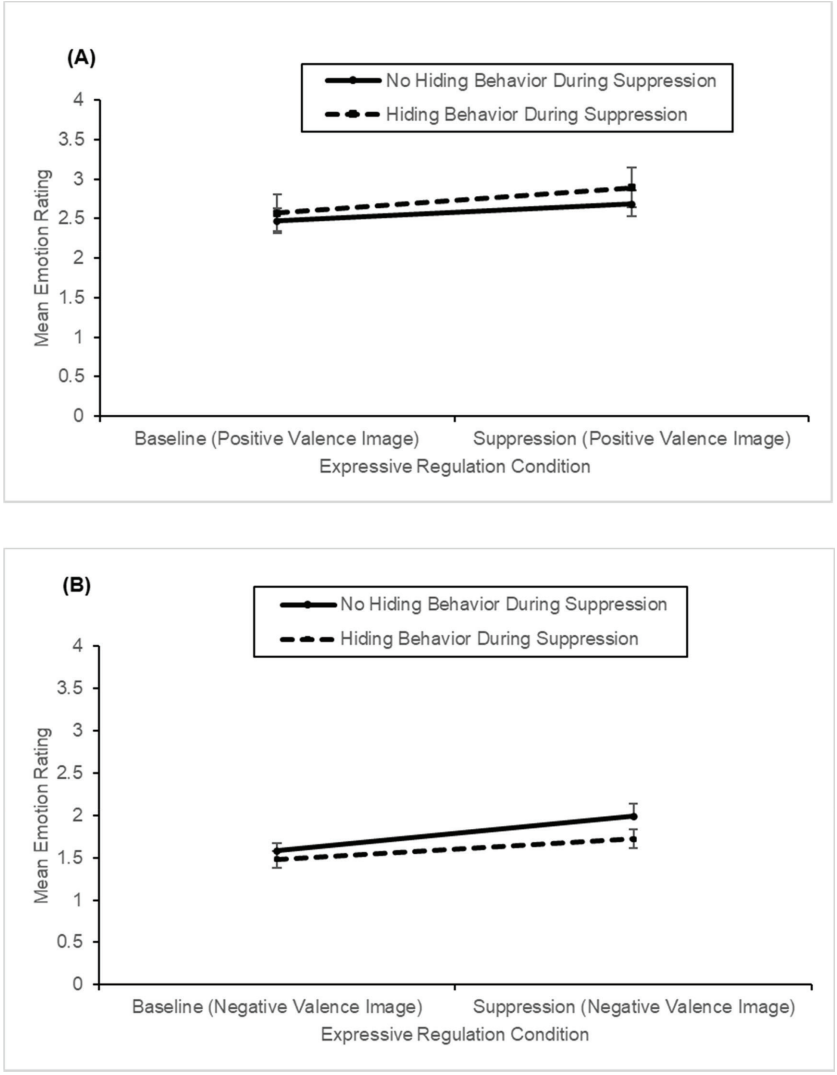

Figure 2. Mean ratings of emotion expressed by children to (A) positive- and (B) negative-valence images across the baseline and suppression conditions, separated by whether children displayed hiding behavior in the suppression condition. Higher ratings indicate greater emotion.

suppression and baseline conditions for children who did and did not demonstrate a hiding behavior. Children who did not demonstrate a hiding behavior showed more negative emotional expression in the suppression condition (M = 1.99, SD = 0.94) compared with the negative baseline condition (M = 1.58, SD = 0.60), indicating that they were still enhancing negative emotions when asked to suppress, $t(39) = -2.58$, $p = .01$, $d = -.41$. Last, there was not a significant difference between positive suppression (M = 2.68, SD = 1.14) and positive baseline (M = 2.47, SD = 1.01), $t(39) = -1.21$, $p = .23$, $d = -.19$. Therefore, children who did not demonstrate a hiding behavior during the suppression condition did not successfully suppress either positive or negative emotional expression when explicitly instructed.

