Social Information Processing in Children: Specific Relations to Anxiety, Depression, and Affect

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Two studies examined shared and unique relations of social information processing (SIP) to youth’s anxious and depressive symptoms. Whether SIP added unique variance over and above trait affect in predicting internalizing symptoms was also examined. In Study 1, 215 youth (ages 8–13) completed symptom measures of anxiety and depression and a vignette-based interview measure of SIP. Anxiety and depression were each related to a more negative information-processing style. Only depression was uniquely related to a less positive information processing style. In Study 2, 127 youth (ages 10–13) completed measures of anxiety, depression, SIP, and trait affect. SIP’s relations to internalizing symptoms were replicated. Over and above negative affect, negative SIP predicted both anxiety and depression. Low positive SIP added variance over and above positive affect in predicting only depression. Finally, SIP functioning partially mediated the relations of affect to internalizing symptoms.

In the past few decades, researchers have built a substantial, yet conflicting, body of literature examining the specificity of anxiety and depression in children. Whether anxiety and depression represent one or two distinct constructs remains unclear (e.g., Axelson & Birmaher, 2001; L. A. Clark & Watson, 1991). Understanding the extent to which anxiety, depression, and their correlates represent a single or multiple constructs informs etiology and maintenance theories of these conditions, elucidates theory on comorbidity more generally (Sher & Trull, 1996), and guides treatment and prevention efforts (e.g., Kendall, Kortlander, Chansky, & Brady, 1992).

Given the prominence of cognitive symptoms in theories and treatments of the two disorders, understanding overlapping and distinctive cognitive correlates of youth anxiety and depression is especially important. A growing literature documents that both anxiety and depression are related to social-cognitive symptoms such as selective attention to threatening or negative events, negative attributions for others’ behavior, and maladaptive problem solving (e.g., Bell, Luebbe, Swenson, & Allwood, 2009; Daleiden & Vasey, 1997; Marien & Bell, 2004; Quiggle, Garber, Panak, & Dodge, 1992; Suarez-Morales & Bell, 2006; Vasey & Dadds, 2001). Conclusions about the specificity of cognitive aspects of anxiety and depression, however, are hampered by two notable limitations in extant literature. First, historically work has focused solely on anxiety or depression (or internalizing in general), and research is just starting to assess both simultaneously and specifically (e.g., Eley et al., 2008). Without assessing both constructs, strong conclusions about common and unique elements of anxiety and depression cannot be made. Second, anxiety and depression are broad constructs consisting of cognitive, emotional, behavioral, and physiological components. Yet the relations of cognitive aspects to these syndromes have been examined...
without considering other important contributors like affect. The current investigation contributes to the debate on the specificity of internalizing constructs and the role of social cognitive functioning by (a) testing whether associations with a comprehensively assessed aspect of social-cognitive functioning, social information processing (Crick & Dodge, 1994), represent unique relations to depressive and anxiety symptoms versus relations to variance shared by the two constructs, and (b) examining whether social cognitive functioning provides unique information about anxiety and depression over and above levels of trait affect.

SPECIFICITY OF ANXIETY AND DEPRESSION IN CHILDHOOD

Rates for co-occurring anxiety and depressive disorders in children, taken from community and clinical samples, range from roughly 16% to 62%, with most falling in the 30% to 35% range (Brady & Kendall, 1992). Similarly, the typical correlation between measures of anxiety and depressive symptoms falls within the .40 to .50 range (Brady & Kendall, 1992; Seligman & Ollendick, 1998), though as high as .80 (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998). Some researchers argue that the constructs of anxiety and depression are two points along a single continuum or two manifestations of a single underlying diathesis (Dealy, Ishiki, Avery, Wilson, & Dunner, 1981; King, Ollendick, & Gullone, 1991), whereas others argue that they represent distinct phenomena with different emotional, behavioral, and cognitive correlates (Axelson & Birmaher, 2001; D. A. Clark, Beck, & Stewart, 1990). The tripartite framework provides a way to account for both the common and unique factors in anxiety and depression (L. A. Clark & Watson, 1991; Mineka, Watson, & Clark, 1998). In this model, verified in adult (Brown, Chorpita, & Barlow, 1998) and child (Joiner, Catanzaro, & Laurent, 1996) samples, both anxiety and depression share a nonspecific distress component (i.e., elevated negative affect), whereas depression is uniquely characterized by low positive affect and anxiety is uniquely characterized by increased physiological arousal (though the latter may only be unique to panic disorder; Brown et al., 1998; Mineka et al., 1998).

Although the tripartite model focuses primarily on affective experience, evidence suggests that the model can also be applied to thought content associated with anxiety and depression. Consistent with Beck’s (2006) content-specificity hypothesis, studies have shown that depression is uniquely related to depressive-specific negative thoughts (i.e., reflecting threat and uncertainty) and unrelated or positively related to positive thoughts (Jolly & Dykman, 1994; Jolly & Wiesner, 1996; Laurent & Stark, 1993; Marien & Bell, 2004), although relations may be less consistent in youth compared to adults (Alfano, Beidel, & Turner, 2002; Epkins, 1996; Weems, Berman, Silverman, & Saavedra, 2001). Despite this important work on how social-cognitive content relates to internalizing symptoms, how social-cognitive processes, such as social information processing, relate to anxiety and depression is less clear.

Crick and Dodge’s (1994) social information processing (SIP) model describes six interrelated steps for how individuals respond cognitively and behaviorally to social situations: (a) encoding of socially relevant stimuli, (b) interpretation of stimuli, (c) clarification of goals for the specific situation, (d) problem-solving response construction, (e) problem-solving response selection, and (f) behavioral enactment. In social situations, youth are hypothesized to simultaneously engage in these processes via feedback loops, drawing on memory of past social experiences and others’ evaluations to inform their own decision-making processes. How children navigate these processes is theorized to influence their social adjustment, and evidence suggests that this multistage model predicts youth adjustment better than single or more general social cognition indices (Crick & Dodge, 1994; Dodge, Petit, McClasky, & Brown, 1986).

