



Published in final edited form as:

J Early Adolesc. 2009 April 1; 29(2): 307–327. doi:10.1177/0272431608320125.

Gender, Anxiety, and Depressive Symptoms:

A Longitudinal Study of Early Adolescents

Tara M. Chaplin

University of Pennsylvania

Jane E. Gillham

University of Pennsylvania and Swarthmore College

Martin E. P. Seligman

University of Pennsylvania

Abstract

Does anxiety lead to depression more for girls than for boys? This study prospectively examines gender differences in the relationship between anxiety and depressive symptoms in early adolescence. One hundred thirteen 11- to 14-year-old middle school students complete questionnaires assessing depressive symptoms and three dimensions of anxiety (worry and oversensitivity, social concerns and concentration, and physiological anxiety) as well as total anxiety symptoms at an initial assessment and 1 year later. Total anxiety and worry and oversensitivity symptoms are found to predict later depressive symptoms more strongly for girls than for boys. There is a similar pattern of results for social concerns and concentration symptoms, although this does not reach statistical significance. Physiological anxiety predicts later depressive symptoms for both boys and girls. These findings highlight the importance of anxiety for the development of depression in adolescence, particularly worry and oversensitivity among girls.

Keywords

gender differences; anxiety; depressive symptoms; adolescence

During early adolescence, rates of depression begin a steady climb; 1-year incidence rates increase from 2% to 3% for 6- to 11-year-olds and from 3% to 8% for 11- to 15-year-olds (Angold & Rutter, 1992; Cohen et al., 1993; Hankin et al., 1998). In addition, a gender difference¹ in depression starts to emerge at this time. Starting around age 13 to 15, girls are twice as likely as boys to have clinical depression and high levels of depressive symptoms, and this difference continues long into adulthood (Hankin et al., 1998; Nolen-Hoeksema & Girgus, 1994). Both depressive disorders and moderate levels of symptoms are associated with impairments in functioning among adolescents (Gotlib, Lewinsohn, & Seeley, 1995).

Given the preponderance of depression among girls, it is important to understand the developmental trajectory toward depression for girls in finer grain (Keenan & Hipwell, 2005; Zahn-Waxler, Race, & Duggal, 2005). One potential route to depression among girls

© 2009 SAGE Publications

Please address correspondence to Tara M. Chaplin, Department of Psychiatry, Yale University, 2 Church St. South, Room 209-R, New Haven, CT 06519; e-mail: tara.chaplin@yale.edu..

Authors' Note: Tara M. Chaplin is now at the psychiatry department at Yale University.

Note

1. We use the term *gender differences* in the present paper. We use *gender* to highlight that these differences may be socially influenced.

may be early feelings of anxiety. In childhood, girls are more likely than boys to worry (Silverman, La Greca, & Wasserstein, 1995) and to experience anxiety symptoms (Ollendick & Yule, 1990). In adulthood, anxiety and depressive disorders and symptoms are more likely to co-occur for women than for men (Angst, Merikangas, & Preisig, 1997; Breslau, Schultz, & Peterson, 1995; but for exception see Dobson, 1985). Thus, it is possible that early anxiety symptoms predict increases in depressive symptoms in early adolescence for girls more so than for boys (Zahn-Waxler et al., 2005). The present study aims to add to the literature on anxiety and depression by following early adolescents prospectively for 1 year.

Developmental Relations Between Depression and Anxiety

Anxiety symptoms frequently co-occur with depressive symptoms among children and adolescents, with correlations between self-report measures of depressive and anxiety symptoms ranging from .20 to .70 (Brady & Kendall, 1992; Wolfe et al., 1987). In fact, anxiety and depressive symptoms are so highly correlated that some researchers have questioned whether anxiety and depression are part of the same syndrome. Lahey and colleagues' (2004) factor-analytic study with 4- to 17-year-olds found that anxiety symptoms involving worry and social anxiety (but not separation anxiety, specific fears, or compulsions) loaded on the same factor as depressive symptoms. Also, Kendler and colleagues' studies of adult women find that Generalized Anxiety Disorder (GAD) and Major Depressive Disorder share common genetic etiologies, although they may have distinct environmental causes (Kendler, Neale, Kessler, Heath, & Eaves, 1992; Kendler, 1996). Barlow and others propose that negative emotionality underlies both anxiety and depression (Barlow, 2000), although depression is distinguished from anxiety by also involving low positive affect. In contrast, other research supports anxiety and depression as separable constructs. Stark and Laurent (2001) found that self-reported depressive symptoms loaded on a different factor from worry-related anxiety symptoms in fourth- to seventh-grade children. Furthermore, anxiety and depression are associated with different cognitive patterns (Greenberg & Alloy, 1989; Ingram, Kendall, Smith, Donnell, & Ronan, 1987).