Discussion

We examined whether preschool-aged children could demonstrate emotion regulation flexibility by modifying an existing paradigm that measured expressive flexibility in adults using within-individual variations of their expressions to images of positive and negative valence based on situational demands to enhance or suppress (Bonanno et al., 2004). We found that when the situation demanded, children could successfully enhance positive and negative emotions but could not successfully suppress either positive or negative emotions. Our subsequent examination of the extent of this demonstration of emotion regulation in a real-world social setting, as measured by the Disappointing Gift task, found that children who showed fewer negative expressions to emotional valence stimuli and successfully enhanced positive emotions when the situation demanded were more successful in inhibiting their disappointment upon receiving an undesirable gift.

When the situation required them to suppress their expressions, children did not significantly alter their expressions to the positive-valence stimuli and enhanced their expressions to the negative-valence stimuli compared with the baseline condition. Although this does not indicate that children cannot downregulate emotional expressions, it suggests that children at this age might be unable to suppress emotional expressions when instructed. Between 3 and 6 years of age, children experience rapid gains in executive function skills (Carlson et al., 2004) as their prefrontal cortex undergoes dramatic neuronal growth (Diamond, 2002). Being able to suppress emotional expressions to meet situational demands may emerge later in development after the onset of executive function skills such as inhibitory control and working memory.

Finding that our sample of children successfully upregulated their emotional expressions when the situation demanded, we were interested in whether the extent to which they could enhance their expressivity of emotion was related to more success with their emotion regulation in the Disappointing Gift task, a situation with realistic social demands. We found that children who upregulated their positive emotional expression when the situation demanded could also minimize their observable disappointment when given their least desired prize. Results suggest that children who show more control over upregulating their positive emotional expression in an experimental setting may have better adaptive emotion regulation strategies in a scenario with more realistic social demands. Controlling negative emotionality is vital to socio-emotional competence and crucial for positive engagement and self-regulation during peer interactions (Denham et al., 2003). Further, we found that children who showed less spontaneous negative emotionality before being asked to enhance or suppress their emotional expressions (i.e., baseline condition) also had more adaptive emotion regulatory behaviors in the Disappointing Gift task. This finding is consistent with other studies that have found a link between uncontrolled negative emotionality and detriments to children's social interactions (Denham et al., 2002; Rydell et al., 2003), suggesting that children who are more labile in negative emotional expressions may be at risk for poorer social competency. Our findings underscore the value of this experimental paradigm and highlight that spontaneous negative emotionality and intentional enhancement of positive emotions are associated with children's emotion regulatory behaviors in socially demanding situations, which may affect their real-world adjustment.

The current study contributes to a gap in the emotion regulation literature by examining strategies for both the upregulation (enhancement) and downregulation (suppression) of emotions. It included many methodological advantages. Modifying a within-subjects experimental design created by Bonanno et al. (2004) provided an objective, standardized measure of children's expression of their emotions. We also systematically examined up- and downregulation for negative and positive emotions separately using images of positive and negative valence coupled with audio clips to elicit emotional expressions further. This approach allowed for a more nuanced understanding of what emotional valence preschool children could intentionally enhance or suppress based on situational demand. Solely relying on observational studies of suppression would have made it difficult to disentangle the extent to which better scores reflected a child having less emotional lability or actively regulating emotional expressions. The current findings suggest that both play a role.

Limitations

Given our study's small sample size, replication with a larger sample is needed to corroborate our findings. Though our sample was socioeconomically diverse, the parents of the children were English speaking, predominantly White (non-Hispanic), and college educated, and all resided in the Greater Boston metropolitan area. Therefore, our findings may not generalize to other populations of varying cultures and socioeconomic backgrounds, and future studies should incorporate a more comprehensive sample of varying demographics.

