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RESEARCH ARTICLE



Attachment security to mother is associated with lower trait expressive suppression among girls in middle childhood

Jacquelyn Gross ^a, Jessica A. Stern ^b, Dianna Tran ^c, Sayaka Awao ^a
and Jude Cassidy ^a

^aDepartment of Psychology, University of Maryland, College Park, MD, USA; ^bDepartment of Psychological Science, Pomona College, Claremont, CA, USA; ^cDepartment of Psychology, University of Notre Dame, South Bend, IN, USA

ABSTRACT

This study investigates links between children's attachment security to their mother in middle childhood and two aspects of emotion regulation: (1) trait expressive suppression (ES), the dispositional tendency to hide emotional expressions across contexts, and (2) state ES, the extent to which children hide expressions in a specific context. Children ages 9 to 10 ($N = 117$; 46% female) reported their trait ES prior to the laboratory visit. To capture state ES in the context of sadness, children watched a sadness-inducing movie scene in the perceived presence of others and reported the sadness they felt during the scene. Children's facial expressions were coded, with state ES defined as the difference between outward expression and self-reported felt emotion. Results indicate that, for girls, greater attachment security was associated with lower trait (but not state) ES. Findings point to a potential early correlate of suppression as a regulatory strategy among girls.

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Attachment; emotion regulation; expressive suppression; middle childhood; emotion expression; gender differences

Introduction

One of the most central concepts of attachment theory and research is that secure attachment to a primary caregiver supports children's capacity to effectively regulate emotions (Calkins & Leerkes, 2004; Cassidy, 1994; Thompson, 2016). Decades of research suggest that securely attached children – those who have experienced relatively consistent sensitive responses to their emotions – develop effective emotion regulation strategies based on experiences within the attachment relationship and are able to implement them even when the attachment figure is not present (e.g. Brenning et al., 2012; Brumariu, 2015; Cooke et al., 2019; Kerns et al., 2007; Movahed Abtahi & Kerns, 2017; Obeldobel et al., 2023; Zimmer-Gembeck et al., 2017). Despite extensive evidence supporting the link between attachment security and certain indicators of child emotion regulation, relatively little is known about links to a commonly used strategy for regulating emotion known as *expressive suppression*, which we examine here in relation to child attachment security.

Expressive suppression (ES) is a behavioral modification strategy involving attempts to hide outward expression of emotion, such as when a child feels sadness or anger but does

not show it through facial expressions or body language. Although hiding outward expressions of emotion can serve important self-protective, cultural, or social functions in some contexts (e.g. Dunbar et al., 2022; see Gross & Cassidy, 2019, for a summary; Thomas et al., 2009), over-reliance on ES as an emotion regulation strategy is associated with negative developmental outcomes such as depression and anxiety, emotion dysregulation, and increased physiological stress responding (de Veld et al., 2012; Gross & Cassidy, 2024; see Schäfer et al., 2017, for a meta-analysis).

Expressive suppression as a regulatory strategy is defined by the process model of emotion regulation (Gross, 2014), a model rooted in the personality/social psychology literature that has been widely used in studies with adults and cited extensively as an influential framework for understanding emotion regulation processes. The process model views emotions *as a process* involving loosely coupled changes in feelings, behavior, and physiology that unfold over a timeline of seconds to minutes (see Gross, 2014, for a detailed description of the model). According to this model, ES is an attempt to regulate emotion relatively late in the process, after the emotional response has already occurred (for example, feeling sad but then concealing facial expressions of sadness). Expressive suppression is distinct from other forms of suppression, such as suppression of thoughts or feelings, in that these other forms do not involve concealing behavioral displays of emotion after the emotional response is already underway. Rather, those forms involve modifying other aspects of the emotional response, such as subjective experiences.

State and trait expressive suppression

As is the case with many aspects of human functioning (Mischel & Shoda, 1995), ES can be considered as both a state and a trait characteristic. Whereas *state* ES includes context-specific instances of hiding emotional expression, *trait* ES is the dispositional tendency to hide emotional expressions during daily life across time and context. As children's repertoire of emotion regulation strategies grows, they come to rely on some strategies more than others (e.g. Zimmer-Gembeck & Skinner, 2011); over time, as children repeatedly use a given strategy across contexts, its use may become trait-like as patterns of emotion regulation become more stable (Cole et al., 1994). However, trait-like measures of emotion regulation tendencies do not capture the full picture of children's emotion experiences and do not allow for examining the possibility that individual differences may only emerge in some contexts (Obeldobel et al., 2023). In fact, some researchers have argued that emotion regulation can only be studied in specific contexts (e.g. using state-like measures) and that adaptive emotion regulation requires the ability to flexibly respond to changing environmental demands (e.g. Calkins & Hill, 2007; Cole et al., 1994, 2004; Saarni, 1999; Thompson, 1994). Evidence further suggests that these state and trait constructs are likely distinct phenomena, sometimes uncorrelated with each other and related to different aspects of development (e.g. Gračanin et al., 2016; Lanteigne et al., 2014). As such, researchers cannot assume that high trait suppression will translate into observed suppression; even when a trait is a generalized tendency, it is unlikely to be evident in every situation. Therefore, it is important for researchers to understand the correlates of both state and trait measures of emotion regulation strategies like ES.

State ES is typically measured via behavioral observation (e.g. of facial expressions or body language) in a specific context; additionally, because a lack of emotional behavior can only be considered “suppression” if there is indeed an emotional response to hide, state ES measures also often capture the experiential component of emotion (e.g. using self-report) or a physiological component (e.g. skin conductance or heart rate) (e.g. Gračanin et al., 2016; Lanteigne et al., 2014; Pu et al., 2010; Zimmermann et al., 2001). Trait ES is typically measured using standardized self-report questionnaires that assess the frequency or extent to which children hide behavioral expressions of emotion across multiple contexts in daily life (such as with the Emotion Regulation Questionnaire for Children and Adolescents; Gullone & Taffe, 2012).

Children’s attachment quality: links with expressive suppression

Increasingly, developmental researchers have adopted the process model as a useful framework for understanding emotion regulation strategies in childhood, bridging the social psychology and developmental psychology literatures (e.g. Diaz & Eisenberg, 2015; Gross & Cassidy, 2019; Riediger & Luong, 2015). Expressive suppression is particularly relevant to childhood attachment quality, given the long history within attachment theory and research of studying how distress is expressed as a pattern of behavior intended to preserve the attachment figure’s availability (Ainsworth et al., 1978; Bowlby, 1973; Cassidy et al., 2025; Main, 1981). It is reasonable to expect that attachment security is associated with free-flowing emotional expressions (rather than suppression), because attachment security arises from consistent experiences of having expressions of both positive and negative emotions routinely accepted and responded to sensitively (e.g. Leerkes, 2011; Kobak et al., 2017; see Bretherton, 1990, for a discussion of “open communication”). Specifically, securely attached children are thought to learn that it is acceptable to openly express and communicate a range of emotions to their parents, whereas insecurely attached children, whose emotions have been met with rejection or inconsistent support, learn to modify emotional behavior to best ensure proximity to a caregiver when needed (Cassidy, 1994; Cassidy et al., 2025; Main, 1990). Patterns of emotion expression developed within the parent-child relationship may then generalize to other social partners such as friends and peers (Kerns et al., 2007).

