

# UC Davis

## UC Davis Previously Published Works

### Title

Observed Emotions as Predictors of Quality of Kindergartners Social Relationships.

### Permalink

<https://escholarship.org/uc/item/78z4d162>

### Journal

Social Development, 26(1)

### ISSN

0961-205X

### Authors

Hernández, Maciel

Eisenberg, Nancy

Valiente, Carlos

et al.

### Publication Date

2017-02-01

### DOI

10.1111/sode.12179

Peer reviewed



Published in final edited form as:

*Soc Dev.* 2017 February ; 26(1): 21–39. doi:10.1111/sode.12179.

## Observed Emotions as Predictors of Quality of Kindergartners' Social Relationships

Maciel M. Hernández<sup>1</sup>, Nancy Eisenberg<sup>1</sup>, Carlos Valiente<sup>1</sup>, Tracy L. Spinrad<sup>1</sup>, Sarah K. VanSchyndel<sup>1</sup>, Anjolii Diaz<sup>2</sup>, Kassondra M. Silva<sup>1</sup>, Rebecca H. Berger<sup>1</sup>, and Jody Southworth<sup>1</sup>

<sup>1</sup>Arizona State University

<sup>2</sup>Ball State University

### Abstract

This study evaluated whether positive and anger emotional frequency (the proportion of instances an emotion was observed) and intensity (the strength of an emotion when it was observed) uniquely predicted social relationships among kindergarteners ( $N = 301$ ). Emotions were observed as naturally occurring at school in the fall term and multiple reporters (peers and teachers) provided information on quality of relationships with children in the spring term. In structural equation models, positive emotion frequency, but not positive emotion intensity, was positively related to peer acceptance and negatively related to peer rejection. In contrast, the frequency of anger provided unique positive prediction of teacher–student conflict and negative prediction of peer acceptance. Furthermore, anger intensity negatively predicted teacher–student closeness and positively predicted teacher–student conflict. Implications for promoting social relationships in school are discussed.

### Keywords

anger; emotions in school; peer acceptance; peer rejection; positive emotion; teacher-student relationship quality

---

The social relationships students experience in school have implications for academic development as early as kindergarten. In fact, positive peer (Buhs & Ladd, 2001; see Juvonen, 2006, for a review; Wentzel & Watkins, 2002) and teacher–student relationships (e.g., Baker, 2006; Maldonado-Carreño & Votruba-Drzal, 2011; Pianta & Stuhlman, 2004; Silva et al., 2011) predict various measures of children's academic adjustment. Forming relationships in school comes effortlessly for some children whereas others encounter more challenges, perhaps due to their expression of emotion in school. The role of positive emotion and anger in the school context, although introduced decades ago (Prescott, 1938), only recently has received much empirical attention (Meyer & Turner, 2007; Pekrun & Linnenbrink-Garcia, 2014; Valiente, Swanson, & Eisenberg, 2012). Moreover, school children's emotions usually have been assessed with adults' reports or in specific emotion-

eliciting tasks introduced by researchers; thus, examining observed emotions expressed at school can help broaden our understanding of the associations between emotion expressivity and social relationships at school. In this study, we examined whether frequency and intensity of anger and positive emotions displayed at school uniquely predicted the quality of children's relationships with peers and teachers.

Frequency of emotion (henceforth indicating the amount an emotion is expressed regardless of its arousal level) and intensity of emotion (henceforth indicating the strength at which an emotion is expressed when it is present) may have different implications for developing relationships with peers and teachers in school. For example, a child may express happiness many times (i.e., high frequency) and each instance may be expressed at low or moderate arousal levels (i.e., low to moderate intensity) that is relatively normative, or at high arousal (i.e., high intensity), sometimes reflecting low regulation (Maszk, Eisenberg, & Guthrie, 1999; Shin et al., 2011). The goals of this study were to separate observed emotion frequency from observed intensity and to examine their additive, unique prediction of peer acceptance (a measure of social preference among peers) and teacher–student relationship quality in kindergarten.

## Emotion Frequency and Intensity as Separate Units of Analysis

Numerous researchers have examined emotion frequency and/or intensity, but rarely have distinct aspects of emotional expression been examined concurrently. Diener, Larsen, Levine, and Emmons (1985) proposed that emotion frequency and intensity are independent from each other. They found that, for adults, average levels of self-reported average positive and negative emotions (without differentiating between its frequency and intensity) were negatively correlated and that this correlation was reduced across longer time intervals whereas positive and negative emotion intensity were strongly and positively correlated. Similar results have been found using observational, teacher-report, or self-report measures of children's emotion (Eisenberg et al., 1996; Fabes, Hanish, Martin, & Eisenberg, 2002; Kim, Walden, Harris, Karrass, & Catron, 2007; Schultz, Izard, Stapleton, Buckingham-Howes, & Bear, 2009; Shin et al., 2011) and family expressiveness (Halberstadt, Cassidy, Stifter, Parke, & Fox, 1995).

Researchers usually have not clearly differentiated between the intensity and frequency of children's emotions (expressed or experienced) and when they have made a distinction, they have typically not examined the unique prediction of both types of emotion expressions simultaneously. Some researchers have used observation or self-reported measures that reflect, to some degree, both frequency and intensity of experience/expression (e.g., Eisenberg et al., 1993; Reschly, Huebner, Appleton, & Antaramian, 2008). More commonly, researchers have used adults' reports of children's emotionality (experienced and/or expressed) but it is often unclear whether adults are recalling the frequency or intensity of children's emotions, or both (Eisenberg et al., 1997; Maszk et al., 1999; Valiente, Swanson, & Lemery-Chalfant, 2012). Furthermore, some measures of emotional intensity (reported by teachers or parents) have actually contained questions that refer to frequency (e.g., "This child tends to get nervous or distressed easily"), as well as to intensity (e.g., "This child responds very emotionally to things around him") of negative and/or unspecified emotion

(Eisenberg et al., 1993; Maszk et al., 1999). These methods, although they reliably measure average emotion and likely partly tap individual differences in emotional expressivity, do not distinguish emotion frequency from intensity.

In addition to the relative uniqueness of emotion frequency from intensity, there is the question of the unique prediction of social adjustment these measures may offer. However, only a few researchers (e.g., Diener et al., 1985; Fabes et al., 2002; Kim et al., 2007) have considered the value of separating emotion frequency from intensity for examining whether they uniquely predict the outcomes of interest. Either intensity or frequency of emotion could be the stronger predictor of outcomes for children and their prediction might be additive; moreover, prediction could vary with both the type of emotion quality/valence and the developmental outcome considered.

## Emotion Expressivity and Social Relationships

Emotions affect opportunities for social relationships to develop and are part of social exchanges (Lyubomirsky, King, & Diener, 2005). Frequency of emotion may shape the general tone of social interactions, whereas intensity likely highlights certain social exchanges and/or communicates a strong message, be it positive or negative.

### Peer acceptance and rejection

Although investigators have examined negative emotion, including anger, more often than positive emotion as a precursor to adjustment, some research suggests that positive expressivity has a facilitating role in social adjustment (Dougherty, 2006; Fredrickson, 2001; Shin et al., 2011). Positive emotions, which encourage approach behaviors, may serve to initiate or elicit interactions from others and promote relationships (Coplan & Bullock, 2012; Fredrickson, 2001; Lyubomirsky et al., 2005; Putnam, 2012). Children who express more frequent positive emotions are also more likely to be prosocial, fun to be around, and engaging, and thus may be better liked by peers (Putnam, 2012). Among preschoolers observed during play interactions, positive affect (e.g., frequency of observations laughing, smiling) has been positively associated with peer acceptance (Denham, McKinley, Couchoud, & Holt, 1990; Shin et al., 2011) and negatively associated with reticent play (i.e., not playing or involved with peers) over time (Spinrad et al., 2004).