Our findings for the suppression condition are also limited as we did not ensure the children's comprehension of the instructions. Twenty-one children in our sample showed physical hiding behaviors during the suppression condition, raising the possibility that children at this age misinterpreted our instructions and could only follow literal directions of "hiding" their feelings. Even though those who did not demonstrate hiding behaviors did not successfully suppress their expressions when the situation demanded, it is possible that neither "suppression hiders" nor "non–suppression hiders" understood the instructions in the suppression condition. Alternatively, it may be that children who demonstrated hiding behaviors understood the instructions and recognized that they could not use suppression as a strategy, electing to implement hiding behaviors instead. As we were working with a population whose inhibitory skills have not fully developed, and the suppression condition always followed either the baseline or the baseline and enhancement conditions, the children may have been unable to hold two or three sets of conflicting instructions in their mind at once, which impacted their demonstration of suppression. Hart et al. (2024) found that adults' suppression abilities were significantly weakened when their working memory resources were taxed under cognitive load, so it may be possible that a similar situation occurred with our study population regarding the instructions. Future research utilizing the emotion regulation flexibility paradigm with this age group should consider more explicit instructions to ensure child comprehension and minimize hiding behaviors, such as explicitly stating what behavior to show on their face or asking them to keep their hands on the table, as well as ways to reduce cognitive load between conditions, such as running each condition as a stand-alone experiment. Longitudinal research is also needed to address whether children must recognize a particular emotion before they can willfully suppress it, as well as the extent to which emotion upregulation is associated with early markers of socio-emotional functioning (e.g., behavioral problems, prosociality) and children's psychological well-being.

As emotion regulation skills develop in a dynamic and multifaceted system, future research with this paradigm should also examine the role of temperament and parents in children's development of emotion regulation flexibility. Temperament is defined as individual differences in reactivity, which can include responding to both specific emotions and more general constructs of emotion, and self-regulation, which includes affect, inhibitory control, and motivation (Rothbart & Bates, 2006). Previous research has found temperament to predict emotion regulation, and differences in reactivity and self-regulation may extend to difficulties in utilizing emotion regulation strategies such as suppression, as the strategy requires inhibiting emotions based on situational demands to achieve a goal (Zalewski et al., 2011). Parents are one of the earliest sources through which children develop social-emotional competence and learn to understand, express, and self-regulate their emotions according to cultural and situational demands (Kiel & Kalomiris, 2015). Three major ways through which parents can shape their child's emotional competence and expressivity are the expression of their own emotions, conversing with their child about emotions, and their reaction to their child's emotions (Eisenberg et al., 1998; Yang & Wang, 2019). In expressing their emotions, parents contribute to their child's emotion knowledge by modeling which emotions to express for specific situations and the method of expressivity. Conversing with their child about emotional states or other internal states and their causes and consequences can help children reflect on their own emotions and interpret others' emotions. Finally, in responding to children's emotions, especially negative ones, parents show their children what emotions are appropriate or inappropriate to express in a particular situation. Therefore, the extent of parents' modulation of emotion expressivity may be related to the extent to which their preschoolers can modulate the expressivity of their emotions based on situational demands.

Culture is another important consideration when examining emotion regulation flexibility. The expressivity, perception, and regulation of emotions can vary based on the norms and values in one's cultural environment (for a review, see Masuda, 2017; Mesquita et al., 2016), which are then transmitted to children by their parents and other agents of socialization, such as images in media and books (Tsai et al., 2007). For example, Western cultures that are "independent" emphasize autonomy and individuality and value the expression of emotions as it reinforces the self as separate and unique and protects individual rights and freedoms (Stearns & Stearns, 1986; Tsai & Clobert, 2019). In contrast, East Asian cultures that are "interdependent" emphasize maintaining group harmony and respect for authority and value the ability to suppress emotions that would disrupt such harmony and the ability to adjust emotional expressions and behavior

according to social contexts (Kitayama et al., 1995; Tsai & Clobert, 2019; Q. Wang, 2013). Son and Doan (2023) found cultural differences in the expressive flexibility of emotions in European American, Korean American, and South Korean 9-year-olds, but previous research has found that cultural variations in the expression and regulation of emotions can manifest even earlier in childhood (Bozicevic et al., 2016; Lowe et al., 2016) and become evident by preschool age (J. Wang, 2013). Therefore, the extent to which a child can up- and downregulate the expression of emotions and whether it is beneficial for developmental outcomes may vary based on the child's cultural context, and differences may emerge as early as preschool (Ford & Mauss, 2015). Given the limited ethnic and geographic diversity of our population, future research should examine whether the emergence of emotion regulation flexibility in preschool children varies across cultures.

