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Examination of the Response Styles Theory in a Community Sample of Young Adolescents

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Abstract

This study examined the Response Styles Theory in a large, racially and ethnically diverse sample ($N = 722$) of 6th, 7th, and 8th graders. We examined the role of response styles (rumination, distraction, and problem-solving) as predictors of changes in depressive symptoms over a seven-month period. Higher levels of rumination and lower levels of problem-solving and distraction were associated with increases in depressive symptoms over time. Response style ratio scores (rumination scores divided by the sum of distraction and problem-solving scores) also predicted increases in depressive symptoms over time. Girls reported greater depressive symptoms compared to boys, and both rumination and response style ratio score statistically accounted for the gender difference in depressive symptoms. Clinical implications include the importance of problem-solving training and rumination reduction techniques in preventive interventions.

Keywords

rumination; response styles theory; gender differences; depression; adolescence

The Response Styles Theory of depression suggests that one's response to negative mood determines whether that negative mood is maintained, exacerbated or diminished. In the original theory, Nolen-Hoeksema (1991) posited that rumination, a cognitive response style that involves passively brooding about one's mood, would lead to increases in depressive symptoms, while distraction and problem-solving would lead to decreases in symptoms. The Response Styles Theory is one of several theories (e.g., Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth; Lazarus & Folkman, 1984) that examine the role of different coping strategies and their consequences for psychological well-being. Many researchers view rumination (along with distraction and problem-solving) as emotion-regulation strategies that affect mood (for reviews see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Watkins, 2008). Some studies have distinguished between different aspects of rumination and found the brooding aspect (i.e., passively dwelling on negative feelings) to be more predictive of depressive symptoms than the reflective aspect (i.e., attempts to gain insight) (e.g., Burwell & Shirk, 2007; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). However, most studies include an overall measure of rumination and do not distinguish between subtypes.

Support for the Response Styles Theory has been well-established in the adult literature (for a review see Nolen-Hoeksema et al., 2008), particularly the relationship between rumination and subsequent increases in depressive symptoms and onset of major depression. Fewer studies have examined the theory in children and adolescents, but those studies have generally found that rumination is related to depressive symptoms in youth (e.g., Abela, Brozina, & Haigh,

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2002; Broderick & Korteland, 2004; Hart & Thompson, 1996; Li et al., 2006; Schwartz & Koenig, 1996). Surprisingly few studies have examined whether distraction and/or problem-solving lead to decreases in depressive symptoms, however (for an exception see Abela, Aydin, & Auerbach, 2007). If either of these response styles reduce the risk of development of depressive symptoms and/or prevent the onset of major depression, they could be important components of preventive interventions for youth; thus, empirical evidence is greatly needed. In this study, we examine all three response styles and their relationship to depressive symptoms in young adolescents.

Rumination and Depressive Symptoms

An association between a ruminative response style and depressive symptoms in youth has been documented in a number of studies both concurrently (Abela et al., 2002; Garnefski, Legerstee, Draaij, Van den Kommer, & Teerds 2002; Grabe, Hyde, & Lindberg, 2007; Grant et al., 2004; Kuyken, Watkins, Holden, & Cook, 2006; Li et al., 2006; Schwartz & Koenig, 1996; Ziegart & Kistner, 2002) and prospectively (Abela et al., 2002; Abela et al., 2007; Broderick & Korteland, 2004; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Schwartz & Koenig, 1996; Silk, Steinberg, & Sheffield Morris, 2003). Some qualifications to the association between rumination and depressive symptoms have been noted, however. For example, one study found that the brooding aspect of rumination, but not the reflective aspect, predicted increases in depressive symptoms (Burwell & Shirk, 2007), mirroring findings in the adult literature (Treynor et al., 2003). Another study found that rumination was concurrently associated with depressive symptoms until worry was added to the model (Muris, Roelofs, Meesters, & Boomsma, 2004). Despite these exceptions, a ruminative response style has been established as an important cognitive risk factor for the development of depressive symptoms among youth.

Distraction, Problem-Solving, and Depressive Symptoms

Few studies have focused on adaptive responses to negative mood among youth. One study of high school students found that distraction and problem-solving were negatively associated with concurrent depressive symptoms (Li et al., 2006). Another study of high school students found distraction to be negatively associated with concurrent depressive symptoms, but not with changes in depressive symptoms over a 6-week period (Schwartz & Koenig, 1996). A study of 3rd and 7th grade children found that neither distraction nor problem-solving were related to concurrent or prospective depressive symptoms (Abela et al., 2002). In contrast, a recent study of 3rd through 6th grade children found that a response style characterized by more distraction and problem-solving was negatively associated with concurrent depressive symptoms and also associated with decreases in depressive symptoms over 6 weeks (Abela et al., 2007). In sum, studies on distraction and problem-solving are largely lacking, and existing results are mixed with regard to depressive symptoms. Because preventive interventions are founded upon techniques designed to reduce and prevent symptoms, examining whether particular response styles are adaptive represents an important research endeavor.

Relationships Among Response Styles

Although some individuals may adopt a primary response style to negative mood, many individuals engage in multiple responses. For example, a child whose friend just moved away may brood about her loneliness, try distracting herself by reading a book, and think of ways to make new friends. How can we predict whether her negative mood will increase or decrease?