However, in contrast to the work on frequency of positive emotion, high intensity positive emotion has been correlated with low social competence and low regulation (Stifter, Putnam, & Jahromi, 2008; Valiente, Swanson, & Eisenberg, 2012), and, thus, positive emotional intensity may be unrelated to peer acceptance (or related in a nonlinear fashion). Peers may notice a child's expression of intense positive emotion (and perhaps this may present more opportunities for play) but overall positive emotional intensity may not translate to peer acceptance, especially if the emotion intensity is sometimes inappropriately expressed.

In contrast to frequency of positive emotion, expressing high emotional negativity (i.e., frequency or intensity) can create vulnerabilities in the development of positive social ties and interactions with peers (Dougherty, 2006; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994; Fabes et al., 2002; Rubin, Bukowski, & Parker, 2006). Children who express

more frequent or intense negative emotions may be less able to cope with peer conflict, less likely to engage in prosocial behavior, and thus less liked by peers (Coplan & Bullock, 2012). In particular, anger frequency and intensity may tax children's regulatory abilities and undermine socially competent responding. Similarly, children who express intense anger, compared to their less intense peers, may be less regulated, encounter greater conflict with peers, and be avoided or rejected by peers because peers perceive more intense negativity as threatening or unpleasant. For example, children who express high levels of anger or other negative emotions tend to be relatively low in peer status (Denham et al., 1990; Eisenberg et al., 1993; Eisenberg et al., 1997; Ladd, Birch, & Buhs, 1999; Maszk et al., 1999; Schultz et al., 2009; Shin et al., 2011; Strand, Barbosa-Leiker, Arellano Piedra, & Downs, 2015). Also, observed anger in preschool (measured as the frequency of observed anger) has been negatively correlated with peer liking (Denham et al., 1990).

In studies using a combination of observer-report and adult-report measures of emotion, negative emotional intensity (rated by teachers) was negatively related to peer social status (Maszk et al., 1999), and negative emotion frequency (e.g., frequency of sad or angry observations) was negatively related to peer acceptance (Shin et al., 2011). However, inconsistent results across methods emerged in one study of preschoolers that examined reports and observations separately. Fabes et al. (2002) reported that teacher-reported dispositional negative emotional intensity (e.g., "This child's negative moods are strong in intensity"), but not separately observed negative emotion frequency or intensity, was correlated with lower peer liking status. It is possible that adults' perceptions of children's dispositional negativity reflected more than mere emotionality (e.g., aggression), which could affect the strength of the relation between the teacher-reported emotion measure and peer liking. Therefore, it is unclear whether frequency or intensity of anger is inversely related to the quality of peer relationships and whether one of these aspects of anger is the predominant significant predictor.

### **Teacher–student relationship quality**

Yee, Gonzaga, and Gable (2014) suggested that children's dispositional expression of positive emotions might facilitate and maintain positive social ties. Positive emotion frequency might predict better teacher–student relationship quality because pleasant interactions likely promote closeness and minimize conflict. Yet few researchers have examined children's positive expressivity as a predictor of teacher–student relationship quality despite its probable role in social adjustment (Fredrickson, 2001; Putnam, 2012). In this study, we examined two aspects of the teacher–student relationship, rather than looking at a global quality measure because some researchers have found different predictors of teacher–student closeness and conflict (e.g., Portilla, Ballard, Adler, Boyce, & Obradovi , 2014).

Empirical evidence, based on a limited number of studies, is mixed regarding the extent to which children's expressed positive emotions predict teacher–student relationship closeness or conflict. For example, self-reported positive affect in school was positively correlated with teacher–student relationship quality (general positive relationship was measured; Reschly et al., 2008). It is unclear whether the rating scale used in the study by Reschly et al.

(2008) assessed frequency and/or intensity of positive affect. However, Ladd et al. (1999) found that the frequency of behaviors linked to positive or neutral emotions (e.g., non-hostility, cooperative play; intensity was not coded) did not significantly predict teacher–student conflict in kindergarten. As already noted, positive emotion intensity is sometimes a correlate of low regulation, which may lessen the positivity of the teacher–student relationship (Sallquist et al., 2009; Valiente, Swanson, & Eisenberg, 2012). Intense positive emotion may be a marker of low regulation for some children whereas other children may express intense positive emotion appropriately (Valiente et al., 2013); thus, intensity of positive expressivity may not predict teacher–student closeness or conflict. We expected frequency of positive emotion to be positively related to teacher–student closeness and negatively related to teacher–student conflict, and speculated that intensity of positive emotion might be unrelated. In addition, we examined the unique prediction provided by both aspects of positive emotion.

Children’s frequency and intensity of anger, in particular, may counter teachers’ implicit and explicit socialization goals of promoting behavior regulation (Bulotsky-Shearer, Dominguez, Bell, Rouse, & Fantuzzo, 2010). Frequent and intense anger may be a distraction in the classroom and result in lower teacher–student relationship quality (i.e., high closeness, low conflict). In fact, there is consistent empirical support indicating that negative emotion inversely predicts the quality of teacher–student relationships (e.g., Ladd et al., 1999; Reschly et al., 2008). For example, students are more likely to have negative encounters with teachers when they exhibit high frequency and/or intensity of negative emotion, especially anger (Eisenberg et al., 1999; Valiente, Swanson, & Lemery-Chalfant, 2012). Furthermore, Valiente, Swanson, and Lemery-Chalfant (2012) found that teachers’ and parents’ reports of kindergarteners’ anger (intensity/frequency unspecified) were negatively related to teacher–student relationship quality (closeness and conflict were combined to form a positive quality measure). These studies suggest that negative expressivity may be particularly problematic for the teacher–student relationship.

## The Present Study

In the present study, we examined whether frequency and intensity of emotional expressivity uniquely predicted two measures of social relationships at school. To do so, we used multi-informant reports from teachers, observers, and peers to reduce biases associated with shared method variance. In addition, observations of emotion distinguishing intensity from frequency in the fall and measures of outcomes in the spring were used to provide temporal ordering. We also statistically controlled for earlier peer acceptance to examine prediction of rank-order change in peer acceptance during kindergarten. Furthermore, in our study, unlike the majority of studies reviewed, approximately half of the participants were of Hispanic heritage – which provides generalizability of results to a more diverse population.

Based on the research reviewed, we expected positive emotion frequency, but not positive emotion intensity, to be associated with greater peer acceptance (peer- and teacher-reported) and teacher–student closeness, and with lower levels of both teacher-reported peer rejection and teacher–student conflict. We also predicted that positive emotion frequency would be associated with greater peer acceptance although we were less sure if positive emotion

intensity would be positively related to peer acceptance (some young children find intense positive emotion exciting or fun, even if teachers may not view relatively intense positive expressivity as appropriate in class). Based on prior theorizing and findings (see above), we expected anger emotion frequency and intensity, perhaps especially intensity, to be associated with lower-quality peer- and teacher–student relationships (i.e., low peer acceptance and teacher–student closeness, high peer rejection and teacher–student conflict).