UNIQUE AND SHARED RELATIONS OF SIP TO ANXIETY AND DEPRESSION

Originally utilized to understand childhood aggressive behaviors, the SIP paradigm also appears promising for understanding internalizing disorders. Culling findings in the separate depression and anxiety literatures, symptoms of anxiety and depression have each been related to negative aspects of SIP, such as interpreting ambiguous situations or behaviors as overly negative or hostile (Daleiden & Vasey, 1997; Dodge, 1993; Quiggle et al., 1992) and expecting negative outcomes from social situations (Marien & Bell, 2004; Muris et al., 1998; Suarez-Morales & Bell, 2006). Unique relations to specific SIP stages have also been found. Anxiety, for instance, has been related to overly attending to threat- or danger-based social cues (Bell-Dolan, Last, & Strauss, 1990; Vasey & Dadds, 2001), selecting avoidant solutions to social problems (Barrett, Rapee, Dadds, & Ryan, 1996; Vasey & Dadds, 2001), and lower social problem-solving self-efficacy (Daleiden & Vasey, 1997; Suarez-Morales & Bell, 2006). Depression has been uniquely linked to more critical self-referent attributions in ambiguous peer situations (Prinstein, Cheah,
& Guyer, 2005), and generating and selecting fewer assertive and more ineffective means to solve problems (Goodman, Gravitt, & Kaslow, 1995; Quiggle et al., 1992; Sacco & Graves, 1984).

Considerable construct and measurement overlap between anxiety and depression make it difficult to untangle the true nature of significant associations with either construct. For example, the significant associations of negative attribution biases to anxiety (see e.g., Daleiden & Vasey, 1997) and depression (e.g., Quiggle et al., 1992) found in separate studies may reflect a true relation with the common component shared by the two syndromes. It is also possible that the attribution bias is actually uniquely related to depression but emerges in studies of anxiety because of overlap with that part of variance shared by anxiety and depression. Indeed, considering both in the same study, Eley and colleagues (2008) found a significant relation of negative interpretations of ambiguous situations with depression independent of anxiety, but not vice versa. Only two other studies have looked at SIP components in relation to both syndromes simultaneously, and both suggest lowered positive SIP functioning being related to depression. T. Gencoz, Voelz, Gencoz, Pettit, and Joiner (2001) found that depression, but not anxiety, was associated with lower rates of positive thoughts during encoding. Dickson and MacLeod (2004) found that anxiety was uniquely related to setting avoidant goals, whereas depression was uniquely related to setting fewer prosocial goals. Overall, whether SIP deficits are shared or unique to either anxiety or depression remains relatively unstudied.

When considering SIP’s role in development or maintenance of internalizing symptoms, examining SIP deficits simultaneously may be even more informative than examining individual SIP components. None of the studies reviewed did so. In fact, recent factor analytic work by Bell and colleagues (2009) suggest the presence of overarching negative and positive SIP styles, and these styles may be stronger predictors of behavior than individual stages. To redress the piecemeal approach that characterizes much of the SIP literature, our study provides a more comprehensive investigation of the SIP model by simultaneously examining variables that appear frequently (although often individually) in other studies (e.g., attributions, response generation and selection, response evaluation). This methodology allowed us to use the tripartite framework to examine the relations of SIP styles to anxiety and depression. Just as Marien and Bell (2004) applied the tripartite framework to cognitive content, finding that youth depression and anxiety shared a common association with greater negative content but only depression was associated with less positive content, we expected SIP to differentially relate to internalizing symptoms. Specifically, we hypothesized that whereas both anxiety and depression would be related to a negative SIP style, only depression would be further characterized by a less positive SIP style.

**JOINT CONTRIBUTIONS OF EMOTIONS AND SIP IN PREDICTING ANXIETY AND DEPRESSION**

The tripartite model has consistently been replicated in both community and clinical samples of youth as young as 6 years old and well into adolescence (Brown et al., 1998; Cannon & Weems, 2006; Chorpita, 2002; Chorpita & Daleiden, 2002; F. Gencoz, Gencoz, & Joiner, 2000; Joiner et al., 1996; Turner & Barrett, 2003), though the model appears to fit more consistently with increased age (e.g., Jacques & Mash, 2004). Past work suggests that anxious and depressed children typically report greater experiences of negative emotions (e.g., anger, worry, sadness), and additionally for depressed youth, less positive emotion. How other mechanisms, like social information processing, fit into a model of internalizing symptoms and affect is relatively unknown. Crick and Dodge (1994) hypothesized that emotions and cognitions are likely intertwined at several stages in the SIP model. In much the same way that activation of negative schema is thought to alter information processing (e.g., Beck, 2006), maladaptive SIP patterns may be activated by certain emotional cues. Similarly, particular SIP biases may not adequately regulate emotional states, thereby contributing to the development and maintenance of internalizing symptoms (see Lemerise & Arsenio, 2000, for a review). Given the well-defined link between positive and negative affect to the broader constructs of anxiety and depression and because strong arguments have been put forth for the relation of emotions to social cognitions, an additional contribution of the present investigation is testing if social-cognitions add predictive information regarding internalizing symptoms over and above affect. Examining the additive validity of SIP with regard to anxiety and depression is important given that social cognitive processes may be especially responsive to cognitive-behavioral interventions.

If social cognitions do inform our understanding of internalizing symptoms over and above affect, SIP responses to specific affective cues might then help explain the relationship between experienced emotion and internalizing symptoms. As Lemerise and Arsenio (2000) argued, emotional arousal may serve as a cue to be encoded, shade perceptions of situations that lead to negative attributions, or motivate children to behave in specific ways or set certain goals. We argue further that these cognitive processes, which take place in reaction to general affective states, may then lead to the
development of anxious or depressive symptoms or disorder. In other words, this general affective state may influence or “infect” cognitive experience, which in turn influences the experience and expression of specific internalizing symptom clusters (i.e., anxiety and depression) that encompass affective, cognitive, and behavioral domains of functioning. A child feeling especially sad or angry, for example, may be more likely to attend to threatening social cues or interpret others’ actions as hostile, putting them at risk for development of depressive or anxious symptoms. Youth low in positive affect may be less likely to have affiliative goals (Lemerise & Arsenio, 2000). In turn, they may fail to give peers the benefit of the doubt in ambiguous situations or work to maintain friendships which, from an interpersonal theory of depression (e.g., Joiner, Coyne, & Blalock, 1999), may lead to experienced depressive symptoms.