Whether or not anxiety and depressive symptoms are part of the same underlying disorder, developmentally, children typically show anxiety symptoms earlier than they show depressive symptoms (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Stein et al., 2001; Wittchen, Kessler, Pfister, & Lieb, 2000; Woodward & Fergusson, 2001). Given that anxiety occurs earlier, some researchers suggest that feelings of anxiety contribute to the development of depression in adolescence (Zahn-Waxler et al., 2005). Anxious children may withdraw from others and may be the target of peer rejection, leading to loneliness, sadness, lowered self-image, and (eventually) depression (Gazelle & Ladd, 2003; Hymel, Rubin, Rowden, & LeMare, 1990). This may be particularly true for girls, given that their sense of self may be more closely tied to their relationships with others (Rose & Rudolph, 2006). Alternately, early anxiety may simply be a marker for a more general (possibly biologically based) tendency toward internalizing disorders, which manifests as depression in adolescence (Kovacs, 1990; Wolfe et al., 1987). Whatever mechanism is at work, it is important to gain a better understanding of relations between anxiety and depression from a developmental perspective and to incorporate gender in this understanding (Zahn-Waxler et al., 2005).

Gender and the Relation Between Depression and Anxiety

Anxiety may be particularly associated with increases in depressive symptoms for adolescent girls. While this possibility has not been explicitly tested prospectively, there is suggestive evidence from several lines of theory and research. First, girls report greater levels of fearfulness and anxiety symptoms and may have higher rates of anxiety disorders than boys, particularly anxiety disorders involving social relationships, such as Separation Anxiety

Disorder and Social Phobia (for review, see Albano, Chorpita, & Barlow, 1996). Second, the consequences of early anxiety may be greater for girls than for boys. Schwartz, Snidman, and Kagan (1999) found that girls with “inhibited” temperaments (a behavioral style involving fearfulness or anxiety in novel situations) at age 2 were more likely to develop social anxiety in adolescence than were boys with inhibited temperaments. This study did not include a measure of depression to test predictions of depressive symptoms. Third, theorists interested in attachment and relationships argue that girls may value or focus on interpersonal relationships more than boys (Gilligan, 1982; Rose & Rudolph, 2006; Shaw & Dallos, 2005). Consequently, girls may experience more worry than boys about relationships, and failed relationships may lead to greater feelings of depression for girls than boys (Cyranowski, Frank, Young, & Shear, 2000).

In addition to anxious temperament, research on anxiety-related personality traits suggests that these are more related to later depression for girls than for boys. For example, excessive empathy or overconcern for others (which may be associated with anxious arousal) has been theoretically linked to depression in girls (Keenan & Hipwell, 2005; Zahn-Waxler, Cole, & Barrett, 1991). In a long-term longitudinal study, Block, Gjerde, and Block (1991) found that girls who reported higher levels of depressive symptoms at age 18 were described by psychologist interviewers at ages 11 and 14 as overcontrolled, shy, and anxious. In contrast, boys reporting high depressive symptoms at age 18 were described at ages 11 and 14 as aggressive, undercontrolled, and self-aggrandizing, traits that are associated with *lower* levels of anxious arousal (Lahey, Hart, Pliszka, Applegate, & McBurnett, 1993). These findings suggest that the development of depression in girls may be closely related to symptoms of anxiety, particularly worry or overconcern for other people in their lives or for social standards.

Importance of Early Adolescence

The present study examines gender and the role of anxiety in the development of depressive symptoms in the early adolescent period. Although feelings of anxiety develop during childhood, adolescence is a particularly important period to examine the relationship between anxiety and depressive symptoms. Depression is infrequent in childhood, but begins to occur at substantial rates in early adolescence (Angold & Rutter, 1992). In addition, early adolescence marks the cusp of the emergence of gender differences in depressive symptoms (Hankin et al., 1998; Twenge & Nolen-Hoeksema, 2002). Also, early adolescence is a period of risk for girls, with girls experiencing a confluence of stressors at one time, including the onset of puberty, transition to middle school, and increases in rates of sexual abuse (Eccles et al., 1993; Nolen-Hoeksema & Girgus, 1994), stressors that may exacerbate existing anxiety feelings, leading to depression (Hankin & Abramson, 2001). Thus, early adolescence is an ideal developmental period in which to capture the initial impact of anxiety on emerging depression, particularly among girls.