In all our models, we also controlled for children’s age, ethnicity, sex, and family socioeconomic status (SES) because of their relations to peer acceptance (Rubin et al., 2006; Spinrad et al., 2004) or teacher–student relationship quality (Garner & Mahatmya, 2015; Jerome, Hamre, & Pianta, 2009; Spilt, Hughes, Wu, & Kwok, 2012). Moreover, we controlled for peer nomination scores of peer acceptance in the fall semester (we did not have a teacher–child relationship measure in fall). In addition, we controlled for the percent of observations in classrooms versus other school settings to account for possible differences in emotion expression by school context.<sup>1</sup>

## Method

### Participants

Participants were kindergarteners ( $N = 301$ , 52% girls,  $M_{\text{age}} = 5.48$  years,  $SD_{\text{age}} = 0.35$  years) from five schools in a southwestern metropolitan area. Children were recruited at the beginning of the school year and two cohorts ( $n = 178$  and 123) participated one year apart. Participating children were from various ethnic backgrounds (52.82% Hispanic, 34.22% White, 2.66% Asian, 1.99% American Indian/Alaska Native backgrounds, 1.99% Black, .67% other, and 5.65% unknown), as reflected by the region of the schools. Child participants had parents with varied education (30% of mothers and 39% of fathers earned a high school degree or less, 31% of mothers and 24% of fathers attended some college, and 39% of mothers and 37% of fathers graduated from college) and household income (an average between \$50,000 to \$69,999, ranging from less than \$9,999 to more than \$100,000).

### Procedure

Data in this report included actual observations of children’s anger and positive emotion at school, teachers’ ratings of children’s peer and teacher–student relationship quality, and peers’ ratings of peer acceptance. Teachers received questionnaires for each participating child during the spring semester. Thirty-two out of 34 teachers (94%) participated and answered questionnaires for 287 out of 301 (95%) of children regarding teacher–student closeness, teacher–student conflict, peer acceptance, and peer rejection. Observers rated children’s positive and anger emotions in school exhibited in the fall semester. Research assistants collected information on peer acceptance in the fall and spring. Teachers were paid \$15 for each survey, and children received two small toys for their participation.

---

<sup>1</sup>We tested whether there were differences in the predictions by emotion intensity displayed in the classroom compared to non-classroom settings but found that the pattern of predictions was the same for emotions expressed in either context.

## Measures

**Peer acceptance and rejection**—In the second half of the spring semester, participating children were asked to name three children in their class they played with the most. Nominations were scored based on order selected (3 = *first*, 2 = *second*, 1 = *third*, 0 = *no nomination*). Scores were summed, divided by the number of raters ( $M = 10.64$  raters per child), and standardized within class. A higher score on this composite represents being nominated more as a playmate and is a measure of social preference among peers (Dougherty, 2006). Previous studies have established the stability, predictive validity, and reliability of similar measures (e.g., Boulton & Smith, 1994; Ladd et al., 1999; Maszk et al., 1999). Peer nomination scores were also assessed in the fall semester using the same procedures and were included as a control variable in analyses. Peer nominations in the fall and spring semesters were correlated ( $r = .53, p < .001$ ).

In late spring, teachers also reported on children's peer acceptance (8 items; e.g., "This child has a lot of friends at school,"  $\alpha = .93$ ) and rejection (4 items; e.g., "This child is picked on by other children,"  $\alpha = .65$ ), using the MacArthur Health and Behavior Questionnaire Social Functioning Scales (Armstrong & Goldstein, 2003). Similar measures have been used in previous studies of elementary school children, showing adequate psychometric properties, reliability over time, and predictive validity (e.g., Obradovi, 2010). The items were rated on a 4-point Likert-type scale (1 = *not at all like*, 4 = *very much like*).

**Teacher–student relationship quality**—In the spring semester, teachers rated (1 = *definitely does not apply*, 5 = *definitely applies*) their level of closeness (8 items, e.g., "I share an affectionate, warm relationship with this child,"  $\alpha = .81$ ) and conflict with students (7 items, e.g., "This child and I always seem to be struggling with each other",  $\alpha = .90$ ; Pianta, Steinberg, & Rollins, 1995). This measure has been used in previous studies of preschool or elementary school children, showing strong psychometric properties (Birch & Ladd, 1997; Hamre & Pianta, 2001; Portilla et al., 2014) and stability over time (Jerome et al., 2009).

**Frequency and intensity of positive and anger expressivity**—Observers ( $n_{\text{total}} = 34$ ;  $n_{\text{female}} = 24$ ) scored children's positive and anger emotions at school in the fall semester, two to three times a week, for approximately 9 to 12 weeks. Each child was observed by two or three different coders during various times during the school day (e.g. classroom, art lab, music lab, library class, lunch/recess). Observers had a list and corresponding picture collage of participants for each class and rated (0 = *no evidence*; 3 = *strong evidence*) children's positive and anger emotion after observing for 30 s, one child at a time (generally, each child was not coded again until the entire list of children, if present, was coded;  $M_{\text{time-coded}} = 64$  min, range: 16-133 min). Positive emotion refers to expressions of happiness, joy, excitement, amusement, pride, positive anticipation, and awe [not differentiating among these emotions], as demonstrated by smiles, cheeks raised, eyes squinted in an intense smile or wide and bright when excited or joyful, jumping up and down, and chest and head up and upbeat tone and/or laughter. Expressions of anger and frustration included pursed or pressed lips, wide eyes with a "hard" stare, furrowed brows and/or forehead, behaviors such as emotionally knocking things, vocal tone and content



(e.g., loud, harsh/cutting, short/sharp intonation), vocalizations (e.g., screaming in anger, grunting, fast and sharp sighs), and posture (e.g., shoulders and chest square and tall, arms stiff in a low V, fists curled).

Prior to observing child interactions in participating schools, observers received several weeks of training, which included rating child interactions in pre-coded videos and/or in pilot preschool settings. Bi-weekly checks were made for agreement with the coding supervisor. Reliability ratings were obtained from a set of pre-coded videos (which were used for reliability purposes starting in the second year of the study for the second group of children in the same schools) and, in both years, randomly selected live observations, rated by a second observer (Total<sub>time</sub> = 1,907 min, i.e. 3,814 observations) in the fall (intraclass  $r = .96$  [positive emotion] and  $.88$  [anger]).

For each child, emotional frequency was operationalized as the number of instances each emotion occurred (a score of at least 1) divided by the total number of observations per child ( $M_{\text{positive-frequency}} = .41$ , range:  $.12-.78$ ;  $M_{\text{anger-frequency}} = .02$ , range:  $.00-.15$ ). To assess emotion intensity, observers' codes for a given child were averaged across all observations for each emotion with a score  $\geq 1$ —that is, when some emotion was observed ( $M_{\text{positive-intensity}} = 2.25$ ;  $M_{\text{anger-intensity}} = 1.64$ ).<sup>2</sup>

Measures of observed emotion frequency and/or intensity have been used in previous research, showing predictive validity of emotion frequency for social competence and adjustment (e.g., Denham et al., 1990; Dougherty, 2006; Fabes et al., 2002; Hernández et al., 2015; Shin et al., 2011). For example, positive emotion frequency was related to social competence (Denham et al., 1990; Dougherty, 2006; Shin et al., 2011), as was negative or anger emotion frequency (Denham et al., 1990; Dougherty, 2006; Shin et al., 2011).

**Covariates**—Age, ethnic minority status (1 = *minority*, 0 = *white, non-Hispanic*), sex (1 = *boy*, 0 = *girl*), SES (composite of standardized family income and the average of parents' education [standardized]), and the percent of observations in classrooms versus other school settings (number of observations in class divided by the total number of observations) were used as covariates.