Future research should also examine the ability to modulate emotional expression in relation to developing empathy skills. The ability to express empathy is a complex socio-emotional phenomenon consisting of cognitive, affective, and motivational processes. These processes include the need to identify another individual's perspective to understand their emotions, share and communicate the emotional state of that individual in terms of valence and intensity, and regulate one's own emotional response to achieve a goal (Decety & Holvoet, 2021). Prior research has found that the precursors necessary for the ability to express affective empathy emerge during infancy and toddlerhood and develop progressively between ages 3 and 5, the latter aligning with the period during which emotion regulation ability rapidly develops (Brown et al., 2017; Decety & Holvoet, 2021; Knafo et al., 2008). Therefore, the ability to enhance and suppress the expression of emotions based on situational demands may be a precursor for the development of empathy skills. Given the age of our study population, future research should utilize this paradigm to examine associations between emotion regulation flexibility and the trajectory of empathy skills across early childhood.

Conclusion

The present study reported empirical efforts to examine the extent to which preschool children enhance and suppress emotional expression to meet situational demands, adding to the growing literature seeking to understand early emerging emotion regulation capacities. Results yielded initial evidence that preschool children are successful in intentionally upregulating emotional expression to meet situational demands, which is associated with their emotion regulation strategies in a real-world context. Preschool-aged children appeared unable to intentionally downregulate emotional

expression when the situation demanded, suggesting that their demonstration of suppression may require further development of processes such as executive function. However, these findings were impacted by the literal interpretation of the instruction "hide" by some children during the suppression condition, necessitating further research utilizing more explicit instructions. Findings highlight that the capacity to upregulate emotions upon instruction is part of children's repertoire of regulatory strategies from early development, providing a more comprehensive picture of emotion regulation development in early childhood. Further research is needed to understand how this specific emotion regulation strategy relates to socioemotional adaptation.

References

Alarcón-Espinoza, M., Sanduvete-Chaves, S., Anguera, M. T., Samper García, P., & Chacón-Moscoso, S. (2022). Emotional self-regulation in everyday life: A systematic review. *Frontiers in Psychology*, *13*, 884756. https://doi.org/10.3389/fpsyg.2022.884756

Bell, M. A., & Wolfe, C. D. (2004). Emotion and cognition: An intricately bound developmental process. *Child Development*, *75*(2), 366–370. https://doi.org/10.1111/j.1467-8624.2004.00679.x

Berger, R. H., Miller, A. L., Seifer, R., Cares, S. R., & Lebourgeois, M. K. (2012). Acute sleep restriction effects on emotion responses in 30- to 36-month-old children. *Journal of Sleep Research*, *21*(3), 235–246. https://doi.org/10.1111/j.1365-2869.2011.00962.x

Blair, C., & Ku, S. (2022). A hierarchical integrated model of self-regulation. *Frontiers in Psychology*, *13*, 725828. https://doi.org/10.3389/fpsyg.2022.725828

Blair, C., Kuzawa, C. W., & Willoughby, M. T. (2020). The development of executive function in early childhood is inversely related to change in body mass index: Evidence for an energetic tradeoff? *Developmental Science*, *23*(1), e12860. https://doi.org/10.1111/desc.12860

Bonanno, G. A. (2001). Emotion self-regulation. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 251–285). Guilford Press.

Bonanno, G. A., & Burton, C. L. (2013). Regulatory flexibility: An individual differences perspective on coping and emotion regulation. *Perspectives on Psychological Science*, *8*(6), 591–612. https://doi.org/10.1177/1745691613504116

Bonanno, G. A., Papa, A., Lalande, K., Westphal, M., & Coifman, K. (2004). The importance of being flexible: The ability to both enhance and suppress emotional expression predicts long-term adjustment. *Psychological Science*, *15*(7), 482–487. doi:10.1111/j.0956–7976.2004.00705.x

Bosquet, M., & Egeland, B. (2006). The development and maintenance of anxiety symptoms from infancy through adolescence in a longitudinal sample. *Development and Psychopathology*, *18*(2), 517–550. https://doi.org/10.1017/S0954579406060275