Abela and colleagues (2007) describe three possible approaches for using response styles to predict changes in depressive symptoms: the traditional approach (examine response styles separately), the interactive approach (examine the interaction of one or more response styles), and the ratio approach (divide rumination score by the sum of distraction and problem-solving

scores). They advocate the use of a ratio approach, because it indexes the relative degree to which individuals utilize each of the response styles. For example, an individual who engages in equal amounts of rumination and distraction would not be expected to experience changes in depressive symptoms over time, while an individual who engages in more rumination than distraction and problem-solving would be expected to experience increases in depressive symptoms over time. Similarly, if two children ruminated to a similar degree, but one of the children also used problem-solving, while the other did not, we would expect the one who used problem-solving to have lower symptoms of depression. Examining rumination and problem-solving scores separately would not account for the differences between these children as well as a ratio score would. Indeed, Abela and colleagues (2007) found ratio scores to be more strongly associated with concurrent depressive symptoms and changes in depressive symptoms than individual response styles. Because their study was the first to use the ratio approach with the Response Styles Theory, these findings warrant replication to better assess the utility of this approach (Abela et al., 2007). Additionally, their study utilized a high-risk sample of youth whose parents were diagnosed with depression. Although a high-risk sample is ideal for testing predictors because it maximizes the variability in depressive symptom scores, it raises questions about generalizability to community samples. Thus, a main goal of the current study was to examine all three response styles proposed by the Response Styles Theory and extend the use of the ratio approach with a community sample of youth.

Using the Response Styles Theory to Understand the Emergence of Gender Differences in Depression

One of the original purposes of the Response Styles Theory was to explain the relatively higher rate of depression in women compared to men (Nolen-Hoeksema, 1987, 1991). The theory suggests that women are more likely to ruminate in response to a negative mood while men are more likely to distract or engage in problem-solving. Studies with adults have found that women are more likely to ruminate than men, and that this difference in rumination accounts, at least partially, for the gender difference in depressive symptoms (i.e., co-varying rumination scores results in a non-significant gender difference in depression scores; Nolen-Hoeksema, Larson, & Grayson, 1999; Roberts, Gilboa, & Gotlib, 1998).

The gender difference in depressive symptoms and onset of major depression first begins to emerge in early adolescence when depressive symptoms begin to increase among girls (Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998; Twenge & Nolen-Hoeksema, 2002). If response style differences are responsible, or partially responsible, for the gender difference in depression, we would expect to see evidence for this during early adolescence. A number of studies of children and adolescents have documented higher rates of rumination among girls as compared to boys (Grabe et al., 2007; Grant & Compas, 1995; Grant et al., 2004; Hampel & Peterman, 2005; Hart & Thompson, 1996; Li et al., 2006; Muris et al., 2004; Schwartz & Koenig, 1996; Silk, Steinberg, & Sheffield Morris, 2003; Ziegart & Kistner, 2002), although some have not found a gender difference in rumination, despite sampling from similar age ranges (e.g., Abela et al., 2002; Abela et al., 2007; Broderick & Korteland, 2004). Few studies of youth have examined whether a gender difference in rumination accounts for the emerging gender difference in depression. Of the studies that could have examined this question, three did not find a gender difference in depression (Abela et al., 2002; Silk et al., 2003; Ziegart & Kistner, 2002), three did not examine whether girls' higher use of rumination explained their higher depressive symptoms (Grabe et al., 2007; Li et al., 2006; Muris et al., 2004), two found that rumination did not account for the gender difference in depression scores (Grant & Compas, 1996; Schwartz & Koenig, 1996) and one found that girls' greater tendency to ruminate statistically accounted for their higher depression scores (Grant et al., 2004). Because of the mixed findings in previous research, a second goal of the current study was to test the

hypothesis that greater depressive symptoms among girls are accounted for by their greater tendency to ruminate.

Although some research indicates that girls are more likely to report using a ruminative response style compared to boys, gender differences in the tendency to distract and problem-solve have rarely been examined in youth. Of the five studies that examined gender differences in distraction, four found no differences (Abela et al., 2002; Abela et al., 2007; Li et al., 2006; Schwartz & Koenig, 2006), and one found that girls showed less distraction compared to boys (Hampel & Petermann, 2005). Of the three studies that examined gender differences in problem-solving, one found no difference (Abela et al., 2007), one found that girls reported more problem-solving than boys (Li et al., 2006), and one offered mixed results (i.e., 3rd grade girls reported more problem-solving than boys, but 7th grade girls reported less problem-solving than boys; Abela et al., 2002). None of these studies examined whether gender differences in distraction or problem-solving accounted for gender differences in depressive symptoms. Clarifying gender differences in distraction and problem-solving among youth may contribute to a better understanding of the gender difference in depressive symptoms that emerges in adolescence.

Goals of Present Study

The primary goal of the present study was to compare the use of ratio scores to the traditional approach for examining the tenets of the Response Styles Theory in a community sample. Consistent with Abela and colleagues' (2007) findings, we predicted that ratio scores of rumination to distraction and problem-solving would be superior in predicting changes in depressive symptoms over time (i.e., it may be the lack of distraction and problem-solving that is costly for some individuals, not just the presence of rumination). A second goal of the present study was to examine the role of response style as an explanation of the emergence of gender differences in depressive symptoms in young adolescents, clarifying the mixed findings in previous research. Finally, we sought to generalize findings from the Response Styles Theory to a racially and ethnically diverse sample of young adolescents. Much of the prior work examining the Response Styles Theory in youth has sampled primarily from White, non-Hispanic populations (for an exception see Grant et al., 2004 who utilized an African American sample). Given that Hispanic adolescents consistently report higher depressive symptoms than White adolescents (e.g., McLaughlin, Hilt & Nolen-Hoeksema, 2007; Roberts & Chen, 1995; Roberts & Sobhan, 1992), it is important to examine whether similar processes explain the development of depression in this population. All of these goals serve to inform prevention work.