## Results

### Intercorrelations Among Study Variables

Table 1 provides the intercorrelations among variables along with means and standard deviations for the measures used in the study. Peers' and teachers' reports of acceptance were negatively correlated with teacher-reported peer rejection and teacher–student conflict and positively correlated with teacher–student closeness (Table 1). Teacher-reported peer rejection was negatively correlated with teacher–student closeness and positively correlated with teacher–student conflict. Teacher–student closeness and conflict were inversely

<sup>2</sup>Observations were also assessed in the spring semester but only fall semester scores were used in the present study. Between the fall and spring semesters, positive emotion frequency ( $r = .62, p < .001$ ), positive emotion intensity ( $r = .67, p < .001$ ), anger emotion frequency ( $r = .36, p < .001$ ), and anger emotion intensity ( $r = .14, p < .10$ ) were correlated, showing some measure stability. Given potential changes in expressivity between spring and fall, it is not surprising that some findings for intensity were weak.

correlated. Positive emotion frequency (but not intensity) was significantly and positively correlated with teacher- and peer-reported peer acceptance and negatively correlated with peer rejection. Anger frequency was negatively correlated with teacher-reported peer acceptance and positively correlated with teacher–student conflict. Furthermore, anger intensity was near significantly, positively correlated with teacher–student conflict.

### **Preliminary Analyses: Confirmatory Factor Analyses (CFA)**

Before testing our proposed models, we evaluated the measurement properties of our study variables in a structural equation modeling (SEM) framework using *Mplus* (Muthén & Muthén, 1998-2014). Model fit was considered good (acceptable) if the comparative fit index (CFI) was close to or above .95 (at least .90) and the root mean square error of approximation (RMSEA) was less than .06 (less than .08) (Hu & Bentler, 1999). We used the ‘Type = Complex’ analysis command to account for the non-independence of observations due to clustering of data by classroom (Muthén & Muthén, 1998-2014). We also used full information maximum likelihood estimation with robust standard errors (MLR), to account for missing data and estimate standard errors that are robust to non-independence of observations when using ‘Type = Complex’ analyses (Muthén & Muthén, 1998-2014). We first identified a measurement model that examined the degree to which each manifest variable loaded on the appropriate latent factor.

The CFA for the four social relationship latent variables (i.e., peer acceptance, teacher-reported peer rejection, teacher–student closeness, and teacher–student conflict) showed acceptable fit to the data: MLR  $\chi^2(50) = 65.93, p > .05$ , CFI = .98, RMSEA = .03. Peer acceptance was composed of two indicators, peer nominations of play and teacher-reported peer acceptance scale ( $r = .33, p < .001$ ), and had significant standardized factor loadings (.33 and .96, respectively). Peer rejection, composed of the four teacher-reported items as indicators, also had significant standardized factor loadings (all  $> .46$ ). Teacher–student closeness and conflict items were each converted into three parcels (Little, Rhemtulla, Gibson, & Schoemann, 2013; Yang, Nay, & Hoyle, 2010) by randomly assigning items to create indicators (after reversing items as appropriate) for the two teacher–student relationship quality latent factors, with acceptable standardized factor loadings for teacher closeness (.68-.86) and teacher–student conflict (.80-.92). In the latent CFA, peer acceptance (composed of teacher- and peer-reported measures) was negatively correlated with teacher-rated peer rejection ( $r = -.57, p < .001$ ) and teacher–student conflict ( $r = -.66, p < .001$ ), and positively correlated with teacher–student closeness ( $r = .56, p < .001$ ). Teacher-reported peer rejection was negatively correlated with teacher–student closeness ( $r = -.26, p < .01$ ) and positively correlated with teacher–student conflict ( $r = .32, p < .05$ ). Teacher–student closeness was negatively correlated with teacher–student conflict ( $r = -.41, p < .001$ ).

### **Structural Models**

Models were tested within an SEM framework using MLR estimation in *Mplus* (Muthén & Muthén, 1998-2014) using the latent constructs in the CFA and the ‘Type = Complex’ command. Standardized coefficients are reported. Covariates were correlated with one another and with all other predictors; also, paths from the covariates to the outcomes were estimated. Additionally, fall peer nomination scores were used as a predictor of spring peer

nomination scores to reflect rank-order changes in peer acceptance. Given that more than half of participants were of Hispanic heritage, we tried replacing the ethnic minority status covariate with an ethnicity variable based on Hispanic heritage (1 = *Hispanic*, 0 = *non-Hispanic*) but the results remained the same and thus, we kept ethnic minority status as a covariate instead. Furthermore, cohort did not relate to the outcome study variables and thus, we analyzed the models with all participants in one group.

### Positive Emotion Frequency, Intensity, and Social Relationships in School

We first tested a model examining whether positive emotion frequency and intensity uniquely predicted peer acceptance, peer rejection, teacher–student closeness, and teacher–student conflict (Figure 1). This model showed adequate fit: MLR  $\chi^2$  (125) = 189.46,  $p < .001$ , CFI = .95, RMSEA = .04. Positive emotion frequency, but not intensity, was positively related to peer acceptance ( $b = .15$ ,  $p < .01$  [controlling for earlier levels of peer acceptance]) and negatively related to rejection ( $b = -.15$ ,  $p < .01$ ); neither positive frequency nor intensity predicted teacher–student closeness or conflict.<sup>3</sup> In addition, although not shown in the figure, age was negatively associated with peer relationship conflict ( $b = -.15$ ,  $p < .001$ ) and boys and ethnic minority students had lower teacher–student closeness ( $bs = -.14$  and  $-.13$ ,  $p < .05$ ). Also, peer acceptance, rated by peers, in the fall predicted peer acceptance in the spring ( $b = .49$ ,  $p < .001$ ).

### Anger Emotion Frequency, Intensity, and Social Relationships in School

The model testing whether anger emotion frequency and intensity predicted acceptance, peer rejection, teacher–student closeness, and teacher–student conflict fit adequately (Figure 2): MLR  $\chi^2$  (125) = 186.03,  $p < .001$ , CFI = .95, RMSEA = .04. Anger frequency negatively predicted peer acceptance ( $b = -.16$ ,  $p < .05$  [controlling for earlier levels of peer acceptance]) and positively predicted teacher–student conflict ( $b = .28$ ,  $p < .001$ ). Also, anger intensity was uniquely and negatively related to teacher–student closeness ( $b = -.13$ ,  $p < .05$ ) and positively related to teacher–student conflict ( $b = .13$ ,  $p < .05$ ). The covariates in this model predicted the same variables as those in the first model.

## Discussion

Using a short-term longitudinal design, the present study tested whether the frequency and intensity of positive emotion and anger predicted subsequent social relationships in kindergarten. Previous research has rarely distinguished emotion frequency from intensity or examined how they relate separately to different domains of social adjustment. Overall, the findings support the need to consider the nuances of observed emotion in school and their social correlates because frequency and intensity provide some non-overlapping prediction of children's relationships at school. Furthermore, although positive and negative emotions, in general, are independent constructs, positive and anger intensity were positively correlated, similar to what Diener et al. (1985) found among adults.

---

<sup>3</sup>We tested whether positive emotion intensity had a curvilinear effect on the outcomes of interest. However, positive emotion intensity did not have a significant curvilinear effect.

Frequency and intensity of positive emotion were positively related in zero-order correlations. However, only positive emotion frequency assessed in the fall was uniquely positively associated with peer acceptance (controlling for earlier levels of peer acceptance) and negatively associated with peer rejection in the spring; these relations for frequency are consistent with other studies of preschoolers examining general positive emotion (Denham et al., 1990; Shin et al., 2011). We note that in zero-order correlations, positive emotion intensity was correlated with teacher-reported peer acceptance at a marginally significant level. However, positive emotion intensity was not correlated with either teacher–student closeness or conflict. This brings up a question about the nature of the relation between positive emotion intensity and peer or teacher–student relationship quality. One possibility is that positive emotion intensity is sometimes expressed in an unregulated manner, and is more often perceived as unregulated by teachers. In auxiliary analyses, we explored the possibility that positive emotional intensity expressed in the classroom may be most predictive of teacher–student closeness or conflict, compared to positive emotional intensity expressed in other settings, such as recess. However, separately examining the context in which positive emotion intensity was expressed did not yield differential or unique prediction to teacher–student closeness or conflict; that is, the relations continued to be nonsignificant. Future research could explore a finer analysis of which types of positive emotion intensity were expressed during teacher or peer interactions.