It is possible that attachment quality is associated with both state and trait ES. The early patterns of emotion expression that generalize to other social partners may develop into habitual patterns of suppression across social contexts, leading to the emergence of trait ES. Additionally, although children’s use of state ES largely depends on contextual factors (English et al., 2017), individual differences shaped by cultural, genetic, and relational influences – such as attachment quality – also contribute to the use of this emotion regulation strategy in the moment (Gross & Cassidy, 2019; see also Gross, 2015, for a description of the extended process model). In the following sections, we highlight evidence supporting a link between attachment quality and both state and trait ES.

Attachment quality and state expressive suppression

Prior studies suggest that attachment quality may relate to the extent to which children hide emotional displays in specific contexts. For example, observational studies indicate

that some insecurely attached children (those whose attachment bids have been consistently rejected) minimize their distress and/or attachment behavior during interactions with parents, such as by concealing negative emotional expressions or not sharing their negative feelings (Berlin & Cassidy, 2003; Gander & Buchheim, 2015; Spangler & Zimmermann, 2014). Specifically, insecure-avoidant (but not insecure-ambivalent) children do not appear to be outwardly distressed when separated from their caregiver (i.e. their behavior and facial expressions reveal little emotion), yet they experience physiological signs of distress such as increased heart rate and cortisol levels (see Gander & Buchheim, 2015).

Some insecurely attached children may also learn to suppress with other social partners, including peers, friends, or strangers. Indeed, several studies have found that insecure attachment is associated with a divergence between expressed and “felt” emotion in specific nonfamilial contexts, such as rejection by unfamiliar peers (White et al., 2012); lab paradigms intended to induce feelings of vulnerability, fear, or social evaluative stress by strangers (Borelli et al., 2013, 2014; Borelli, Ho, et al., 2017); and a joint problem-solving interaction with a friend (Zimmermann et al., 2001).

Notably, the term “expressive suppression,” a behavioral strategy defined by the process model (see above), is not typically used in the childhood attachment literature, and thus it can be difficult to discern whether a study examines state ES or something slightly different. For example, some studies have found that attachment quality is related to constructs similar to state ES, such as emotion discordance, divergence, coherence, or “emotion suppression” (e.g. Borelli, Ho, et al., 2017). Like state ES, these other constructs involve a mismatch between two or more indicators of emotion (behavioral, experiential, and physiological), but unlike ES, do not necessarily involve appearing outwardly unemotional to others despite feeling (and being consciously aware of feeling) emotional. To illustrate, one study found that children with high levels of attachment security displayed “psychobiological convergence” – where their physiological response to a stressor was significantly correlated with their self-reported negative emotion – but children with lower levels of attachment security did not show this same convergence of emotional indicators (Sichko et al., 2018). Despite the use of slightly different constructs and measures, these prior studies provide indirect support for the notion that attachment quality may relate to state ES in childhood.

Attachment quality and trait expressive suppression

Compared to state ES, previous research provides more direct support for a link between trait ES and children’s attachment quality. This is because well-validated self-report measures of trait ES have been developed for use by children and adolescents, including the suppression subscale of the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012). Using these self-report measures, several studies have found that trait ES is related to children’s attachment quality measured in a variety of ways, including self-reported attachment to mother and/or father, observed attachment to a primary caregiver, and self-reported “attachment style” (a “trait” pattern of attachment that begins to emerge in middle childhood and reflects conscious elements of how individuals experience emotions and behave in close relationships) (e.g. Beijers et al., 2021; Brenning & Braet, 2013; Gresham & Gullone, 2012; House et al., 2022; Kokkinos

et al., 2019; Moreira et al., 2017). Notably, the self-reported nature of trait ES suggests that by middle childhood, children can be consciously aware of a discrepancy between felt and expressed emotions and are able to report this discrepancy reliably (Gullone & Taffe, 2012).

Key gaps in the research

Although the evidence suggests that attachment quality may be related to ES in childhood, no previous study has examined attachment quality as it relates to both trait and state ES within the same study. As noted above, it is important to distinguish between dispositional and situational measures of emotion regulation. Trait ES speaks to consistent patterns of emotion regulation over time and across contexts and may reflect inflexible use of ES in inappropriate contexts or over-reliance regardless of context. It may be that insecure attachment gives rise to inflexible patterns that only manifest as a dispositional tendency best captured by trait measures (and that secure attachment allows for more flexibility to choose from among a broad range of strategies). In contrast, state ES reflects the dynamic *process* of emotion regulation in response to a specific event, and its use depends on contextual factors such as the type of emotion being suppressed and the social context. It may be attachment quality is only predictive of ES in certain contexts or with specific emotions. Because previous studies have examined the connection either with trait ES or state ES, differences in findings across studies may be due to characteristics of the sample, methodology, or other aspects of study design. Measuring trait and state ES independently within the same sample allows us to disentangle variance due to study design and sample characteristics, and thus better understand the nature of their links to attachment quality in childhood.

Another notable gap is the lack of attention to the role of children's gender. A large body of research indicates that gender socialization is an important contributor to how children express and regulate emotions (see Chaplin & Aldao, 2013, for a meta-analytic review). Beginning in infancy and throughout development, children learn gender-role-consistent behaviors through observation, cognitive learning, and socialization by parents, teachers, and peers (Liben & Bigler, 2002). Evidence for gender differences in expressive suppression is mixed, with some studies finding that boys suppress more than girls (e.g. Borelli, Smiley, et al., 2017; Brenning & Braet, 2013; Gullone & Taffe, 2012; Gullone et al., 2010; Palmer et al., 2018) and other studies finding no gender differences (e.g. Haag et al., 2023, House et al., 2022; Lonigro et al., 2023). The inconsistent findings may be due in part to how children are socialized to express specific emotions. One major theory proposes that boys are more often discouraged from expressing vulnerable emotions such as sadness and fear, and girls from expressing disharmonious emotions such as anger (Brody, 1999; Brody & Hall, 2008; Chaplin et al., 2005; Fuchs & Thelen, 1988). The expression of sadness in particular may be socialized differently, with parents encouraging boys to hide their sadness more than girls (Cassano & Zeman, 2010; Cassano et al., 2007) and having more frequent and more extended conversations about sadness with girls than with boys (e.g. Adams et al., 1995; Fivush et al., 2000).