The Present Study Hypotheses

The present longitudinal study builds upon past theory and research by examining whether anxiety predicts later depressive symptoms more strongly for girls than for boys in early adolescence. In addition to an examination of general anxiety symptoms as predictors of depressive symptoms, we examine three subtypes of anxiety that are differentiated in one of the most commonly used measures of anxiety in children, the Revised Children’s Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1997). The subtypes are worry and oversensitivity, physiological anxiety, and social concerns and concentration problems. Our separate examination of the subtypes is supported by research indicating that they represent different dimensions of anxiety. First, factor analysis of the RCMAS confirms the three subscales as distinct factors (Reynolds & Paget, 1981; Reynolds & Richmond, 1997). Second,

the subtypes show divergent validity, correlating with different dimensions of child behavior (Reynolds, 1982). Third, other research studies have examined the specific subtypes rather than the overall anxiety score (e.g., Pina & Silverman, 2004).

We hypothesized that general anxiety symptoms would predict later depressive symptoms for girls more than for boys. Also, given that the tendencies to worry and to overemphasize social relationships may be gender-related risk factors for depression, we hypothesized that the anxiety subscales involving worry and social concerns in particular would be more predictive of later depressive symptoms for girls than boys.

Method

Participants

The sample consisted of 113 early adolescent middle school students (57 boys and 56 girls). Adolescents' ages ranged from 11 to 14 years, $\bar{X} = 12.55$ years, $SD = 0.95$ years. Fifty-five participants were in the sixth grade, 32 in seventh grade, and 26 in eighth grade. Demographically, participants were representative of their community, with 90 (79%) White, 12 (10.6%) African American, 5 (4.4%) Asian, 1 (0.9%) Hispanic, and 5 (4.4%) identified as Other. One hundred five of the 113 families chose to report on their income level. Of these, the mean reported yearly family income was \$85,661 ($SD = \$63,062$) in 2002. Adolescents with family income information scored higher than those without on Time 1 depressive symptoms— $t(10.82) = 3.3$; $p = .01$ —but not anxiety symptoms ($p > .12$).

Recruitment

Participants for this study were drawn from the control group of a larger study on the effectiveness of a school-based program designed to teach coping and problem-solving skills to adolescents. Recruitment letters with consent and assent forms were sent to the families of all (approximately 6,000) students in five middle schools in two suburban school districts in the northeastern United States. Of these, 1,016 students signed up for the study. These students completed a screening questionnaire on depressive symptoms. Based on the screening questionnaire, we invited 609 adolescents into the study. The 609 students were not significantly different from the original sample in race or ethnicity, $\chi^2(n = 1,016) = 10.29$; $p > .10$. We first invited students who scored highest on depressive symptoms, and then students with progressively lower symptoms were accepted in order to fill spaces in the intervention groups. In the end, participants' depressive symptom scores at Time 1 covered the full range on the Children's Depression Inventory (CDI; Kovacs, 2001), from 0 to 36, with a mean of 11.05 ($SD = 8.79$). This mean is somewhat higher than the mean of 9.98 reported for the normative CDI sample (Kovacs, 2001) but is below the cut point of 13 that is commonly used to denote mild to moderate levels of depressive symptoms (Kovacs, 2001).

Of the 655 adolescents invited into the study, we received parental consent and student assent for 417. Of these participants, 129 (about 1 of 3) were randomly assigned to the no-intervention control group and were assessed at Time 1 (in their 1st year in the study). Of these 129 students, 113 (87.6%) completed the assessment again about 1 year later (Time 2). These 113 students make up the sample for the present study. We selected children from the control condition in order to examine the trajectory from anxiety to depressive symptoms in a group that was not affected by an intervention.

The remaining two thirds of students were assigned to one of two intervention conditions—to receive either the student program alone or the student program plus an additional parent program. Students in both intervention conditions attended an after-school group cognitive-behavioral intervention that met for 1.5 hours once per week for 12 weeks. Intervention groups

were led by trained teachers and/or school counselors. The intervention was designed to promote resiliency through teaching a variety of cognitive-behavioral skills (e.g., identifying and evaluating pessimistic thoughts, relaxation) and social problem-solving skills (e.g., assertiveness). Parents in the student + parent program condition attended six evening sessions every other week where they met with a trained guidance counselor to review the same skills taught in the student after-school sessions. A more detailed outline of the programs may be obtained upon request from the authors.

Procedure

At each assessment point (Time 1 and Time 2), adolescents completed questionnaires during the school day in groups of 15 to 20 students in their school cafeteria or classroom.