In a similar vein, Lonigan, Vasey, Phillips, and Hazen (2004) proposed a model in which an attentional bias toward threat is posited to partially mediate the relation of negative affectivity to anxiety, especially for youth low in effortful control. Recent empirical work in a sample of 4th- through 12th-grade youth (Lonigan & Vasey, 2008) supports this joint affect and cognitive bias model, but again, only considers one social cognitive processing component and is specific to anxiety. Despite calls for empirical studies that consider the role of both cognitions and emotions in the SIP framework, few studies to date have done so. Our investigation takes a step toward remedying this issue by jointly considering SIP cognitions and trait affect in the realm of youth internalizing symptoms. Specifically, we hypothesized that SIP would add unique variance in the prediction of both anxiety and depression over and above trait affect. Further, SIP was hypothesized to mediate the relations of affect to internalizing symptoms. Specifically, we hypothesized that negative SIP would be a common mediator of the relation of negative affect to both anxiety and depression, whereas positive SIP would mediate the relation of low positive affect to depression.

**THE CURRENT INVESTIGATION**

Although anxiety and depression have many overlapping SIP features (e.g., shared negative attributions, problem-solving deficits), disparate relations of SIP to anxiety and depression may elucidate the distinction between the two phenomena. We conducted two studies to examine the relation of SIP to childhood internalizing symptoms, with particular attention to differences between depression and anxiety. Our samples consisted of elementary-aged youth because cognitive aspects of SIP and differentiation between anxious and depressive symptoms have both likely emerged by this point (Cole, Truglio, & Peeke, 1997; Crick & Dodge, 1994). Using self-reported measures of anxiety and depressive symptoms, as well as a vignette-based interview measure of hypothetical, ambiguous, and unresolved social problems, Study 1 examined whether anxiety and depression are differentially related to SIP functioning. Study 2 had three aims. First, we attempted to replicate findings from Study 1. Second, we investigated whether our pattern of relations between SIP and internalizing symptoms remained after controlling for youths’ levels of positive and negative trait affect. Third, we examined the interplay between social cognitions and affect in predicting internalizing symptoms. Specifically, we tested whether SIP styles mediated the well-established relation between trait affect and internalizing symptoms.

**STUDY 1**

**Method**

**Participants**

Participants were third- through sixth-grade children recruited for the Children’s Evaluation of Everyday Social Encounters Project, a larger study assessing anxiety, depression, and social-information processing (Bell et al., 2009). Potential participants were randomly selected from the enrollment roster of a public school district in central Missouri. Parents or legal guardians of potential participants received a letter explaining the study and a phone call requesting their child’s participation. Of 430 parents reached by telephone, 257 provided informal agreement to participate. A total of 215 children were ultimately included in the current study. Of the remaining 42 families with informal agreement, 36 families cancelled or failed to attend their data collection sessions and could not be rescheduled, 1 child withdrew assent, 1 child displayed cognitive impairment that prevented him from completing the protocol, and 4 children did not complete enough of the measure items for study inclusion.

Participants included 109 girls and 106 boys, ranging from 8 to 13 years old ($M = 10.28, SD = 1.26$). Self-identified race/ethnicity of the sample was mostly Caucasian (81%), with 7% African American, 3% Hispanic, 3% Asian American, 5% (1 participant) American Indian, 6% who identified themselves as “Other,” and 1% who did not provide ethnicity information. Children came from primarily middle- to upper-class families, with 40% of families’ incomes falling between $40,000 and $80,000 per year, and an additional 30% of families making more than $80,000 per year. Participants were approximately evenly divided across third (25%), fourth (22%), fifth (25%), and sixth grades (28%). Chi-square analyses indicated no significant differences in number of participants in each grade level, $\chi^2(3) = 2.10, p = .55$. 
Measures

Social information processing. The Children’s Evaluation of Everyday Social Encounters Questionnaire (ChEESE-Q; Bell et al., 2009) is a vignette-based measure of children’s SIP. Children are presented with six hypothetical, ambiguous social situations and respond to questions assessing several stages of Crick and Dodge’s (1994) model of SIP. After an open-ended question that orients the participant to the vignette, other questions (described next) assess specific aspects of SIP. For all rating scale questions, children rate the relevant item on a 1-to-5 scale (unless otherwise indicated, 1 [definitely not] to 5 [definitely]), and scores for each item were averaged across vignettes.

Interpretation is assessed with two attribution questions, each with four items. First, for causal attributions, the child rates his or her belief that the vignette event occurred because of something (a) positive about himself or herself (positive internal), (b) negative about himself or herself (negative internal), (c) positive about the vignette’s protagonist (positive external), and (d) negative about the protagonist (negative external). Second, for intent attributions, the child rates his or her belief that the vignette protagonist acted (a) accidentally and with (b) positive, (c) negative, and (d) neutral intent. For goal formation/clarification, the child rates the extent to which she or he would have each of six goals for meeting situational demands (task-focused, avoidant, face-saving, affect management, distress expression, and relationship-focused).

Finally, evaluation of likely response enactment is assessed with three questions. First, the child indicates which of six goals the selected behavior would meet (multiple selections permitted). Unlike other items using the 1-to-5 scale, the child’s score for each of the six selected response justifications is the proportion of times across the six vignettes the child endorses the specific goal for why a particular response was endorsed as the selected response justifications. For goal attainment/effectiveness, the child rates how effective the selected response would be in meeting the child’s primary goal. Originally, the ChEESE-Q also included an open-ended question for each of the SIP stages of response construction and response selection. However, after examining the psychometric properties of these items in context with the other forced-choice items described, they were dropped from further analyses (see Bell et al., 2009, for an expanded discussion of this issue).