Given that parents are a key source of gender socialization, these studies point to the possibility that girls and boys suppress emotions differently due in part to the messages they receive from attachment figures about which emotions are and are not acceptable to

express. Messages coming from the parent, therefore, may be based on both the security of the attachment relationship and the child's gender, factors which could interact to influence how parents respond to their child's emotional expressions. For example, perhaps securely attached boys do not receive the typical gender-based messages to suppress from their parent, given that the secure attachment presumably arose from consistent experiences of having all emotional expressions responded to sensitively (e.g. see evidence that mother-child attachment is a uniquely important contributor to emotional development, above and beyond gender influences; Steele et al., 2008). Alternatively, perhaps gender-based norms for boys to suppress are strong enough to weaken links that may exist between attachment security and suppression, such that both secure and insecure boys suppress equally – in which case, perhaps the link between security and ES would exist only among girls. However, the interaction between attachment security and gender in predicting ES has not been explored in previous research.

The present study

The goal of the present study is to address these gaps in the research. First, we investigate links between attachment security and both trait ES (multiple emotions across multiple contexts) and state ES (in a sad context) in middle childhood. Second, we examine whether gender interacts with attachment security to predict ES, such that the links differ for boys and girls.

Operationalizing expressive suppression

As mentioned previously, trait ES is typically assessed with self-report measures capturing widespread dispositional tendencies to suppress across multiple contexts. The present study does this using the suppression subscale of the Emotion Regulation Questionnaire for Children and Adolescents (Gullone & Taffe, 2012), which provides a composite score reflecting suppression of several emotions and of emotions in general across unspecified situations (e.g. "I keep my feelings to myself").

Measurement of state ES, in contrast, requires defining a specific context in which children may or may not suppress a specific emotion. For the present study, we examine state suppression during a social context in which children perceived others to be watching them, as children of this age are often motivated to suppress based on perceptions of social judgment (Gross & Cassidy, 2019). We chose *sadness* in order to explore the possibility that children's gender plays a role specifically in the link between attachment security and suppression within a sad context, given prior evidence that boys are more encouraged by attachment figures to hide their sadness than girls (Cassano & Zeman, 2010; Cassano et al., 2007). In addition, sadness is a commonly experienced emotion that is often hidden in social contexts, and previous studies have successfully induced sadness in this age group using film clips (e.g. Rice et al., 2007; Zeman & Garber, 1996).

Because ES involves attempts to modify only the behavioral component of an emotional response, resulting in a mismatch between inner feelings and outer presentation, we operationalize state ES as the difference between the level of sadness a child reports feeling and the level of emotion visible on their face; this approach follows several previous studies of ES (e.g. Gross et al., 2000; Pu et al., 2010). Children watched a sadness-inducing movie scene while being video-recorded; their "facial expressiveness" was later

coded by trained, reliable coders. Children reported their feelings of sadness during the scene using developmentally appropriate scales to best capture the subjectivity of the emotion.

Developmental period

We examine these links in middle childhood, not only because middle childhood is an understudied developmental period in research on emotion regulation, but also because it is a crucial time for changes in both children's attachment behavior and representations as well as their emotion regulation capacities. During middle childhood, children's social worlds expand as they spend significantly more time away from parents, and parents have less control over children's social environments (Kerns & Brumariu, 2016). Parents remain principal attachment figures, but the emotion regulation strategies learned within the parent-child attachment relationship begin to generalize to other relationships and other contexts as children enter middle childhood (Contreras & Kerns, 2000), making it an ideal period in which to study how the security of attachment to a parent may relate to suppression with others. During middle childhood children also acquire new cognitive, social, and emotional skills while developing increased autonomy and the capacity for autonomous emotion regulation (Cole et al., 1994; Weinberg & Klonsky, 2009). The increasing stability of dispositional emotion regulation that emerges during adolescence (Bandon et al., 2008; Edossa et al., 2018) maps onto measurement issues: children can reliably report trait ES by age 9, with stability over a 12-month period (e.g. Gullone & Taffe, 2012). Gender differences in emotion expression also become more pronounced during this period (Chaplin & Aldao, 2013).

Study hypotheses

We hypothesize that secure attachment will negatively relate to both state ES (in the context of sadness) and trait ES (of emotions in general) during middle childhood. As discussed above, these links may differ for boys and girls because of differences in how they are socialized by attachment figures to express and regulate emotions, and the possibility that these gender-based differences interact with the extent of security to those figures. Yet given the speculative nature of this thinking and the limited previous research on specific ways that gender may interact with attachment security, we do not pose specific hypotheses about the role of child gender in predicting ES. As such, analyses of interactions with gender are exploratory.

Method

Participants

Participants were 9- and 10-year-old children ($N = 117$; 54 girls, 63 boys) who were recruited with their parent through flyers distributed at public elementary schools and posted via public locations and social media. The sample was drawn from a large metropolitan area and surrounding suburban areas in the United States Mid-Atlantic region. Inclusion criteria were proficiency in English and typical development (e.g. no diagnosis of autism). The sample was racially diverse (5% Asian, 31% Black, 9% Latinx, 45% White, and 10% other racial groups), but fairly homogenous in terms of socioeconomic

Table 1. Demographic information of participants.

	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	Range
Parents			
Age (years)		41.75 (5.03)	27 – 53
Gender			
Female	94 (80%)		
Male	23 (20%)		
Education			
Some high school	3 (3%)		
High school graduate	8 (7%)		
Associate's degree	9 (8%)		
Some college	6 (5.1%)		
College graduate	28 (24%)		
Advanced degree	61 (52.1%)		
Annual household income			
Less than \$50k	18 (15%)		
\$50k – \$75k	12 (10%)		
\$75k – \$100k	20 (17%)		
More than \$100k	60 (51%)		
Race/Ethnicity			
African American	31 (27%)		
Asian American	9 (8%)		
Hispanic/Latinx	11 (9%)		
White	60 (51%)		
Other	5 (4%)		
Marital status			
Single	24 (21%)		
Married	92 (79%)		
Number of children in home		2.32 (.89)	1 – 5
Children			
Age (years)		9.82 (.45)	8.98 – 11.07
Gender			
Female	54 (46%)		
Male	63 (54%)		
Race/Ethnicity			
African-American	18 (31%)		
Asian American	3 (5%)		
Hispanic/Latinx	5 (9%)		
White	26 (45%)		
Other	6 (10%)		

Note. For some variables, percentages do not total 100% due to missing data: for Parental age, $n = 3$; for Education, $n = 2$; for Income, $n = 7$; for Marital status, $n = 1$; for Number of children in home, $n = 1$.

status (e.g. about half of parents held an advanced degree with a household annual income of at least \$100K); this may be due to convenience sampling. See Table 1 for additional demographic information. Sample size was determined using an a priori power analysis of linear multiple regression, with power set at .80 and Type I error rate of .05. The power analysis indicated that a sample size of 114 would be sufficient to detect a small to medium effect of two predictors and their interaction (R^2 increase).