Measures

Anxiety symptoms—We assessed anxiety symptoms with the RCMAS (Reynolds & Richmond, 1997), a frequently used self-report anxiety scale for children and adolescents. The RCMAS presents 28 statements that are rated as *yes* (True about you) or *no* (Not true about you). One point is given for each *yes* response. Items were summed to create one total score and three subscale scores, with higher scores reflecting higher levels of anxiety. The present study used the total anxiety score, which includes all 28 items, to assess total anxiety symptoms. In addition, the study used the three anxiety subscales to assess subtypes of anxiety: worry and oversensitivity (11 items; e.g., “I worry a lot of the time,” “My feelings get hurt easily”), physiological anxiety (10 items; e.g., “Often I feel sick in my stomach,” “I am tired a lot”), and social concerns and concentration (7 items; e.g., “I feel that others do not like the way I do things”). The social concerns and concentration subscale consists of six social concern items and only one item relating to concentration and so may primarily measure social problems.

In past research, the RCMAS total and subscale scores have demonstrated convergent and divergent validity (Reynolds, 1982) as well as high internal consistency and test-retest reliability (Reynolds & Richmond, 1997). In the present study, internal consistencies were good: for total symptoms, $\alpha = .93$; for worry and oversensitivity, $\alpha = .87$; for physiological anxiety, $\alpha = .78$; and for social concerns and concentration, $\alpha = .81$.

Depressive symptoms—We assessed depressive symptoms with the CDI (Kovacs, 2001). The CDI is a widely used 27-item self-report measure that assesses cognitive, emotional, and behavioral symptoms of depression over the previous 2-week period. For each item, adolescents are asked to choose one statement of three that best describes them (“I am sad once in a while,” “I am sad many times,” and “I am sad all the time”). Items are later scored from 0 to 2. We removed one item on the CDI relating to suicide at the request of school administrators prior to administration, leaving 26 items. Items were summed to create a depressive symptom score, with higher scores reflecting greater symptoms. In past research, the CDI has shown good internal consistency and convergent validity with other indices of depression (Kovacs, 2001). In the present study, the internal consistency of the CDI was .92.

Statistical Procedures

To examine the hypothesis that anxiety symptoms would be a stronger predictor of later depressive symptoms for girls than for boys, we tested for an interaction between gender and anxiety at Time 1 predicting depressive symptoms 1 year later at Time 2. All analyses controlled for depressive symptoms at Time 1. We conducted four regressions, one for each measure of anxiety (total anxiety, worry and oversensitivity, physiological anxiety, and social concerns and concentration). In each equation, the dependent variable was depressive symptoms at Time 2. We entered depressive symptoms at Time 1 in Step 1 as a covariate and the main effect of gender, the main effect of anxiety at Time 1, and the interaction between

gender and anxiety as predictors in Step 2. When the interaction term significantly predicted ($p < .05$) or tended to predict ($p < .10$) depressive symptoms, follow-up regression analyses were conducted, separately for girls and boys, examining anxiety symptoms at Time 1 predicting depressive symptoms at Time 2, controlling for depressive symptoms at Time 1.

We inspected each variable for normality. The depressive symptom measure at Time 2 was positively skewed (skewness z score > 3.58). To improve normality of the data, this score was log transformed (Tabachnick & Fidell, 2001). This transformation shifted the scores so that they became normally distributed (an assumption of ANOVA) without changing the meaning of the analysis (Tabachnick & Fidell, 2001). Transformed scores were used for analyses but for ease of interpretation, raw scores are presented in the table of means (Table 1) and in the figures.

When conducting regressions including main effect terms (e.g., anxiety symptoms, gender) and their interactions (e.g., the interaction between anxiety symptoms and gender), problems of multicollinearity can arise. To help address this, the predictor variables were centered around their means before being entered into the regression equation (Aiken & West, 1991). Following this, there was no indication of multicollinearity; all Tolerances $> .30$ and all Variance Inflation Factors < 3.32 .

Results

Overview

Total anxiety symptoms and worry and oversensitivity symptoms predicted later depressive symptoms more strongly for girls than for boys. Physiological anxiety predicted later depressive symptoms for both girls and boys. There was a nonsignificant trend for social concerns and concentration problems to predict later depressive symptoms more strongly for girls than for boys.

Attrition

With one exception, t tests showed no significant differences between students who dropped out of the study between Time 1 and Time 2 ($n = 16$) and those who had complete data ($n = 113$) on Time 1 depressive or anxiety symptom measures: Students who dropped out by Time 2 had higher social concerns and concentration symptoms than those who remained, $t(127) = -2.06$; $p = .04$. Chi-square analyses did not indicate differences between the groups on any demographic variable.