Given that each SIP stage was assessed across six vignettes and with multiple questions per stage (resulting in 90 separate items), data reduction was needed for analyses using the ChEESE-Q. Although Crick and Dodge’s theoretical model suggests stage-specific factors, previous exploratory factor analytic work with the ChEESE-Q (using iterated principal factor analysis with promax rotation) suggested that three valence-related SIP styles connecting items across SIP stages best fit the data (Bell et al., 2009). Further, compared to individual stage or sole item scores, use of factor scores proved to be more reliable (i.e., higher internal consistency and test-retest coefficients) and valid (i.e., stronger cross-stage than within-stage item correlations). The three factors are as follows: Youth scoring high on the Negative Information Processing Style (NIPS) factor are likely to show more negative internal and external causal and intent attributions, and hold avoidant and distress-expression goals and justifications. The Positive Information Processing Style (PIPS) factor comprises positive internal and external causal and intent attributions, having solution-focused, face-saving, or relationship-focused goals, and positive evaluations of problem-solving decisions. A second positive factor is concerned solely with response justification (i.e., why the child chose a particular solution). Labeled Positive Response Evaluation Style (PRES), youth scoring high on this factor are likely to select solutions they rate as satisfying the goals of being solution-focused, face-saving, affect managing, and relationship-focused. The three factors are reliable across time (4-week test–retest r = .60–.69), and additional information concerning the development and initial support for the validity of the ChEESE-Q can be found in Bell and colleagues (in press). For the current study, participants received separate NIPS (α = .75), PIPS (α = .78), and PRES (α = .72) factor scores.

Depressive symptoms. The Children’s Depression Inventory (CDI; Kovacs, 1992) is a self-report, 27-item scale assessing somatic, cognitive, affective, and behavioral symptoms of depression in youth age 7 to 17 years. Children indicate which of three sentences best describes them in the past 2 weeks (e.g., “I am sad once in a while”; “I am sad many days”; “I am sad all the time”). Items are scored in terms of increased presence of symptomatology (0 = symptom absence; 1 = mild symptom presence; 2 = a definite symptom); higher total scores indicate higher levels of depressive symptoms. Per university Institutional Review Board (IRB) and local school district’s request, and as in many prior studies (e.g., Cole et al., 1997), the item assessing suicidal ideation was excluded, thereby yielding a possible range of scores between 0 and 52. For the current study, raw scores rather than T scores were used for analyses. The CDI has been found to have acceptable levels...
of internal consistency, test–retest reliability, and convergent and discriminant validity (though strongest when comparing clinical vs. nonclinical groups) across varying samples (Kovacs, 1992; Smucker, Craighead, Craighead, & Green, 1986). In the current study, coefficient alpha was .82.

Anxiety symptoms. The State-Trait Anxiety Inventory for Children–Trait Version (STAIC–T; Spielberger, 1973) is a 20-item, self-report tool used primarily with 9- to 12-year-old children to measure somatic, behavioral, affective, and cognitive aspects of general trait anxiety. The child indicates whether each statement (e.g., “I worry too much”) is hardly ever, sometimes, or often true for them (scored 1, 2, or 3, respectively). Scores range from 20 to 60, and higher scores indicate higher levels of trait anxiety. As with depression, raw scores were used. The STAIC–T has adequate internal consistency (Crowley & Emerson, 1996; Spielberger, 1973), moderate test–retest reliability (rs between .65 and .71; see Spielberger, 1973), and adequate convergent and discriminant validity (again, strongest when comparing clinical versus nonclinical groups; Reynolds, 1982; Spielberger, 1973). In the current sample, coefficient alpha was .85.

Procedure

All procedures were approved by the university’s IRB. Participants completed measures in the child’s home or in the research lab. After obtaining written parental consent and child assent, participants completed the ChEESE-Q first to eliminate priming of negative affect by the measures of anxiety and depression, and then completed the CDI and STAIC–T in counterbalanced order. To eliminate variance due to reading ability, a research assistant read all measures aloud and then recorded the child’s responses. Children were paid $12 each for their participation.

Results

Preliminary Analyses

Means, standard deviations, and intercorrelations for measures of child-rated SIP, anxiety, and depression are presented in Table 1. One-way analyses of variance and Pearson product–moment correlations were used to test for mean differences within categorical (i.e., gender, child’s grade in school, and ethnicity) and associations with continuous (i.e., age and income) demographic variables for SIP, CDI, and STAIC–T scores. No significant effects emerged for age, gender, race, or grade level. Income was negatively associated with CDI (r = −.33, p < .01) and STAIC–T (r = −.27, p < .01) scores. Thus, income was included as a covariate in analyses presented next.

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Note. SIP = Social Information Processing; NIPS = Negative Information Processing Style; PIPS = Positive Information Processing Style; PRES = Positive Response Evaluation Style; CDI = Children’s Depression Inventory; STAIC–T = State-Trait Anxiety Inventory for Children–Trait Form.

a N = 215.
b Because adjustments in the response format were made to improve psychometric properties for some Children’s Evaluation of Everyday Social Encounters items, direct comparisons between scale scores in Study 1 and Study 2 are not possible.

| Predictor |  |  |  |  |  |  |  |  |  |  |  |
|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|           | Pred. Anxiety   | Pred. Depression |                  |                  |                  |                  |                  |                  |                  |                  |
| Income    | R2 = .19        | F(2, 209) = 24.68*** |                 |                  |                  |                  |                  |                  |                  |                  |
| NIPS      | R2 = .17        | F(2, 209) = 22.38*** |                 |                  |                  |                  |                  |                  |                  |                  |
| Income    | R2 = .12        | F(2, 209) = 14.74*** |                 |                  |                  |                  |                  |                  |                  |                  |
| NIPS      | R2 = .17        | F(2, 209) = 22.38*** |                 |                  |                  |                  |                  |                  |                  |                  |
| Income    | R2 = .12        | F(2, 209) = 14.74*** |                 |                  |                  |                  |                  |                  |                  |                  |
| NIPS      | R2 = .17        | F(2, 209) = 22.38*** |                 |                  |                  |                  |                  |                  |                  |                  |

Note. SIP = Social Information Processing; NIPS = Negative Information Processing Style; PIPS = Positive Information Processing Style; PRES = Positive Response Evaluation Style.