Procedure

The study was approved by the University of Maryland, College Park IRB (Approval #1048473); parents provided written informed consent and children provided verbal assent. Children received \$10 and a certificate for participating. At least 24 hours prior to a visit to the university lab (in order to reduce topic-related saliency during the lab visit), children completed an online trait expressive suppression (ES) questionnaire sent to them

via email. During the lab visit, parents provided information about demographics and other constructs that served as potential covariates, and children worked in a separate room adjacent to the parent's room. To provide an emotional baseline, children first rated their subjective feelings of present happiness, sadness, anger, and fear. Then, children were given a task by an adult experimenter to view a movie scene that they were told might be emotional. To simulate the presence of other people while maintaining a standardized context, children were told that they would be video-recorded and the recording would be watched later by others. A video camera, pointed out to participants, was placed within two feet in plain sight. During the movie scene, children's facial expressions were video-recorded and later coded. When the movie scene ended, children rated the subjective sadness (and other emotions) they felt during the scene and completed a series of tasks unrelated to the present study. At the end of the visit, approximately 20 minutes after the movie scene ended, children completed a questionnaire that assessed attachment security to their mother.

To note, children were part of a larger study that was not the aim of the present study, in which they were randomly assigned to one of two conditions. Procedures (as described above) were identical across conditions except for the instructions provided to children just before watching the movie scene. Children assigned to one condition were told: "For this part, while you're watching the movie scene, we don't want you to show how you're feeling with your face or your body. Nobody should be able to see what you're feeling by looking at you. So, as you watch, try your best to not show the camera how you really feel" (adapted from Richards & Gross, 2000). Children in the other condition were not given any emotion regulation instructions. Extensive checks were performed to ensure that experimental condition did not confound tests of the focal hypotheses. Experimental condition was unrelated to all study variables, including all demographics, observed facial expressions during the movie scene ($r = -.13$, $p = .180$), reported sadness during the movie scene ($r = .01$, $p = .881$), child attachment security ($r = -.12$, $p = .194$), and trait ES ($r = .07$, $p = .452$). To assess whether the experiment influenced links between attachment security and state ES, we included condition as a moderator in models predicting state ES and as a covariate to control for any potential influence. Experimental condition was not included in the model predicting trait ES, because trait ES reflects dispositional attributes measured prior to the lab visit.

Measures and materials

Demographics

Before coming to the laboratory, children were asked to report their gender (male [coded as 0] or female [coded as 1]). During the lab visit, parents reported their child's date of birth, child's race/ethnicity, and their relationship to their child. All parents indicated they were either a mother or a father. Parents also reported their own age, gender, and race/ethnicity. The race variables were dummy coded into five dichotomous variables (yes/no) for each parent and child representing Asian or Asian American, Black or African American, Hispanic or Latinx, White, and Other Race. (Because few participants selected American Indian/Alaska Native or Hawaiian/Other Pacific Islander, these categories were included in the "Other" racial/ethnic category.) Parents also reported other family characteristics (see Table 1).

Trait expressive suppression

Children completed the expressive suppression subscale from the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012). The subscale contains four statements rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Examples include: “When I’m feeling bad (e.g. sad, angry, or worried), I’m careful not to show it” and “I keep my feelings to myself.” In the present study, we added three additional items for a total of seven items to ask children about specific emotions: (1) “When I’m feeling *sad*, I’m careful not to show it,” (2) “When I’m feeling *angry*, I’m careful not to show it,” and (3) “When I’m feeling *worried*, I’m careful not to show it.” The ERQ-CA previously demonstrated good internal consistency and stability over a 12-month period (Gullone & Taffe, 2012; suppression subscale, $\alpha = .75$). In the present study, all seven items in the modified subscale were averaged to create a composite (*Cronbach’s* $\alpha = .77$).

State expressive suppression within a sad context

To elicit sadness, children were shown a 3-minute movie scene from *The Champ* (Lovell & Zeffirelli, 1979), in which a boy is crying because of his father’s serious injuries. In previous research, this scene was selected from a pool of over 250 scenes as being the most effective at eliciting sadness while not eliciting other emotions, in an ethnically diverse sample, based on the intensity and discreteness of participants’ emotional responses (e.g. Gross & Levenson, 1995). This scene has been used successfully in prior research to elicit sadness in middle childhood (Rice et al., 2007).

In line with previous studies of expressive suppression, state suppression (in the context of sadness) was calculated as the difference between (a) self-reported feeling of sadness during the movie scene and (b) observed facial expressions of emotion during the movie scene (both described in more detail below; for previous studies, see e.g. Gross et al., 2000; Pu et al., 2010; Zimmermann et al., 2001). This calculation also follows similar studies that subtract one standardized emotion measure from another to calculate divergence between felt and expressed emotion (e.g. Borelli, Smiley, et al., 2017). Scores on the sadness rating and facial expressiveness were standardized using z-scores, and the facial expressiveness z-score was subtracted from the sadness rating z-score. Higher state ES scores indicate higher levels of subjective sadness relative to outward expressions (i.e. feeling more sadness but showing less facial expression), and thus greater discrepancy between feeling and behavior.

Self-reported sadness. Before watching the movie scene, children were trained to rate their subjective feelings (e.g. “How sad do you feel right now?”) on a 4-point scale (1 = not really to 4 = very). So that children did not focus exclusively on sadness, they were also trained to rate feelings of happiness, anger, and fear. Children provided ratings of their emotions at baseline, before the movie scene. After watching the movie scene, children immediately reported sadness and the other emotions on the same 4-point scale (e.g. “How sad did you feel during the movie scene?”).