Descriptive Information

Means and standard deviations for anxiety and depressive symptoms at Time 1 and Time 2 are presented, separately for boys and girls, in Table 1. As shown in Table 1, there was a significant gender difference in one variable; girls reported higher levels of worry and oversensitivity than boys at Time 2.

Gender Differences in Associations Between Anxiety Symptoms at Time 1 and Depressive Symptoms at Time 2

We hypothesized that anxiety symptoms, particularly those involving worry and oversensitivity and social concerns, would predict later depressive symptoms more strongly for girls than for boys.

Total anxiety symptoms—Total anxiety symptoms were a stronger predictor of depressive symptoms for girls than for boys. The interaction between gender and total anxiety symptoms tended to predict depressive symptoms, $\beta = .13$; $p = .09$ (see Table 2 and Figure 1). Follow-up

regressions conducted separately for girls and boys indicated that total anxiety symptoms at Time 1 significantly predicted subsequent depressive symptoms for girls— $\beta = .34$; $t(53) = 2.09$; $p = .04$ —but not for boys, $\beta = .16$; $t(54) = 0.72$; $p = .47$. For girls, higher total anxiety symptoms predicted higher depressive symptoms.

Worry and oversensitivity—Worry and oversensitivity was a stronger predictor of depressive symptoms for girls than for boys. The interaction between gender and worry and oversensitivity significantly predicted depressive symptoms, $\beta = .16$; $p = .03$ (see Table 2 and Figure 2). The prediction of depressive symptoms from worry and oversensitivity was marginally significant for girls— $\beta = .28$; $t(53) = 1.96$; $p = .056$ —but was not significant for boys, $\beta = -.10$; $t(54) = -0.61$; $p = .55$. For girls, higher worry and oversensitivity predicted higher depressive symptoms.

Physiological anxiety—The relationship between physiological anxiety and later depressive symptoms did not differ by gender. The interaction between gender and physiological anxiety was not significant, $\beta = .03$; $p = .68$ (see Table 2). Interestingly, there was a significant main effect of physiological anxiety; higher levels of physiological anxiety predicted higher depressive symptoms, $\beta = .29$; $p = .01$ (see Table 2).

Social concerns and concentration—There was mixed evidence for a gender difference in the relationship between social concerns and concentration symptoms and later depressive symptoms. The interaction between gender and social concerns and concentration symptoms tended to predict depressive symptoms, $\beta = .14$; $p = .07$ (see Table 2). However, neither beta was significant; for girls, $\beta = .22$; $t(53) = 1.48$; $p = .14$, and for boys, $\beta = -.01$; $t(54) = -0.04$; $p = .97$.

Do Depressive Symptoms at Time 1 Predict Anxiety Symptoms at Time 2 by Gender?

It is possible that the significant anxiety by gender interactions reflect that anxiety and depressive symptoms simply co-occur more for girls than for boys, rather than that anxiety precedes depressive symptoms more for girls than for boys. To test this possibility, we examined the reverse analysis, predicting anxiety symptoms at Time 2 from gender, depressive symptoms at Time 1, and the interaction between gender and depressive symptoms, covarying anxiety symptoms at Time 1. Results did not support this reverse hypothesis; the depressive symptom by gender interaction terms were not significant predictors of any type of anxiety symptom at Time 2 (all β s $< .06$; p s $> .35$).

Discussion

We found that total anxiety symptoms and worry and oversensitivity symptoms were stronger predictors of later depressive symptoms in girls than in boys in early adolescence. There was a nonsignificant trend for social concerns and concentration related symptoms to predict depressive symptoms differentially by child gender. Lastly, physiological anxiety predicted later depressive symptoms regardless of adolescents' gender. The results highlight the need to attend to anxiety problems in the early adolescent period, particularly worry and oversensitivity among girls.

Worry and Oversensitivity and General Anxiety Symptoms

That general anxiety symptoms and worry and oversensitivity were more strongly associated with later depressive symptoms for girls than for boys may suggest different causes of depression for girls versus boys. For boys, high levels of aggressive, acting-out behavior may lead to later depression (Block et al., 1991; Garber, Quiggle, Panak, & Dodge, 1991). In contrast, for girls an internalizing, overcontrolled presentation in childhood and early

adolescence may lead to later depression (Keenan & Hipwell, 2005; Zahn-Waxler et al., 2005). But why might worry lead to depression for girls more so than for boys? Perhaps worry confers greater risk among girls because they are more likely than boys to worry about others' well-being (Zahn-Waxler et al., 1991). Very high levels of concern for others may lead girls to take on the problems of others, resulting in high levels of guilt, sadness, and possibly depression (Zahn-Waxler et al., 2005).