Bozicevic, L., De Pascalis, L., Schuitmaker, N., Tomlinson, M., Cooper, P. J., & Murray, L. (2016). Longitudinal association between child emotion regulation and aggression, and the role of parenting: A comparison of three cultures. *Psychopathology*, *49*(4), 228–235. https://doi.org/10.1159/000447747

Brophy-Herb, H. E., Zajicek-Farber, M. L., Bocknek, E. L., McKelvey, L. M., & Stansbury, K. (2013). Longitudinal connections of maternal supportiveness and early emotion regulation to children's school readiness in low-income families. *Journal of the Society for Social Work and Research*, *4*, 2–19. https://doi.org/10.5243/jsswr.2013.1

Brown, M. M., Thibodeau, R. B., Pierucci, J. M., & Gilpin, A. T. (2017). Supporting the development of empathy: The role of theory of mind and fantasy orientation. *Social Development*, *26*(4), 951–964. https://doi.org/10.1111/sode.12232

Cameron, L. D., & Overall, N. C. (2018). Suppression and expression as distinct emotion-regulation processes in daily interactions: Longitudinal and meta-analyses. *Emotion*, *18*(4), 465–480. https://doi.org/10.1037/emo0000334

Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Effects of suppression and acceptance on emotional responses of individuals with anxiety and mood disorders. *Behaviour Research and Therapy*, *44*(9), 1251–1263. https://doi.org/10.1016/j.brat.2005.10.001

Carlson, S. M., Mandell, D. J., & Williams, L. (2004). Executive function and theory of mind: Stability and prediction from ages 2 to 3. *Developmental Psychology*, *40*(6), 1105–1122. https://doi.org/10.1037/0012-1649.40.6.1105

Carlson, S. M., & Wang, T. S. (2007). Inhibitory control and emotion regulation in preschool children. *Cognitive Development*, *22*(4), 489–510. https://doi.org/10.1016/j.cogdev.2007.08.002

Chen, S., Chen, T., & Bonanno, G. A. (2018). Expressive flexibility: Enhancement and suppression abilities differentially predict life satisfaction and psychopathology symptoms. *Personality and Individual Differences*, *126*, 78–84. https://doi.org/10.1016/j.paid.2018.01.010

Cole, P. M. (1986). Children's spontaneous control of facial expression. *Child Development*, *57*(6), 1309–1321. https://doi.org/10.2307/1130411

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*, *75*(2), 317–333. https://doi.org/10.1111/j.1467-8624.2004.00673.x

Compas, B. E., Jaser, S. S., Bettis, A. H., Watson, K. H., Gruhn, M. A., Dunbar, J. P., Williams, E., & Thigpen, J. C. (2017). Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative

review. *Psychological Bulletin*, *143*(9), 939–991. https://doi.org/10.1037/bul0000110

Conte, E., Ornaghi, V., Grazzani, I., Pepe, A., & Cavioni, V. (2019). Emotion knowledge, theory of mind, and language in young children: Testing a comprehensive conceptual model. *Frontiers in Psychology*, *10*, 2144. https://doi.org/10.3389/fpsyg.2019.02144

Côté, S., Gyurak, A., & Levenson, R. W. (2010). The ability to regulate emotion is associated with greater well-being, income, and socioeconomic status. *Emotion*, *10*(6), 923–933. https://doi.org/10.1037/a0021156

Decety, J., & Holvoet, C. (2021). The emergence of empathy: A developmental neuroscience perspective. *Developmental Review*, *62*, 100999. https://doi.org/10.1016/j.dr.2021.100999

Denham, S. A., Blair, K. A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, S., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence? *Child Development*, *74*(1), 238–256. https://doi.org/10.1111/1467-8624.00533

Denham, S. A., Blair, K., Schmidt, M., & DeMulder, E. (2002). Compromised emotional competence: Seeds of violence sown early? *American Journal of Orthopsychiatry*, *72*(1), 70–82. https://doi.org/10.1037/0002-9432.72.1.70