Facial expressiveness. The facial expressiveness measure is designed to include expressions of all emotions and provides a single score. Video-recordings of participants’ facial expressions during the movie scene were viewed in isolation with no sound by two trained, reliable coders with no additional information about the children. The single

5-point scale used to code facial expressiveness (1 = absence of any emotion to 5 = very frequent, intensive displays of emotion) was adapted from the Facial Expression Coding System (FACES; Kring & Sloan, 2007), which considers the frequency, intensity, and duration of all emotional expressions. The adapted measure is designed to include expressions of all emotions because children's attempts to hide an emotion (in this case, the sadness they reported they were feeling), including their failure to do so, manifest in a variety of expressive ways and not solely in traditionally sad facial expressions. Anecdotally, children in this study exhibited a range of expressions during the movie scene, including nervousness, general discomfort, and tense, non-Duchene smiling. This measurement approach captures all of the expressions that children may display when they are feeling sad.

The FACES system is widely used in research using film clips to elicit emotion and has been tested for use with diverse populations, with high intra-class correlations and high test-retest reliability (Kring & Sloan, 2007). FACES also relates in predictable ways to other observational coding systems, facial muscle activity, individual-difference measures of personality, skin conductance, and heart rate (Kring & Sloan, 2007). In the present study, 81% of cases were double coded with good inter-coder reliability (*Krippendorff's* $\alpha = .80$).

Attachment security

All children reported on attachment security to their mother (as opposed to any other caregiver) to standardize the construct. Attachment security was assessed with the 24-item Security Scale (Kerns et al., 2015; Koehn & Kerns, 2022). For each item, children were presented with two statements, each describing a type of child. For example: "Some kids worry that their mom might not be there when they need her, BUT other kids are sure their mom will be there when they need her." Children first chose the statement describing the child who was "more like" them, then indicated whether the response they chose was "really true" or "sort of true" for them. This response format was developed to minimize social desirability biases. Items are scored from 1 to 4, with higher scores indicating perceptions of greater security, and all items were averaged to create a composite of attachment security. In previous studies, this measure has demonstrated good internal reliability and construct validity, including measurement invariance across cultures, child gender, and child age (Nair et al., 2025); a meta-analytic examination of the Security Scale's validity showed that this measure demonstrated stability over time and is associated with other attachment measures, caregiver sensitivity, and various developmental correlates (Brumariu et al., 2018). In the present study, items demonstrated good internal consistency (*Cronbach's* $\alpha = .89$).

Data analysis plan

SPSS Version 28 was used to conduct all analyses. First, we analyzed bivariate correlations and descriptive statistics for key variables (child gender was coded as 1 = female, 0 = male). Then, we selected covariates based on bivariate correlations. Specifically, parent or child demographic characteristics that were significantly correlated with the outcome were selected as covariates in the model predicting that outcome. In

addition, the child's experimental condition was included as a covariate to control for its influence on state ES.

Lastly, we conducted a series of multiple regression analyses with selected covariates using model 1 of the PROCESS macro for SPSS (Hayes, 2013). The PROCESS macro is especially useful for small or non-normally distributed samples, as it uses bootstrapping to produce robust confidence intervals for conditional effects, reducing reliance on normality assumptions. The macro's default method for handling missing data is listwise deletion; however, the rate of missing data in the present study was low and Little's MCAR test was not significant, indicating data were missing completely at random ($\chi^2(4) = 1.54, p = .820$).

Given the conceptual distinction between state ES (in a sad context) and trait ES (of emotions in general), as well as their lack of correlation in the present study ($r = -.07$), the two outcome variables were tested in separate models. The first multiple regression model investigated how child attachment security, child gender, and their interaction predicted trait ES. The second model investigated how child attachment security, child gender, and their interaction predicted state ES. For both models, significance was tested using 5000 bootstrapped samples to estimate unbiased 95% confidence intervals for the coefficients; conditional effects of the focal predictor (child attachment security) at each value of the moderator (child gender) were examined if the interaction term was significant. A third analysis was conducted using the same methods to examine whether children's experimental condition interacted with their attachment security to predict state ES.

Results

Preliminary analyses

Table 2 provides bivariate correlations and Table 3 provides descriptive statistics for key study variables. Trait and state ES were not correlated with each other ($r(114) = -.07, p = .430$). Gender was unrelated to both trait ES ($r(115) = -.15, p = .118$) and state ES ($r(114) = .17, p = .075$). The mean score on trait ES was 2.61 ($SD = .69$) for boys and 2.39 ($SD = .83$) for girls. The mean score on state ES was $-.21$ ($SD = 1.49$) for boys and $.25$ ($SD = 1.28$) for girls (difference between emotion and behavior z-scores). Attachment security was not significantly correlated with trait ES ($r(112) = -.17, p = .075$), state ES ($r(111) = .04, p = .662$), or gender ($r(112) = .16, p = .081$).

As a manipulation check, a paired samples *t*-test showed that children's self-reported sadness increased from baseline ($M = 1.07, SD = .30$) to the movie scene ($M = 2.69, SD = .85$), $t(115) = -19.59, p < .001$, suggesting that the movie scene successfully evoked sadness. During the movie scene, children's happiness ($M = 1.16, SD = .47$), anger ($M = 1.17, SD = .44$), and fear ($M = 1.68, SD = .75$) remained low, indicating the emotional response was specific to sadness.

Regarding covariate selection, parent education and income were significantly correlated with children's trait ES, $r(113) = .19, p = .038$ and $r(108) = -.23, p = .015$, respectively. Thus, these variables were included as covariates in the model predicting trait ES as an outcome. No variables were correlated with state ES.

Table 2. Bivariate correlations among key study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Trait ES	1																
2. State ES in context of sadness	-.07	1															
3. Parent is female	-.10	-.02	1														
4. Parent age	-.00	-.09	-.09	1													
5. Parent married	-.12	-.03	-.20*	.21*	1												
6. Parent education	-.19*	.13	.07	.36**	.42**	1											
7. Household income	-.23*	.00	-.05	.33**	.49**	.66**	1										
8. Child age	-.07	-.13	-.15	.12	.12	.14	.23*	1									
9. Child is female	-.15	.17	-.02	-.22*	-.04	-.18	-.17	.01	1								
10. Child attachment security	-.17	.04	.09	-.16	-.17	-.11	-.13	.09	.16	1							
Child race																	
11. Asian	.09	-.01	-.12	-.06	.14	.07	-.05	.06	.02	-.13	1						
12. Black/AA	-.03	.01	.26**	-.24*	-.26**	-.19*	-.31**	.08	.20*	.13	-.17	1					
13. Latino/a	-.15	.00	-.05	-.20*	-.27**	-.28**	-.19*	-.17	.03	.08	-.09	-.21*	1				
14. White	-.01	-.04	-.03	.40**	.33**	.35**	.40**	.02	-.21*	-.09	-.24**	-.55**	-.30**	1			
15. Other race	.15	.05	-.17	-.06	-.02	-.08	.03	-.03	.00	-.01	-.01	-.22*	-.12	-.32**	1		
16. Home language: English	.02	.08	.18	.07	-.01	.13	.17	.08	.07	-.05	-.19*	.13	-.36**	.21*	-.02	1	
17. Number of children in home	.01	.05	-.04	-.08	.09	-.17	-.07	.04	.19*	-.03	.01	.08	-.15	-.00	.03	-.02	1

Note. * $p < .05$; ** $p < .01$; ES = Expressive Suppression; AA = African American. Parent race categories were removed due to space limitations and to reduce redundancy (as they were highly correlated with child race), but they showed similar correlations as Child race across all variables.