Method

Participants

The sample for this study was recruited from the total enrollment (approximately 1500 students) of two middle schools (Grades 6–8) from a school district in central Connecticut that agreed to participate in the study (students in self-contained special education classrooms and students in technical programs who did not attend school for the majority of the school day were excluded). The community in which the schools are located is a small urban community (metropolitan population of 71,538). Schools were chosen for the study based on the demographic characteristics of the school district (economically, racially, and ethnically diverse) and their willingness to participate in the study.

The parents of all eligible children (N = 1567) in the participating middle schools were asked to provide active consent for their children to participate in the study. Parents who did not return written consent forms to the school were contacted by telephone to obtain consent.

Twenty-two percent of parents did not return consent forms and could not be reached to obtain consent, and 6% of parents declined to provide consent for their child to participate in the study. The overall participation rate in the study at Time 1 was 72%. Additional students who were not present at the Time 1 assessment period were added at Time 2 (71 students) and Time 3 (139 students). Some of these students were absent at the Time 1 assessment and some had moved to the school district during the time interval separating the assessments. Two hundred seventeen (13.85%) participants who were present at the Time 1 assessment did not participate at the last assessment. Some of these students were absent on the day of data collection and some had moved from the district. It is important to note the transience of student enrollment in this district. Data from the school district indicate that over the four-year period from 2000–2004, 22.7% of students had left the district (Connecticut Department of Education, 2006).

The Time 1 sample included 51.2% (N = 545) boys and 48.8% (N = 520) girls, resulting in 1065 participants, all of whom provided assent before participating in the study. Only participants with data for all study variables at all three time points (N = 722) were used for analyses. There were no significant differences in demographic characteristics, response style, or depression scores between participants with data at all three time points and those without.

Participants were evenly distributed across grade level with 31.8% (N = 337) of participants in the sixth grade, 33.9% (N = 360) in the seventh grade, and 34.3% (N = 364) in the eighth grade at the time of the study. The race/ethnicity composition of the sample reflected the community composition and was as follows: 13.2% (N = 141) non-Hispanic, White; 11.8% (N = 126) non-Hispanic, Black; 56.9% (N = 610) Hispanic/Latino; 2.2% (N = 24) Asian/Pacific Islander; 0.2% (N = 2) Native American; 0.8% (N = 9) Middle Eastern; 9.3% (N = 100) Biracial or Multiracial; and 4.2% (N = 45) reported being members of other racial/ethnic groups. A small percentage of participants, 1.3% (N = 14), declined to provide information on their racial/ethnic background. Twenty-seven percent (N = 293) of participants reported living in single-parent households. We did not ask the students to report on their family income because the validity of their reports was unlikely to be high. The community in which the participating middle schools reside is a uniformly lower SES community, with a per capita income of $18,404 (Connecticut State Department of Education, 2006 based on data from 2001). School records indicated that 62.3% of students qualified for free or reduced lunch in the 2004–2005 school year. There were no differences across the two schools in demographic variables.

Measures

Depressive Symptoms—The Children's Depression Inventory (CDI; Kovacs, 1992) is the most widely used self-report measure of depressive symptoms in children and adolescents. The CDI is a 27-item self-report measure of depressive symptoms that has been standardized on children and adolescents aged 7 to 17 years. Each item consists of three statements (e.g., *I am sad once in a while, I am sad many times, I am sad all the time)* representing different levels of severity of a specific symptom of depression (e.g., depressed mood) or a consequence of depressive symptoms (e.g., social rejection). Items are assigned a numerical value from 0 (symptom absent) to 2 (symptom present and severe), and higher scores indicate higher levels of depression. The CDI has sound psychometric properties, including internal consistency (Reynolds, 1994), test-retest reliability, and discriminant validity (Kovacs, 1992). The item pertaining to suicidal ideation was removed from the measure at the request of school officials and the human subjects committee. The CDI demonstrated good reliability in this sample (T1 α =.82; T3 α =.89). Additionally, we found similar reliabilities for the CDI among White, Black and Hispanic participants (Hilt, McLaughlin, & Nolen-Hoeksema, 2009).

Response Styles—We used the Children's Response Styles Questionnaire (CRSQ; Abela, Brozina, & Haigh, 2002) to examine participants' tendency to engage in rumination,

distraction, and problem-solving when distressed. The measure is modeled after the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991) that was developed for adults. For each item, children are asked to rate how often they respond in that way when they feel sad on a 4-point Likert scale (0 = *almost never*, 1 = *sometimes*, 2 = *often*, 3 = *almost always*). The reliability and validity of the CRSQ, as well as its subscales, have been demonstrated in several studies (Abela, Vanderbilt, & Rochon, 2004; Abela et al., 2002; Abela et al., 2007). In order to compare the traditional approach for testing the Response Styles Theory, we first examine the effects of each of the three conceptual subscales on depressive symptoms. Because Abela and colleagues (2007) reported two underlying factors of the CRSQ (rumination and distraction/problem-solving), we utilize the combined distraction/problem-solving scale to calculate ratio scores. Internal consistency for each subscale is similar for White, Black and Hispanic participants.

Rumination—The rumination subscale from the CRSQ is a 13-item scale that assesses the extent to which participants respond to sad feelings with rumination: self-focused thought concerning the causes and consequences of depressed mood. Sample items include: *Think about a recent situation wishing it had gone better* and *Think "Why can't I handle things better?"*. The CRSQ rumination scale demonstrated excellent reliability in this study (α for Time 1 =.87; α for Time 2 =.88).

Distraction—The distraction subscale from the CRSQ is a 7-item scale that assesses the extent to which participants respond to sad feelings with distraction: active engagement in activities to avoid feeling sad. Sample items include: *Help someone else with something so you don't think about your problem* and *Go to your favorite place and get your mind off your feelings*. The CRSQ distraction scale demonstrated low, but adequate reliability in this study (α for Time 1 =.63; α for Time 2 =.64). Abela and colleagues (2007) reported that some of the items from this subscale had low (r = <.20) item-total correlations, and they dropped them from analyses. We found all items from this subscale to have acceptable item-total correlations (rs ranged from .37 –.57); thus, we have retained all of the scale's items.