Diamond, A. (2002). Normal development of prefrontal cortex from birth to young adulthood: Cognitive functions, anatomy, and biochemistry. In D. T. Stuss & R. T. Knight (Eds.), *Principles of frontal lobe function* (pp. 466–503). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195134971.003.0029

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*(4), 241–273. https://doi.org/10.1207/s15327965pli0904_1

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, *6*, 495–525. https://doi.org/10.1146/annurev.clinpsy.121208.131208

Extremera, N., & Rey, L. (2015). The moderator role of emotion regulation ability in the link between stress and well-being. *Frontiers in Psychology*, *6*, 1632. https://doi.org/10.3389/fpsyg.2015.01632

Ferrier, D. E., Bassett, H. H., & Denham, S. A. (2014). Relations between executive function and emotionality in preschoolers: Exploring a transitive cognition-emotion linkage. *Frontiers in Psychology*, *5*, 487. https://doi.org/10.3389/fpsyg.2014.00487

Fombouchet, Y., Pineau, S., Perchec, C., Lucenet, J., & Lannegrand, L. (2023). The development of emotion regulation in adolescence: What do we know and where to go next? *Social Development*, *32*(4), 1227–1242. https://doi.org/10.1111/sode.12684

Ford, B. Q., & Mauss, I. B. (2015). Culture and emotion regulation. *Current Opinion in Psychology*, *3*, 1–5. https://doi.org/10.1016/j.copsyc.2014.12.004

Garon, N., Bryson, S. E., & Smith, I. M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin*, *134*(1), 31–60. https://doi.org/10.1037/0033-2909.134.1.31

Gilliom, M., Shaw, D. S., Beck, J. E., Schonberg, M. A., & Lukon, J. L. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology*, *38*(2), 222–235. https://doi.org/10.1037/0012-1649.38.2.222

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1–26. https://doi.org/10.1080/1047840X.2014.940781

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Gupta, S., & Bonanno, G. A. (2011). Complicated grief and deficits in emotional expressive flexibility. *Journal of Abnormal Psychology*, *120*(3), 635–643. https://doi.org/10.1037/a0023541

Hart, R. P., Benzshawel, J. A., & Bonanno, G. A. (2024). Does cognitive load influence expressive flexibility? Comparing civilian and veteran populations. *Cognition and Emotion*, *13*, 1–9. doi:10.1080/02699931.2024.2316194

Howse, R. B., Calkins, S. D., Anastopoulos, A. D., Keane, S. P., & Shelton, T. L. (2003). Regulatory contributors to children's kindergarten achievement. *Early Education and Development*, *14*(1), 101–119. https://doi.org/10.1207/s15566935eed1401_7

Hudson, A., & Jacques, S. (2014). Put on a happy face! Inhibitory control and socioemotional knowledge predict emotion regulation in 5- to 7-year-olds. *Journal of Experimental Child Psychology*, *123*, 36–52. https://doi.org/10.1016/j.jecp.2014.01.012

Ip, K. I., Miller, A. L., Karasawa, M., Hirabayashi, H., Kazama, M., Wang, L, Olson, S. L., Kessler, D., & Tardif, T. (2021). Emotion expression and regulation in three cultures: Chinese, Japanese, and American preschoolers' reactions to disappointment. *Journal of Experimental Child Psychology*, *201*, 104972. https://doi.org/10.1016/j.jecp.2020.104972

Ip, K. I., Miller, A. L., Wang, L., Felt, B., Olson, S. L., & Tardif, T. (2023). Emotion regulation as a complex system: A multi-contextual and multi-level approach to understanding emotion expression and cortisol reactivity among Chinese and US preschoolers. *Developmental Science*, *27*(5), e13446. https://doi.org/10.1111/desc.13446

Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, *30*(7), 865–878. https://doi.org/10.1016/j.cpr.2010.03.001

Kelley, N. J., Glazer, J. E., Pornpattananangkul, N., & Nusslock, R. (2019). Reappraisal and suppression emotion-regulation tendencies differentially predict reward-responsivity and psychological well-being. *Biological Psychology*, *140*, 35–47. https://doi.org/10.1016/j.biopsycho.2018.11.005

Kiel, E. J., & Kalomiris, A. E. (2015). Current themes in understanding children's emotion regulation as developing from within the parent-child relationship. *Current Opinion in Psychology*, *3*, 11–16. https://doi.org/10.1016/j.copsyc.2015.01.006

Kitayama, S., Markus, H. R., & Matsumoto, H. (1995). A cultural perspective on self-conscious emotions. In J. P. Tangney & K. W. Fisher (Eds.),*Self-conscious emotions: The psychology of shame, guilt, embarrassment, and pride* (pp. 439–464). Guilford Press.