Table 3. Descriptive statistics of key study variables.

Variable	<i>M</i>	<i>SD</i>	Range
Trait ES	2.51	.76	1.00 – 4.29
State ES in context of sadness (raw)	.74	.98	.00 – 3.00
State ES in context of sadness (standardized)	.00	1.41	–4.13 – 2.42
Facial expressiveness	2.16	1.33	1.00 – 5.00
Baseline sadness	1.08	.30	1.00 – 3.00
Baseline happiness	3.24	.67	2.00 – 4.00
Baseline anger	1.03	.16	1.00 – 2.00
Baseline fear	1.32	.54	1.00 – 4.00
Sadness during movie	2.69	.85	1.00 – 4.00
Happiness during movie	1.16	.47	1.00 – 3.00
Anger during movie	1.17	.44	1.00 – 3.00
Fear during movie	1.68	.75	1.00 – 4.00
Attachment security	3.32	.45	1.73 – 4.00

Note. ES = Expressive Suppression. State ES in context of sadness (raw) was calculated by subtracting facial expressiveness from sadness during movie. State ES in context of sadness (standardized) was used in Regression Model 2, calculated as the z-score of sadness during movie minus the z-score of facial expressiveness. Missing data: State ES in context of sadness, $n = 1$; Facial expressiveness, $n = 1$; Attachment security, $n = 3$; Sadness during movie, $n = 1$; Happiness during movie $n = 1$; Anger during movie $n = 1$; Fear during movie $n = 1$.

Regression model 1: trait expressive suppression

Child attachment security, child gender, and their interaction were regressed onto trait ES, with parent education and income as covariates. The overall model predicted a significant amount of variance, $R^2 = .19$, $F(5, 101) = 4.71$, $p = .001$. Attachment security was not an individual predictor, but child gender and the interaction term were significant predictors. Analyses of conditional effects revealed a significant negative association between attachment security and trait ES for girls only (see Table 4 and Figure 1). For girls, a 1-point decrease in attachment security was associated with an increase of .77 in their trait ES, as measured by the subscale from the ERQ-CA.

Regression model 2: state expressive suppression

Child attachment security, child gender, and their interaction were regressed onto state ES, with experimental condition as a covariate. The overall model did not predict a significant amount of variance, $R^2 = .03$, $F(4, 108) = .93$, $p = .449$. None of the variables, including the interaction, was a significant predictor (see Table 5 and Figure 2).

Table 4. Regression model 1: trait expressive suppression.

	$\beta^{\wedge}$	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Attachment security	.00	.20	.01	.994	–.39, .39
Child gender	2.24	1.09	2.06	.042	.08, 4.39
Attachment $\times$ Child gender	–.77	.32	–2.39	.019	–1.41, –.13
Covariates					
Education	–.09	.07	–1.29	.202	–.22, .05
Income	–.12	.07	–1.65	.102	–.27, .03
Conditional Effects of Attachment Security on Trait ES for each Child Gender					
Male	.00	.20	.01	.994	–.39, .39
Female	–.77	.26	–3.02	.003	–1.27, –.26

Note. β = unstandardized regression coefficient; *SE* = standard error of the coefficient; CI = confidence interval. Child gender was coded as 1 = female, 0 = male. Listwise deletion was used to handle missing data ($n = 10$).

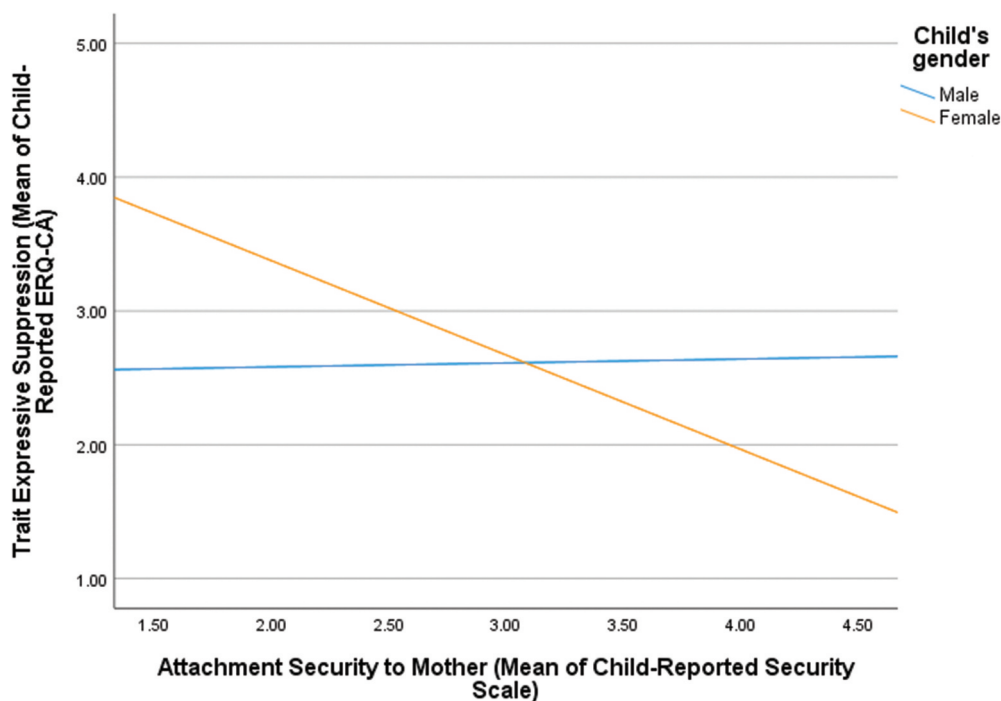


Figure 1. Regression model 1: interaction of attachment security and gender predicting trait ES.

Table 5. Regression model 2: state expressive suppression in context of sadness.