Positive emotion has rarely been included in studies of children’s emotion and school adjustment, and our results suggest that frequency of positive emotion, but not intensity, is predictive of aspects of peer acceptance. Expressing frequent positive emotions in school may evoke positive responses from others or may facilitate enacting prosocial behaviors with peers, which has positive implications for continued social development, particularly for younger children (Juvonen, 2006; Wentzel & Watkins, 2002). Perhaps positive emotion intensity did not predict peer relationship acceptance because it is sometimes (but likely not always) associated with impulsive and unregulated behavior detrimental to positive peer relationships (Kim et al., 2007; Putnam, 2012). In future research, investigators might identify whether there are specific classroom or school conditions in which positive emotion relates to the development of social relationships in school. For example, positive emotion expression and related temperamental dispositions may be less predictive of positive peer and teacher–student relationships in classroom environments characterized by high instructional support (Curby, Rudasill, Edwards, & Pérez-Edgar, 2011). Furthermore, we did not distinguish different types of positive emotion (e.g., awe, amusement, contentment), which might differ in their relations to teacher–student relationship quality and peer acceptance. It is possible, for instance, that some positive emotion expressions are more or less likely to promote peer or teacher–student relationship quality.

Anger frequency predicted lower peer acceptance but anger intensity did not predict peer acceptance or rejection, similar to the null findings on observed negative emotion intensity reported by Fabes et al. (2002) in one respect. However, researchers have found that negative emotion (including anger) reported by parents or teachers is negatively associated with peer liking (e.g., Denham et al., 1990; Fabes et al., 2002; Maszk et al., 1999). Thus, it appears that findings for anger may vary as a function of method (parent/teacher report vs naturalistic observations) of assessing children’s anger emotions. Perhaps teachers’ and

parents' ratings of anger disproportionately reflect anger associated with aggression and other unregulated behaviors rather than anger used appropriately or frustration in the school context. That is, anger could serve an instrumental role in peer interactions in some circumstances.

It is possible that observations of anger at school, often with peers, were not consistently associated with peer rejection (anger frequency only predicted lower peer acceptance) because anger can sometimes be an expression of dominance by well-liked children or children with controversial social status (i.e., children liked by some peers and disliked by others; Ladd, 2005). In fact, aggressive tendencies have sometimes been associated with high peer status (Bukowski, Gauze, Hoza, & Newcomb, 1993). Thus, anger frequency and intensity may not have predicted peer rejection because of the diverse contexts in which anger was expressed at school. For example, anger in response to defending a peer or thwarting an intruder to a group activity may not relate to peer rejection but other types of anger might relate. In future research, it might be useful to examine anger emotion in different peer contexts, such as reacting to unpleasant peer interactions, as well as to assess the types of anger that predominate in both observed anger and adults' ratings of children's anger.

Anger frequency and intensity both positively and uniquely predicted teacher–student conflict; in addition, anger intensity predicted lower teacher–student closeness. Thus, prediction of teacher–student closeness was greater if both facets of anger were considered. We speculate that anger frequency is symptomatic of more common unpleasant interactions whereas anger intensity may be a sign of aggression/hostility and that both undermine the teacher–student relationship (particularly promoting teacher–student conflict). Also, in our study, children expressed anger less frequently than positive emotion; thus, anger may be seen as less normative and, hence, when present may be salient to teachers. Teachers may be especially attuned to children's negative emotions, especially anger (Eisenberg et al., 1993; Houts, Caspi, Pianta, Arseneault, & Moffitt, 2010), similar to other studies showing that antisocial, but not prosocial, behavioral styles predicted teacher–student relationship quality (high closeness, low conflict; Ladd et al., 1999). The findings on anger frequency and intensity predicting greater social relationship difficulties highlight the importance of identifying children who are prone to express anger at school and intervening early on in their schooling trajectories. However, teachers' expectations about children's behavior and emotional expressions likely vary across teachers. In the future, researchers could examine variation in classroom climate and teachers' expectations as possible moderators of the association of children's emotion expressions with teacher–student relationship quality.

Although anger frequency predicted peer acceptance, it did not predict teacher–student closeness. Moreover, only anger intensity inversely predicted teacher–student closeness. Although they both reflect positive social relationships, teacher–student closeness and peer acceptance reflect different aspects of social competence. Peer acceptance included items reported by teachers but also social status nominations among peers. The nominations scores, combined with the peer acceptance scale reported by teachers, reflected social status among peers. One reason why anger frequency may have predicted peer acceptance but not teacher–student closeness is that peer acceptance reflected social status but teacher–student

closeness was rather about the affective relationship between teacher and student. Furthermore, emotion expression may be less associated with teacher–student closeness because other factors, such as teacher characteristics unaccounted for in this study, may also be critical for developing a close relationship with teachers (de Jong et al., 2014; Jerome et al., 2009). Alternatively, anger and frustration in the classroom context may sometimes reflect approach motivation during academic-related tasks (He, Xu, & Degnan, 2012), indicating academic persistence that might be favorable to teacher–student relationship quality.

Given the importance of teacher–student relationship quality for academic development (Baker, 2006; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004), the aforementioned findings have implications for prevention and intervention efforts in the early school years. Specifically, identifying and addressing children’s anger emotion frequency and intensity may encourage teacher–student relationship closeness and reduce the likelihood of teacher–student conflict, ultimately fostering children’s adjustment. Additionally, promoting opportunities for positive emotion may help children to develop positive relationships with peers in kindergarten. Emerging research on emotion scaffolding between teachers and students provides one avenue for fostering the experience of positive emotions in the classroom and with peers in school (Meyer & Turner, 2007). Initiatives to improve classroom cohesion might also support children’s emotion regulation and, in turn, reduce the frequency of negative expressivity and intense dysregulated emotional displays (Hagelskamp, Brackett, Rivers, & Salovey, 2013).

Strengths of this study include extensive use of observational measures, as well as the use of multiple methods and reporters. Furthermore, measures of social relationships were assessed months after the observations of emotion and we also controlled for earlier levels of peer acceptance. Distinguishing emotion frequency from intensity using observational measures is also a relatively new method that yielded novel results with implications for assessing emotional expression categories. Observational measures of emotional expression may be more effective at differentiating between frequency and intensity. Nonetheless, future research should refine the methods of assessing emotional intensity and frequency in naturalistic settings, perhaps with use of daily diary reports probing emotional intensity in older children. Study limitations include the inability to examine possible bidirectional associations between emotional expression and relationship quality in school. It is quite possible that the quality of children’s social relationships at school affect both the intensity and frequency of their expressed emotions (Reavis, Donohue, & Upchurch, 2015). In addition, longitudinal research on the relations of emotional intensity and frequency to the quality of social relationships would clarify the generalizability of our results at different age ranges and during school transitions. Despite these limitations, our results support the view that it is useful to examine both intensity and frequency of positive emotions and anger when examining young children’s social functioning.

## Acknowledgments

Research reported in this publication was supported by the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health under Award Number R01HD068522, awarded to Nancy Eisenberg and Carlos Valiente. The content is solely the responsibility of the authors and does not

necessarily represent the official views of the National Institutes of Health. We thank the participating families, schools, staff, and research assistants who took part in this study.