Knafo, A., Zahn-Waxler, C., Van Hulle, C., Robinson, J. L., & Rhee, S. H. (2008). The developmental origins of a disposition toward empathy: Genetic and environmental contributions. *Emotion*, *8*(6), 737–752. https://doi.org/10.1037/a0014179

Kuhn, L. J., Willoughby, M. T., Vernon-Feagans, L., & Blair, C. B. (2016). The contribution of children's time-specific and longitudinal expressive language skills on developmental trajectories of executive function. *Journal of Experimental Child Psychology*, *148*, 20–34. https://doi.org/10.1016/j.jecp.2016.03.008

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). *International Affective Picture System (IAPS): Instruction manual and affective ratings* (Technical Report A-4). Center for Research in Psychophysiology, University of Florida.

Levin, R. L., & Rawana, J. S. (2022). Exploring two models of emotion regulation: How strategy use, abilities, and flexibility relate to well-being and mental illness. *Anxiety, Stress, and Coping*, *35*(6), 623–636. https://doi.org/10.1080/10615806.2021.2018419

Lowe, J. R., Coulombe, P., Moss, N. C., Rieger, R. E., Aragón, C., MacLean, P. C., Caprihan, C., Phillips, J. P., & Handal, A. J. (2016). Maternal touch and infant affect in the Still Face Paradigm: A cross-cultural examination. *Infant Behavior and Development*, *44*, 110–120. https://doi.org/10.1016/j.infbeh.2016.06.009

Maccallum, F., Tran, S., & Bonanno, G. A. (2021). Expressive flexibility and anxiety. *Journal of Affective Disorders*, *281*, 935–940. https://doi.org/10.1016/j.jad.2020.11.028

Masuda, T. (2017). Culture and attention: Recent empirical findings and new directions in cultural psychology. *Social and Personality Psychology Compass*, *11*(12), 1–16. https://doi.org/10.1111/spc3.12363

Mesquita, B., Boiger, M., & De Leersnyder, J. (2016). The cultural construction of emotions. *Current Opinion in Psychology*, *8*, 31–36. https://doi.org/10.1016/j.copsyc.2015.09.015

Ornaghi, V., Pepe, A., Agliati, A., & Grazzani, I. (2019). The contribution of emotion knowledge, language ability, and maternal emotion socialization style to explaining toddlers' emotion regulation. *Social Development*, *28*(3), 581–598. https://doi.org/10.1111/sode.12351

Pițur, S., & Miu, A. C. (2020). Childhood maltreatment and expressive flexibility: Specific effects of threat and deprivation? *Cognition and Emotion*, *34*(8), 1721–1728. https://doi.org/10.1080/02699931.2020.1795625

Robson, D. A., Allen, M. S., & Howard, S. J. (2020). Self-regulation in childhood as a predictor of future outcomes: A meta-analytic review. *Psychological Bulletin*, *146*(4), 324–354. https://doi.org/10.1037/bul0000227

Rodin, R., Bonanno, G. A., Rahman, N., Kouri, N. A., Bryant, R. A., Marmar, C. R., & Brown, A. D. (2017). Expressive flexibility in combat veterans with posttraumatic stress disorder and depression. *Journal of Affective Disorders*, *207*, 236–241.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.),*Handbook of child psychology, sixth edition: Social, emotional, and personality development* (pp. 99–166). Wiley.

Rydell, A.-M., Berlin, L., & Bohlin, G. (2003). Emotionality, emotion regulation, and adaptation among 5- to 8-year-old children. *Emotion*, *3*(1), 30–47. doi:10.1037/1528–3542.3.1.30

Solomon, B., DeCicco, J. M., & Dennis, T. A. (2012). Emotional picture processing in children: An ERP study. *Developmental Cognitive Neuroscience*, *2*(1), 110–119. doi:10.1016/j.dcn.2011.04.002

Son, H., & Doan, S. N. (2023). Cultural differences in maternal emotion control values and children's expressive flexibility. *Social Development*, *32*, 501–516. https://doi.org/10.1111/sode.12670

Southward, M. W., & Cheavens, J. S. (2017). Assessing the relation between flexibility in emotional expression and symptoms of anxiety and depression: The roles of context sensitivity and feedback sensitivity. *Journal of Social and Clinical Psychology*, *36*(2), 142–157. https://doi.org/10.1521/jscp.2017.36.2.142

Stearns, C. Z., & Stearns, P. N. (1986). *Anger: The struggle for emotional control in America's history*. University of Chicago Press.

Tobin, R. M., & Graziano, W. G. (2011). The disappointing gift: Dispositional and situational moderators of emotional expressions. *Journal of Experimental Child Psychology*, *110*(2), 227–240. https://doi.org/10.1016/j.jecp.2011.02.010

Tsai, J. L., & Clobert, M. (2019). Cultural influences on emotion: Empirical patterns and emerging trends. In S. Kitayama & D. Cohen (Eds.),*Handbook of cultural psychology* (pp. 292–318). Oxford University Press.

Tsai, J. L., Louie, J. Y., Chen, E. E., & Uchida, Y. (2007). Learning what feelings to desire: Socialization of ideal affect through children's storybooks. *Personality*

and Social Psychology Bulletin, *33*(1), 17–30. https://doi.org/10.1177/0146167206292749

Tull, M. T., & Aldao, A. (2015). Editorial overview: New directions in the science of emotion regulation. *Current Opinion in Psychology*, *3*, iv–x. https://doi.org/10.1016/j.copsyc.2015.03.009

Wang, J. (2013). *Emotions and behaviors of Chinese and U.S. preschoolers in two emotionally challenging tasks* [Unpublished doctoral dissertation]. Colorado State University.

Wang, Q. (2013). *The autobiographical self in time and culture*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199737833.001.0001

Wang, Y., & Hawk, S. T. (2020). Expressive enhancement, suppression, and flexibility in childhood and adolescence: Longitudinal links with peer relations. *Emotion*, *20*(6), 1059–1073. doi:10.1037/emo0000615

Wang, Y., Hawk, S. T., & Zong, W. (2020). Bidirectional effects between expressive regulatory abilities and peer acceptance among Chinese adolescents. *Journal of Experimental Child Psychology*, *199*, e104891. https://doi.org/10.1016/j.jecp.2020.104891

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, *72*(3), 655–684. https://doi.org/10.1111/1467-8624.00304

Westphal, M., Seivert, N. H., & Bonanno, G. A. (2010). Expressive flexibility. *Emotion*, *10*(1), 92–100. https://doi.org/10.1037/a0018420

Yang, Y., & Wang, Q. (2019). Culture in emotional development. In V. LoBue, K. Pérez-Edgar, & K. A. Buss (Eds.),*Handbook of emotional development* (pp. 569–593). Springer. https://doi.org/10.1007/978-3-030-17332-6_22

Yang, Y., & Wang, Q. (2023). Longitudinal relations of emotion knowledge to psychosocial adjustment in European and Chinese American school-age children. *Social Development*, *32*(4), 1149–1167. https://doi.org/10.1111/sode.12679

Zalewski, M., Lengua, L. J., Wilson, A. C., Trancik, A., & Bazinet, A. (2011). Emotion regulation profiles, temperament, and adjustment problems in preadolescents. *Child Development*, *82*(3), 951–966. https://doi.org/10.1111/j.1467-8624.2011.01575.x

Zhu, Z., & Bonanno, G. A. (2017). Affective flexibility: Relations to expressive flexibility, feedback, and depression. *Clinical Psychological Science*, *5*(6), 930–942. doi:10.1177/2167702617717337