	$\beta^{\wedge}$	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Attachment security	.14	.38	.36	.720	-.62, .89
Child gender	.66	2.09	.31	.754	-3.48, 4.79
Attachment $\times$ Child gender	-.08	.62	-.13	.896	-1.31, 1.15
Covariate					
Experimental Condition	.32	.27	1.19	.236	-.21, .85

Note. β = unstandardized regression coefficient; *SE* = standard error of the coefficient; CI = confidence interval. Child gender was coded as 1 = female, 0 = male.

To confirm that children's experimental condition did not play a role, a third multiple regression model examined child attachment security, condition, and their interaction in predicting state ES. The overall model did not predict a significant amount of variance ($R^2 = .03$, $p = .40$) and none of the predictors, including the interaction, was significant.

Discussion

The present study examined attachment security as it relates to both state and trait expressive suppression in middle childhood and is among the first to examine the gender-specific role of attachment security in children's expressive suppression. We found no main effects of attachment security on either outcome; however, the link between attachment security and trait suppression was moderated by child gender, such that attachment security was associated with lower trait suppression for girls, but not for boys. Findings

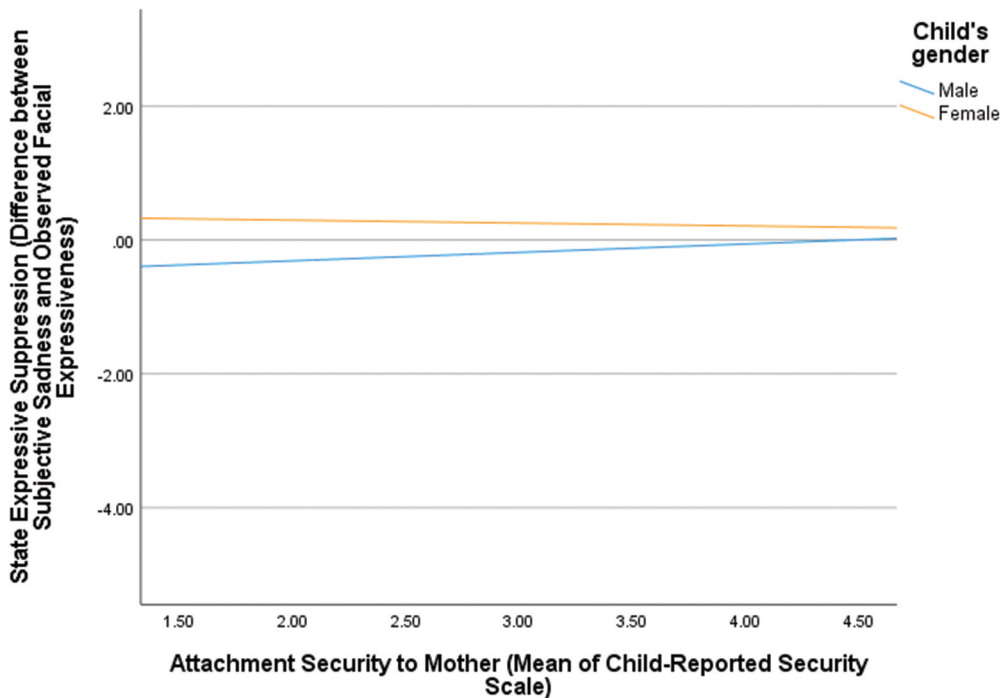


Figure 2. Regression model 2: interaction of attachment security and gender predicting state ES in the context of sadness.

advance the literature on the link between attachment and a key emotion regulation strategy, using a combination of observational methods and child perspectives.

As in previous studies, children's state and trait suppression were not significantly related to each other, and they showed distinct patterns of association with attachment security. This underscores the importance of assessing both state and trait dimensions in studies of child emotion regulation. Regarding children's trait ES, secure attachment was associated with lower trait ES, but only for girls. More securely attached girls tended to report openly expressing and communicating a range of emotions, whereas less securely attached girls – whose emotions may have been met with more rejection or inconsistent support from attachment figures – tended to report hiding their emotions more often. This finding that security to mother is linked to girls' emotional openness is consistent with the idea that patterns of emotion expression learned within the parent-child relationship generalize to other social settings and may develop into habitual patterns.

For boys, however, the hypothesized link between attachment security and trait ES did not emerge. As we speculated in the introduction, perhaps gender-based norms for boys to suppress are strong enough to weaken links that may exist between attachment security and ES, such that both secure and insecure boys suppress equally. Interestingly, meta-analytic evidence suggests that gender differences in emotion expression are more pronounced in contexts with peers and strangers, and less so in contexts with parents (Chaplin & Aldao, 2013). Perhaps securely attached boys, even though their experiences may leave them confident in sharing a range of emotions with parents, nonetheless

suppress emotions in the wider world. Indeed, boys tend to suppress emotions more than girls generally, across a broad spectrum of contexts (e.g. Borelli, Smiley, et al., 2017; Brenning & Braet, 2013; Gullone & Taffe, 2012; Gullone et al., 2010; Palmer et al., 2018). As emotion regulation researchers have emphasized, ES is not always a maladaptive strategy, and in fact, suppression serves important social, self-protective, and cultural functions in some contexts. Given the cultural gender norms for boys to hide their feelings in more contexts than girls, it may be that suppression is the most adaptive response for boys in certain situations. Securely attached boys may recognize the social and cultural benefits of conforming to gender norms when it is most adaptive, which may run counter to a tendency for open communication with parents. Although open communication of emotion is highly adaptive and may be preferable much of the time (suggested by findings that trait suppression is associated with negative developmental outcomes), having ES available within a “repertoire of strategies” improves children’s ability to navigate relationships and responsibilities (Cai et al., 2018; Cole & Jacobs, 2018; Loughheed & Hollenstein, 2012). The gender differences observed in the present study underscore the importance of examining the role of child gender in links between attachment security and emotion regulation (Chaplin & Aldao, 2013), particularly in pre-adolescence, when gendered patterns of emotion socialization may become increasingly salient.

For children’s *state* ES within a sad context, attachment security was unrelated to suppression during a task in the perceived presence of others, contrary to hypotheses. Many factors are relevant when considering this finding, particularly the way in which state suppression is conceptualized and measured in this study. For instance, this finding contrasts with previous research demonstrating links between attachment quality and constructs similar to state ES, such as emotion discordance or divergence (Borelli et al., 2013, 2014; Borelli, Ho, et al., 2017; White et al., 2012). As noted in the introduction, ES differs from these constructs in that it captures children’s attempts to modify only the behavioral component of an emotional response and comes from the process model of emotion regulation, a model that is more often used in the adult ES and personality/social psychology literature (e.g. Gross et al., 2000; Pu et al., 2010). It is therefore possible that the different findings result from measuring slightly different constructs. Further, because less securely attached children tend to under-report their negative emotions (e.g. Borelli, Ho, et al., 2017), links between attachment security and state ES may not have emerged in the present study because state ES uses self-report to assess subjective feelings, following extensive previous research (Gross et al., 2000; Pu et al., 2010; Zimmermann et al., 2001). Despite evidence that children can provide reliable and valid measures of their subjective feelings through self-report (as well as reliable and valid self-reports of trait ES), researchers attempting to measure state ES should be aware of how individual differences such as attachment quality may affect children’s self-reports of emotion.