*p < .05. **p < .01. ***p < .001.
income. For each regression, either anxiety or depression served as the criterion variable, whereas the SIP variable of interest was entered along with income as predictors. Gender and grade were also each tested as moderators of the relations of NIPS, PIPS, and PRES to anxiety and depression. All interactions were non-significant (all $F_s < 1$). As such, these variables were not included in the final models presented in Table 2. To test whether SIP was differentially related to anxiety and depression, tests of dependent correlations were utilized (Meng, Rosenthal, & Rubin, 1992). Specifically, we examined if the magnitude of the relation between SIP and one internalizing construct (e.g., depression) differed significantly from the relation of SIP to the other internalizing construct (e.g., anxiety) accounting for the fact that all information comes from the same participants. In essence, this analysis allowed us to test differential relationships without covarying out important variance in anxiety or depression (e.g., by including the opposing construct as a predictor in a multiple regression analysis; see Miller & Chapman, 2001). To control for the effect of income on this relationship, anxiety and depression were each regressed on income levels first and subsequent residual values were used to calculate correlation coefficients (i.e., semipartial correlations) of SIP to internalizing symptoms.

As predicted, both anxiety and depression were positively related to NIPS, controlling for family income (see Table 2). Tests of dependent correlations indicated that the semipartial correlations of NIPS to anxiety ($r_{xy} = .35$) and to depression ($r_{xy} = .27$), respectively, were not significantly different from one another ($Z_{diff} = 1.16, p > .05$). On the other hand, the two positive SIP variables, PIPS and PRES, were each unrelated to anxiety (note that these models are therefore not presented in Table 2). One of the two positive SIP variables, PRES, was related negatively to depression. Further, a test of dependent correlations indicated that the semipartial correlation of PRES with depression ($r_{xy} = -.13$) was statistically greater in magnitude than the (nonsignificant) relation with anxiety ($r_{xy} = .01$; $Z_{diff} = -2.00, p < .05$). Overall, these results suggest that PRES is uniquely, inversely related to depression. When controlling for family income, PIPS was unrelated to depression (though note the significant, bivariate, inverse relation in Table 1).

**STUDY 2**

Given the differential relations of negative and positive SIP to depression and anxiety in Study 1, we aimed to replicate and expand the findings in Study 2. Specifically, the three aims of Study 2 were to answer the following questions: (a) Can relations of anxiety and depression to SIP styles be replicated? (b) Do SIP styles predict internalizing symptoms over and above affect?, and (c) Do SIP styles mediate the relation of affect to internalizing symptoms?

**Method**

**Participants**

Participants included a school-based sample of fifth- and sixth-grade students recruited from a middle school located in a small Midwestern town. All children in these grades were given a permission slip to take home to be signed by their parent or legal guardian indicating consent for their child’s participation. Of 205 permission slips distributed, 139 were returned and 129 parents provided consent, yielding a consent rate of 63%. Except for 2 students who were absent the day of questionnaire administration, all students with parental consent assented to participate, yielding a final sample of 127 students.

Of the sample, 71 were girls (56%) and 56 were boys, ranging from 10 to 13 years old ($M = 11.11, SD = .69$). Self-identified race/ethnicity of the sample was mostly Caucasian (87%), with 4% African American, 2% Native American, 2% Biracial, 1% Hispanic, and 3% who identified as “Other.” Two students did not provide ethnicity information. Income data were not collected for this sample, but families in this school district are typically middle class (e.g., median household income is slightly more than $39,000, and 28.3% of students received free lunch in 2006; Missouri Department of Elementary and Secondary Schools, 2007). Participants were approximately evenly divided across fifth (47%) and sixth grades (53%).

**Measures**

**SIP.** SIP was assessed using a modified version of the ChEESE-Q. Per findings from Bell and colleagues (2009), certain items were altered to improve their psychometric properties. Specifically, for response construction, instead of an open-ended question in which participants could generate potential solutions, eight potential problem-solving responses were provided for each vignette. Participants indicated on a 5-point scale how likely they were to enact each behavior. Subsequently, response selection was assessed by having the child indicate which of the potential solutions he or she was most likely to do in that situation. Finally, the response format for response justification was modified from a proportion score to be a 5-point scale in which students indicated the extent to which their chosen solution met each of the six goals provided. These changes did not alter the overall length or administration time of
the ChEESE-Q but did increase the number of items available for analyses (i.e., 180 items total). Again, data reduction was needed. In a previous study using this sample (Bell et al., 2009) confirmatory factor analytic work supported the three-factor model previously found in Study 1. In addition, avoidant and aggressive items from the response construction stage loaded on the NIPS factor, whereas prosocial items from this stage loaded on the PIPS factor. Coefficient alpha for each factor was acceptable: .87, .84, and .81 for NIPS, PIPS, and PRES, respectively.

Depression. As in Study 1, depression was assessed using the CDI (Kovacs, 1992) with the suicidal ideation question omitted. Coefficient alpha in this sample was .84.

Anxiety. Also like Study 1, anxiety was assessed with the STAIC–T (Spielberger, 1973). Coefficient alpha was calculated as .86.

Positive and negative affect. Trait affect was assessed with the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999). Summed scores for 12 items assessing positive affect (PA subscale) and 15 assessing negative affect (NA subscale) in the past few weeks are calculated separately. For each item, children rate on a 5-point Likert scale (from very slightly or not at all to extremely) how much they have been experiencing a specific emotional state (e.g., happy, sad, worried). The PANAS-C is reliable and valid for use with children and adolescents in both community and clinical settings and has demonstrated convergent and discriminate validity with measures of anxiety and depression (Laurent et al., 1999). In our sample, coefficient alpha was .89 for the NA subscale and .88 for the PA subscale.

Procedures

All procedures were approved by the university’s IRB. After assent was obtained, measures were administered in one of two large groups during the school day. Unlike Study 1, group administration of measures prevented counterbalancing. As with Study 1, the ChEESE-Q was administered first to eliminate priming by anxiety, depression, and affect measures. Although all study measures were designed to be self-administered (including the ChEESE-Q), a graduate research assistant read each measure aloud as participants completed surveys at their seats to help eliminate difficulties with reading and to ensure completion of data collection within the school’s permitted timeframe. Undergraduate research assistants were also available to help keep children focused on the task and assist with questions. Children were given a university-logo pencil and a small snack for participating.

Results

Preliminary Analyses

Means, standard deviations, and intercorrelations for measures of child-rated SIP, anxiety, depression, and trait affect are presented in Table 1. Notably, correlations provide support for the affective components of the tripartite model. Specifically, both anxiety and depression were significantly related to increased negative affect, whereas depression, but not anxiety, was significantly related to decreased positive affect (see Table 1). One-way analyses of variance were used to test for mean differences within demographic variables (i.e., gender, child’s grade in school, and ethnicity) for SIP, CDI, STAIC–T, and PANAS-C scores. No significant effects emerged. Compared to Study 1, participants in Study 2 reported significantly higher levels of depression, \( r(340) = 6.39, p < .001 \), and anxiety, \( r(340) = 2.84, p = .005 \), symptoms. Changes made to improve the psychometric properties of the ChEESE-Q between studies prevented direct comparisons of these scores across samples.

Aim 1: Can Relations of Anxiety and Depression to SIP Styles Be Replicated?

The first aim of the Study 2 was to replicate the relations of SIP styles to anxiety and depression. Again, regression analyses with either anxiety or depression as the criterion variable were used to test whether each SIP style predicted internalizing symptoms. Like in Study 1, gender and grade were each tested as moderators of the relations, but all interactions were nonsignificant (all \( F < 1 \)). Finally, tests of dependent correlations were used to compare relative magnitude of relations of SIP to anxiety versus to depression.

In general, patterns of results replicated Study 1, with some effects being stronger. Like Study 1, NIPS was related to both anxiety (\( \beta = .35, t = 4.12, p < .001 \)) and depression (\( \beta = .44, t = 5.43, p < .001 \)), and a test of dependent correlations indicated that the magnitudes of these two effects did not significantly differ from one another (\( Z_{\text{diff}} = 0.86, p > .05 \)). On the other hand, PIPS (\( \beta = -.29, t = -3.42, p < .001 \)) and PRES (\( \beta = -.36, t = -4.38, p < .001 \)) were each negatively associated with depression, and these relations were stronger than in Study 1. Each type of positive SIP was unrelated to anxiety (\( \beta = .07, t = 0.78, p = .44 \), and \( \beta = .08, t = 0.86, p = .39 \), for PIPS and PRES, respectively). Likewise, tests of dependent correlations provided further...
evidence of unique relations of positive SIP to depression; the correlations of PIPS and PRES to depression were significantly larger than the correlations of these SIP styles to anxiety ($Z_{\text{diff}} = -4.03, p < .001$, and $Z_{\text{diff}} = -4.50, p < .001$, for PIPS and PRES, respectively).1

Aims 2 and 3: Do SIP Styles Predict Internalizing Symptoms Over and Above Affect? Do SIP Styles Mediate the Relation of Affect to Internalizing Symptoms?

Aims 2 and 3 of Study 2 could each be answered with the same set of analyses. Mediation analyses were conducted using path analysis (e.g., Kline, 2004) with maximum likelihood estimation in Mplus 5.0 (Muthén & Muthén, 1998–2007). Path analysis provided several benefits over the traditional Baron and Kenny (1986) mediation approach including allowing a simultaneous test of multiple predictors, intercorrelated mediators, and outcome variables. An additional benefit of Mplus statistical software, in particular, is the ability to compute bias-corrected bootstrap estimates of standard errors for specific indirect effects.

Figure 1 presents two saturated models fit to obtain standardized estimates of total, direct, and indirect effects among study variables (nonsignificant paths are indicated with a dashed line). Because of high collinearity between PIPS and PRES, these two variables were tested as potential mediators of the relation between affect and internalizing symptoms in separate models (the top and bottom panels of Figure 1, respectively). Although one option often used in analytic frameworks like regression is to combine variables that are highly collinear for analyses, PIPS and PRES were examined in separate models given previous confirmatory factor analytic work that suggested a two-factor model with PIPS and PRES combined actually fit significantly worse than the three-factor model with PIPS, PRES, and NIPS as separate factors (Bell et al., 2009). Residual variance in anxiety and depression was allowed to correlate.

Several components of these models are of interest to the current study. First, the direct effects of positive and negative affect on each SIP variable indicated that these variables were related in meaningful and expected ways. As hypothesized, negative affect was significantly related to NIPS, whereas positive affect was related strongly to both PIPS (Figure 1, top panel) and PRES (Figure 1, bottom panel). Notably, NIPS was unrelated to positive affect, and PIPS and PRES were unrelated to negative affect.

For study Aim 2, the direct effects of SIP styles on depression and anxiety, respectively, indicated that social cognition contributed significant variance to anxiety and depression over and above affect (and over the other SIP variable in the model). In particular, NIPS contributed unique variance in predicting both anxiety and depression over that variance accounted for by affect and positive SIP functioning. In contrast, both PIPS and PRES were inversely related to depression, but unrelated to anxiety, over and above affect.

Finally, indirect effects from affect to internalizing symptoms through SIP were tested (i.e., Aim 3). Because indirect effects may not be normally distributed, we used bias-corrected bootstrapping procedures ($N = 1,000$).
Regarding indirect effects of positive affect on internalizing symptoms, a significant indirect effect did not emerge through PIPS (standardized indirect effect = −.07, ns, 95% CI = −.16, .02) as originally hypothesized but did through PRES (standardized indirect effect = −.14, p = .03, 95% CI = −.27, −.02). Because significant direct effects of positive affect on depression emerged, these results indicated that PRES was a partial mediator. No significant direct effect of positive affect (or indirect effects through PIPS or PRES) was found to predict anxiety. Overall, these results suggest that social cognitive styles do, in fact, partially mediate the relation between affect and internalizing symptoms in valence-specific ways.

Saturated models, by definition, have perfect fit. Follow-up analyses, however, were conducted to specifically test fit of a trimmed model in line with our hypotheses that negative affect would be directly related to both anxiety and depression and partially mediated through NIPS, whereas positive affect would be directly related only to depression with an indirect effect through positive SIP. Again, separate models for PIPS and PRES were tested. According to recommended criterion values (Hu & Bentler, 1999), the model including PIPS fit the data adequately (though note the large confidence interval for root mean square error of approximation [RMSEA], and Tucker–Lewis index [TLI] value below .95): \( \chi^2(4) = 7.17, \ p = .13; \ RMSEA = .07 \) (90% CI = .00, .17), comparative fit index (CFI) = .98, TLI = .94. All direct and indirect paths (i.e., positive affect \( \rightarrow \) PIPS \( \rightarrow \) depression; negative affect \( \rightarrow \) NIPS \( \rightarrow \) anxiety; negative affect \( \rightarrow \) NIPS \( \rightarrow \) depression) were significant in the model. The model including PRES fit very well: \( \chi^2(4) = 4.26, \ p = .37; \ RMSEA = .02 \) (90% CI = .00, .14), CFI = .99, TLI = .99. Again, all direct and indirect paths (i.e., positive affect \( \rightarrow \) PRES \( \rightarrow \) depression; negative affect \( \rightarrow \) NIPS \( \rightarrow \) anxiety; negative affect \( \rightarrow \) NIPS \( \rightarrow \) depression) were significant in the model.

Finally, alternative models in which affect was tested as a mediator of the relation of SIP to internalizing symptoms were fit to provide more confidence in the obtained results of the hypothesized trimmed model. The models fit the data poorly. For the model with PIPS: \( \chi^2(4) = 18.61, \ p < .001; \ RMSEA = .17 \) (90% CI = .10, .25), CFI = .91, TLI = .62. For the model with PRES: \( \chi^2(4) = 12.00, \ p = .01; \ RMSEA = .13 \) (90% CI = .05, .21), CFI = .95, TLI = .84. Because the trimmed and alternative models are nonnested, they could not be compared directly. However, the good fit for the hypothesized model and poor fit for the alternative model provides greater confidence in the hypothesized model.

Discussion

The major purposes of our current studies were to investigate unique relations of SIP styles to anxiety and depression and to examine the additive validity of SIP in a model of affect and internalizing symptoms among two community samples of elementary school children. Our findings extend the literature in two notable ways. First, by examining unique relations of SIP to anxiety and depressive symptoms in the same sample of children, we were able to draw firmer conclusions about what aspects of SIP are common to both anxiety and depression versus specific to one or the other. Second, our data could directly test a previously described (e.g., Lemerise & Arsenio, 2000; Lonigan et al., 2004), yet unstudied, integrated model of SIP, emotions, and internalizing symptoms.

Relations of Anxiety and Depression to SIP Styles

The tripartite model of affect has been supported as a viable framework for understanding shared and unique aspects of child anxiety and depression. Originally focused on affective and physiological components of anxiety and depression, it has recently been extended to the cognitive domain (Marien & Bell, 2004). Our results support the inclusion of social cognitive processes in the tripartite framework. Consistent with prior findings from the separate anxiety and depression literatures, both anxiety and depression were associated with a more negative SIP style. Moreover, this relation was of similar magnitude for anxiety and depression. On the other hand, only depression was related to less positive SIP styles. Thus, in line with the two previous studies that simultaneously addressed anxiety and depression (Dickson & MacLeod, 2004; T. Gencoz et al., 2001), difficulties with interpreting, evaluating, and solving social problems in a positive manner may be a key factor that sets depression apart from anxiety. Whereas anxious youth are likely to interpret situations in a negative manner may be a key factor that sets depression apart from anxiety. Whereas anxious youth are likely to interpret situations in a negative...
manner across SIP stages, they also appear able to at least entertain positive conceptualizations of social interactions and respond accordingly. Youth experiencing depressive symptomatology are seemingly at a distinct disadvantage in this regard.

In Study 2 several associations of SIP to internalizing symptoms were of larger magnitude than similar relations in Study 1. This may have been due to our ability to control for income in Study 1, which shares variance with both SIP and internalizing symptoms. Income data were not available for Study 2. Stronger findings might also reflect sample-specific characteristics. Youth in Study 1 appeared relatively better adjusted than in Study 2, as indicated by significantly lower depression and anxiety scores. Finally, although age did not moderate relations in either sample, the inclusion of only fifth- and sixth-grade youth in Study 2 may help explain the stronger relations. Specifically, Study 2’s findings may have reflected the fact that as youth approach adolescence, SIP patterns may be more stable (Bell-Dolan & Wessler, 1994), and internalizing symptoms more prevalent yet distinguishable (Cole et al., 1997).

Joint Contributions of Emotions and SIP in Predicting Anxiety and Depression

Despite several theoretical models that posit an interplay between emotions and social cognitions in the development of psychopathology (e.g., Crick & Dodge, 1994; Lemerie & Arsenio, 2000; Lonigan et al., 2004), it is surprising that few studies have directly tested these relations. By including a measure of affect along with a comprehensive assessment of social cognitive functioning, the current study makes several advances. First, from a psychometric perspective, the moderate to strong relations of positive and negative affect to positive and negative SIP functioning, respectively, adds to the emerging body of support for the validity of the ChEESE-Q given the theoretical link between emotions and cognitions (e.g., Lemerie & Arsenio, 2000; Lonigan et al., 2004). Further, the ChEESE-Q also demonstrated discriminant validity, as the relations between SIP and affect were valence specific (i.e., correlations of negative affect to positive SIP and of positive affect to negative SIP were nonsignificant in expected directions).

Second, although broader stress-diathesis models suggest that certain emotional and social cognitive difficulties may be related, yet independent, risks for youth psychopathology (e.g., Hankin & Abramson, 2001), empirical work examining the two simultaneously has been sparse. Our results suggested that SIP predicted unique variance in internalizing symptoms over and above children’s level of trait affect. Again, these results fit nicely into a tripartite framework such that negative SIP predicted both anxiety and depression over and above negative affect, whereas low positive SIP was related only to depression even controlling for positive affect. Together, SIP and affect accounted for approximately 27% of variance in anxiety symptoms and 40% of variance in depression symptoms. Clearly other unmeasured risk factors (e.g., physiological arousal, environmental stressors, genetic vulnerability) help explain the experience and expression of anxiety and depression symptoms, but our results underscore the importance of considering both affective and social cognitive risks when conceptualizing internalizing problems.

Finally, the current study is one of the first to explicitly test the pathway from affect to internalizing symptoms through the mechanism of SIP. Consistent with theory and in line with hypotheses, we found that NIPS partially mediated the relation of negative affect to both anxiety and depression. Similarly, both PIPS (though only in the trimmed model) and PRES mediated the relation of lowered positive affect to increased depression. The extent to which SIP explained these relationships was small (e.g., absolute values of standardized indirect effects between .07 and .14), yet still significant, and both affect and SIP had larger direct effects outside of these indirect pathways.

Still, as others have suggested, a child’s affective cues may influence how the course of SIP is navigated (e.g., Lemerie & Arsenio, 2000; Lonigan et al., 2004). Our data suggest that trait affect may influence positive and negative SIP functioning. In turn, SIP may contribute to the development of internalizing symptoms, which include not only affective and cognitive symptoms but also broader behavioral symptoms. For example, in social situations a child who experiences less happiness than other youth may be less likely to interpret the actions of others as prosocial or warm, try to be proactive in goal setting (e.g., maintaining relationships), or enact prosocial responses that may require heightened motivation. In line with behavioral and interpersonal models of depression (e.g., Joiner et al., 1999; Rehm, 1977), repeated social failures that occur in this manner, in which youth fail to elicit positive reinforcement or underestimate positive outcomes from interpersonal interactions, may put youth at risk for developing depressive symptoms or disorder. We acknowledge that cross-sectional studies with symptom measures only begin to unravel the complex interplay of emotionality and SIP in relation to pathology. Although previous work suggests that SIP functioning is similar across stages (Bell et al., 2009), affective cues may have specific influences on SIP at various stages that in turn influence symptomatology. Yet the current study is an important first test of joint-risk models that include both emotion and social cognitive processes.
Limitations and Future Directions

Our findings should be interpreted in light of three limitations. First, the ChEESE-Q is a relatively new measure of SIP that specifically targets situations that are difficult for youth with social anxiety. Although clear advantages of this measure are that it is one of the most comprehensive SIP measures of its kind and that it uses situations highly relevant for youth with internalizing symptoms, it is possible that additional vignettes may elicit different responses. In the future, using vignettes that pull for more sadness or even positive emotions may provide a clearer picture of SIP deficits for depressed youth. Similarly, because it may be a specific component of some anxiety disorders (e.g., panic; Brown et al., 1998; Mineka et al., 1998), we did not assess levels of physiological hyperarousal in this study. From a tripartite framework, however, anxious arousal is hypothesized to be specific to anxiety, and future work should examine potential relations to SIP. Though speculative in the absence of data, experienced anxious arousal in social situations may likely activate NIPS-like SIP, and may help explain relations of arousal to anxiety. Finally, utilizing the ChEESE-Q to study SIP in youth with diagnosable anxiety and depressive disorders would be informative. Likely, maladaptive SIP functioning would be even more pronounced in such populations.

Second, using only children’s self-report means that monomethod bias cannot be ruled out. Although children may be the best reporters of their own affect, thoughts, and internal symptoms (Cantwell, Lewinsohn, Rohde, & Seeley, 1997; Kazdin, 1994), data gathered from parent- and teacher-reports may provide a richer (although likely more complex) picture of how child-reported SIP functioning relates to internalizing symptoms more observable to others. For instance, teachers may provide unique information about specific SIP stages (e.g., behavioral enactment) across various peer interactions. Similarly, a measure of directly observed behavior was not included in this investigation. Research using behavioral analogues that simulate the hypothetical situations of the ChEESE-Q or observational studies of SIP and family interactions, for example, may reveal even stronger relations with anxiety and depression.

Finally, inclusion of additional mediators or moderators of the interplay between trait affect and trait SIP is warranted. As one example, Lonigan et al. (2004) have theorized that low effortful control (i.e., the inability to regulate negative reactivity to specific stimuli) may be a necessary condition for the development of internalizing pathology. Further, effortful control may moderate not only the relation of affective processes to internalizing symptoms, but also SIP’s mediational role.

Considering the vignettes used in the current investigation, children low in effortful control may have viewed these situations as more aversive (i.e., evoking increased negative affectivity) and in turn may not have been able to regulate maladaptive cognitive patterns. Considering such moderated mediational pathways in future studies requires careful examination in larger, longitudinal studies that are powerful enough to detect such effects and to tease apart specific causal pathways.

Implications for Research, Policy, and Practice

Although our data demonstrate relations across a range of symptoms in a community sample, the findings have implications for internalizing disorder treatment. Our findings may provide insight into why cognitive-behavioral treatments are effective for youth experiencing internalizing disorders (David-Ferdon & Kaslow, 2008; Silverman, Pina, & Viswesvaran, 2008). For instance, cognitive-behavioral treatments may help children change attributions, interpretations, goal setting, and problem solving in social situations. Our results suggest that a common feature of both anxiety and depression is a negative style across multiple SIP stages. Moreover, targeting negative SIP may be an especially potent target for youth with comorbid anxiety and depression. Yet depression’s unique relation to low positive SIP may suggest an important focus for developing more effective and efficient treatments. Finally, our data suggest that SIP is one means through which affect influences symptom development. Teaching youth appropriate skills to regulate both negative and positive emotional experiences may lead to less maladaptive SIP functioning. As such, interventions focused on more upstream, affective experiences may have beneficial effects for SIP as well as internalizing symptoms. Overall, the most effective treatments would likely incorporate interventions in both the emotional and social cognitive domains.

REFERENCES