## References

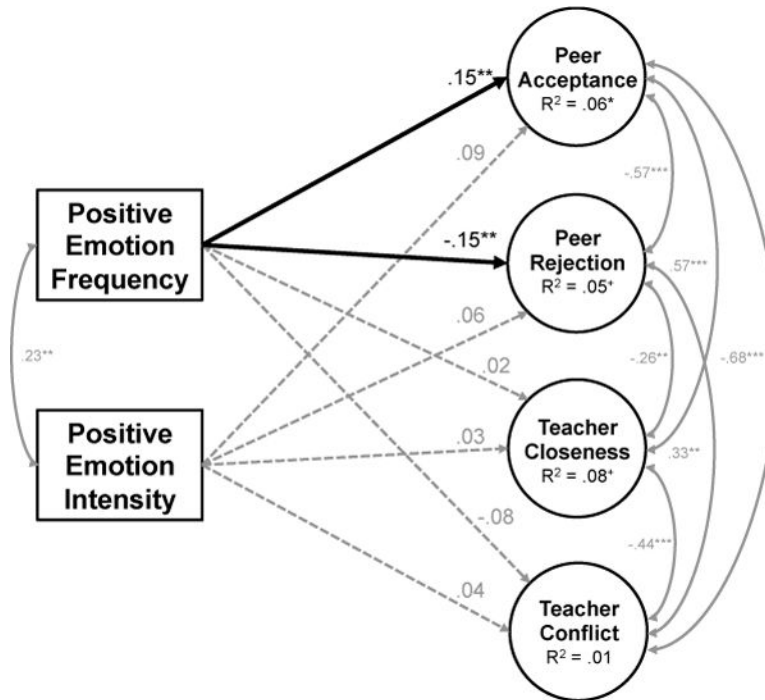
- Armstrong, JM., Goldstein, LH. Manual for the MacArthur health and behavior questionnaire (HBQ 1.0). University of Pittsburgh MacArthur Foundation Research Network on Psychopathology and Development; 2003.
- Baker JA. Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology*. 2006; 44:211–229. DOI: 10.1016/j.jsp.2006.02.002
- Birch SH, Ladd GW. The teacher–child relationship and children’s early school adjustment. *Journal of School Psychology*. 1997; 35:61–79. DOI: 10.1016/S0022-4405(96)00029-5
- Boulton MJ, Smith PK. Bully/victim problems in middle-school children: Stability, self-perceived competence, peer perceptions and peer acceptance. *British Journal of Developmental Psychology*. 1994; 12:315–329. DOI: 10.1111/j.2044-835X.1994.tb00637.x
- Buhs ES, Ladd GW. Peer rejection as an antecedent of young children’s school adjustment: An examination of mediating processes. *Developmental Psychology*. 2001; 37:550–560. DOI: 10.1037/0012-1649.37.4.550 [PubMed: 11444490]
- Bukowski WM, Gauze C, Hoza B, Newcomb AF. Differences and consistency between same-sex and other-sex peer relationships during early adolescence. *Developmental Psychology*. 1993; 29:255–263. DOI: 10.1037/0012-1649.29.2.255
- Bulotsky-Shearer RJ, Dominguez X, Bell ER, Rouse HL, Fantuzzo JW. Relations between behavior problems in classroom social and learning situations and peer social competence in Head Start and kindergarten. *Journal of Emotional and Behavioral Disorders*. 2010; 18:195–210. DOI: 10.1177/1063426609351172
- Coplan, RJ., Bullock, A. Temperament and peer relationships. In: Zentner, M., Shiner, RL., editors. *Handbook of temperament*. New York: Guilford Press; 2012. p. 442-461.
- Curby TW, Rudasill KM, Edwards T, Pérez-Edgar K. The role of classroom quality in ameliorating the academic and social risks associated with difficult temperament. *School Psychology Quarterly*. 2011; 26:175–188. DOI: 10.1037/a0023042
- de Jong R, Mainhard T, van Tartwijk J, Veldman I, Verloop N, Wubbels T. How pre-service teachers’ personality traits, self-efficacy, and discipline strategies contribute to the teacher-student relationship. *British Journal of Educational Psychology*. 2014; 84:294–310. DOI: 10.1111/bjep.12025 [PubMed: 24829122]
- Denham SA, McKinley M, Couchoud EA, Holt R. Emotional and behavioral predictors of preschool peer ratings. *Child Development*. 1990; 61:1145–1152. DOI: 10.1111/1467-8624.ep9102040970 [PubMed: 2209184]
- Diener E, Larsen RJ, Levine S, Emmons RA. Intensity and frequency: Dimensions underlying positive and negative affect. *Journal of Personality and Social Psychology*. 1985; 48:1253–1265. DOI: 10.1037/0022-3514.48.5.1253 [PubMed: 3998989]
- Doughtery LR. Children’s emotionality and social status: A meta-analytic review. *Social Development*. 2006; 15:394–417. DOI: 10.1111/j.1467-9507.2006.00348.x
- Eisenberg N, Fabes RA, Bernzweig J, Karbon M, Poulin R, Hanish L. The relations of emotionality and regulation to preschoolers’ social skills and sociometric status. *Child Development*. 1993; 64:1418–1438. DOI: 10.1111/j.1467-8624.1993.tb02961.x [PubMed: 8222881]
- Eisenberg N, Fabes RA, Guthrie IK, Murphy BC, Maszk P, Holmgren R, Suh K. The relations of regulation and emotionality to problem behavior in elementary school children. *Development and Psychopathology*. 1996; 8:141–162. DOI: 10.1017/S095457940000701X
- Eisenberg N, Fabes RA, Murphy BC, Shepard S, Guthrie IK, Mazsk P, Jones S. Prediction of elementary school children’s socially appropriate and problem behavior from anger reactions at age 4–6 years. *Journal of Applied Developmental Psychology*. 1999; 20:119–142. DOI: 10.1016/S0193-3973(99)80007-0

- Eisenberg N, Fabes RA, Nyman M, Bernzweig J, Pinuelas A. The relations of emotionality and regulation to children's anger-related reactions. *Child Development*. 1994; 65:109–128. DOI: 10.1111/j.1467-8624.1994.tb00738.x [PubMed: 8131642]
- Eisenberg N, Guthrie IK, Fabes RA, Reiser M, Murphy BC, Holgren R, Losoya S. The relations of regulation and emotionality to resiliency and competent social functioning in elementary school children. *Child Development*. 1997; 68:295–311. DOI: 10.1111/j.1467-8624.1997.tb01941.x [PubMed: 9180003]
- Fabes RA, Hanish LD, Martin CL, Eisenberg N. Young children's negative emotionality and social isolation: A latent growth curve analysis. *Merrill-Palmer Quarterly*. 2002; 48:284–307. DOI: 10.1353/mpq.2002.0012
- Fredrickson BL. The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*. 2001; 56:218–226. DOI: 10.1037//0003-066X.56.3.218 [PubMed: 11315248]
- Garner PW, Mahatmya D. Affective social competence and teacher-child relationship quality: Race/ethnicity and family income level as moderators. *Social Development*. 2015; 24:678–697. DOI: 10.1111/sode.12114
- Hagelskamp C, Brackett MA, Rivers SE, Salovey P. Improving classroom quality with the RULER approach to social and emotional learning: Proximal and distal outcomes. *American Journal of Community Psychology*. 2013; 51:530–543. DOI: 10.1007/s10464-013-9570-x [PubMed: 23444004]
- Halberstadt AG, Cassidy J, Stifter CA, Parke RD, Fox NA. Self-expressiveness within the family context: Psychometric support for a new measure. *Psychological Assessment*. 1995; 7:93–103. DOI: 10.1037/1040-3590.7.1.93
- Hamre BK, Pianta RC. Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*. 2001; 72:625–638. DOI: 10.1111/1467-8624.00301 [PubMed: 11333089]
- He J, Xu Q, Degnan KA. Anger expression and persistence in young children. *Social Development*. 2012; 21:343–353. DOI: 10.1111/j.1467-9507.2011.00622.x
- Hernández MM, Eisenberg N, Valiente C, Spinrad TL, VanSchyndel SK, Diaz A, Pina AA. Observed emotion frequency versus intensity as predictors of socioemotional maladjustment. *Emotion*. 2015; 15:699–704. DOI: 10.1037/emo0000099 [PubMed: 26214568]
- Houts RM, Caspi A, Pianta RC, Arseneault L, Moffitt TE. The challenging pupil in the classroom: The effect of the child on the teacher. *Psychological Science*. 2010; 21:1802–1810. DOI: 10.1177/0956797610388047 [PubMed: 21078897]
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*. 1999; 6:1–55. DOI: 10.1080/10705519909540118
- Jerome EM, Hamre BK, Pianta RC. Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. *Social Development*. 2009; 18:915–945. DOI: 10.1111/j.1467-9507.2008.00508.x [PubMed: 24991084]
- Juvonen, J. Sense of belonging, social bonds, and school functioning. In: Alexander, PA., Winne, PH., editors. *Handbook of educational psychology*. 2nd. Mahwah, NJ: Erlbaum; 2006. p. 655-674.
- Kim G, Walden T, Harris V, Karrass J, Catron T. Positive emotion, negative emotion, and emotion control in the externalizing problems of school-aged children. *Child Psychiatry and Human Development*. 2007; 37:221–239. DOI: 10.1007/s10578-006-0031-8 [PubMed: 17001525]
- Ladd, GW. *Children's peer relations and social competence: A century of progress*. New Haven, CT: Yale University Press; 2005.
- Ladd GW, Birch SH, Buhs ES. Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child Development*. 1999; 70:1373–1400. DOI: 10.1111/1467-8624.00101 [PubMed: 10621962]
- Little TD, Rhemtulla M, Gibson K, Schoemann AM. Why the items versus parcels controversy needn't be one. *Psychological Methods*. 2013; 18:285–300. DOI: 10.1037/a0033266 [PubMed: 23834418]

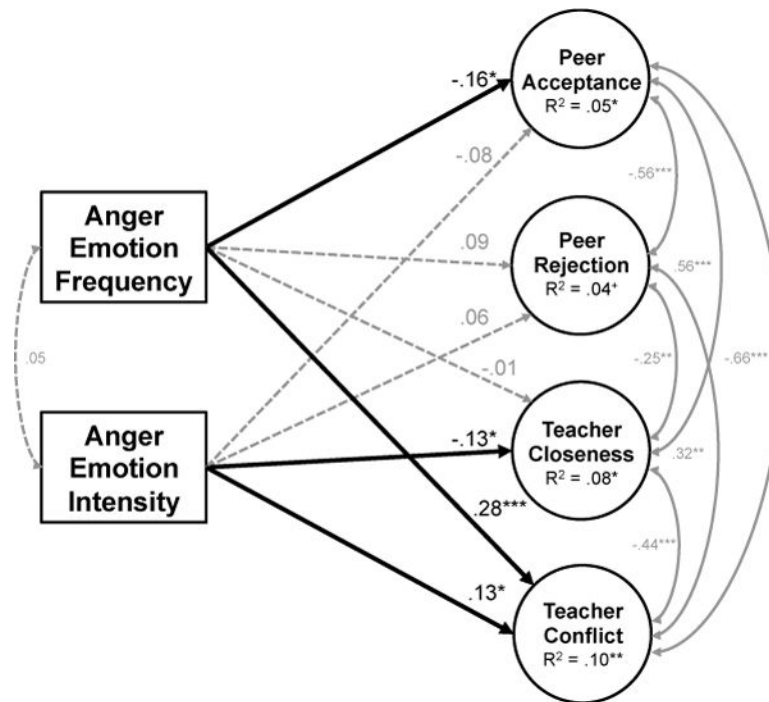


- Lyubomirsky S, King L, Diener E. The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*. 2005; 131:803–855. DOI: 10.1037/0033-2909.131.6.803 [PubMed: 16351326]
- Maldonado-Carreño C, Votruba-Drzal E. Teacher-child relationships and the development of academic and behavioral skills during elementary school: A within- and between-child analysis. *Child Development*. 2011; 82:601–616. DOI: 10.1111/j.1467-8624.2010.01533.x [PubMed: 21410918]
- Maszk P, Eisenberg N, Guthrie IK. Relations of children's social status to their emotionality and regulation: A short-term longitudinal study. *Merrill-Palmer Quarterly*. 1999; 45:468–492.
- Meyer, DK., Turner, LC. Scaffolding emotions in classrooms. In: Schutz, PA., Pekrun, R., editors. *Emotion in education*. San Diego, CA: Academic Press; 2007. p. 243-258.
- Muthén, LK., Muthén, BO. *Mplus User's Guide*. 6th. Los Angeles, CA: Muthén & Muthén; 1998–2014.
- Obradovi J. Effortful control and adaptive functioning of homeless children: Variable- and person-focused analyses. *Journal of Applied Developmental Psychology*. 2010; 31:109–117. DOI: 10.1016/j.appdev.2009.09.004 [PubMed: 20401161]
- Pekrun, R., Linnenbrink-Garcia, L. *International handbook of emotions in education*. New York, NY: Routledge; 2014.
- Pianta RC, Steinberg MS, Rollins KB. The first two years of school: Teacher-child relationships and deflections in children's classroom adjustment. *Development and Psychopathology*. 1995; 7:295–312. DOI: 10.1017/S0954579400006519
- Pianta RC, Stuhlman MW. Teacher-child relationships and children's success in the first years of school. *School Psychology Review*. 2004; 33:444–458.
- Portilla XA, Ballard PJ, Adler NE, Boyce WT, Obradovi J. An integrative view of school functioning: Transactions between self-regulation, school engagement, and teacher-child relationship quality. *Child Development*. 2014; 85:1915–1931. DOI: 10.1111/cdev.12259 [PubMed: 24916608]
- Prescott, DA. *Emotion and the educative process*. Washington, DC: American Council on Education; 1938.
- Putnam, SP. Positive emotionality. In: Zentner, M., Shiner, RL., editors. *Handbook of temperament*. New York: Guilford Press; 2012. p. 105-123.
- Reavis RD, Donohue LJ, Upchurch MC. Friendship, negative peer experiences, and daily positive and negative mood. *Social Development*. 2015; 24:833–851. DOI: 10.1111/sode.12123
- Reschly AL, Huebner ES, Appleton JJ, Antaramian S. Engagement as flourishing: The contribution of positive emotions and coping to adolescents' engagement at school and with learning. *Psychology in the Schools*. 2008; 45:419–431. DOI: 10.1002/pits.20306
- Rubin, KH., Bukowski, WM., Parker, JG. Peer interactions, relationships, and groups. In: Eisenberg, N., Damon, W., Lerner, RM., editors. *Handbook of child psychology: Vol.3, Social, emotional, and personality development*. 6th. Hoboken, NJ: John Wiley & Sons Inc; 2006. p. 571-645.
- Sallquist JV, Eisenberg N, Spinrad TL, Reiser M, Hofer C, Zhou Q, Eggum N. Positive and negative emotionality: Trajectories across six years and relations with social competence. *Emotion*. 2009; 9:15–28. DOI: 10.1037/a0013970 [PubMed: 19186913]
- Schultz D, Izard CE, Stapleton LM, Buckingham-Howes S, Bear GA. Children's social status as a function of emotionality and attention control. *Journal of Applied Developmental Psychology*. 2009; 30:169–181. DOI: 10.1016/j.appdev.2008.12.002
- Shin N, Vaughn BE, Akers V, Kim M, Stevens S, Krzysik L, Korth B. Are happy children socially successful? Testing a central premise of positive psychology in a sample of preschool children. *The Journal of Positive Psychology*. 2011; 6:355–367. DOI: 10.1080/17439760.2011.584549
- Silva KM, Spinrad TL, Eisenberg N, Sulik MJ, Valiente C, Huerta S, School Readiness Consortium. Relations of children's effortful control and teacher-child relationship quality to school attitudes in a low-income sample. *Early Education and Development*. 2011; 22:434–460. DOI: 10.1080/10409289.2011.578046 [PubMed: 22573932]
- Spilt JL, Hughes JN, Wu JY, Kwok OM. Dynamics of teacher-student relationships: Stability and change across elementary school and the influence on children's academic success. *Child Development*. 2012; 83:1180–1195. DOI: 10.1111/j.1467-8624.2012.01761.x [PubMed: 22497209]