Another possible explanation for the stronger anxiety-depression link among girls is a third variable account: Girls may be more likely than boys to have an endogenous, biologically based form of depression (Kendler, Gardner, McNeale, & Prescott, 2001). This biologically based depression may manifest as a tendency toward worry in childhood and then take the form of depressive symptoms in adolescence. Indeed, several researchers have proposed that anxiety and depression are part of the same disorder and anxiety symptoms are not causal, just the earlier manifestation (e.g., Kovacs, 1990). Interestingly, this research finds that worry and social anxiety are the types of anxiety most related to the depressive syndrome (Kendler et al., 1992; Lahey et al., 2004; but for exception see Stark & Laurent, 2001). This may explain why worry and oversensitivity was the type of anxiety most related to later depressive symptoms for girls more than boys.

The stronger relationship between worry and later depressive symptoms for girls might simply be due to a high co-occurrence between anxiety and depression. However, we did not find that gender interacted with depressive symptoms to predict anxiety 1 year later. This suggests that there may be something unique about anxiety symptoms as harbingers rather than consequences of depressive symptoms for adolescent girls. This is consistent with past findings that anxiety precedes the onset of depression (e.g., Cole et al., 1998). Of course, additional longitudinal research is needed to more completely understand the direction of effects between feelings of anxiety and depression. For example, Kovacs, Obrosky, and Sherrill (2003) found that clinically depressed girls were more likely than depressed boys to develop a comorbid anxiety disorder after age 13; however, their study used a clinical sample and so findings may not be representative of the development of anxiety symptoms in youth with a range of depressive symptoms.

Physiological Anxiety and Social Concerns and Concentration Symptoms

In contrast to worry and oversensitivity, physiological anxiety predicted later depressive symptoms for both boys and girls. Worry and oversensitivity reflect affective symptoms of anxiety that may be more prevalent in and more encouraged in girls than in boys (Eisenberg, Cumberland, & Spinrad, 1998; Zahn-Waxler et al., 2005). In fact, in the present study, girls reported higher levels of worry and oversensitivity than boys at Time 2. Physiological symptoms of anxiety, such as headaches and fatigue, in contrast, were not gender differentiated in the present study. Such physical problems are not associated with a particular gender role in the way that worry is associated with the female gender role to be concerned about or nurturing toward others (Zahn-Waxler et al., 1991).

Regarding social concerns and concentration related anxiety symptoms, there was a nonsignificant trend for girls to show a stronger relation between social concerns and concentration problems and later depression than boys; however, neither girls' nor boys' social concerns and concentration symptoms were significantly predictive of depressive symptoms. The measure of this anxiety subtype may not have been specific enough to show a strong link to later depressive symptoms, since it included items reflecting both anxiety about social situations (which may be more specifically related to depression, particularly for girls) and about difficulties concentrating (which may reflect more general attention problems not specific to depression).

Gender Differences in Symptom Levels

Notably, although we found gender differences in the prediction of depressive symptoms from anxiety, we did not find significant gender differences in mean levels of depressive symptoms. Girls scored about 1 point higher than boys on the CDI at Time 2 (see Table 1); however, this did not reach significance. This gender difference may have become larger with time, as depressive symptoms increase in later adolescence. A recent meta-analysis found that a notable (1.5-point) difference between boys and girls on the CDI does not occur until age 14 (Twenge & Nolen-Hoeksema, 2002). At Time 2, our study's adolescents were slightly below this age (they had a mean age of 13.5 years). Interestingly, we did find a significant gender difference in worry and oversensitivity, with girls reporting higher levels than boys at Time 2. This may contribute to increasing gender differences in depressive symptoms across middle to late adolescence.

Summary and Limitations

We found an important association between anxiety symptoms and later depressive symptoms by gender in a community sample of early adolescents. Worry and oversensitivity predicted later depressive symptoms more strongly for girls than for boys, whereas physiological anxiety predicted later depressive symptoms for both genders. It should be noted that overall, the level of depressive symptoms actually decreased over the year of this study. This is unusual given that depressive symptoms are typically higher in older adolescents than early adolescents. However, many longitudinal studies find a decrease in symptomatology across repeated assessments, possibly due to participants' habituation to the questionnaire items or regression to the mean (Twenge & Nolen-Hoeksema, 2002). Despite the overall decrease in depressive symptoms, it is notable that the decrease was less substantial for girls with greater early worry. These girls may maintain a steady level of depressive symptoms, eventually leading to depressive disorders.