Problem-solving—The problem-solving subscale from the CRSQ is a 5-item scale that assesses the extent to which participants respond to sad feelings with problem-solving: solution-focused responses to avoid feeling sad in the future. Sample items include: *Think of a way to make your problem better* and *Ask a friend/parent/teacher to help you solve your problem*. The CRSQ problem-solving scale demonstrated acceptable reliability in this study (α for Time 1 =.71; α for Time 2 =.74).

Procedure

Participants completed questionnaires during their homeroom period on three occasions during the school year. The CDI was completed at Time 1 and Time 3 in order to examine changes in symptoms during the school year, and the CRSQ was administered at Times 1 and 2 to predict prospective changes in depressive symptoms. Four months elapsed between the Time 1 (November 2005) and Time 2 (March 2006), and three months elapsed between Time 2 and Time 3 (June 2006). This time frame was chosen to allow the maximum time between assessments while also ensuring that all assessments occurred within the same academic year. Given the transient nature of the school population, data collection within one academic year was necessary to avoid high attrition. One study personnel and homeroom teachers were present in the classroom during the assessment period. Participants were assured of the confidentiality of their responses and the voluntary nature of their participation.

Data Analytic Plan

In order to examine the first study goal, we used hierarchical multiple regression analyses (Cohen & Cohen, 1983) to examine how well each method (traditional and ratio) predicted residual changes in depressive symptoms. Time 3 CDI scores served as the dependent variable in all analyses, and Time 1 CDI scores were entered in the first step. Response styles at Time 1 were entered on the second step, followed by response styles at Time 2 on the third step. Entering response styles at both Time 1 and Time 2 allowed us to test whether any changes in response styles from Time 1 to Time 2 accounted for additional variance in CDI scores over and above Time 1 response styles. For the traditional approach, each response style was examined as an individual predictor of symptom changes. The ratio approach involves dividing rumination scores by the sum of the distraction and problem-solving scores and entering the ratio score as a main effect in the model. We examined the amount of variance accounted for by each model to compare each method.

We next examined whether response styles accounted for the gender difference in depressive symptoms. A repeated measures analysis of variance examining depressive symptoms at Time 1 and Time 3 was conducted with gender as a between-subjects factor to confirm the gender difference in depressive symptoms. We examined both the traditional and ratio methods to determine whether response style mediated the gender difference in depressive symptoms. We used methods outlined by Baron and Kenny (1986) and Sobel (1982) to test the ratio approach because it involves only one indirect (i.e., mediational) effect. In order to test the traditional approach, we employed a method that allows multiple indirect effects (for rumination, distraction, and problem-solving) to be tested within the sample model (Preacher and Hayes, 2008).

Results

Descriptive Statistics

Correlations among all variables along with means and standard deviations are presented in Table 1. Of note, rumination and response styles ratio scores at both Time 1 and Time 2 were significantly correlated with depressive symptoms at both Time 1 and Time 3. Distraction at Time 1 was negatively associated with depressive symptoms at Time 1 and Time 3; distraction at Time 2 was also negatively associated with depressive symptoms at Time 3. Problem-solving at Time 1 was negatively associated with depressive symptoms only at Time 3. Also of note, all three response styles were positively correlated with each other, despite their different relationships to depressive symptoms. All three response styles continued to be significantly related to each other when depressive symptoms were co-varied. These results suggest that youth may use a variety of strategies, both positive and negative, when they experience distress, providing evidence for the importance of accounting for engagement in both positive and negative responses.

Table 2 presents effect sizes for gender differences in all variables. Girls reported significantly higher depressive symptoms than boys at both Time 1 and Time 3. As predicted, girls also exhibited higher rumination and ratio scores. Girls also exhibited higher scores on problem-solving, but there was no gender difference in distraction.[1]

Predicting Changes in Depressive Symptoms with Response Styles

Depressive symptoms increased from Time 1 (M = 9.43, SD = 6.29) to Time 3 (M = 9.94, SD = 7.78), $F(1, 721) = 4.05$ $p < .05$. Regression models utilizing the traditional and ratio

[1]All significant gender differences in response styles (including ratio scores) remain significant when controlling for depressive symptom scores.

methods were tested to examine which model accounted for more variance in depression scores at Time 3, controlling for Time 1 depression scores. The assumption of homogeneity of covariance was met in each equation.

Traditional approach—A regression equation was specified that involved entering each of the three response styles from Time 1 as main effects on step 2, and each of the three response styles from Time 2 on Step 3. Examination of Step 2 indicated that greater levels of rumination and lower levels of problem-solving at Time 1 predicted increases in depressive symptoms. Step 3 was also significant, with greater rumination and less distraction at Time 2 accounting for change in depressive symptoms from Time 1 to Time 3. The model accounted for 34.1% of the variance in Time 3 depression score (95% CI for R^2 =.28–.39). See Table 3 for results at each step.

Ratio approach—Another regression model was tested, using the ratio score (rumination score divided by the sum of distraction and problem-solving scores). In this model, Step 2 was significant, indicating that a tendency to engage in greater levels of rumination relative to distraction and problem-solving accounted for increases in depressive symptoms. Step 3 was also significant, suggesting that greater rumination relative to distraction and problem-solving at Time 2 accounted for an incremental increase in depressive symptoms from Time 1 to Time 3. The model accounted for 33.7% of the variance in T3 depression score (95% CI for R^2 =. 28–.39). See Table 4 for results at each step.

In sum, higher levels of rumination at Time 1 predicted increases in depressive symptoms, and higher levels of problem-solving at Time 1 predicted decreases in depressive symptoms, in line with the traditional method of testing the response styles theory. Greater rumination and less distraction at Time 2 also accounted for increased depressive symptoms, also in line with the theory. Additionally, the ratio method significantly predicted changes in depressive symptoms. The amount of variance accounted for by the traditional and ratio regression models was not significantly different given their overlapping R^2 confidence intervals.

Understanding the Gender Difference in Depressive Symptoms

Gender exerted a significant between-subjects effect on depressive symptoms in a repeated-measures ANOVA, $F(1, 718) = 7.09$, $p < .01$. Thus, there was a significant gender difference in depressive symptoms, taking into account depression measured at both time points.

In order to test for mediation using the ratio approach, we used steps outlined by Baron and Kenny (1986), examining whether the ratio score mediated the gender difference in depressive symptoms. The ratio score was associated with both the predictor (gender) and the criterion (depressive symptoms). The gender difference in Time 1 depressive symptoms was significantly reduced (from β=.09, p =.00 to β=.06, p =.04), adjusted R^2 =.13, Sobel's $z = 3.63$, $p < .001$, when the ratio score was added to the model, providing evidence for partial mediation (see Figure 1).

In order to examine the mediating effect of the individual response styles, we tested their indirect effects using a bootstrapping approach that provides bias corrected and accelerated confidence intervals (BcA CIs; Preacher & Hayes, 2008). This approach allows multiple mediators to be tested in the same model. The gender difference in Time 1 depressive symptoms was significantly reduced when the three response styles were added to the model (from t = 3.01, p =.00 to t =.34, p =.69), providing evidence for mediation. Girls reported higher levels of both rumination and problem-solving. Rumination was associated with greater depressive symptoms, while problem-solving was associated with lower depressive symptoms. There was no gender difference in distraction. The indirect effects of both rumination (BcA CI =.99 to 1.88) and problem-solving (BcA CI = −.59 to −.19) were significant (see Figure 2 for path

coefficients). In sum, the ratio score partially mediated the gender difference in depressive symptoms, and rumination and problem-solving, together, fully mediated the gender difference in depressive symptoms.

Discussion

The present study examined changes in depressive symptoms over a seven-month time period in a community sample of young adolescents. Consistent with prior research, greater rumination at Time 1 predicted increases in depressive symptoms over time. Additionally, lower problem-solving at Time 1 prospectively predicted increases in depressive symptoms. Greater rumination and lower distraction at Time 2 also predicted increases in depressive symptoms from Time 1 to Time 3. Response style ratio scores (rumination divided by distraction and problem-solving) at Time 1 and Time 2 also predicted increases in depressive symptoms. We found a gender difference in depressive symptoms, with girls scoring higher than boys. Gender differences in rumination, problem-solving, and in response style ratio scores statistically accounted for this gender difference in depressive symptoms. These findings are largely consistent with predictions from the Response Styles Theory (Nolen-Hoeksema, 1991).

Response Styles and Depressive Symptom Changes

Of the three response styles, rumination was the strongest and most consistent predictor of change in depressive symptoms. This study adds to a growing literature supporting the role of rumination in the development of depressive symptomatology in youth (e.g., Abela et al., 2007; Broderick & Korteland, 2004; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Schwartz & Koenig, 1996; Silk, Steinberg, & Sheffield Morris, 2003). Our sample was highly diverse and from a low-income community. Our results suggest that rumination is an important target for prevention and intervention work in such populations.

In addition to rumination, low problem-solving at Time 1 prospectively predicted increases in depressive symptoms in this sample. Two previous studies, one with younger children (Abela et al., 2007) and one with adolescents (Li et al., 1996) found lower levels of problem-solving to be associated with increases in depressive symptoms. Problem-solving skills training has been demonstrated as an efficacious treatment for various childhood problems (e.g., Kazdin, Siegel, & Bass, 1992) and is a major component in cognitive-behavioral interventions for depressed adolescents and targeted preventions for youth at risk for depression (e.g., Clarke et al., 1995; Lewinsohn, Clarke, Hops, & Andrews, 1999). Our results confirm the importance of problem-solving skills training as a component of prevention and intervention programs for youth.

The current study found that lower levels of distraction at Time 2 predicted increases in depressive symptoms from Time 1 to Time 3. These results are consistent with some prior work linking low levels of distraction to increases in depressive symptoms (Abela et al., 2007; Li et al., 1996). Interestingly, distraction at Time 1 was not a significant predictor of increases in depressive symptoms. Nolen-Hoeksema and colleagues (2008) pointed to issues with measuring distraction as a way of coping with depression that may apply in this study. Specifically, distraction scales such as the one used in this study ask participants how many distracting activities they engage in, and how often. Such questions do not tap how absorbed individuals become in their distracting activities; some individuals may engage in many distracting activities but not pour their attention into any of them, shifting from one strategy to another in attempt to distract themselves from negative moods. These measurement problems may explain the inconsistent findings regarding the association between distraction and depression that have emerged from the adult literature, in which distraction measures much like the one in this study have been used (see review by Nolen-Hoeksema et al., 2008).

Additionally, it is possible that distraction has an inconsistent relationship with depression in the literature because it is a short-term solution. From a clinical perspective, distraction is one tool to improve mood, but it should be used with other, longer-term strategies like problem-solving.

Although rumination and problem-solving/distraction exhibited differential relationships to depressive symptoms (positive and negative, respectively), they were positively associated with one another. In fact, all three response styles were inter-correlated, despite their differing relationships with depressive symptoms. This finding suggests that individuals employ multiple coping strategies when experiencing distress and that even those who engage in problematic coping (i.e., rumination) may also employ more effective strategies. As such, it is important to take into account not only the extent to which individuals engage in coping strategies that are deleterious but rather the engagement in negative coping relative to more effective, positive coping strategies to determine level of risk for psychopathology. It follows that determining an individual's level of risk for the development of depressive symptoms may best be approached by examining his or her ratio score (rumination divided by distraction and problem-solving). In the present study, ratio scores were significantly related to increases in depressive symptoms over time, consistent with findings from Abela and colleagues (2007). However, the ratio score did not account for more variance in depressive symptoms than considering each response style separately. Perhaps the ratio score is more important to consider in high-risk samples (see Abela et al., 2007) while the rumination score (or individual response styles) is sufficient for predicting depressive symptoms in community samples.

Role of Response Styles in Understanding Gender Differences in Depressive Symptoms

An important contribution of the present study is the finding that response styles statistically account for the observed gender difference in depressive symptoms. Specifically, rumination and problem-solving statistically mediated the gender difference in depressive symptoms, while the ratio score of rumination to distraction and problem-solving partially mediated the gender difference in depression. This finding helps to extend predictions of the Response Styles Theory to early adolescence, the time when gender differences in depression and depressive symptoms first emerge (Hankin et al., 1998; Twenge & Nolen-Hoeksema, 2002). According to the Response Styles Theory, females are more likely to ruminate, while males are more likely to use distraction and problem-solving. We found support for the former prediction, but not the latter. The effect size for the gender difference in rumination was medium in magnitude, and rather large for gender differences. The gender difference in problem-solving was slightly smaller, but still helped to account for gender differences in depressive symptoms, resulting in a suppression effect. Girls were more likely to report rumination, and this accounted for their higher depressive symptoms; however, girls were also more likely to report problem-solving, and this was associated with lower depressive symptoms.

The finding that girls reported using more problem-solving than boys is in line with other research showing that girls tend to report using more coping strategies, including problem-solving, compared to boys (e.g., Abela et al., 2000; Connor-Smith et al., 2000; Li et al., 1996). In their study, Connor-Smith and colleagues (2000) found that even taking into account the total number of coping responses reported, girls still reported using proportionately more problem-solving than boys. Given that girls have higher depressive symptoms compared to boys, this raises the question of construct validity in the problem-solving scale. While many of the scale items do seem to tap into the problem-solving process (e.g., *Ask someone to help you solve your problem*, *Think of a way to make your problem better*), attempts at problem-solving may not reflect engagement in the full problem-solving process of generating solutions, evaluating their consequences and choosing the best solution.

It is also important to note that the gender difference in depressive symptoms was present in our sample at Time 1. Thus, it is possible that the relationship is bi-directional, and that gender differences in depressive symptoms also account for gender differences in response style. It will be important for future research to clarify the temporal relationship of the emergence of gender differences in these constructs to further understand how the Response Styles Theory applies to the development of depression.

Clinical Implications

A direct application of this work might consider how to reduce rumination in girls. One obvious answer would be to teach girls to use problem-solving to deal with their distress. However, girls reported using significantly more problem-solving than boys, yet they had higher depressive symptoms overall. It may be that girls are trying to use problem-solving but are ineffective because rumination slips in and interferes with the quality of their problem solving. Numerous experimental studies have found that rumination leads dysphoric or clinically depressed individuals to perform more poorly on interpersonal problem-solving tasks than they are capable of (Donaldson & Lam, 2004; Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998; Lyubomirsky & Nolen-Hoeksema, 1995; Watkins & Baracaia, 2002; Watkins & Moulds, 2005). Thus, even though girls scored higher than boys on problem-solving, the fact they also showed more tendency to ruminate may mitigate the potentially positive effects of their problem-solving on depression. It is also possible that although girls report using problem-solving more than boys, their approach is less effective. Thus, if problem-solving is targeted, teaching *effective* approaches to solution generation and selection will be important rather than suggesting that youth simply problem-solve to a higher degree.

Another way to approach reducing rumination is to target it directly, and such interventions are beginning to emerge in the literature. A recent intervention specifically aimed at reducing ruminative self-focus showed significant reductions in both rumination and depressive symptoms among a small group of adults (Watkins et al., 2007). This treatment utilized functional analysis to examine the role of rumination, and also applied traditional cognitive-behavioral interventions to help individuals switch to more effective thinking styles (Watkins et al., 2007). Part of this treatment involved helping individuals switch from a ruminative cycle which may serve to avoid emotional experience to a more adaptive process of experiencing and effectively dealing with emotions. Other treatments that focus on emotional experience, such as mindfulness meditation, have also demonstrated reductions in rumination in previously depressed individuals (Jain et al., 2007; Kingston, Dooley, Bates, Lawlor, & Malone, 2007; Ramel, Goldin, Carmona, & McQuaid, 2004). These interventions help individuals to focus on the present moment without judgment instead of getting caught up in cycles of ruminative thought. Examining the efficacy of these promising interventions among adolescents represents an important avenue for future inquiry.

Another relevant intervention for youth depression has recently been developed that targets children's self-regulation of distress (Kovacs et al., 2006). Regulatory difficulties during periods of stress represent the primary intervention target. The therapy focuses on identifying children's typical responses to distressing situations, identifying the contexts that elicit maladaptive management of distress, and replacing habitual maladaptive responses to distress with alternative responses from the child's own repertoire of emotion-regulation responses that ameliorate negative mood. This intervention demonstrated efficacy in a pilot study with children meeting criteria for dysthymia and major depression (Kovacs et al., 2006). The relevance of this therapy for reducing rumination and increasing problem-solving and other adaptive responses to distress, including distraction, is clear. These studies provide an important template for future interventions with adolescents who engage in rumination.

Strengths and Limitations

One of the major strengths of this study was the use of a large, racially and ethnically diverse sample of young adolescents from the general community assessed at multiple time points. Prior studies of rumination have involved primarily White, non-Hispanic samples (with the exception of Grant et al., 2004 who studied African Americans). Results from the present study indicate that Response Styles Theory is generalizable to a largely Hispanic sample. This finding is consistent with studies finding similar effects of rumination in different countries (see by Nolen-Hoeksema et al., 2008). Future work may consider the role of cultural factors in the development of response styles (Hilt et al., 2009) and also consider examining possible differences in the content of ruminative thought for different ethnic groups. The age range of this sample was also strong in capturing the development period when gender differences in depressive symptoms first emerge (Twenge & Nolen-Hoeksema, 2002).[2] This study added to a growing literature in support of the Response Styles Theory in youth. It helped to clarify some of the mixed findings in the literature, especially regarding the role of response styles in contributing to the gender difference in depressive symptoms.

One major limitation of the current study is the use of self-report measures which may be influenced by adolescents' current symptoms. In particular, it will be important for future research to examine alternative methods for assessment of response styles, particularly problem-solving. Self-report of problem-solving may reflect strategies such as problem-solving orientation or cognitive restructuring, while a more ecologically valid measure would assess solution generation and enactment. Prior lab-based research has identified reliable methods for assessing state rumination, distraction, and problem-solving (e.g., Lyubomirsky & Nolen-Hoeksema, 1993; 1995). Given the large sample and longitudinal design utilized in this study, use of lab-based measures of rumination, problem-solving and distraction was not feasible. However, future research examining response styles and adolescent depression would benefit from utilization of alternative methods of assessment for response styles. Additional measure development in youth would also help to address the limitation of measurement overlap between rumination and depressive symptoms. Work with adult samples has shown that rumination, stripped of its depressive content, is still associated with depressive symptoms (Treynor, Gonzalez, & Nolen-Hoeksema, 2003), but this work with child and adolescent samples is lacking (see Burwell & Shirk, 2007 for an exception). Finally, we sought to generalize our findings to a diverse sample, but to date there has been little systematic research examining mechanisms in the development of depressive symptoms with racially and ethnically diverse samples. Although it is beyond the scope of the current study to examine cultural differences in response styles, this remains an important avenue for future research.

Conclusion and Future Directions

Early adolescence is a period of rising vulnerability to depressive symptoms, especially in girls. Young adolescents who develop depression are at high risk for relapse over the lifespan (Fombonne, Wostear, Cooper, Harrington, & Rutter, 2001; Lewinsohn, Rohde, Klein, & Seeley, 1999). Understanding factors that contribute to depression in this developmental period will aid the design of more effective prevention and intervention programs. Our results add to the growing body of evidence that how youth respond to initial symptoms of distress predict whether their symptoms persist or subside. In particular, youth who engage in high levels of rumination, develop more depressive symptoms over time. Developing programs that effectively reduce rumination and enhance problem-solving and distraction skills is an important goal for future research.

[2]There were no significant interactions with grade in any of the regression models.

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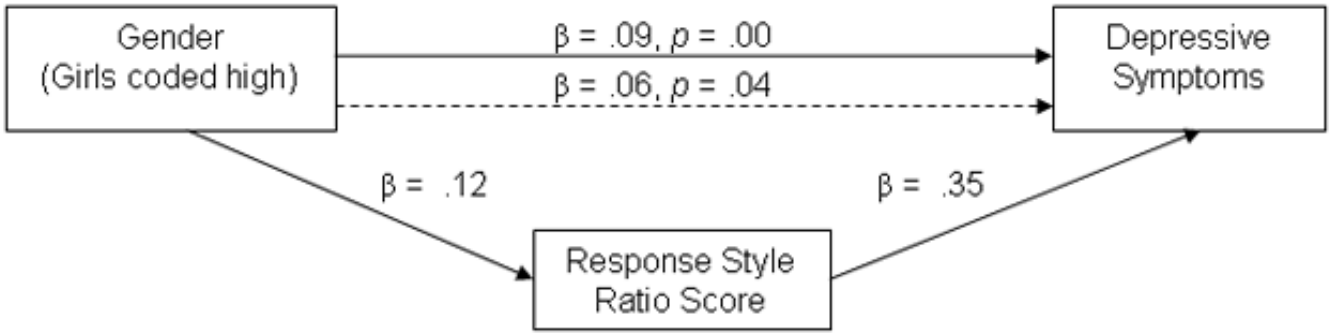

Figure 1.
The partially mediating effect of response style ratio score on the relationship between gender and depressive symptoms.

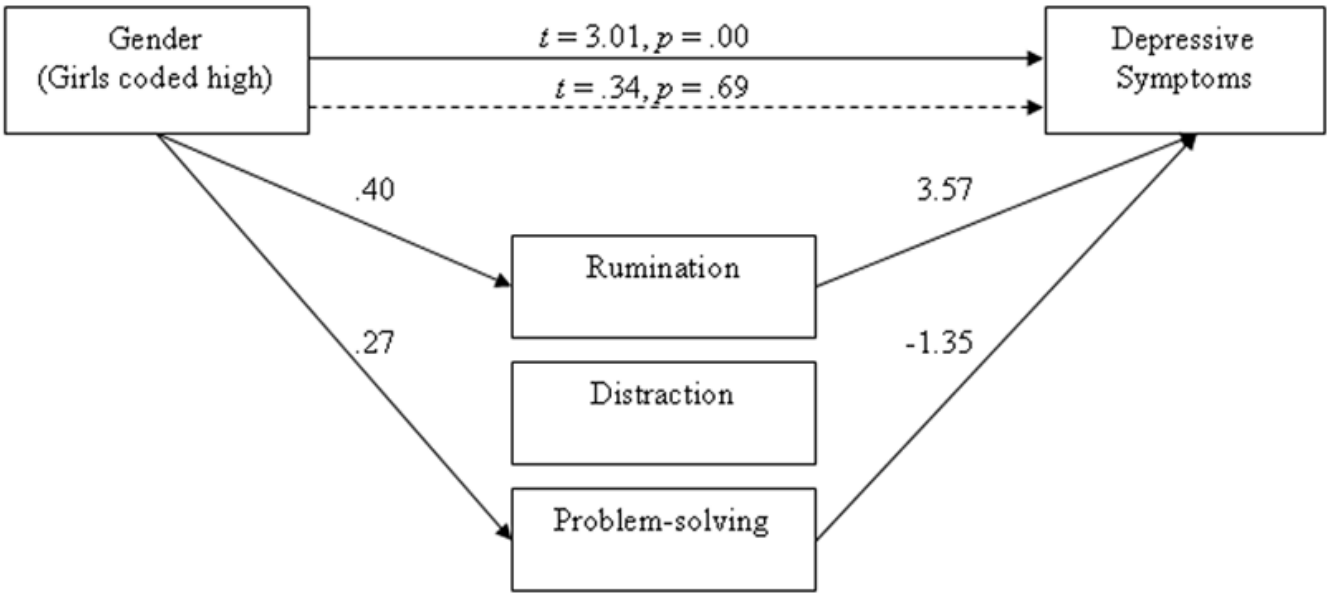

Figure 2.
The mediating effect of response styles (rumination, distraction, and problem-solving) on the relationship between gender and depressive symptoms. Significant path coefficients are displayed.

Table 1

Correlations, Means and Standard Deviations

	1	2	3	4	5	6	7	8	9	10
1. CDI T1	--									
2. Rum T1	.45**	--								
3. Dist T1	−.10*	.23**	--							
4. PS T1	−.06	.38**	.51**	--						
5. Ratio Score T1	.34**	.49**	−.28**	−.16*	--					
6. Rum T2	.43**	.58**	.10*	.16**	.31**	--				
7. Dist T2	−.02	.13**	.43**	.29**	−.12**	.26**	--			
8. PS T2	.05	.18**	.28**	.39**	−.09*	.34**	.53**	--		
9. Ratio Score T2	.27**	.37**	−.17**	−.09*	.37**	.57**	−.29**	−.18**	--	
10. CDI T3	.56**	.28**	−.09*	−.13**	.25**	.33**	−.09*	−.04	.27**	--
M and (*SD*s)	9.43 (6.29)	11.20 (7.77)	9.87 (4.04)	5.79 (3.51)	.83 (1.12)	10.65 (7.70)	8.58 (3.87)	4.93 (3.15)	.90 (.98)	9.94 (7.78)

Note. CDI = Child Depression Inventory; Rum = rumination; Dist = distraction; PS = problem solvling.

* *p* <.05

** p <.01.

Table 2

Gender Differences in Variables

	Means (*SD*s) For Girls	Means (*SD*s) for Boys	*t* statistic	*d*
CDI T1	10.03 (6.41)	8.75 (6.07)	2.77**	.21
Rumination T1	12.69 (7.88)	9.55 (7.33)	5.52***	.41
Distraction T1	9.83 (4.03)	9.91 (4.06)	.27	.02
Problem-Solving T1	6.27 (3.40)	5.27 (3.56)	3.87***	.29
Ratio Scores T1	.95 (1.29)	.71 (.89)	2.91**	.23
Rumination T2	12.28 (8.14)	8.92 (6.78)	5.97***	.45
Distraction T2	8.56 (3.40)	8.62 (3.72)	.20	.01
Problem-Solving T2	5.35 (3.10)	4.48 (3.14)	3.73***	.28
Ratio Scores T2	1.09 (1.21)	.70 (.59)	5.30***	.46
CDI T3	10.49 (7.72)	9.32 (7.83)	2.02*	.15

Note. CDI = Children's Depression Inventory.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3

Hierarchical Regression Predicting Changes in Depressive Symptoms Using the Traditional Approach

Predictors	R^2	***F* for increment in R^2**	***t* for with-in set predictors**	***Df***	***Pr***
1. Control Variable	.31	329.01^{***}		1, 720	
CDI Time 1			18.14^{***}		.56
2. Time 1 Response Style	.33	5.43^{**}		4, 717	
Rumination			2.59*		.10
Distraction			.10		.00
Problem-Solving			-3.58^{***}		−.13
3. Time 2 Response Style	.35	6.91^{***}		7, 714	
Rumination			4.02^{***}		.15
Distraction			−2.45*		−.09
Problem-Solving			−.96		−.04

Note. *Df* = degrees of freedom; *Pr* = partial correlation.

** p <.01

*** p <.001.

Table 4

Hierarchical Regression Predicting Changes in Depressive Symptoms Using the Ratio Approach

Predictors	R^2	F **for increment in** R^2	t **for with-in set predictors**	*Df*	*Pr*
1. Control Variable	.32	332.71***		1, 709	
CDI Time 1			18.24***		.57
2. Time 1 Response Styles	.32	6.55*		2, 708	
Ratio Score			2.56*		.10
3. Time 2 Response Style	.33	12.33***		1, 707	
Ratio Score			3.51***		.13

Note. *Df* = degrees of freedom; *Pr* = partial correlation.

* p <.05

*** p <.001.