Moreover, considerations of state ES may be particularly complex precisely because a given “state” is extensively influenced by many situational factors: e.g. the intensity and type of induced emotion, the presence/absence of others, the identity of those others, and stimulus properties (English et al., 2017). For example, in terms of stimulus properties, it may be that the movie scene’s focus on the serious injury of a parent was so intense that any other influences on suppression were overshadowed. In prior studies, situations involving high-intensity negative emotion were particularly related to the use of

suppression (e.g. Lennarz et al., 2018). In terms of the induced emotion, the present study measured state suppression within the context of sadness, whereas previous studies in which links emerged have used contexts involving stress or anxiety (e.g. Borelli, Ho, et al., 2017). It is possible that links between attachment security and state ES are emotion-specific, such that security is more strongly related to children's suppression of *fear/distress*, given the centrality of response to threat in the formation of attachment bonds (Bowlby, 1969/1982) and of parents' sensitive responses to distress specifically in predicting secure attachment (Leerkes et al., 2012).

An additional explanation for the present findings is that attachment is less related to children's state ES in a single context, but more related to expressive *flexibility* — the ability to adaptively choose among a range of emotion regulation strategies depending on the context — such that children's state expressive suppression may be lower among trusted social partners and higher with strangers, for example. Research supports the idea that expressive suppression can be adaptive in certain contexts (see Gross & Cassidy, 2019). Therefore, it may not be the use of expressive suppression in a single instance but rather the flexible deployment of suppression when needed that is related to attachment quality.

Strengths, limitations, and future directions

Strengths of the present study include the investigation of both state and trait expressive suppression, a racially diverse sample, use of a multimethod approach (child self-report, emotion induction, coder-rated observations of child facial expression), and focus on middle childhood as an important period in the development of expressive suppression. In addition, the approach used in the present study provides a different perspective on suppression than that typically seen in the developmental psychology literature. Bridging these bodies of work is valuable in that each can share insights and generate new avenues for future research, with each contributing to the knowledge base on how attachment quality may relate to a mismatch between children's subjectively felt and outwardly expressed emotions.

Importantly, however, the sample was small, majority higher-SES, and drawn from a U.S. context using convenience sampling; thus, the extent to which the results generalize to other groups (e.g. families with lower incomes or from other cultures) is not clear. Future work in larger, socioeconomically diverse, and cross-cultural samples should examine the role of other child, family, and cultural factors to illuminate contextual and intersectional influences on the development and consequences of expressive suppression (e.g. Butler et al., 2007; Ramzan & Amjad, 2017). Furthermore, analyses related to the role of gender were exploratory; the link that emerged between security and trait ES for girls but not boys provides a clear basis for hypothesis-testing about attachment, ES, and gender in future research. The present study did not specifically measure socialization but rather used gender as a proxy for the typical gender-based messages that boys and girls receive from multiple sources. Future studies including parental emotion socialization could address additional important questions. Beyond gender, there are countless other socialization influences on ES, such as race and ethnicity, socioeconomic status, and nationality that may also interact with attachment quality (and with each other) to predict the use of ES (Dunbar et al., 2022; Gross & Cassidy, 2019; Thomas et al., 2009). Regarding

the sample size, because our a priori power analysis assumed a small- to medium-sized interaction effect – larger than what is typically observed in the social sciences – the study may not have been optimally powered to detect the very small interaction effects usually reported in the literature. Therefore, although we detected a significant interaction, findings emerging from designs that are less sensitive to small effects should be interpreted cautiously, as interaction estimates may be imprecise, unstable, or inflated.

In addition, the task of studying state ES requires defining a specific context in which to examine how children suppress in real time; however, this means that results can only be generalized to similar contexts. For the present study, we focused on children's suppression in a sad context among unfamiliar people, so the results cannot be generalized to other emotional contexts or suppression among close friends or parents. Specifically, we simulated the presence of others using a conspicuous video camera, rather than studying ES during real time social interactions, to standardize the social context. Although we do not view this as a limitation of the study, the trade-off for a standardized protocol was a less naturalistic social context. Future studies examining, for example, communication with a peer in real-time may more closely replicate how children commonly experience suppressing emotion when feeling sad in daily life. Additionally, future studies investigating the role of gender may use contexts involving suppression of anger or frustration, given evidence that girls are more often socialized to suppress disharmonious emotions (e.g. Chaplin et al., 2005).

We note the importance of considering the extent to which the attachment measure and the trait ES measure contained similar items that could account for a link fuelled by measurement rather than the constructs of interest. Because only two of the 24 items of the Kerns et al. Security Scale focus on ES (i.e. "Some kids do not really like telling their mom what they are thinking or feeling," and "[Some] kids do not go to their mom when they are upset"), it is unlikely that measurement overlap guides the current findings.¹ (In fact, the inclusion of these items in the attachment measure underscores the theoretical underpinnings of a link between security and shared emotions.)

Another limitation of the study design is that children were part of a larger study testing an experimental manipulation that was not the aim of the present study. Although secondary analysis of existing data is a common practice for maximizing the utility of datasets, and we made substantial efforts to rule out that the experiment played a role, it is possible that the manipulation affected children's behavior or emotions in unmeasured ways.

Conclusion

Emotion regulation has far-reaching implications for children's social competence, psychological well-being, and behavioral health. The tendency to hide emotions during middle childhood can potentially carry forward into adolescence and young adulthood, coloring interactions with peers and emerging romantic relationships. Attachment theory offers a framework for understanding early contributors to expressive suppression, as secure children may be more able to show vulnerable or difficult emotions to others.

Note

1. In addition, following an editorial comment, we re-ran the primary analyses using a modified version of the Security Scale with those two items removed and the results did not change.

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ORCID

Jacquelyn Gross  <http://orcid.org/0000-0001-7613-6826>

Jessica A. Stern  <http://orcid.org/0000-0003-1357-724X>

Dianna Tran  <http://orcid.org/0000-0003-1561-9861>

Sayaka Awao  <http://orcid.org/0000-0001-5546-8020>

Jude Cassidy  <http://orcid.org/0000-0003-4961-1892>

Data availability statement

The data that support the findings of this study are available from the corresponding author, JG, upon request.

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