- Spinrad TL, Eisenberg N, Harris E, Hanish L, Fabes RA, Kupanoff K, Holmes J. The relation of children's everyday nonsocial peer play behavior to their emotionality, regulation, and social functioning. *Developmental Psychology*. 2004; 40:67–80. DOI: 10.1037/0012-1649.40.1.67 [PubMed: 14700465]
- Stifter CA, Putnam S, Jahromi L. Exuberant and inhibited toddlers: Stability of temperament and risk for problem behavior. *Development and Psychopathology*. 2008; 20:401–421. DOI: 10.1017/S0954579408000199 [PubMed: 18423086]
- Strand PS, Barbosa-Leiker C, Arellano Piedra M, Downs A. Exploring the bidirectionality of emotion understanding and classroom behavior with Spanish- and English-speaking preschoolers attending Head Start. *Social Development*. 2015; 24:579–600. DOI: 10.1111/sode.12111
- Valiente C, Eisenberg N, Spinrad TL, Haugen R, Thompson MS, Kupfer A. Effortful control and impulsivity as concurrent and longitudinal predictors of academic achievement. *The Journal of Early Adolescence*. 2013; 33:946–972. DOI: 10.1177/0272431613477239
- Valiente C, Swanson J, Eisenberg N. Linking students' emotions and academic achievement: When and why emotions matter. *Child Development Perspectives*. 2012; 6:129–135. DOI: 10.1111/j.1750-8606.2011.00192.x [PubMed: 23115577]
- Valiente C, Swanson J, Lemery-Chalfant K. Kindergartners' temperament, classroom engagement, and student-teacher relationship: Moderation by effortful control. *Social Development*. 2012; 21:558–576. DOI: 10.1111/j.1467-9507.2011.00640.x
- Wentzel KR, Watkins DE. Peer relationships and collaborative learning as contexts for academic enablers. *School Psychology Review*. 2002; 31:366–377.
- Yang C, Nay S, Hoyle RH. Three approaches to using lengthy ordinal scales in structural equation models: Parceling, latent scoring, and shortening scales. *Applied Psychological Measurement*. 2010; 34:122–142. DOI: 10.1177/0146621609338592 [PubMed: 20514149]
- Yee, CI., Gonzaga, GC., Gable, SL. Positive emotions in close relationships. In: Tugade, MM, Shiota, MN., Kirby, LD., editors. *Handbook of positive emotions*. New York, NY: Guilford Press; 2014. p. 215-258.



**Figure 1.** SEM of positive emotion frequency and intensity predicting the peer (i.e., peer acceptance and rejection) and teacher–student (i.e., teacher–student closeness and conflict) relationship, MLR  $\chi^2(125) = 189.46, p < .001, CFI = .95, RMSEA = .04$ . Standardized coefficients are presented. Dashed lines represent non-significant coefficients. Covariates include age, ethnic minority, sex, SES, and percent of classroom observations.  $^+p < .10. *p < .05. **p < .01. ***p < .001$ .



**Figure 2.** SEM of anger frequency and intensity predicting the peer (i.e., peer acceptance and rejection) and teacher–student (i.e., teacher–student closeness and conflict) relationship. Standardized coefficients are presented. Dashed lines represent non-significant coefficients. Covariates include age, ethnic minority, sex, SES, and percent of classroom observations. MLR  $\chi^2(125) = 186.03, p < .001, CFI = .95, RMSEA = .04.$  <sup>+</sup> $p < .10.$  \* $p < .05.$  \*\* $p < .01.$  \*\*\* $p < .001.$

Table 1

Intercorrelations among the study scales and variables ( $N = 301$ )

		Peer Relationship			Teacher-Student Relationship			Emotions in School							Covariates						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	M	SD				
<b>Peer Relationship</b>																					
1.	Peer acceptance (PR)	T2	-														0.01	0.96			
2.	Peer acceptance (TR)	T2	.33***	-													3.60	0.58			
3.	Peer rejection (TR)	T2	-.13*	-.47***	-												1.12	0.31			
<b>Teacher-Student Relationship</b>																					
4.	Teacher-student closeness (TR)	T2	.15**	.50***	-.20**	-											4.38	0.63			
5.	Teacher-student conflict (TR)	T2	-.17**	-.62***	.31***	-.36***	-										1.55	0.86			
<b>Emotions in School</b>																					
6.	Positive frequency (OR)	T1	.15*	.14*	-.17**	.01	-.04	-									0.41	0.11			
7.	Positive intensity (OR)	T1	.08	.11 <sup>+</sup>	-.02	-.01	.00	.23*	-								2.25	0.26			
8.	Anger frequency (OR)	T1	-.06	-.17**	.08	.02	.28***	-.01	-.08	-							0.02	0.02			
9.	Anger intensity (OR)	T1	-.10	-.10	.04	-.10	.14 <sup>+</sup>	.01	.33***	.04	-						1.64	0.54			
<b>Covariates</b>																					
10.	Peer acceptance (PR)	T1	.53***	.27***	-.16***	.12*	-.12*	.22***	.12*	-.02	-.11	-					0.05	0.97			
11.	SES	T1	.04	.06	-.06	-.02	-.05	-.09	-.02	.00	.10	-.04	-				-0.05	0.97			
12.	Age	T1	.14*	.06	-.11 <sup>+</sup>	.06	.04	.05	.04	-.03	-.05	.14*	-.10 <sup>+</sup>	-			5.48	0.35			
13.	Ethnic minority <sup>a</sup>	T1	.05	-.11 <sup>+</sup>	.07	-.08	-.01	.04	-.06	.03	.02	.02	-.34***	.10 <sup>+</sup>	-		0.64	0.48			
14.	Sex <sup>b</sup>	T1	.08	.04	-.03	-.10 <sup>+</sup>	.03	.07	-.03	-.03	-.06	.06	.11 <sup>+</sup>	.12*	-.07	-	0.49	0.50			

Note. PR = peer report, TR = teacher-report, OR = observer report, SES = socioeconomic status (family income and average parent education), T2 = spring assessment, T1 = fall assessment.

<sup>a</sup> Ethnic Minority (Minority = 1, white, non-Hispanic = 0).

<sup>b</sup> Sex (Boy = 1, Girl = 0). Zero-order correlations are based on observed variables.

<sup>+</sup>  $p < .10$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

!100' > d  
\*\*\*

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript