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## Context-Inappropriate Anger, Emotion Knowledge Deficits, and Negative Social Experiences in Preschool

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### Abstract

This study examined contextually-inappropriate (CI) anger in relation to emotion recognition and situation knowledge, negative social experiences, and externalizing behavior among low-income 4-year-olds attending Head Start ( $n=134$ ). Approximately one-quarter of children (23%) showed anger when presented with positive/neutral slides and videos (valence-incongruent CI anger), whereas 2/5 of children (40%) showed anger when presented with negative slides and videos (valence-congruent CI anger). Valence-incongruent CI anger was associated with lower emotion situation knowledge (for boys only), more self-reported peer rejection and loneliness, and greater negative nominations by teachers and peers. Both valence-incongruent and (for boys only) valence-congruent CI anger were positively associated with externalizing behavior. Overall, valence-incongruent CI anger was more strongly associated with negative child outcomes than valence-congruent CI anger.

### Keywords

preschoolers; emotion; context; anger; loneliness; social rejection; externalizing problems

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Aggressive children are more likely than others to experience social isolation, peer rejection, and victimization (e.g., Crick & Grotpeter, 1996; Monks, Ortega Ruiz, & Torrado Val, 2002). In turn, childhood aggression and negative social experiences increase vulnerability for later externalizing and delinquent behavior (Ialongo, Vaden-Kiernan, & Kellam, 1998; Kupersmidt, Burchinal, & Patterson, 1995). However, not all aggressive children experience these negative social outcomes (Coie, Terry, Lenox, Lochman, & Hyman, 1995; Haselager, Cillessen, Van Lieshout, Riksen-Walraven, & Hartup, 2002). Emotion regulation difficulties have been suggested as a mechanism that may help explain such variation (Coie, Dodge, Terry, & Wright, 1991; Coie et al., 1995), yet research in this area has yet to identify

specific emotion regulation patterns that may be particularly important for social problems. We posit that a particular type of emotion regulation pattern, specifically out-of-context anger displays, or what we term “context-inappropriate anger”, may place children at increased risk for peer interaction difficulties and negative behavioral outcomes.

Emotion regulation is clearly important for the development of prosocial behavior and overall social competence (Eisenberg et al., 1997; Fabes et al., 1999). A form of anger that may lead to negative social experiences and behavior problems may be showing anger in situations that do not normally provoke anger (context-inappropriate; CI). CI anger responses are those that we do not expect to occur in a given situation, based on what the stimuli in that situation are typically expected to evoke (e.g., novelty, threat, positive approach).

Current understanding of how emotion relates to behavioral and social outcomes has been gathered mostly from responses shown in contexts that typically elicit *context-appropriate* (CA) affect (e.g., fear responses to novelty), and examining the level of emotion expressed. For example, anger expressed during a frustrating task (waiting for a desired outcome) has been associated with externalizing and self-regulatory behaviors (Cole et al., 2011; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). Yet, studying CI anger may be more informative for understanding emotion regulation difficulties associated with situationally-maladaptive behavior. Regulatory processes modulate emotional responses to situational changes (Thompson, 1994) and therefore require consideration of contextual factors (Cole, Martin, & Dennis, 2004; Cole, Michel, & Teti, 1994). CI anger may reflect inflexible anger patterns (Cole et al., 1994) and thus represent a maladaptive social response. Although this has not been examined in preschool-age children, older children who expressed more CI anger (as reported by parents) showed greater externalizing behavior during middle childhood (Locke & Goldsmith, 2007).

CI anger may also impair children’s social adjustment because it is not an adaptive way to achieve social goals. A child who wishes to affiliate with peers typically shows positive affect and engaging behavior in peer social interaction contexts (context appropriate positive affect), for example. Although it is possible to hypothesize a reason for anger in this situation (e.g., the child develops a subgoal of getting a toy from a peer), an anger display is typically not an adaptive way to achieve the goal of social affiliation associated with this context. One can also imagine that showing anger in non-social contexts (e.g., watching a funny movie, playing alone with toys) would reduce the child’s likelihood of achieving goals such as enjoyment, interest, or engagement that are typically associated with such contexts.

Although showing anger may at times be an appropriate response for achieving a subgoal (Cole et al., 1994; Izard, 2007), frequent expressions of anger in social contexts could put the child at a disadvantage for achieving broader positive affiliation goals. CI anger may also uniquely potentiate behavior problems by inducing reciprocal negative social interactions with others. For example, preschoolers who showed more anger in free play contexts where there were no displays of aggression or interpersonal conflict (non-dispute contexts) were more likely to initiate aggression with peers (Arsenio & Lover, 1997) and

were less accepted by their peers than other children (Arsenio, Cooperman, & Lover, 2000). Conversely, levels of anger in contexts where the child or peer showed verbal or physical aggression (aggression-related contexts) were *not* related to aggressive behavior or peer acceptance (Arsenio et al., 2000). In non-dispute contexts, peers may view angry responses as inappropriate. Furthermore, angry or rejecting peer responses to CI anger may facilitate more anger responses from a child showing CI anger, thereby perpetuating the angry interaction. School-aged children who were victims of peer aggression were more likely to respond with aggressive behaviors themselves (Wilton, Craig, & Pepler, 2000). Across the preschool period patterns of reciprocal behavior develop, where peer rejection follows acts of aggression and aggression follows peer rejection. This indicates that the preschool years may be important for maturation of the bidirectional patterns of rejection and aggression that are displayed in later childhood (Chen, McComas, Hartman, & Symons, 2011; Olson, 1992). These repeated patterns of reciprocal aggressive behavior and negative social experiences can lead to later externalizing and delinquent behavior (Coie et al., 1995; Haselager et al., 2002). Although the present study cannot address these long-term outcomes of CI anger, findings should inform us about whether CI anger is associated with concurrent negative social outcomes.

Lastly, CI anger may impair the communicative function of emotions (Campos, Campos, & Barrett, 1989) putting the child at risk for social isolation and rejection because he or she cannot appropriately send emotional cues (Halberstadt, Denham, & Dunsmore, 2001). Negative emotional behaviors can be adaptive when they communicate the child's emotional state to others with the possibility of receiving helpful or caring responses (Campos et al., 1989). If the emotion being expressed is not congruent with contextual conditions, however, a child may be signaling something other than what is adaptive for that situation. For example, CI anger in play contexts may appear to others as unprovoked anger that is incongruent with the dominant goal of positive affiliation. Such incongruent behaviors may be inexplicable to others (e.g., peers, teachers, parents). With repeated interactions of this nature, social isolation or peer rejection may result. Because rejection and victimization can lead to increased feelings of loneliness (Crick & Grotpeter, 1996; Kochenderfer & Ladd, 1996), children showing CI anger may also experience greater feelings of loneliness. Given all of the possible mechanisms by which CI anger may potentiate negative social experiences, goals of this study were to examine concurrent associations of CI anger with child social and behavioral functioning. We are aware that our initial cross-sectional study cannot address the directionality of the association between CI anger, emotion knowledge, and social outcomes, yet view this as a first step toward identifying the meaning of the CI anger construct.

The few studies that have measured CI anger or out-of-context aggression have focused on anger or aggression expressed in positive or neutral contexts (e.g., Arsenio et al., 2000; Locke, Davidson, Kalin, & Goldsmith, 2009). Although showing anger in positively-valenced contexts (we use the term *valence-incongruent* CI anger to describe this behavior) is notably out-of-context, expressing anger in non-provoking negatively-valenced contexts (we use the term *valence-congruent* CI anger to describe this behavior) could also be construed as maladaptive. For example, anger in response to threatening stimuli (where the

typical response would be fear) may increase one's risk for harm, and anger when there is a significant loss (where the typical response would be sadness) may simply alienate others.

Yet, we do not know whether anger responses in such non-provoking negative contexts (valence-congruent CI anger) is viewed by others as more acceptable than anger in positive contexts (valence-incongruent CI anger). To address this possibility, we measured anger during negative slides and videos that primarily depicted threatening (e.g., sharks, chase scenes) or sadness-eliciting (e.g., illness) stimuli and positive/neutral slides and videos depicting entertaining stimuli or calm scenarios in relation to negative social experiences. Of note, it is possible that other forms of CI negative affect (e.g., sadness, fear) could also contribute to patterns of maladaptive social interactions, such that children who are fearful in positive play contexts and choose to play alone may be less popular than their peers (Lease, Kennedy, & Axelrod, 2002; Rubin, Daniels-Beirness, & Hayvren, 1982), or socially neglected (Bierman, 1987), for example. In the current study, we focused on CI anger due to the potential importance of CI anger for externalizing behavior and specific negative social outcomes that have been associated with aggressive behavior (i.e., victimization, peer rejection, loneliness).

Perception and appraisal of emotionally-relevant cues (e.g., emotional faces, rewards) may be particularly relevant for expressing anger appropriately. In other words, children need to recognize and understand the emotional elicitors in the environment to appraise the context accurately. In early childhood, children are learning to identify and understand one's own and others' emotions (Denham, 1998; Halberstadt et al., 2001). Children's ability to interpret emotional faces and situational cues undergoes substantial growth during the preschool period (approximately ages 3 to 5 years; Denham, 1986; Denham & Couchoud, 1990). Likewise, children's knowledge of display rules (Misailidi, 2006) and the expression of emotion according to these social conventions (Cole, 1986; Saarni, 1984) are also developing during the preschool years. Given such rapid development of emotion regulation and emotion knowledge, and the importance of forming positive social relationships during early childhood, preschool is an important period in which to assess the expression of anger in context and how it relates to social outcomes.

## Present Study

The present study had two goals. First, we sought to determine whether preschool-age children demonstrated CI anger behaviorally. We measured CI anger as facial anger during presentation of affective videos and slides. We conceptualized anger expressed during the positive and neutral stimuli as valence-incongruent CI anger, whereas anger expressed during the negative stimuli was conceptualized as valence-congruent CI anger. We included both forms of CI anger to examine if each predicted unique associations with study outcomes. Although behavioral and parent-reported CI anger has been identified during middle childhood (Locke et al., 2009; Locke & Goldsmith, 2007), it has not been examined in preschool-age children. Second, we sought to test whether (valence-incongruent and valence-congruent) CI anger at this age was related to children's emotion knowledge skills, negative social experiences with peers, or parent- and teacher-reported externalizing behavior problems.

## Hypotheses

We expected that a small group of preschoolers would show CI anger and that valence-incongruent CI anger would be less prevalent than valence-congruent CI anger. Because we expect accurate understanding of the emotional context to be generally important in the development of affect regulation, we predicted children who show either form of CI anger (valence-incongruent or valence-congruent) would have lower emotion knowledge than other children.

Although we expected greater CI anger would be related to more negative social experiences (self-reported rejection, victimization, and loneliness; negative peer- and teacher-reported social functioning), we further predicted valence-incongruent CI anger would be more detrimental than valence-congruent CI anger for peer interactions and relationships, as these may depend on peer perceptions and response to the child, and valence-incongruent CI anger may be more challenging for preschool peers to understand. In contrast we expected both valence-incongruent and valence-congruent CI anger would be associated with greater externalizing behavior, as both forms of CI anger may indicate lower overall flexibility in regulating emotion across contexts and increased risk for maladaptive behavior problems (Cole et al., 1994).

Given possible sex differences in our study outcomes, we included sex interactions with both forms of CI anger in all analyses. Boys and girls may differ in how CI anger would be related to EK because misinterpreting the context may influence aggressive behavior differently in boys and girls. Because there are discrepant findings on whether misinterpretation influences aggressive behavior in boys (Schultz et al., 2000) or girls (Meece & Mize, 2010) we did not have specific predictions for sex differences in how EK will relate to CI anger. Boys and girls also vary in how aggression (Lee, 2009; Miller-Johnson et al., 1999; Orue & Calvete, 2011) influences social status among peers. Since boys may show higher mean level of anger than girls (for review see Chaplin & Aldao, 2013), the expression of anger in non-provoking contexts (CI anger) by boys may not be as unexpected as if girls were to show CI anger. Therefore, associations of CI anger and negative social outcomes could be stronger for girls, as they may face greater social sanctions around the expression of negative affect in general. Alternatively, it may be that boys who display CI anger, in addition to generally high levels of contextually-appropriate anger, may face more negative consequences from peers.

## Method

### Participants

Participants were 134 children attending Head Start in the Northeast United States (45% male;  $M$  age = 60 months,  $SD = 3.4$ , Range: 4.47 – 5.63 years). Reflecting the demographics of the region, the sample was 77% Caucasian, 8% African American, and 15% biracial or other. Further, 16% of participants endorsed a Latino ethnicity. Family income was \$25,740 per year, with an average of 2.5 children and 2 adults in the home ( $M$  income-to-needs ratio = 1.19; 24% single-parent homes). Children were participating in a larger study of emotion processing and social competence (removed for review), which entailed additional child

assessments. All procedures were approved by the university hospital IRB. Participants were recruited during summertime placement screenings and classroom open houses at Head Start, as well as at the school at pickup and drop-offs.

### Procedure and Measures

In a quiet room at Head Start, children individually participated in emotion-elicitation assessments (viewing pictures and videos) by trained research assistants who were known to them from previous data collection efforts. The emotion-elicitation assessments typically took about 45 minutes to complete. On a different day, children were individually interviewed by the research assistants in a quiet room at Head Start to assess their emotion knowledge, language abilities, and social experiences in school. Interviews typically took about 25 minutes to complete. Children's teachers and parents completed questionnaires to assess child functioning. We focus here on data from the emotion-elicitation assessments, interviews, and parent- and teacher-reports. The emotion-elicitation and the interviews were collected within two weeks of each other (interviews first), and the parent- and teacher-reports were collected within 4 weeks of the emotion elicitation assessment. Families were compensated \$50.00 for their participation.

**CI anger**—CI anger was assessed via behavioral responses during the emotion-elicitation assessment.

**Emotion-elicitation assessments:** Developmentally-appropriate picture slides from the International Affect Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999) and short video clips were presented to children on a computer screen in the following order: 5-minute neutral video; 4 neutral or positive slides (each slide presented for ~7 seconds); 4 negative slides; 4 positive slides; 4 negative videos (~2 minutes each); positive video (44 seconds). Affective valence norms have been generated for the IAPS slides that range from highly positive (valence ( $V$ ) = 9) to highly negative ( $V$  = 1) (Lang et al., 1999). Our positive slides based on IAPS child (7–9 years) norms were puppies ( $V$  = 8.69), dolphins ( $V$  = 8.64), fireworks ( $V$  = 7.47), clouds ( $V$  = 7.61), flowers ( $V$  = 6.43), and ice cream ( $V$  = 8.44), neutral slides were fire hydrant ( $V$  = 6.06) and fork ( $V$  = 5.64), and negative slides were snake ( $V$  = 3.92), shark ( $V$  = 3.91), sinking ship ( $V$  = 2.48), and cockroach on a pizza ( $V$  = 4.03). Similar IAPS slides were used in a recent study of toddlers (Berger, Miller, Seifer, Cares, & LeBourgeois, 2012). The neutral movie depicted an underwater seascape (SeaScapes; McAbian & Holman, 1994) and the negative videos were four movie clips depicting affectively negative or somewhat distressing events (i.e., chase scenes, illness scenes from E.T., Finding Nemo, and The Lion King).

**Behavioral scoring:** In addition to anger, raters coded neutral-interest, positive, fatigue, surprise, sadness, confusion, disgust, fear-anxiety, and contempt facial expressions during slide presentations and videos on a second-by-second basis using the System for Identifying Affect Expressions by Holistic Judgments coding system (AFFEX; Izard, Dougherty, & Hembree, 1989). Coding was conducted from videotaped facial expressions slowed to half-speed using Observer XT software (Noldus Information Technology, 1995). Interrater reliability was calculated based on 22 tapes (16% of sample) coded independently by blind



scale was computed: responses for the 4 items were scored 0 if incorrect, 1 if only the correct valence was given (e.g., “sad” for “angry”), and 2 if correct.

**Expressive emotion knowledge:** Three tasks were used to assess children’s ability to generate emotion words. Using EMT photos, children were asked to verbally state the emotion that each child in a panel of four was feeling. A score was computed to indicate number of emotions correct out of 8. Using the four drawn feeling faces from the AKT (happy, sad, angry, or scared), children were asked to identify each emotion using words and responses were scored as for the other AKT task. Children were also asked to “name all the different feeling words you can think of,” based on the KAI. A total score indicated the number of emotion words the child generated. These measures of emotion recognition knowledge and expressive emotion knowledge have predicted self-reported loneliness in preschoolers (Heinze et al., 2015). As emotion recognition knowledge and expressive emotion knowledge were significantly correlated ( $r(132) = .49, p < .001$ ), we computed a sum of the standardized Emotion Recognition and Expressive Emotion Knowledge scores to indicate *Recognition/Expressive Emotion Knowledge* ( $\alpha = .83$ ).

**Behavioral emotion knowledge:** Finally, children’s ability to understand how others are feeling by reading behavioral cues about emotion was assessed. In this portion of the protocol, unlike the earlier portions that were purposely delivered in a neutral tone, interviewers used puppets from the AKT and emphasized behavioral emotion cues (i.e., vocal and facial expressions) to enact stories depicting 8 situations in which the main character experienced happiness, sadness, anger, or fear. At the end of each story, children were asked to identify how they thought the protagonist felt. Responses were scored as for the other AKT tasks and yielded a summary score for *Behavioral Emotion Knowledge* (8 items,  $\alpha = .73$ ). In a study using AKT measures with preschoolers, EK was negatively related to anger shown during free play (Denham, 1986).

**Child-reported social experiences:** After the EK portion of the interview, children were interviewed regarding their social experiences in school, specifically victimization, rejection, and loneliness. These measures had been used in previous work (Asher, Rose, & Gabriel, 2001; Burgess, Ladd, Kochenderfer, Lambert, & Birch, 1999; Cassidy & Asher, 1992; Heinze et al., 2015; Kochenderfer & Ladd, 1996) and were not modified from the original sources. Children were first given practice items to rate (e.g., “I have toast for breakfast”) using the 3-point response scale (1 = no, 2 = sometimes, 3 = yes) to make sure they understood the process. Victimization items were based on the Perceptions of Peer Support Scale (e.g., “do you get picked on”; 5 items;  $\alpha = .77$ ; Kochenderfer & Ladd, 1996). Ratings of victimization using the Perceptions of Peer Support Scale have been associated with observations of child experience of peer aggression (Kochenderfer & Ladd, 1997). The Rejection scale (e.g., “do kids tell you they don’t like you”; Asher et al., 2001) was 9 items ( $\alpha = .74$ ) and the Loneliness scale (e.g., “is school a lonely place”; Burgess et al., 1999; Cassidy & Asher, 1992) was 8 items ( $\alpha = .76$ ). Scales had all been used with children in the fall of their kindergarten year, where children were in our age range (5.5 years; Buhs & Ladd, 2001; Kochenderfer & Ladd, 1996). Children who report greater feelings of loneliness on the Loneliness scale were more likely to report less school liking, more school avoidance,



lower perceived peer acceptance, and lower perceived competence (Coplan, Closson, & Arbeau, 2007). Using similar measures, Heinze et al. (2015) found preschoolers reporting greater rejection/victimization had lower behavioral emotion knowledge.

**Teacher-reported social functioning:** Teachers responded to four questions regarding the extent to which children were liked or disliked by peers (e.g., “most children would say this is one of the 3 children in class they like the most”; adapted from Fabes & Eisenberg, 1992). Responses were coded and summed to create a negative teacher rating variable (4 items,  $\alpha = .72$ ). This measure has shown associations with preschool aggression and coping with interpersonal anger (Fabes & Eisenberg, 1992).

**Peer-reported social functioning:** Children’s classmates were also briefly interviewed to assess peer reports of child social functioning, as has been done in prior research with children this age (Buhs & Ladd, 2001). Using class photos as a visual aid, children in the classroom were individually asked to name children in their class who they liked least and who starts fights or picks on and teases other kids. Following Buhs & Ladd (2001), responses were coded to reflect negative ratings and averaged to create a negative peer nomination variable (2 items,  $\alpha = .69$ ). Peer negative nominations have been related to victimization, group entry behavior, loneliness, and school avoidance (Buhs & Ladd, 2001). As teacher and peer-reported negative nominations were significantly correlated ( $r(124) = .41, p < .001$ ), we computed an average of the two scores for an overall *Negative Nomination* score to be used in analyses.

**Parent-reported externalizing:** Children’s parents completed the 100-item Child Behavior Checklist normed for our age group (CBCL 1 ½ – 5; Achenbach & Rescorla, 2001), which yields a standardized score for Externalizing symptoms. Only the Externalizing subscale T scores were used for the purposes of the current investigation.

**Teacher-reported externalizing:** Children’s teachers completed the 100-item Child Behavior Checklist-Teacher Report Form (C-TRF; Achenbach & Rescorla, 2001), which yields a standardized score for Externalizing symptoms. Only the Externalizing subscale T scores were used for the purposes of the current investigation. Parent and teacher ratings of externalizing behavior were significantly correlated ( $r(124) = .54, p < .001$ ) so we computed an average of the two scores for an overall *Externalizing Behavior* score to be used in analyses.

### Statistical Analysis

There was 1 missing datapoint for CI anger, 1 missing for DIAL language score, 0 missing for EK measures, 8 missing for externalizing behavior, 8 missing for self-reported social experience variables, and 8 missing for negative nominations. Importantly, we found participants who were missing externalizing behavior, self-reported social experiences, or negative nominations were not more likely to show valence-incongruent or valence-congruent CI anger (externalizing behavior:  $\chi^2(1, N = 133) = .56, ns$ ,  $\chi^2(1, N = 133) = .37, ns$ ; self-reported social experiences:  $\chi^2(1, N = 133) = 3.39, ns$ ,  $\chi^2(1, N = 133) = 1.82, ns$ ; negative nominations:  $\chi^2(1, N = 133) = .96, ns$ ,  $\chi^2(1, N = 133) = 1.82, ns$ ).

We conducted a series of hierarchical regression analyses to assess the respective contributions of valence-incongruent and valence-congruent CI anger to recognition/ expressive and behavioral emotion knowledge; to child-reported victimization, rejection, and loneliness in school; to other-reported social functioning; and to externalizing symptoms. For each analysis, we also examined the contribution of child age, sex, and language skill (for EK outcomes only). For each analysis of the contribution of valence-incongruent CI anger beyond contribution of valence-congruent CI anger, we first entered child age and sex (step 1), followed by an equation that included both the covariates and valence-congruent CI anger (step 2), followed by an equation that included the covariates, valence-congruent and valence-incongruent CI anger (step 3). Finally, we added a valence-congruent CI anger-sex interaction term and a valence-incongruent CI anger-sex interaction term (step 4) to test for changes in the predictor-criterion association based on child sex. For analyses of EK outcomes, we included standardized language scores (DIAL-3) with the age and sex covariates. In each analysis, males served as the reference category. We interpreted the final model that added a significant predictor to the model.

## Results

Means, standard deviations and correlations among all variables are reported in Table 1. Age and sex were not associated with CI anger, but age and sex differences occurred for some of the EK skills and social outcomes. As expected, language skill was related to both EK skills. Valence-incongruent CI anger was associated with greater loneliness and both valence-incongruent and valence-congruent CI anger were related to greater externalizing behavior.

### Frequency of CI Anger and Associations between Valence-Incongruent and Valence-Congruent CI Anger

We first addressed the simple question of the frequency of valence-incongruent and valence-congruent CI anger. About one-quarter (23%; 31 out of 133) of the children expressed valence-incongruent CI anger during the positive slides, neutral slides, or baseline video. As expected, the percentage of children expressing anger during negative slides or videos (valence-congruent CI anger) (40%; 53 out of 133) was higher than the percentage of children who expressed any anger during the positive or neutral slides or videos (valence-incongruent CI anger) ( $\chi^2(1, N = 133) = 10.26, p = .001$ ). As indicated in Table 1, valence-incongruent CI anger was moderately related to valence-congruent CI anger.

### Associations between Valence-Incongruent and Valence-Congruent CI Anger and Child Outcomes

**Emotion knowledge**—Valence-incongruent CI anger was related to behavioral emotion knowledge, but this association was qualified by a valence-incongruent CI anger-by-sex interaction (see Table 2). As seen in Figure 1, boys who showed valence-incongruent CI anger had lower behavioral emotion knowledge compared to boys who did not show valence-incongruent CI anger. The valence-incongruent CI anger-behavioral emotion knowledge association was not significant for girls. Notably, valence-incongruent CI anger predicted emotion knowledge outcomes when valence-congruent CI anger was accounted for, indicating that it predicted outcomes above and beyond valence-congruent CI anger.

Valence-incongruent CI anger was not related to recognition/expressive emotion knowledge (not tabled). Valence-congruent CI anger was not related to either of the emotion knowledge outcomes.

**Self-reported loneliness, victimization, and peer-rejection**—Valence-incongruent CI anger predicted self-reported loneliness and peer-rejection, indicating that children who expressed valence-incongruent CI anger during positive/neutral slides or videos reported more loneliness and peer-rejection than children who did not express valence-incongruent CI anger (see Table 3). Valence-incongruent CI anger was not related to victimization (not tabled). Notably, valence-incongruent CI anger predicted negative child-reported social experience outcomes when valence-congruent CI anger was accounted for, indicating that it predicted outcomes above and beyond valence-congruent CI anger. Valence-congruent CI anger was not related to any of the child-reported negative social experience outcomes.

**Negative nominations**—Valence-incongruent CI anger predicted negative nominations (see Table 4), indicating that children who showed valence-incongruent CI anger during positive/neutral slides or videos were reported as less liked compared to children who did not show valence-incongruent CI anger. Notably, valence-incongruent CI anger predicted negative nominations when valence-congruent CI anger was accounted for, indicating that it predicted outcomes above and beyond valence-congruent CI anger. Valence-congruent CI anger was not related to negative nominations.

**Externalizing behavior**—Valence-incongruent and valence-congruent CI anger predicted externalizing behavior (see Table 5). Notably, valence-incongruent CI anger predicted externalizing behavior problem outcomes when valence-congruent CI anger was accounted for, indicating that it predicted outcomes above and beyond valence-congruent CI anger. The valence-congruent CI anger-externalizing behavior association was qualified by a valence-congruent CI anger-by-sex interaction. As seen in Figure 2, boys who showed valence-congruent CI anger had greater externalizing behavior than boys who did not show valence-congruent CI anger. The valence-congruent CI anger-externalizing behavior association was not significant for girls.

## Discussion

This study examined whether valence-incongruent and valence-congruent CI anger was detectable in preschool-age children, and assessed associations of valence-incongruent and valence-congruent CI anger with children's emotion knowledge, negative social experiences, and externalizing behavior. As predicted, anger was non-normative when viewing stimuli designed to elicit neutral or positive affect (valence-incongruent CI anger), but more common when viewing stimuli designed to elicit negative affect (valence-congruent CI anger). Although only 6% of children showed anger in both positive and neutral situations, 23% showed some degree of anger during either the positive or neutral stimuli (valence-incongruent CI anger). As predicted, valence-incongruent CI anger was related to lower behavioral emotion knowledge (for boys only) and greater peer rejection, loneliness, and negative nominations by peers and teachers. Valence-incongruent and (for boys only) valence-congruent CI anger was related to greater externalizing behavior.

Importantly, valence-incongruent CI anger was associated with child outcomes across each of the three domains assessed, even after accounting for the contribution of valence-congruent CI anger, age, sex and language.

It was primarily valence-incongruent CI anger (anger in neutral/positive contexts) that predicted outcomes above and beyond valence-congruent CI anger (anger in negative contexts); valence-congruent CI anger did not relate to most of the study outcomes. These findings may indicate that it is not overall anger frequency without regard for context that is relevant for negative social outcomes. It is also important to note that valence-congruent and valence-incongruent CI anger were not highly correlated in this study (.28) and in past research CI and CA anger are often modestly correlated (e.g., Locke et al., 2009), perhaps indicating that children who show CI anger are not highly anger reactive.

### **Valence-Incongruent CI Anger was Associated with Worse Emotion Knowledge**

Our findings indicated that children who show CI anger have less emotion knowledge than other children. Specifically, knowledge of emotion situations (considering behavioral cues) was deficient in children who showed valence-incongruent CI anger during neutral/positive slides/videos compared to the other children. Similarly, Arsenio and colleagues (2000) reported a tendency for lower (recognition and situation) emotion knowledge in preschool-age children who expressed anger during non-aggressive (“baseline”) contexts. Although we expected EK would generally be related to both forms of CI anger, it may not be surprising that valence-incongruent CI anger had stronger associations with EK than valence-congruent CI anger. For example, children showing valence-congruent CI anger in threatening contexts may be interpreting the context appropriately but responding with defensive anger. Whereas children who show valence-incongruent CI anger in positive/neutral contexts may be misinterpreting the positive cues in the context (e.g., happy faces, rewards). The finding that valence-incongruent CI anger was associated with situation knowledge rather than recognition knowledge is not surprising given that children may show CI anger at least in part because they have more difficulty correctly interpreting emotion-eliciting situations.

It may be that some children show (valence-incongruent or valence-congruent) CI anger because they interpret social contexts differently than other children. Children who show CI anger may also be vulnerable to misinterpreting other children’s intentions as hostile (*hostile attribution bias*; Dodge & Coie, 1987), in part, because they misread children’s emotional expressions as anger (*anger bias*) (Lemerise, Gregory, & Fredstrom, 2005). The tendency to interpret hostile intent in ambiguous (Dodge & Coie, 1987) or non-anger (Schultz, Izard, & Ackerman, 2000) contexts may make a child more likely to engage in aggression. Indeed, poor emotion knowledge has often been associated with aggression and behavior problems during the preschool years (Trentacosta & Fine, 2010). Given its potential significance for social outcomes, we advocate for future research on biased emotion knowledge and hostile attribution biases that may have special consequence for children who show CI anger.

## Valence-Incongruent CI Anger was Associated with Self-Reported Loneliness and Peer-Rejection

Showing valence-incongruent CI anger may be an important signal that children are not interpreting social situations accurately. Such differences in social information processing may mediate the association between aggression and rejection (Dodge et al., 2003; Reijntjes et al., 2011). Children who misinterpret social interactions are more likely to be rejected or victimized by peers (Dodge et al 2003; Garner & Lemerise, 2007; Meece & Mize, 2010; Reijntjes et al., 2011; Schultz et al., 2000). For example, preschoolers who were more likely to attribute anger to (positive and negative) non-anger situations had greater levels of teacher-reported peer rejection (Schultz et al., 2000). This may also be the case for children who show CI anger.

Our finding that children who show valence-incongruent CI anger reported more feelings of peer rejection converges with studies showing externalizing behavior predicts negative social outcomes (e.g., Garner & Lemerise, 2007). Given that victimization also appears to increase vulnerability to feelings of loneliness in school-age children (Crick & Grotpeter, 1996; Kochenderfer & Ladd, 1996), it was not surprising that we found valence-incongruent CI anger was also associated with self-reported loneliness. As we expected, valence-congruent CI anger was not as relevant for negative social outcomes. Although this may be in part because children do not perceive anger in negative contexts as inappropriate as anger in positive contexts, it would be informative for future research to measure children's responses to peer anger in threatening contexts or situations involving loss.

Although childhood aggression predicts victimization and loneliness, less is known about emotional risk factors for such experiences during the preschool years (for review, see Monks, 2011 and Vlachou, Andreou, Botsoglou, & Didaskalou, 2011). There is some research on older aged children that indicates emotional styles associated with these negative social outcomes. For example, 5 to 6 year old children who had more reactive or inflexible temperament were more likely to be victimized by peers (Gülay, 2012). Inflexible anger patterns may be relevant for CI anger responses (Cole et al., 1994), and may signal increased child risk for victimization. School-age children who are victims of peer aggression are more likely to respond with aggressive behaviors themselves (Wilton et al., 2000). Angry or rejecting peer responses to CI anger in neutral/positive contexts may facilitate more anger responses from the child showing CI anger, thereby perpetuating the angry interaction. This repeated pattern of aggressive behavior and negative social experiences, particularly during the preschool years when social and emotional competencies are rapidly developing (Denham, McKinley, Couchoud, & Holt, 1990), can lead to later externalizing and delinquent behavior (Coie et al., 1995; Haselager et al., 2002). CI anger during the preschool period may be construed as "unjustified aggression" (Monks, Ortega Ruiz, & Val, 2002), an early form of peer-directed aggression, that may develop into bullying behavior (Monks, 2011). Given the dynamic negative social interactions that may occur with CI anger, we may expect children showing CI anger as more likely to be "bully-victims", showing more reciprocal reactive aggression in response to bullying by their peers (Perren & Alsaker, 2006).

A strength of the current study was that we assessed children's self-reported experiences with peers in addition to gathering reports from teachers and parents. There is a relatively high degree of stability in peer social status during the preschool years (Olson, 1992; Walker, 2009). Further, negative emotional and social experiences during preschool can have a prolonged effect on later social competence (Johnson, Ironsmith, Snow, & Poteat, 2000). Thus it is important to consider emotional "red flags" such as CI that may contribute to these negative social experiences early in development in order to better address the social needs of these children. Accurately identifying specific emotions is the centerpiece of many preschool intervention programs designed to enhance social skills (e.g., Izard, Trentacosta, King, & Mostow, 2004). For example, the PATHS program (Kusche & Greenberg, 1994), the Emotions Course (Izard et al., 2004), and the Incredible Years Series (Webster-Stratton, 2005) all focus on emotion knowledge as a core element of their curriculum.

### **Valence-Incongruent CI Anger was Associated with Other-Reported Social Functioning**

Children and teachers are more likely to nominate children who are temperamentally difficult and aggressive as less-liked (Monks et al., 2002). Not all aggressive children are socially rejected, however, so considering the context of the aggressive behavior may help indicate who is at risk for social harm. In this study, both teachers and peers agreed that children who showed valence-incongruent CI anger were less liked than the other children in their classroom. Anger expressions in atypical positive/neutral contexts may be associated with social rejection more than typical anger reactivity when provoked (Arsenio et al., 2000). Therefore, a child may be more likely to reject a peer who repeatedly expresses anger across situations that typically are not anger-eliciting. However, valence-congruent CI anger to negative stimuli was not related to social status, indicating that it may be anger in positive/neutral contexts (valence-incongruent CI anger) that is most relevant for social status; for example, it may disrupt the flow of positive interactions in a way that valence-congruent anger does not. Since preschoolers can both like and dislike peers who are physically or relationally aggressive (Nelson, Robinson, & Hart, 2005), the nature of how emotional behavior confers social status may be clarified if we consider the social and emotional context of different types of aggressive behavior.

### **Valence-Congruent and Valence-Incongruent CI Anger was Associated with Externalizing Behavior**

Because children with behavior problems sometimes have difficulty altering their emotion displays to suit the context (Cole et al., 1994), examining a child's propensity to show CI emotion in relation to their peer social experiences may elucidate pathways through which atypical emotion displays, particularly anger displays, are associated with externalizing behavior. In the quest to understand how externalizing behavior is related to emotion processing difficulties, prior research has primarily focused on emotional reactivity in situations that normatively elicit a given emotion. In the current study, we found CI anger during either negative (valence-congruent) or positive/neutral slides or videos (valence-incongruent) predicted externalizing behavior. This may indicate that it is the tendency to show anger in (positive or negative) non-anger provoking contexts that is associated with increases in maladaptive behavior. These findings indicate that studying anger across

positive and negative contexts may inform our understanding of how emotional patterns increase vulnerability to maladaptive behavior. Although this had not previously been examined in preschool-age children, our findings are consistent with previous studies of older children (Locke & Goldsmith, 2007).

Other studies have reported that differential responsivity to positively and negatively-valenced stimuli was related to externalizing behavior. For example, children with greater antisocial behavior made lower ratings of arousal to negative slides and greater arousal ratings to positive slides (Sharp, van Goozen, & Goodyer, 2006). Such findings concur with the decreased sensitivity to punishment and increased sensitivity to reward associated with antisocial behavior (Sharp et al., 2006). Assessing behavioral and physiological measures of arousal could inform our understanding of the differential emotional responses to positive and negative stimuli that we found in children showing CI anger. Future studies on how other forms of CI negative affect are associated with maladaptive behavior may also focus on child responses to positive vs negative slides. For example, children with greater anxiety symptoms rated pleasant IAPS slides as less positive, but did not differ from other children in ratings of negative slides (Kotta & Szamoskozi, 2012). Such results may be informative for designing future studies involving forms of CI affect that are more appropriate for anxiety outcomes, such as CI fear.

### **Sex Modified how CI Anger Predicted Behavioral and Social Outcomes**

A few of our findings were qualified by sex differences in how CI anger may be relevant for behavioral and social functioning. First, only boys' valence-congruent CI anger in response to negative slides and videos was related to externalizing behavior. This finding is consistent with other studies showing that anger reactivity is related to externalizing behavior only for boys (Clay, Hagglund, Kashani, & Frank, 1996; Shaw, Keenan, & Vondra, 1994).

We also found that valence-incongruent CI anger was related to lower behavioral EK in boys only. Given that social cognitive factors (i.e., the tendency to attribute anger to non-anger contexts) may be more salient for aggressive behavior in boys (Schultz et al., 2000), perhaps this greater likelihood of EK deficits in boys who show CI anger explains their tendency to show greater externalizing behavior. Girls' CI anger, on the other hand, was unrelated to their EK, suggesting other factors may be more salient in predicting girls' externalizing behavior.

For both sexes, the expression of valence-incongruent CI anger was related to peer social outcomes, specifically rejection, loneliness, and negative nominations from peers and teachers. Although CI anger was related to negative social outcomes for both boys and girls, it may be that there are sex-specific pathways to negative peer social outcomes among children who show CI anger during the preschool years. Overt aggression, a hallmark of externalizing behavior, may be more salient for boys' social outcomes, where boys are more likely to be victims of overt aggression (Crick & Grotpeter, 1996) and overt aggression is more likely to predict peer rejection in boys than in girls (Wood, Cowan, & Baker, 2002). On the contrary, girls are more likely to show relational forms of aggression (Crick & Grotpeter, 1995), a form of aggression which may be more salient for girls' social outcomes (Crick, Casas, & Mosher, 1997; Crick & Grotpeter, 1995). Assessing CI anger specifically

in relation to both overt and relational aggression could further highlight some of the emotion regulation processes that are particularly important for predicting negative social outcomes in boys and girls (Conway, 2005).

### Limitations and Future Directions

Although our study provides some insight into the behavioral and social correlates of CI anger, it has limitations. One limitation is the cross-sectional and correlational design, which limits the ability to interpret the directionality of associations among CI anger, emotion knowledge, and social outcomes. It may be that children who show CI anger are treated aggressively by other children and over time they develop a hostile attribution bias that furthers their aggressive tendencies and development of externalizing behavior problems. Alternatively, it is plausible that children who experience rejection by others will be more likely to show CI anger and externalizing behavior problems. Longitudinal research or experimental designs (e.g., intervention studies) may be able to shed more light on these processes that are likely transactional in nature.

A second design limitation is a valence-order confound associated with the way the neutral/positive and negative stimuli were presented. Given the neutral video was always presented first and the negative videos always presented 5th, the vast majority of the valence-congruent anger ratings were observed after the valence-incongruent anger ratings. An advantage to showing the neutral videos first is that it limited carryover effect of context-congruent CI anger in the context-incongruent CI anger ratings, which are the main focus of the study. An additional order confound could be attributed to the lack of counterbalancing of the slide presentation blocks, although we alternated the presentation of negative and positive slides.

There are also a few measurement limitations to note. Lab-based procedures allow for more subtle forms of anger to be rated, but measurement is limited to a few highly specific situations (in our case, viewing slide and video stimuli designed to elicit different affective states) on only one assessment day. Even behavioral measures that are well-designed are small samples of behavior, and lack of a relation between a behavior and other measures could conceivably be due to inadequate behavioral sampling. One advantage of using a non-interactive behavioral measure of CI anger was the ability to present specific emotional stimuli in a standardized format, without the uncontrollable reciprocal responses that may occur during social interactions. Although studying peer interaction contexts directly would provide a more naturalistic way to assess how CI anger may relate to social functioning, we were able to show that CI anger in non-social contexts predicted social outcomes. Future research could also measure anger during contexts that typically elicit anger (context appropriate). It is difficult to experimentally evoke anger in the type of lab-based assessment that we used, as opposed to, say a peer-provocation context. We were also selective in which negative IAPS slides were presented to the participants, which may have limited the valence contrast between negative and neutral slides. Given the age of our participants, we did not feel it was appropriate to show more negatively-valenced IAPS slides (e.g., medical emergencies, interpersonally violent scenes). However, we did select negative slides with higher arousal rating norms than the neutral slides.



Finally, although we were able to identify those children who expressed anger across both positive and neutral situations, the rarity of this behavior (6%) limits the ability to extend analyses beyond the descriptive level. Future studies with larger samples or those that screen for CI anger may be able to conduct analyses of children who consistently show CI anger across contexts.

Overall, findings suggest the importance of characterizing the context of emotional responses when examining emotional correlates of competent social behaviors (Arsenio et al., 2000). Including CI affect as a research construct may lead to a greater understanding of the process that leads to a negative social world of rejection and loneliness, and may improve our ability to prevent the process from starting. Childhood aggression has long-term consequences for behavioral symptoms and social functioning and this maladaptive pathway appears to differ for boys and girls (Coie et al., 1995). We have shown that valence-incongruent CI anger was uniquely related to concurrent emotion knowledge, social functioning, and externalizing behavior, above and beyond the contributions of valence-congruent CI anger. This cross-sectional, correlational study provides preliminary insight on the negative social outcomes that may be associated with CI anger. Given the negative cycle of negative affect, social harm, and externalizing behavior that may be perpetuated by or influence CI anger responses, we would advocate longitudinal study of this atypical emotional construct.

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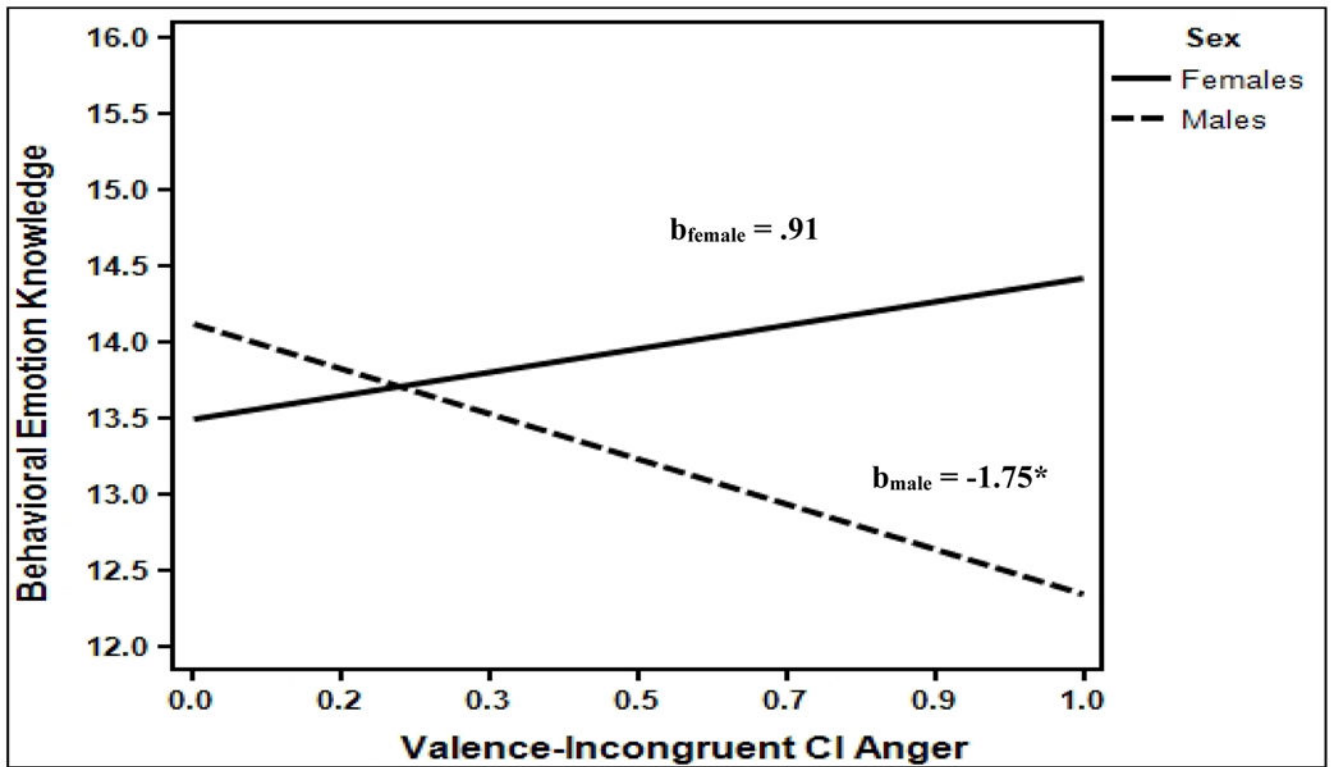
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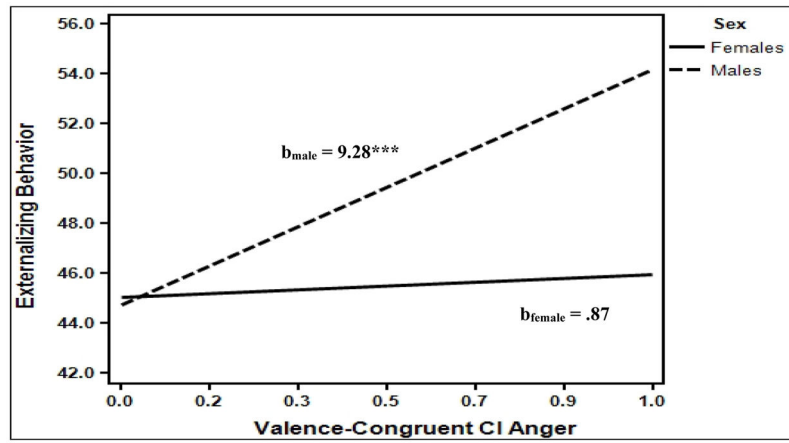
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**Figure 1.**  
 Dependent variable is the behavioral emotion knowledge score (Denham, 1986) with higher values indicating more situational knowledge when behavioral cues provided.  
 Note.  $*p < .05$ .



**Figure 2.** Dependent variable is the externalizing score (Achenbach & Rescorla, 2000) with higher values indicating more externalizing behavior.  
*Note.* \*\*\* $p < .001$ .

**Table 1**

Means, Standard Deviations, and Correlations between Predictors and Outcome Variables

	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. Valence-congruent CI anger												40% (53 of 133)	
2. Valence-incongruent CI anger	<b>.28**</b>											23% (31 of 133)	
3. Recognition/Expressive EK	.05	.02										0	3.86
4. Behavioral EK	-.03	-.06	<b>.51***</b>									13.66	2.56
5. Loneliness	.07	<b>.21*</b>	-.17	<b>-.29**</b>								1.45	.47
6. Victimization	.07	.07	-.07	-.15	<b>.44***</b>							1.74	.61
7. Peer-Rejection	.07	.14	-.12	<b>-.23*</b>	<b>.56***</b>	<b>.69***</b>						1.66	.49
8. Negative Nominations	-.02	.18	.03	-.001	.11	<b>.22*</b>	.14					-.02	.82
9. Externalizing Behavior	<b>.27**</b>	<b>.31**</b>	-.04	-.05	<b>.18*</b>	<b>.30**</b>	<b>.26**</b>	<b>.66***</b>				48.05	9.83
10. Sex <sup>a</sup>	.06	.04	.11	.04	.06	.10	.05	<b>-.21*</b>	-.12			Female = 55%	
11. Age	.10	-.03	.10	<b>.18*</b>	<b>-.21*</b>	-.14	-.09	<b>-.22*</b>	-.17	.03		4.99	.28
12. Language	-.02	.01	<b>.46***</b>	<b>.29**</b>	<b>-.20*</b>	.06	-.09	.05	<b>-.19*</b>	.13	-.09	97.95	13.69

Note:

<sup>a</sup> .0 = males, 1 = females.

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .

The pattern of results did not change when Spearman Rho coefficients were used.



Table 2

CI Anger and Behavioral Emotion Knowledge

	<u>Behavioral Emotion Knowledge</u>		
	$\beta$		
Step 1: Covariates			
Sex	-.01	-.01	-.001
Age	.22***	.23***	.20*
DIAL Language	.31***	.31***	.29**
Step 2: Valence-Congruent CI Anger Predictors			
Anger during Negative	-.06	-.05	-.07
Step 3: Valence-Incongruent CI Anger Predictors			
Anger during Positive or Neutral		-.04	-.28*
Step 4: Valence-Congruent CI anger X Sex Interaction			.04
Valence-Incongruent CI anger X Sex Interaction			.32*
Model <i>F</i>	6.51***	4.98**	4.00**
Model <i>R</i> <sup>2</sup>	.13	.14	.14
Change in <i>R</i> <sup>2</sup>	.13***	.003	.001
			.05*

Note.

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .

**Table 3**

CI Anger and Loneliness and Peer Rejection

	Loneliness		Peer Rejection	
	$\beta$	$\beta$	$\beta$	$\beta$
Step 1: Covariates				
Sex	.06	.06	.06	.05
Age	-.21*	-.22*	-.19*	-.10
Step 2: Valence-Congruent CI Anger Predictor				
Anger during Negative	.09	.04	-.12	.08
Step 3: Valence-Incongruent CI Anger Predictor				
Anger during Positive or Neutral		.19*	.36**	.12
Step 4: Valence-Congruent CI Anger X Sex Interaction			.21	.10
Valence-Incongruent CI Anger X Sex Interaction			-.23	-.24
Model <i>F</i>	2.98	2.33	2.85*	2.64*
Model <i>R</i> <sup>2</sup>	.05	.06	.09	.12
Change in <i>R</i> <sup>2</sup>	.05	.01	.03*	.03
			.01	.01
			.01	.01
			.01	.02
			.01	.06
			.01	.02
			.01	.02

Note.

\*  $p < .05$ ,

\*\*  $p < .01$ .

**Table 4**

CI Anger and Negative Nominations

	Negative Nominations	
	$\beta$	
Step 1: Covariates		
Sex	-.20*	-.20*
Age	-.21*	-.19*
Step 2: Valence-Congruent CI Anger Predictor	.02	-.04
Step 3: Valence-Incongruent CI Anger Predictor		.18*
Step 4: Valence-Congruent CI Anger X Sex Interaction		-.24
Valence-Incongruent CI Anger X Sex Interaction		.24
Model <i>F</i>	5.63**	3.73*
Model <i>R</i> <sup>2</sup>	.08	.09
Change in <i>R</i> <sup>2</sup>	.08***	.0002
		.03*
		.04

Note.

\*  $p < .05$ ,

\*\*  $p < .01$ .

**Table 5**

CI Anger and Externalizing Behavior

	Externalizing Behavior	
	$\beta$	
Step 1: Covariates		
Sex	-.13	-.14
Age	-.16	-.17*
Step 2: Valence-Congruent CI Anger Predictor		
Anger during Negative	.29**	.23*
Step 3: Valence-Incongruent CI Anger Predictor		
Anger during Positive or Neutral	.24**	.09
Step 4: Valence-Congruent CI Anger X Sex Interaction		
Anger during Negative X Sex		-.37**
Valence-Incongruent CI Anger X Sex Interaction		.21
Model <i>F</i>	2.74	5.94**
Model <i>R</i> <sup>2</sup>	.04	.13
Change in <i>R</i> <sup>2</sup>	.04	.09**
		.05**
		.06*
		6.25***

Note.

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .