Comorbidity of anxiety and depression in

youth: A developmental analysis

Laura D. Seligman

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Thomas H. Ollendick, Chair

George Clum

Robin Cooper

Jack Finney

Cynthia Lease

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(ABSTRACT)

The purpose of the current study was to examine a model explaining a pathway from anxiety to depression in youth. Additionally, a second model was considered examining specifically the worry component of anxiety and its role in the development of depression. Path analyses were used to examine the relationships between general anxiety and worry and academic competence and functioning, social competence and functioning, attributional style, hopelessness, and depression. In addition, the impact of sex and cognitive ability on these relationships was examined.

Results revealed that anxious and depressive symptomatology were significantly correlated. Further, some support was found to suggest that the significant relationship between self-reported anxiety and depression was partially mediated through social and/or academic variables as well as attributional style and hopelessness. While sex was not found to significantly impact these relationships, cognitive ability did moderate the relationship between worry and academic functioning even when other variables were considered simultaneously. The implications of these findings for treatment and research are discussed.

Dedication

To my dad ... for everything.

Acknowledgments

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Recent epidemiological investigations suggest that major depression affects around 2% to 3% of children and approximately 3% of adolescents, while other affective disorders such as dysthymia are estimated to affect another 2.5% of children and 0.1% of adolescents (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Zarate & Tohen, 1996). Interestingly, however, it has not been until relatively recently that it has been accepted that children can and do experience depression in much the same way as adults. Until the 1970s it was believed that children could experience either "masked" depression, in which an underlying depressive state would be evidenced by externalizing symptoms (i.e., delinquent behavior), somatic complaints, and phobias, or that the concept of depression was entirely inapplicable in childhood because children lack a fully developed superego (Kashani et al., 1981).

However, it is now commonly accepted that children and adolescents can and do experience significant affective disturbances (W. M. Reynolds, 1992 ; however see Seifer, Nurcombe, Scioli, & Grapentine, 1989, for an opposing view). Moreover, there is some evidence to suggest that children who experience a depressive disorder are likely to experience chronic mood disorders (Luby, Todd, & Geller, 1996) and that individuals may be permanently changed by the experience of depression (Rohde, Lewinsohn, & Seeley, 1990). Although there appears to be growing consensus regarding the existence of affective disorders in childhood and certainly in adolescence, and the impact of these disorders on youth, families, and communities, the question remains as to why children and adolescents become depressed.

Lewinsohn's Behavioral Model of Depression

Childhood is often depicted as a carefree, optimistic time. Yet depressed children are all too aware of the problems and difficulties we often believe are reserved for adults. Among a myriad of symptoms, these children report anhedonia, weight changes, somatic complaints, guilt, impaired concentration and some report they are so unhappy that they have considered suicide (Birmaher, Ryan, & Williamson, 1996). An obvious question,

therefore, is what happens to engender such serious and negative feelings. Lewinsohn (1974) has suggested that such symptoms may stem from a lack of positive reinforcement from the child's environment.

Essentially, Lewinsohn posits that depressive symptoms will emerge when there exists a low rate of *response contingent* positive reinforcement. In turn, the rate of response contingent positive reinforcement will depend on the number of events an individual perceives as reinforcing, the availability of reinforcing events in the environment, and the "instrumental behavior of the individual, i.e., the extent to which he possesses the skills and emits those behaviors that will elicit reinforcement for him from his environment" (Lewinsohn, 1974, p.158). In other words, depression may result when an individual does not perceive positive outcomes resulting from his/her behavior or does not have the ability to produce behaviors that are likely to result in positive outcomes. Importantly, Lewinsohn emphasizes that reinforcement in isolation will not serve to protect against depression, rather the individual must perceive the reinforcement as being linked to his/her own behavior. Therefore, it is not enough that the environment provide potentially reinforcing conditions, the individual must view positive reinforcement as legitimate in light of the behaviors he/she emits.

Among the factors that can ultimately and negatively influence the rate of response contingent positive reinforcement, Lewinsohn identifies the occurrence of social withdrawal, impacting the availability of reinforcement from the environment, and lack of social or academic skills (or occupational skills in adults), impacting the individual's ability to emit behaviors that may be reinforced. For some children this lack of social interaction may include the avoidance of informal as well as formal social activities, such as joining sports teams, which may lead to both a lack of social reinforcement and less opportunity for achievement. Alternatively, children may fail to engage productively in schoolwork and may achieve at a level lower than their potential and thus fail to gain a sense of accomplishment or recognition by others for academic achievements. As implied by Lewinsohn's model, however, the emission of behaviors that lead to positive reinforcement alone is not enough to protect against depression; rather, the child must

perceive the reinforcement as being legitimately linked to his/her behavior. Thus, children may become depressed not only when they are viewed as ineffective by others in the aforementioned domains, but also when they perceive themselves as incompetent.

<u>Social Functioning in Depressed Children and Adolescents</u>

In fact, both social and academic impairment have been found to be associated with depression in youth. For example, Puig-Antich et al. (1985), studying children between the ages of 6- and 12-years, found those diagnosed with endogenous or non-endogenous depressions exhibited significantly greater social impairment than non-diagnosed children and significantly greater levels of academic impairment than non-diagnosed children and psychiatric controls. Additionally, depressed children have been found to be more socially withdrawn than psychiatric controls (Kashani, Vaidya, Soltys, Dandoy, & Reid, 1990).

Using peer nomination procedures, Faust, Baum, and Forehand (1985) found children's self-reported depression to be negatively related to peer ratings of likeability, children's own perceptions of their positive nominations by peers (i.e., children's guesses as to the number of positive peer nominations they received) and children's perceptions of their likeability ratings (i.e., children's guesses as to their peers' ratings of them) and to be positively correlated with negative nominations and children's perceptions of their negative nominations. A multiple regression analysis revealed children's estimates of their likeability and negative nominations by peers to be the best predictors of depression. Unfortunately, no measure of social withdrawal/neglect was obtained. Similarly, Cole, Martin, Powers, and Truglio (1996) found social competence, as measured by peer, teacher, parent, and self-reports, predicted later depression.

Examining social skill, Vinnick and Erickson (1994) found parent and self-reported level of social skills to be negatively related to depression in third and sixth grade children. Furthermore, social skills appeared to interact with negative life events such that in the presence of high stress, social skill served as a protective factor, decreasing the likelihood of significant depressive symptomatology.

Although few studies have investigated these relationships longitudinally, the Waterloo Longitudinal Project followed youth from age five into adolescence (Rubin, 1993). Results indicated that early social withdrawal was related to later internalizing symptomatology, including depression. Similarly, in the Social Competence Project, Ollendick and colleagues found that children (i.e., fourth grade students) rated by teachers as being socially withdrawn reported lower levels of self-efficacy, assertiveness, and more negative outcome expectancies than children rated by teachers as popular (Ollendick, Oswald, & Francis, 1989). Fewer negative consequences were found for the socially neglected or withdrawn children identified by teachers or peers when they were followed into early adolescence (i.e., ninth grade), with the notable exception that youths identified by teachers as withdrawn in fourth grade showed greater emotional difficulties than those youth that had been identified as well-adjusted (Ollendick, Greene, Weist, & Oswald, 1990; Ollendick, Weist, Borden, & Greene, 1992).

Academic Functioning in Depressed Children and Adolescents

In regard to the role of academic achievement in the development of depression, Hilsman and Garber (1995) examined 203 fifth and 236 sixth grade children at three points in time. First, the children were assessed for depressive symptomatology one week prior to receiving their report cards. At that time, the children also indicated the lowest grade they would consider to be acceptable for them to receive in each subject. The children's depressive symptomatology was assessed again the day after and five days after they received their report cards. Children's actual grades were recorded and academic stress scores were computed comparing children's reported acceptable grades with their actual grades. Academic stress was defined in terms of the degree of discrepancy between these two indices. Results indicated that at one day after receiving report cards, controlling for prior depressive symptomatology, academic stress was a significant predictor of self-reported depression.

However, at five days after receiving the report cards the academic stressor alone did not predict depressive symptoms. Rather the interaction of academic stress and children's academic cognitions (i.e., beliefs about their academic competence and ability

to control academic outcomes) and the interaction of academic stress and attributional style (i.e., degree of internal, stable, and global attributions for negative events) predicted depression while controlling for previous depressive symptomatology. Thus, these results suggest that cognitive factors (e.g., perceived competence or self-efficacy and attributional style) may moderate the relationship between achievement stress and depression. On the other hand, in a direct test of moderator and mediator models, attributional style was shown to mediate, not moderate the relationship between depression and competence in areas such as social and academic performance (Cole & Turner, 1993).

Thus, these findings call into question a direct link between lack of academic and social competence and depression as suggested by Lewinsohn's model, instead suggesting that the relationship may be better explained by a model in which poor academic and social performance lead to a depressogenic attributional style, which in turn leads to depression. Such an attributional style has been termed helplessness under the reformulated theory of learned helplessness (M. E. P. Seligman, Abramson, Semmel, & von Baeyer, 1979). In a more recent revision of the theory however, Abramson and colleagues suggest that helplessness is not sufficient to cause the development of depression. Rather, they suggest that helplessness is necessary for the development of hopelessness, which in turn is a proximal and sufficient cause of depression (Abramson, Metalsky, & Alloy, 1989). That is, when present, hopelessness will necessarily result in depression; specifically, leading to what Abramson and others (Abramson et al., 1989) have termed "hopelessness depression". In such cases, where hopelessness is not simply considered a symptom but given causal status, hopelessness is defined as the presence of helplessness along with the expectancy of a high probability of negative outcomes and the belief that one lacks control over the occurrence of these outcomes. Such a hypothesis is consistent with findings to date, particularly those discussed earlier, reported by Hilsman and Garber (1995).

In summary, while it can be postulated that poor social and academic functioning can lead to helplessness, and over time, to hopelessness, the question remains as to what

may cause difficulties in social and academic functioning. It appears probable that there exist several pathways leading to such problems. The oft-reported finding of the comorbidity of anxiety with depression in both general community samples (Anderson, Williams, McGee, & Silva, 1987; Fergusson, Horwood, & Lynskey, 1993; Kashani et al., 1987a; Kashani et al., 1987b; Kashani & Orvaschel, 1988; Lewinsohn et al., 1993; McGee et al., 1990), and clinical samples (Francis, Last, & Strauss, 1992; Kovacs, Gatsonis, Paulauskas, & Richards, 1989; Last, Strauss, & Francis, 1987; Mitchell, McCauley, Burke, & Moss, 1988; Strauss, Last, Hersen, & Kazdin, 1988b) along with the observation that anxiety typically precedes depression (e.g., Kovacs et al., 1989) suggests one possible pathway beginning with anxiety. That is, youth who suffer from trait (or continuous), high anxiety may, over time, begin to suffer negative outcomes, putting them at risk for depression. In fact, numerous investigations have found a link between anxiety and social withdrawal, social skills deficits, and difficulties in academic functioning.

Social Functioning in Anxious Children and Adolescents

Although not unequivocal, the current literature suggests that anxious children are often socially neglected. Similarly, socially withdrawn children have been found to evidence high levels of anxiety (Strauss, Forehand, Smith, & Frame, 1986).

For example, using an observational method, Panella and Henggeler (1986) investigated the peer interactions of low-SES, inner-city, African American boys between the ages of 15- and 18-years. More specifically, they reported on the general domains of affect, amount of conflict, degree of dominance, and social competence and cooperation during peer interaction. Using a two-stage procedure, boys were placed in one of three groups: conduct disordered, anxious, or well adjusted. Results revealed that when the anxious youth were engaged in a social interaction task, they showed less positive affect, more apprehension, and less social competence than the well-adjusted youth engaged in the same task.

In another investigation, this time examining the social behaviors of preschool children, Rubin and Clark (1983) found that children's frequency of unoccupied play and

their number of negative peer nominations were related to teachers' ratings of children's anxiety/fear. In addition, children's level of anxiety/fear was correlated with solitary play.

Similarly, Strauss, Frame and Forehand (1987) investigated sociometric status and other peer perceptions of third through fifth grade children rated as being either anxious/withdrawn or non-anxious/non-withdrawn by their teachers. A total of 48 children participated, 24 in each group, with an equal number of boys and girls included in the anxious and non-anxious group. In addition to matching on sex, groups were matched for grade and age. Results revealed that anxious children were less popular than non-anxious children. The anxious children received more "liked least" and less "liked most" nominations. Additionally, they were perceived by their peers to be shy and socially withdrawn (not surprising given that group status was partially determined by teachers' perceptions of withdrawn behavior) and less likable.

In a more comprehensive investigation Strauss and her colleagues (Strauss, Lease, Kazdin, Dulcan, & Last, 1989) investigated social competence in a group of 55 anxiety disordered children between 5- and 17- years of age diagnosed with separation anxiety disorder (n=12), overanxious disorder (n=13), separation anxiety disorder and overanxious disorder (n=17), simple phobia of school (n=11), or other simple phobias (n=2). They were compared to a psychiatric control group (i.e., outpatients diagnosed with attention-deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder, and/or adjustment disorder) and non-referred children. Social competence was assessed using parent, teacher, and self-reports. In general, self-ratings made by the anxious youth and the psychiatric controls were not different. However, anxious children rated themselves as lonelier and less socially competent than non-referred children. Again, in most areas, parent reports for anxious children were no different than parent reports for the psychiatric controls; however, parents of anxious children indicated they observed more withdrawn behaviors with their children than did parents of psychiatric controls or non-referred children. Furthermore, parents of anxious children rated their children as having less appropriate social skills than parents of non-referred children.

Again for teacher reports, most comparisons between the anxious children and the psychiatric controls were not significant. However, in general, teachers rated the anxious children as more shy, less socially skilled, and more socially isolated than the non-referred children.

Similarly, Strauss, Lahey, Frick and Frame (1988a) assessed sociometric status of children between the ages of 6- and 13-years, with either overanxious disorder (n=4), obsessive-compulsive disorder (n=1), separation anxiety disorder (n=3), or multiple anxiety disorders (n=8). Again comparisons were made with a psychiatric control group (i.e., children with conduct disorder) and non-referred controls. Children's classmates nominated the three children in their class whom they liked most, the three that they liked least and the three that fought the most. Anxious children received significantly less "liked most" nominations in comparison with the non-referred children, although the two groups were the same on the number of "liked least" nominations they received and the number of times they were identified by their classmates as fighting the most. The anxious children were more socially neglected than non-referred children and they had less social impact (defined as the number of liked most nominations plus the number of liked least nominations, adjusted for class size).

In sum, although collectively these investigations provide some support for the contention that anxiety and social maladjustment are correlated, methodological limitations preclude conclusions regarding more far-reaching implications. That is, in most investigations, measurement of anxiety and social variables have been taken at one point in time, thus no definitive statement can be made about the direction of the observed relationships. Obviously, this is problematic when trying to draw conclusions regarding a developmental trajectory from anxiety and its outcomes to the development of depression.

Sex Differences in the Sequelae of Social Neglect and Withdrawal

Further complicating the picture, recent evidence from longitudinal investigations suggests that the pathway from internalizing disorders is different for boys and girls, with young boys with internalizing symptoms being at significant risk for later *externalizing*

problems whereas young girls with internalizing symptoms are at risk for continued *internalizing* symptoms (McGee, Feehan, Williams, & Anderson, 1992). Despite such evidence, little research exists investigating factors that could lead to such a discrepancy. Strauss (1988) suggests that the social consequences for anxiety may be different for boys and girls, providing one possible explanation. For example, in an early investigation of peer perceptions of children at risk for disorder, boys with internalizing behaviors were consistently viewed negatively by their peers while girls with internalizing symptoms appeared to engender more ambivalent (i.e., both positive and negative) reactions from classmates (Rolf, 1972). Moreover, given our society's different expectations for boys and girls, in which it may be more acceptable for girls to express feelings of fear and anxiety, it intuitively makes sense that the peer reactions experienced by boys and girls would differ. Despite this, the possibility that the relationship of anxiety and social neglect and withdrawal may be complicated by sex differences has received little attention. As such, the relationship between anxiety, its social sequelae, and sex remains unclear and presents and important avenue for further exploration. Similarly, although findings are mixed (cf. Kistner, Balthazor, Risi, & Burton, 1999) several recent studies have found sex differences in the sequelae of actual and perceived social competence (Cole, 1991; Morison & Masten, 1991). For example, in a seven year longitudinal investigation Morison and Masten (1991) found boys suffered more negative consequences (e.g., low self-esteem) than girls when socially isolated. However, the mechanisms that lead to such differences remain unclear.

Academic Functioning in Anxious Children and Adolescents

Similar to findings regarding social functioning, most investigations conclude that anxiety does have a deleterious effect on academic performance.

In one investigation, Offord et al. (1992) found that emotional disorder diagnosed at ages 4- through 12-years was predictive of poor academic performance (as compared to children with no diagnosis at the initial assessment) measured four years later. However, is should be noted that emotional disorder was defined as features of DSM-III

anxiety and affective disorders; therefore, it is difficult to determine whether these effects were associated with anxiety symptomatology per se.

Similarly, in the Strauss et al. (1987) investigation described above, anxious children were rated by their teachers as having significantly poorer academic performance than non-anxious children. However, it must be noted that assessments were made at one point in time. Moreover, teachers rated both anxiety and academic performance and no objective indictor of academic achievement (e.g., grades) was obtained, resulting in added difficulty in interpreting findings.

In one of the most extensive investigations of this topic to date, Ialongo, Edelsohn, Werthamer-Larsson, Crockett and Kellam (1994) assessed a total of 1,197 first grade children enrolled in public schools in Baltimore, Maryland. Children's academic achievement (using a standardized group achievement test) and level of self-reported anxiety were assessed both in the Fall and Spring of first grade. Separate logistic regression analyses in which Fall anxiety scores were regressed onto Spring reading and mathematics achievement revealed that children whose anxiety scores were in the top quartile in the Fall of first grade were almost eight times more likely than less anxious children to be in the lowest quartile for reaching achievement in the spring and about two-and-one-half times as likely to be in the lowest quartile for mathematics achievement in the spring. Moreover, the regression analyses were conducted controlling for Fall level of reading/mathematics achievement and Spring level of anxiety; thus, providing relatively strong evidence that differences were the outcome of Fall anxiety.

In addition, a recent meta-analysis supported the relationship between anxiety and poor academic performance (Seipp, 1991). Seipp reviewed 156 studies investigating the relationship between anxiety and academic achievement. She concluded that highly anxious children scored about one-half a standard deviation below low anxious subjects on measures of academic achievement. Further, where possible, she investigated the relationship between the emotionality component of anxiety (i.e., affective symptoms such as subjective feelings of nervousness) and the worry component of anxiety (i.e., cognitive symptoms such as worrying about events in the future) and found that the

worry associated with anxiety may fully account for the relationship between anxiety and poor academic performance.

Therefore, in general, data suggest a link between anxiety and detriments in academic performance. However, risk factors such as anxiety may have a more complex relationship with academic outcomes than has been investigated heretofore. For instance, it appears that such relationships may not be found across all children, but rather the relationship may vary as a function of intellectual ability (Garmezy, Masten, & Tellegen, 1984). In addition, it may be that certain components of anxiety (i.e., worry), as suggested by Seipp (1991), may be responsible for the relationship between anxiety and poor academic functioning while other components (e.g., negative affect) are less critical. Further, the same methodological limitations discussed with regard to the literature linking anxiety and social functioning apply when interpreting findings examining the relationship between anxiety and academic functioning. Accordingly, so do the caveats regarding conclusions that can be drawn. Although, Ialongo et al. (1994) and Offord et al. (1992) made attempts to investigate the direction of the relationship between academic performance and anxiety, and their results suggested that poor academic performance may be the result of anxiety, the remainder of the studies discussed can neither refute nor support such a conclusion.

The Pathway From Anxiety to Depression

A synthesis of these findings suggests a path leading from anxiety to depression as shown in Figure 1. As depicted in this path model, it is hypothesized that anxiety (either anxiety in general, or as suggested by Seipp's (1991) findings, the worry component of anxiety) leads a child to make negative judgments about his/her performance (i.e., social competence and academic competence) and to actual academic difficulties and social withdrawal. Given previous findings, as discussed above, however, the relationship between anxiety and social outcomes (i.e., social withdrawal and perceived social competence) is expected to be moderated by the child's sex whereas the relationship between anxiety and academic outcomes (i.e., academic difficulties and perceived academic competence) is hypothesized to be moderated by the child's

intellectual ability. In turn, these stressors are hypothesized to give rise to an explanatory style in which positive events are attributed to external, unstable, and specific causes and negative events are attributed to internal, stable, and global causes (i.e., helplessness). However, given findings that social competence and neglect may impact boys and girls differently, the possibility that sex may moderate the relationship between social variables and attributional style is also explored. Over time, this attributional style is expected to become well-entrenched and develop into hopelessness, in which the child not only feels helpless to control outcomes but also holds a high negative outcome expectancy (i.e., the child is sure that negative events will occur). Finally, hopelessness is hypothesized, as in the hopelessness theory of depression, to be sufficient to cause depression.

Based upon these analyses, the purpose of the proposed investigation was to test these hypotheses exploring one possible pathway from childhood anxiety[1] to one type of subsequent depression (i.e., hopelessness depression). To test these predictions, two separate path analyses were performed. In the first, the path model depicted in Figure 1, beginning with anxiety, was tested. In the second, the path model depicted in Figure 1, beginning with worry, was examined.

<center>Methods</center>

Participants

Participants were students who were taking part in a larger longitudinal investigation being conducted by the Montgomery County School District to study variables related to school dropout. The first wave of data collection took place during the Spring semester of the 1995-1996 school year. At that time, 722 students enrolled in the sixth grade in Montgomery County completed several measures including an anxiety scale (the Revised Children's Manifest Anxiety Scale (RCMAS)), a locus of control scale, and a dropout prediction profile; additionally, archival data, including standardized

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[1] The terms anxiety and depression are used here to refer to anxious and affective symptomatology not anxiety and affective disorders

test scores were collected. In the present investigation, only the anxiety measure and standardized test scores were used.

The second and third waves of data collection took place while the majority of participants were enrolled in the eighth grade. All participants included in this investigation were in the eight grade during the 1997-1998 school year. Of the 722 students that participated in the study in sixth grade, 435 had complete data and were included in the current investigation. The remaining 287 students were not included in the analyses presented here because they had either moved out of the county (n = 77), dropped out of school (n = 3), were being home schooled (n = 2), were on homebound education (n = 4), were enrolled in alternative schools (n = 2), were enrolled in a detention home (n = 1) or did not complete one or more of the measures administered in sixth or eighth grade (n = 198). There were no differences between the 435 students and the 287 students without complete data in terms of sex (χ^2 (1) = 1.31 p > .05) or race (χ^2 (3) = .76 p > .05). Also, comparing the 435 students included in the present investigation to those who completed the RCMAS in sixth grade but who were not included in the present investigation (n = 126, due to missing data), there were no differences in total anxiety scores in the sixth grade (t (557) = .78, p > .05).

Montgomery County School District encompasses four middle schools—Auburn Middle School, Blacksburg Middle School, Christiansburg Middle School, and Shawsville Middle School and utilizes a full inclusion program (i.e., there are no separate special education classrooms). In effect, this means that adolescents with varying degrees of intellectual ability and emotional difficulties were included in the sample.

Complete data were collected for a total of 219 girls and 216 boys. The sample was predominantly Caucasian (94%) but included African American students (3%), Hispanic students (.5%), and Indian students (2%). In sixth grade the mean age of participants was 12 years (S.D. = .29). During the third wave of data collection, in the Spring of eighth grade, the mean age for the sample was 13.6 years (S.D. = .59).

Procedures

In addition to the information collected with the specific aim of predicting school dropout, administrators at Montgomery County School District agreed to administer measures, as described below, to be used for purposes of the project outlined here. Since all students participated and data were confidential, the project was exempt from review by the human subjects committee and institutional review board of the Montgomery County School District; however, all procedures and measures were reviewed and approved by the Montgomery County School System.

The second and third waves of data collection occurred during December of 1997 and April 1998, respectively. The measures described below were administered to students in their health/physical education classes by project staff. Written instructions included on each questionnaire were reviewed orally to ensure students' understanding. Additionally, all materials were checked as they were completed in order to reduce the occurrence of missing data.   Individual administration sessions for adolescents absent during group administration were arranged.

Measures

Table 1 presents the timetable followed for administration of each of the measures listed below. As noted above, sixth grade data were obtained during April of 1996 and eighth grade data were collected in December of 1997 and April of 1998.

The Revised Children's Manifest Anxiety Scale. (RCMAS ; C. R. Reynolds & Richmond, 1978) The RCMAS is a 37 item questionnaire (28 anxiety items, 9 lie/social desirability items) designed for use with youth between the ages of 6 and 19 years. In each item the child is presented with a statement (e.g., "I get nervous when things do not go the right way for me.") and asked to indicate if the statement is true or not true of them. Possible total scores range from zero to 28, with higher scores indicating greater trait anxiety. Analysis has revealed a five factor structure: two lie factors, a physiological factor, a worry/oversensitivity factor, and a concentration factor (C. R. Reynolds & Paget, 1981). The worry/oversensitivity scale consists of 11 items generally reflecting anxious apprehension (e.g., "I worry about what is going to happen"). Accordingly,

scores on the worry scale can range from 0 to 11. Using a sample of Caucasian and African-American boys and girls, C. R. Reynolds and Paget (1983) reported coefficient alphas ranging from .78 to .85 for the total anxiety score. In the same sample, coefficient alphas for the worry scale ranged from .76 to .81. In the present sample coefficient alpha for the total anxiety score was .87 in both sixth and eighth grade. Similarly, coefficient alphas for the worry subscale score was .80 in both sixth and eighth grade. In order to identify students with *trait* anxiety, the sum of students' total anxiety scores in sixth and eighth grade and the worry scale scores in sixth and eighth grade from the RCMAS were used to measure anxiety.

Cognitive Abilities Test. (COGAT ; Thorndike & Hagen, 1987) The COGAT is a group, multi-level (by difficulty), ability test administered in the Montgomery County school district at periodic intervals. The battery is divided into three parts: verbal (sentence completion, verbal classification, and verbal analogies), quantitative (quantitative relations, number series, and equation building), and non-verbal (figure classification, figure analogies, and figure analysis). For purposes of the present investigation only verbal and quantitative scores were used. Both scales have been shown to demonstrate good test-retest reliability, with correlations over a sixth month period for all grade levels (i.e., K-12) ranging from .72 to .92 for the verbal scale and .72 to .87 for the quantitative scale. Moreover, both scales demonstrate adequate internal consistency, with KR-20 reliability coefficients ranging from .82 to 94 for the verbal scale and .87 to .95 for the quantitative scale. In addition, COGAT scores have been shown to correlate with academic achievement scores (Thorndike & Hagen, 1987). Mean scores on each scale are 100 with a standard deviation of 16.

In the current sample, third and fifth grade quantitative and verbal ability scores were available. An average of all ability scores (i.e., third and fifth grade verbal and quantitative scores) available for each student was used as the measure of cognitive ability.

Pupil Evaluation Inventory. (PEI ; Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976) Sociometric status was evaluated with peer ratings on a modified version of the

PEI. In the original version of the PEI children were presented with 35 items (e.g., "Those who are especially nice") and asked to nominate each child in their class (by placing an "X" next to the child's name on a class roster) that fit the description given by the item. Factor analysis of the PEI revealed three factors: aggression, withdrawal, and likeability. Two-week test-retest reliability has been demonstrated to be above .80 for all factors; moreover, scores on the PEI have been shown to correlate with both teacher and self-reports (Pekarik et al., 1976). In the modified version of the PEI used in this investigation, three items from each of the scales were used (similar to Ollendick et al., 1992). For each of the nine items, students rated each of their peers in their health/physical education class on a six-point Likert scale, indicating how well the item described each of their classmates. An average rating was calculated across the three items on the withdrawal scale and used as a measure of social withdrawal[2]. Internal consistency, as estimated by coefficient alpha was .80. Scores could range from 1 to 6. In general, the validity and reliability of peer ratings have been demonstrated (Strauss, 1988).

Self-Perception Profile for Children. (SPPC ; Harter, 1985). The SPCC is a 36 item self-report inventory. Each item uses a "structured alternative format" in order to avoid pulling for a socially desirable response. Therefore respondents read two descriptions (e.g., "Some kids often forget what they learn" but "Other kids can remember things easily"), for each item, decided which description was most like them, and then indicated whether the statement was "sort of true" for them or "really true" for them. The SPCC contains five specific domains (scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct) and a global self-worth composite. In the present investigation the scholastic competence and social acceptance scales were used as measures of social and academic competence, respectively. Scores on each of the scales can range from 6 to 24, with higher scores

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[2] Due to a clerical error, data for only two items on the social withdrawal scale were available for one class. Therefore, for the 16 students enrolled in this class and included in the analyses presented herein, social

reflecting higher levels of perceived competence. Harter (1985) reports internal consistency estimates (Cronbach`s Alpha), across four samples, to be above .80 for the scholastic competence scale, and above .75 for the social acceptance scale. In the current sample, coefficient alpha for the scholastic competence scale was .81 and coefficient alpha for the social acceptance scale was .78.

Grades. Grade point average (a composite of grades in reading, math, social studies, and science) for the second six weeks of eighth grade, computed on a four-point scale, were obtained from student transcripts and used as a measure of academic achievement. Grades were standardized by teacher to control for teacher variability in assigning grades.

The KASTAN-R-CASQ. (Kaslow, Tannenbaum, & M. E. P. Seligman, 1978) The KASTAN-R-CASQ, or the Children's Attributional Style Questionnaire, is a 48 item self-report inventory designed to assess attributional style as described by the reformulated learned helplessness theory (i.e., internal, stable, global attributions for bad events and external, unstable, specific attributions for good events). As such, there are two scales, each containing 24 items, one for bad events (e.g., "You tell a joke and no one laughs") and one for good events (e.g., "Your friend tells you that you look nice"). For each item, the respondent is presented with the event and asked to choose between two possible explanations (attributions) for why the event occurred. The given attributions hold two of the attributional dimensions constant while varying the third. Several scores can be derived form the KASTAN-R-CASQ, including six subscales scores, one for each of the three attributional dimensions for good and bad events, a good composite score (Good: Internal + Stable + Global), a bad composite (Bad: Internal + Stable + Global), and a composite score that is the difference of the good and bad composites. In this investigation the composite score was used as the measure for attributional style (*lower* composite scores indicate a more maladaptive attributional style). The authors report that

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withdrawal was calculated by averaging the scores on two items and not three The internal consistency estimate presented here does not include data from this class.

the composite score demonstrates adequate test-retest reliability over a three month period (r=.72).

In response to investigations of the psychometric properties of the KASTAN-R-CASQ and for ease of administration, a shortened version of the questionnaire was developed by (Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). This revised, 24 item version was used in the present investigation. In the current sample, internal consistency (coefficient alpha) for the positive and negative composite scores was .55 and .52, respectively.

The Hopelessness Scale for Children. (HSC ; Kazdin, French, Unis, Esveldt-Dawson, & Sherick, 1983) The HSC, a 17 item self-report scale modeled after the adult scale developed by Beck and his colleagues (Beck, Weissman, Lester, & Trexler, 1974), was designed to measure the cognitive construct of hopelessness in children and adolescents. The HSC was developed on an inpatient psychiatric sample that ranged in age from 8 to 13 years. The test uses a true/false response format. Scores range from zero to 17, with higher scores indicating greater hopelessness. Kazdin and his colleagues report somewhat low but acceptable estimates of internal consistency (coefficient alpha = .75) and split-half reliability (r = .70). In the present sample coefficient alpha was .72.

Reynolds Adolescent Depression Scale. (RADS ; W. M. Reynolds, 1987) The RADS is a 30-item questionnaire designed for use with adolescents between the ages of 13 and 18. In each item the respondent is presented with a statement (e.g., "I feel I am bad.") and asked to indicate how often the statement is true of them, using a four point, likert-type scale ranging from "almost never" to "most of the time". Test-retest reliability of the RADS has been examined in three studies. Over a six-week interval a test-retest reliability coefficient of .80 was obtained and over a three-month interval a test-retest reliability coefficient of .79 was obtained; finally, over a one-year interval a test-retest reliability coefficient of .63 was obtained (W. M. Reynolds, 1987). Although this last estimate may be considered low, given the length of time between testings and the expected fluctuation of depressive symptomatology over such a time interval, this estimate most probably includes real variation in symptomatology as well as variations

due to the instrument. As such, the RADS can be considered an adequately stable measure of depression. Additionally, the RADS has been shown to be significantly correlated with other self-report measures of depression as well as data obtained from clinical interviews.

Two items from the RADS relate specifically to social withdrawal (i.e., "I feel lonely." and "I feel like hiding from people."). In order to avoid artificially inflating the relationship between depression and social withdrawal these two items were deleted. The total score from the RADS (with the omission of the two items described above) was used as the measure of depression in the Spring of eighth grade. The internal consistency for the modified version of the RADS used here was .92.

<div align="center">Results</div>

Preliminary Analyses

Means and standard deviations for the entire sample and separately for boys and girls can be seen in Table 2. In general, as a group, participants reported less symptomatology and more positive self-evaluations than normative samples. For example, inspection of Table 2 suggests that the current sample reported lower anxiety, both in sixth and eighth grade, than the RCMAS test development samples at the same grade levels (C. R. Reynolds & Richmond, 1985). Similarly, compared to standardization samples, participants in the current sample viewed themselves as less depressed (W. M. Reynolds, 1987) and more socially and scholastically competent (Harter, 1985).

Bivariate correlations for all measures are shown in Table 3. As is widely reported (King, Ollendick, & Gullone, 1991), depression and anxiety, as measured by the RCMAS total score, were significantly correlated. Moreover, a similar, significant relationship was found when examining the correlation between the worry component of anxiety and youths' self-reports of depression. As expected, actual social and academic functioning (that is, students' grades and peer ratings of social withdrawal) were significantly correlated with the students' self-perceptions of social and scholastic competence. In addition, all bivariate correlations are as would be expected except for

the lack of a significant correlation between worry and grades and social withdrawal and attributional style.

Moderator Analyses

   Trait Anxiety

      Before performing the path analyses, tests for possible moderating effects for sex and cognitive ability were conducted using the procedures outlined by Baron and Kenny (1986). First, to test for a moderating effect of sex on the relationship between anxiety and social functioning variables (i.e., social withdrawal and perceptions of social competence), two sets of regression equations were computed. Specifically, social withdrawal and social competence were regressed on anxiety separately for boys and girls and the difference in regression coefficients was tested. Results suggested that sex did not moderate the effects of anxiety on social withdrawal, t (431) = 1.06, $\underline{p}$ > .05 or student's perceptions of their own social competence t (431) = 1.02, $\underline{p}$ > .05.

      The possibility that sex moderated the relationship between the social functioning variables and the development of a depressogenic attributional style was tested in the same manner. Again, tests comparing the regression coefficients for boys and girls suggested that sex did not serve to moderate the relationship between social withdrawal and attributional style or perceived social competence and attributional style, t (431) = .08, $\underline{p}$ > .05 and t (431) = .41, $\underline{p}$ > .05, respectively.   Given these findings, sex was not considered in further analyses.

      To test for a moderating effect of cognitive ability on the relationship between academic functioning and academic competence and anxiety, two separate regression analyses were conducted. In the first, academic functioning (i.e., grades) was regressed on anxiety (i.e., RCMAS scores), cognitive ability (i.e., COGAT scores) and the product of anxiety scores and cognitive ability scores. Results suggested that although there was no main effect for anxiety (t (431) = 1.90, $\underline{p}$ > .05), there was both a significant main effect for cognitive ability (t (431) = 7.941, $\underline{p}$ < .01) and a significant cognitive ability X anxiety interaction (t (431) = -2.20, $\underline{p}$ < .05).

      Second, academic competence (i.e., the scholastic competence scale from the SPPC) was regressed on anxiety (i.e., RCMAS scores), cognitive ability (i.e., COGAT scores) and the product of anxiety scores and intellectual ability scores. This time, results

revealed that anxiety did not impact perceptions of academic competence, either when examined alone (t (431) = -0.06, p > .05), or as a moderator of cognitive ability (t (431) = -0.54, p > .05); the main effect for cognitive ability, however, was significant (t (431) = 5.07, p < .001).

Worry

Analyses identical to those described above, testing for a moderating effect of sex on the relationship between worry and social functioning variables yielded similar results suggesting that sex did not serve as a moderator when examining both social withdrawal t (431) = .46, p > .05 and perceptions of social competence t (431) = 1.09, p > .05.

When moderator analyses were conducted for cognitive ability, first predicting academic functioning, significant main effects were found for worry (t (431) = 2.07, p <.05) and cognitive ability (t (431) = 8.62, p < .001). A significant worry X cognitive ability interaction emerged as well (t (431) = -1.99, p < .05). When predicting youths' perceptions of their own academic competence, again only the main effect for cognitive ability was significant (t (431) = 5.55, p < .001).

Therefore, the model depicted in Figure 1 was altered so that the initial models tested in the path analyses described below incorporated pathways for the significant main effects and interactions that emerged in these regression analyses. The initial model in which general anxiety serves as a starting point is shown in Figure 2. Similarly, the model predicting depression from worry can be seen in Figure 3.

Path Analyses

Path analyses were conducted using the SAS v6.12 statistical software package. More specifically, the CALIS procedure which, in addition to estimating model parameters provides a variety of fit (e.g., Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI)) and modification (i.e., Lagrange multiplier test and Wald test) indices was used. Models were tested using the weighted least squares (WLS) parameter estimation method. The WLS method was chosen because it does not assume multivariate normality.

Model estimation followed a systematic approach in which the initial models depicted in Figures 2 and 3 were estimated and then modifications were made according to guidelines designed to minimize errors associated with data driven modification procedures and, as such, maximize the likelihood that results could be generalized to samples within the population of interest. In this vein, a parallel specification procedure was followed in which the sample was randomly divided in two and identical analyses were conducted on both samples. Only modifications suggested by both sets of analyses were considered. Moreover, only pathways that were conceptually sound and consistent with the model being tested were added. Finally, one modification was made at a time. The model was then re-estimated in the total sample and a chi-square difference test was performed. The modification was retained only when the chi-square difference test was significant when a path was added or when the chi-square difference test was *not* significant when a path was deleted. The model was then re-examined, and, if appropriate, further modifications were made.

With these general guidelines in place, a stepwise procedure was used in which first the hypothesized pathways were examined. If one or more of the path coefficients associated with these pathways was not significant (in both samples), the pathway with the smallest absolute t-value (in either sample) was eliminated. If it was not necessary to eliminate a pathway, the gamma matrix (which suggests pathways from exogenous variables to endogenous variables) and the beta matrix (which suggests pathways between endogenous variables) produced by the Lagrange multiplier test were examined. In keeping with the assumptions of manifest variable path analysis, modifications which involved correlated error terms, bi-directional relationships and relationships in which causality flowed from right to left (in which causal pathways were reversed from those seen in Figures 2 and 3) were not considered. The one modification that met the criteria above and that would provide the greatest improvement in model fit (as suggested in either sample) was made. The specification search ended either when no (conceptually sound) modifications were suggested within both samples, when the first modification suggested by this procedure did not result in a significant change in chi-square when a

path was added, or after five modifications were considered. Once a final model was determined, parameters were re-estimated using the entire sample of 435 students.

A Model from Anxiety to Depression

The initial model from general anxiety to depression, as depicted in Figure 2 was first estimated in the total sample 435 boys and girls.   According to commonly accepted practice, in which a fit index of .90 or greater is generally considered to indicate acceptable model fit, the initial model did not provide an adequate fit for the data. Fit indices are presented in Table 4.   The significant χ^2 value suggests that there were significant differences between the hypothesized model and the data; however, given that the significance of the χ^2 statistic may be heavily influenced by sample size (Bollen, 1989), it is generally not considered to be the best indictor of model fit. Therefore, several other fit indices including the GFI, AGFI, the comparative fit index (CFI), and the normed fit index (NFI) have been developed. However, as can be seen in Table 4, although there is a great deal of variability among these indices, they also suggest that the model as it was initially hypothesized does not adequately describe the data.

Therefore, modifications were made to the model following the procedures outlined above, resulting in a total of four modifications. First, a path was added from social competence to social withdrawal, resulting in a significant decrease in chi-square ($\Delta\chi^2(1) = 30.61$, $\underline{p} < .001$). Similarly, a second path was added from academic competence to grades ($\Delta\chi^2(1) = 34.99$, $\underline{p} < .001$). As a result, the path from grades to attributional style was no longer significant and, thus this path was dropped without any significant changes in model fit ($\Delta\chi^2(1) = 0.00$, $\underline{p} > .05$). Last, a direct path from grades to hopelessness was added ($\Delta\chi^2(1) = 13.20$, $\underline{p} < .001$).

The resulting model, with standardized path coefficients can be seen in Figure 4. As can be seen in Figure 4, anxiety had little impact on depression through academic variables or actual social withdrawal as reported by students' peers. Anxiety did however, have a significant negative influence on the youths' perceptions of their own social competence. That is, students reporting higher levels of anxiety reported

significantly lower levels of social competence (β = -0.17). Social competence, in turn

effected youths' attributional styles (β = 0.15), with youth reporting greater social

competence reporting a healthier attributional style. A depressogenic attributional style

was related to significantly higher levels of hopelessness (β = -0.21) and finally, higher

levels of hopelessness were related to higher levels of self-reported depression on the

RADS (β = 0.42).

  Fit indices for the final model, as estimated using the entire sample, are given in

Table 4. Again, indications of model fit vary greatly depending upon the fit index

examined. While the GFI suggests that the model provides a good fit for the data, other

indices are less positive, providing mixed support for the modified model.

  <u>A Model from Worry to Depression</u>

  As with the total anxiety scores, the initial model from worry to depression,

(shown in Figure 3) was first estimated in the total sample. Fit indices for the initial

model are presented in Table 4. Again, as expected due to sample size, the χ^2 statistic

was significant, suggesting that there were significant differences between the

hypothesized model and the data. However, indications of model fit from other indices

were mixed. As can be seen in Table 4, the GFI suggests that the initial model accurately

described the data; however, other indices suggested that modifications to the model were

appropriate.

  Again, modifications were made to the model following the procedures outlined

above. First, the path from worry to social withdrawal was dropped. However, when the

model was re-estimated with this path deleted the change in chi-square test was

significant ($\Delta\chi^2(2) = 14.29$, $p < .001$) , suggesting that the fit of the model was

significantly worse with the deletion of this path. Therefore, following the guidelines

above, four additional modifications were considered. First, the path from grades to

attributional style was dropped, resulting in a non-significant change in chi-square

($\Delta\chi^2(1) = .02$, $p > .05$) . Second, as in the model originating from general anxiety, a

path from social competence to withdrawal was added ($\Delta\chi^2(1) = 29.71$, $p < .001$).

Similarly, a path from academic competence to grades was added ($\Delta\chi^2(1) = 43.19$, $\underline{p} <$ .001). Finally, a direct path from grades to hopelessness was estimated ($\Delta\chi^2(1) = 17.59$, $\underline{p} < .001$). The resulting model with standardized path coefficients, as estimated in the total sample, can be seen in Figure 5.

As can be seen in Figure 5 worry impacted depression through students' perceptions of their social competence and academic functioning but not through social withdrawal. Specifically, higher levels of worry were significantly related to reports of lower levels of social competence ($\beta = -0.13$). Surprisingly, higher levels of self-reported worry were related to better grades ($\beta = 0.67$); however, this relationship was complicated by the significant and negative relationship between the worry X cognitive ability interaction and grades ($\beta = -0.57$). As predicted, social competence and academic competence were significantly related to attributional style ($\beta = 0.20$ and 0.42, respectively). In addition, students' perceptions of their social and academic functioning impacted their actual functioning with higher levels of social competence related to less social withdrawal ($\beta = -0.30$) and higher levels of academic competence related to better grades ($\beta = 0.36$). Attributional style had a significant effect ($\beta = -0.28$), in the predicted direction, on hopelessness and youth reporting more hopelessness reported significantly more depressive symptomatology ($\beta = 0.56$).

Fit indices for the final model, as estimated using the entire sample, are given in Table 4. Although modifications resulted in improvement in model fit, the AGFI, CFI, and NFI did not reach the .90 criterion, again providing mixed support for the modified model.

Discussion

Results showed that both general anxiety and worry influenced the development of depression through youths' perceived social competence. Moreover, although general anxiety did not impact depression through its effects on academic variables, consistent with previous findings (e.g., Ialongo et al., 1994; Seipp, 1991; Strauss et al., 1987) worry was related to academic performance; however, worry did not affect academic

competence. One possibility for these different findings for general anxiety and worry, and consistent with the meta-analysis conducted by Seipp (1991), is that it is the worry component of anxiety and not general trait anxiety that is important in predicting academic achievement. In addition, while past investigations have found a connection between general anxiety and academic functioning (Ialongo et al., 1994; Strauss et al., 1987), it should be noted that these studies examined worry and academic functioning in isolation while the current investigation examined these variables as part of a system of relationships including social and cognitive variables. In fact, examining bivariate correlations, both general anxiety and worry were significantly correlated with students' perceived academic competence and general anxiety was significantly correlated with students' grades.

On the other hand, general anxiety did appear to influence the development of youths' perceptions of their social competence but not their actual social behavior in terms of social engagement or withdrawal as judged by their peers. However, social functioning and perceived social competence were significantly correlated suggesting that student's perceptions were not independent of actual social interactions. In fact, not surprisingly, it appears (see Figure 4) that youth's perceptions of their competence, both social and academic, influenced actual functioning. When the model originating from worry was considered this was true as well. However, it should be noted that these relationships were incorporated into the model post hoc. In fact, in both models, model improvement would most probably have been similar had the causal path been reversed. That is, model improvement would have been similar had it been assumed that actual functioning effected perceived competence and not the reverse.

Considering both models (starting from general anxiety and worry), actual social functioning was not related to depression through attributional style and hopelessness. Rather, consistent with recent findings by Kistner and her colleagues (1999), perceived competence but not actual social functioning was related to depression. Moreover, while Kistner et al. (1999) showed that perceived social competence and not actual social acceptance was related to dysphoria in youth, the current investigation expands on these

findings, suggesting that the relationship between social competence and dysphoria is mediated by helplessness (or attributional style) and hopelessness.

Again, in both the model originating from worry and the one originating from general anxiety, actual academic functioning was not related to attributional style; however, perceived academic competence was found to engender a negative cognitive style. Additionally, rather than having an indirect effect on hopelessness mediated through attributional style as predicted, partially consistent with Lewinsohn's behavioral theory of depression (Lewinsohn, 1974), the results of this investigation suggest that academic functioning directly impacts the development of hopelessness. In turn both models suggest a modest relationship between hopelessness and depressive symptomatology such that higher levels of hopelessness were related to higher self-reported depression.

Although sex was examined as a possible moderator variable, boys and girls appeared to be similar both in the way in which anxiety affected their social engagement and their perceptions of their own social competence and in how social variables were related to attributional style. While it was hypothesized that sex differences in affective disorders may be partially explained by different social processes occurring for boys and girls, this supposition was not borne out by the data. Although existing literature has not specifically examined the hypotheses regarding sex differences tested here, this finding is consistent with Kistner and her colleagues' recent observation that although girls reported higher levels of depressive symptomatology, sex did not moderate the relationship between youths perceived social acceptance and dysphoria (Kistner et al., 1999). Cognitive ability, on the other hand, was found to moderate the effects of anxiety and worry on actual academic performance; however, this effect is difficult to interpret especially when considered in the context of the system of relationships examined in the final path models (shown in Figure 4 and Figure 5). While the interaction between cognitive ability and worry continued to have a significant and negative effect on academic functioning (i.e., grades) even when examined in the path model in which worry had a significant main effect on academic functioning, the interaction of cognitive

ability and general anxiety did not significantly effect academic variables when considered in the context of the complete path model. This suggests that while worry will impact youths' academic performance, the strength of this relationship will vary as a function of cognitive ability. For illustrative purposes the regression equation predicting grades, as depicted in the final path model (Figure 5), was examined. This equation, with unstandardized path coefficients, is as follows:

Grades = .08 (academic competence) + .23 (cognitive ability) +

.11(worry) -.09 (cognitive ability)(worry)

For a student reporting an average level of academic competence (in this sample, 16.42), with average cognitive ability (i.e., 100), and with the mean worry score in the current sample (i.e., 7.36), the predicted grade would be -41.12[3]. Holding all values except worry constant, and considering a student with high worry (i.e., 1 standard deviation above the mean for the sample), the predicted value for grade would be -87.08, suggesting that as worry increases grades are negatively affected. Moreover, this relationship holds true when predicted grades are examined for youth with a cognitive ability score 1 standard deviation above the mean and 1 standard deviation below the mean. Furthermore, when a student with either average or below average cognitive ability is considered, the predicted value for grades is slightly *more* than two times (2.12) worse when worry increases from the mean value for the sample to one standard deviation above the mean. For a student with above average cognitive abilities (i.e., one standard deviation above the mean), the impact of increased worry is slightly less, with a one standard deviation increase in worry resulting in a predicted value for grades that is slightly *less* than two (1.99) times worse. Although, these differences are small, they suggest that high cognitive ability serves a small protective function against the negative impact of worry on grades. In turn, this suggests a complex

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[3] This number is for illustrative purposes only and does not correspond directly to grade point average. This is because of the inclusion of the interaction of cognitive ability and worry in the regression equation, represented as a product term that has no real correlate.

interplay of factors such that the detrimental effects of worry may be almost negligible for some youth and significantly interfering for others.

Comparing worry and trait anxiety

Seipp (1991) found that worry, rather than the emotionality component of anxiety (e.g., feelings of nervousness), impacted academic functioning. Therefore, it was hypothesized that a model focusing on worry in determining the outcomes of anxiety might provide a clear and succinct explanation of the relationship between anxiety and depression while a model considering general anxiety might add "noise". Although it is difficult to directly compare the two models originating from anxiety and worry, comparing the fit indices for the two models suggests that the model originating with worry may be better able to explain the observed relationships between the variables depicted in Figures 4 and 5. Additionally, while general anxiety was related only to social competence and not to academic variables, worry impacted both social competence and academic functioning. Cole (1991) found that competence in a number of areas, including social and academic arenas, was related to depression. Therefore, while the model originating from worry provides evidence of the role of a specific component of anxiety in the development of depression that is consistent with Cole's multiple competency based model, considering other components of anxiety seems to detract from this relationship. Such findings again lend support to the superiority of the worry model over the general anxiety model. It should be noted however, that a greater number of data driven modifications were considered in the model originating from worry. This caveat notwithstanding, there is mixed evidence to support both models, with some suggestion, as reported by Seipp (1991) for the more limited case of academic functioning, that the worry component of anxiety may be the most influential in determining the psychosocial sequelae of stable anxiety in youth.

Implications

Although the models depicted in Figures 4 and 5 received only mixed support, these results do begin to suggest that the psychosocial sequelae of anxiety and worry; specifically, anxious youths' academic functioning and their perceptions of their social

competence, can lead to the development of a depressogenic attributional style or hopelessness, and eventually to depression. Therefore, while current treatments for anxiety (e.g., Kendall, Kane, Howard, & Siqueland, 1990) focus largely on exposure to anxiety provoking situations and cognitive distortions surrounding these situations, a more comprehensive approach to the treatment of anxiety may serve to prevent the development of later psychopathology. For example, results suggest the importance of considering anxious youths' perceptions of their peer relationships and assisting these youth in developing more adaptive perceptions of their interactions with others. It may also be useful to specifically assess for and address the issue of test or evaluation anxiety in youth reporting high levels of worry. In this way, it may be possible to prevent the suffering encountered by depressed youths and their families as well as the need for treatment for depression secondary to anxiety.

Limitations

The current investigation represents an important first step in moving beyond the documentation of the high rates of comorbidity between anxiety and depression in youth to explaining this phenomenon; however, several methodological limitations (conceptual limitations are discussed below under future directions) should be noted. First, no measure of youths' depressive symptomatology was available in either the Spring of sixth grade or the Fall of eighth grade. Therefore, it was impossible to control for depression at these times while predicting depression in the Spring of eighth grade. Although an attempt was made to follow youth into adolescence and the greatest period of risk for depression (Zarate & Tohen, 1996), participants were followed for only a brief period of time. Given the developmental nature of the proposed models, longer longitudinal investigations which can control for variables such as depression (as well as the other variables appearing late in the causal pathways hypothesized here) early in childhood and follow youth throughout adolescence are required.

Additionally, when considering social functioning variables, the findings reported here suggest that anxiety influences the subsequent development of depression through youths' perceptions of their social functioning not through actual functioning. However,

the comparison of the relationship between anxiety (or worry) and perceived social competence versus anxiety and actual social functioning *as perceived by the participants' peers* is complicated by the fact that anxiety and perceived competence were measured using self-reports while social competence was examined using peer ratings. Therefore, an alternative conclusion to the one suggested above (that anxiety is related to perceived social competence and not actual social behavior) is that the stronger relationship between anxiety and perceived competence may be at least partially accounted for by common method variance. However, this was not the case when academic functioning and worry was considered, rather academic functioning and not perceived academic competence was found to be related worry; thus this contrasting finding lends additional support to the interpretation that anxiety is related to social competence but not actual social behavior.

Obviously, additional limitations include those that are encountered whenever data driven modifications are made. However, it is interesting to note that similar modifications were suggested when testing both models. Additionally, caution was used in determining how many and which modifications were considered and the sample size was large enough to allow for a parallel specification search procedure to be carried out in two separate samples. However, the degree to which chance relationships were capitalized on and the generalizability of the final models can only be determined by testing these models in new, independent samples.

Future Directions

In line with some of the methodological limitations discussed above and because of students' participation in the Montgomery County Dropout Prediction Study, current plans exist to follow this sample throughout high school, allowing for the opportunity to examine the outcomes of anxiety in late adolescence. However, while this investigation attempts to take a comprehensive look at the relationship between anxiety and depression, incorporating social influences (i.e., actual and perceived peer interactions), emerging evidence suggests the importance of considering broader models incorporating environmental and contextual factors in examining the psychosocial sequelae of anxiety

and the development of depression (Barrett, Rapee, Dadds, & Ryan, 1996; Chorpita, Albano, & Barlow, 1996; Dadds & Barrett, 1996; Rapee, 1997). For example, both Barrett et al. (1996) and Chorpita et al. (1996) examined anxious children's responses to ambiguous situations after the children discussed the situations with their families. In both investigations, the authors concluded that the families of anxious children encouraged maladaptive cognitive biases. Therefore, it may be that parental reactions to anxious youth are an important factor in the development of attributional style. Additionally, Rapee (1997) suggests that parental reactions, specifically, parental rejection, may be influential in the development of depression in youth. While the current investigation examined youths' relationships with peers, no attempt was made to account for family/parental relationships. Incorporation of such relationships may add significantly to the models tested here.

Additionally, although longitudinal studies such as this one allow for the investigation of the development of psychological functioning, they assume that each variable, once examined, remains static and is not influenced by variables hypothesized to play a role later in the causal chain. This, however, is probably not the case and although the models shown here assume causality to flow in one direction, feedback loops, which account for bi-directional relationships, may represent more precisely the processes that occur in the course of development.

Methodologically, such hypotheses are difficult to examine not only because they require repeated measurement of a large number of variables but also because such investigations currently require data to be collected on a very large number of individuals. This is especially difficult when conducting longitudinal investigations involving not only children/adolescents but also their families and peers. However, bootstrapping techniques, currently being developed for use with latent variable path analysis (T. A. Brown, personal communication, February 10, 1999) allow such hypotheses to be examined with smaller samples.

Finally, and importantly, given the implications of the models tested in the present investigation, examination of treatments for anxious youth which specifically target the

processes examined in these models in addition to anxious symptomatology may serve both to treat anxiety and to alleviate the suffering of youth who otherwise would develop secondary affective disorders.

<u>Summary</u>

Although the occurrence of comorbidity between anxiety and depression in youth is well documented (Anderson et al., 1987; Fergusson et al., 1993; Francis et al., 1992; Kashani et al., 1987a; Kashani et al., 1987b; Kashani & Orvaschel, 1988; Kovacs et al., 1989; Last et al., 1987; Lewinsohn et al., 1993; McGee et al., 1990; Mitchell et al., 1988; Strauss et al., 1988b), this observation in and of itself does little to explain the underlying processes that give rise to this phenomenon. Rather, it is a starting point, providing the impetus to search for the mechanisms at work (Rutter, 1994). The goal of the present investigation was to move beyond the current literature documenting high rates of comorbidity of anxiety and depression in youth by examining one possible explanation for this observed phenomenon.

Four principal explanations for comorbidity between disorders such as anxiety and depression have been suggested in the literature (L. D. Seligman & Ollendick, 1998). Specifically, disorders would be expected to co-occur at higher than chance rates when they share a large proportion of definitional criteria, when they are reflective of one underlying construct that has been artificially divided into two classes of disorders, when they share common risk/etiological factors, or when one disorder causes or puts the individual at risk for developing the second (Frances, Widiger, & Fyer, 1990; Klerman, 1990). A recent review of the empirical support for each of these explanations suggested the possibility that anxiety or worry may, over time, give rise to a secondary affective disorder (L. D. Seligman & Ollendick, 1998). Therefore, the current investigation examined two possible models of a developmental progression from anxiety to depression, one model originating with general anxiety and the other beginning with worry. Specifically, integrating Lewinsohn's behavioral theory of depression (Lewinsohn, 1974) with the more recent cognitively focused theory of hopelessness depression (Abramson et al., 1989), it was hypothesized that anxiety would impact

youths' actual and perceived social and scholastic performance and that social and
academic variables would influence youths' attributional style. In turn, it was
hypothesized that youths' attributional style would influence the development of
hopelessness and then hopelessness would influence the development of depression.
Further, given the evidence that sex and cognitive ability may influence the strength or
nature of these relationships (Cole, 1991; Garmezy et al., 1984; Morison & Masten,
1991; Rolf, 1972; Strauss et al., 1988b), the moderating effects of these variables were
explored (see Figure 1). While, the proposed models, with revisions as depicted in
Figures 4 and 5, received some support, the probability is that numerous pathways exist
linking anxiety and depression. Explication of these relationships has important
implications for the prevention of comorbid conditions in youth. Given findings that
suggest that comorbidity is typically associated with greater symptomatology and more
severe impairment (Nottleman & Jensen, 1994) further exploration of the relationship
between anxiety and depression in youth poses an important area for future research.

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