One strength of the present study is its longitudinal design; however, we examined only 1 year of development. Also, our sample was fairly small, limiting statistical power. Because of this, we were unable to examine the possibility that different trajectories exist for subgroups of boys and girls. However, we found important initial results by gender that can be further explored in future research. Another limitation is that the sample consisted of primarily White, middle-class adolescents. Also, although participants were similar to a representative sample (the CDI standardization sample) in terms of their depression levels, these participants and their parents chose to enroll in a study of a coping and problem-solving program and may differ from families who would not choose to enroll in that type of project. Finally, this was a community-based sample and thus may have had less severe depressive symptoms than would be found in a clinical sample. Additional research is needed to determine whether the findings generalize to clinical populations.

Our findings are based on adolescent report of symptoms. This approach is limited in that it does not incorporate parent or teacher perspectives. However, adolescents are found to be accurate reporters of their own symptoms of depression and anxiety. Disorders that involve internal experiences are not as easily observed by others (Bird, Gould, & Staghezza, 1992). Also, we did not examine anxiety and depressive disorders. We initially attempted to do this but too few children (<6%) had diagnoses for meaningful analyses to be conducted. Our findings based on symptom level are still important to consider, given that even moderate levels of depressive symptoms have been shown to negatively affect adolescents' functioning (Gotlib, Lewinsohn, & Seeley, 1995). Third, we did not examine protective factors, such as social support and coping (Dumont & Provost, 1999). For example, girls who have high anxiety in childhood but who use positive coping strategies such as active problem solving may be buffered from depression. Future research should examine this possibility.

In sum, the present study provides evidence that the development of depression in early adolescence may differ by gender. In particular, worry in childhood may lead to the development of depression among girls but not boys. If true, this implies that identifying and treating early feelings of worry and oversensitivity in girls might prevent adolescent depression.

Acknowledgments

The authors thank the students who participated in the study and the research team and school staff who made it possible. The study was supported through Grant MH52270 from the National Institute of Mental Health.

Biography

Tara M. Chaplin, PhD, is an associate research scientist at Yale University. Her research interests are in the role of gender and emotion regulation in the development of psychopathology, particularly the development of depression in adolescence.

Jane E. Gillham, PhD, is a research associate at the University of Pennsylvania and a part-time assistant professor in the psychology department at Swarthmore College. Much of her work focuses on the development and evaluation of school-based interventions designed to promote well-being and prevent depression in children and adolescents.

Martin E. P. Seligman, PhD, is the Fox Leadership Professor of Psychology and the director of the Positive Psychology Center at the University of Pennsylvania. His research interests are in positive psychology, learned helplessness, depression, optimism, and pessimism. He has published 21 books and 200 articles in these fields.

References

- Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Sage; Newbury Park, CA: 1991.
- Albano, AM.; Chorpita, BF.; Barlow, DH. Childhood anxiety disorders. In: Mash, EJ.; Barkley, RA., editors. Child psychopathology. Vol. 2nd ed. Guilford; New York: 1996. p. 279-329.
- Angold A, Rutter M. Effects of age and pubertal status on depression in a large clinical sample. *Development and Psychopathology* 1992;4:5–28.
- Angst J, Merikangas KR, Preisig M. Subthreshold syndromes of depression and anxiety in the community. *Journal of Clinical Psychiatry* 1997;58:6–10. [PubMed: 9236729]
- Barlow DH. Unraveling the mysteries of anxiety and its disorders from the perspective of emotion theory. *American Psychologist* 2000;55:1247–1263. [PubMed: 11280938]
- Bird HR, Gould MS, Staghezza B. Aggregating data from multiple informants in child psychiatry epidemiological research. *Journal of the American Academy of Child and Adolescent Psychiatry* 1992;31:78–85. [PubMed: 1537785]
- Block JH, Gjerde PF, Block JH. Personality antecedents of depressive tendencies in 18-year-olds: A prospective study. *Journal of Personality and Social Psychology* 1991;60:726–738. [PubMed: 2072253]
- Brady EU, Kendall PC. Comorbidity of anxiety and depression in children and adolescents. *Psychological Bulletin* 1992;111:244–255. [PubMed: 1557475]
- Breslau N, Schultz L, Peterson E. Sex differences in depression: A role for preexisting anxiety. *Psychiatric Research* 1995;58:1–12.
- Cohen P, Cohen J, Kasen S, Velez CN, Hartmark C, Johnson J, et al. An epidemiological study of disorders in late childhood and adolescence: I. Age- and gender-specific prevalence. *Journal of Child Psychology and Psychiatry* 1993;34:851–867. [PubMed: 8408371]

- Cole DA, Peeke LG, Martin JM, Truglio R, Seroczynski AD. A longitudinal look at the relation between depression and anxiety in children and adolescents. *Journal of Consulting and Clinical Psychology* 1998;66:451–460. [PubMed: 9642883]
- Cyranski JM, Frank E, Young E, Shear K. Adolescent onset of the gender difference in lifetime rates of major depression: A theoretical model. *Archives of General Psychiatry* 2000;57:21–27. [PubMed: 10632229]
- Dobson K. An analysis of anxiety and depression scales. *Journal of Personality Assessment* 1985;49:522–526. [PubMed: 4067800]
- Dumont M, Provost MA. Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of Youth and Adolescence* 1999;28:343–363.
- Eccles JS, Midgley C, Wigfield A, Buchanan CM, Reuman D, Flanagan C, et al. Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist* 1993;48:90–101. [PubMed: 8442578]
- Eisenberg N, Cumberland A, Spinrad TL. Parental socialization of emotion. *Psychological Inquiry* 1998;9:241–273. [PubMed: 16865170]
- Garber, J.; Quiggle, NL.; Panak, WF.; Dodge, KA. Aggression and depression in children: Comorbidity, specificity, and social cognitive processing. In: Cicchetti, D.; Toth, S., editors. *Rochester Symposium on Developmental Psychopathology*. Vol. 2: Internalizing and Externalizing Expressions of Dysfunction. Lawrence Erlbaum; Hillsdale, NJ: 1991. p. 225-264.
- Gazelle H, Ladd GW. Anxious solitude and peer exclusion: A diathesis-stress model of internalizing trajectories in childhood. *Child Development* 2003;74:257–278. [PubMed: 12625449]
- Gilligan, C. *In a different voice: Psychological theory and women's development*. Harvard University Press; Cambridge, MA: 1982.
- Gotlib IH, Lewinsohn PM, Seeley JR. Symptoms versus a diagnosis of depression: Differences in psychosocial functioning. *Journal of Consulting and Clinical Psychology* 1995;63:90–100. [PubMed: 7896995]
- Greenberg MS, Alloy LB. Depression versus anxiety: Processing of self- and other-referent information. *Cognition and Emotion* 1989;3:207–223.
- Hankin BL, Abramson LY. Development of gender differences in depression: An elaborated cognitive vulnerability-transactional stress theory. *Psychological Bulletin* 2001;127:773–796. [PubMed: 11726071]
- Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell K. Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology* 1998;107(1):128–140. [PubMed: 9505045]
- Hymel S, Rubin KH, Rowden L, LeMare L. Children's peer relationships: Longitudinal prediction of internalizing and externalizing problems from middle to late childhood. *Child Development* 1990;61:2004–2021.
- Ingram RE, Kendall PC, Smith TW, Donnell C, Ronan K. Cognitive specificity in emotional distress. *Journal of Personality and Social Psychology* 1987;53:734–742. [PubMed: 3681649]
- Keenan K, Hipwell AE. Preadolescent clues to understanding depression in girls. *Clinical Child and Family Psychology Review* 2005;8:89–105. [PubMed: 15984082]
- Kendler KS. Major depression and generalized anxiety disorder: Same genes, (partly) different environments?—revisited. *The British Journal of Psychiatry* 1996;168:68–75. [PubMed: 8770431]
- Kendler KS, Gardner CO, McNeale MC, Prescott CA. Genetic risk factors for major depression in men and women: Similar or different heritabilities and same or partly distinct genes? *Psychological Medicine* 2001;31:605–616. [PubMed: 11352363]
- Kendler KS, Neale MC, Kessler RC, Heath AC, Eaves LJ. Major depression and generalized anxiety disorder: Same genes, (partly) different environments? *Archives of General Psychiatry* 1992;49:716–722. [PubMed: 1514877]
- Kovacs, M. Comorbid anxiety disorders in childhood-onset depressions. In: Maser, JD.; Cloninger, CR., editors. *Comorbidity of mood and anxiety disorders*. American Psychiatric Press; Washington, DC: 1990. p. 272-281.

- Kovacs, M. Children's Depression Inventory manual. Multi- Health Systems; North Tonawanda, NY: 2001.
- Kovacs M, Obrosky DS, Sherrill J. Developmental changes in the phenomenology of depression in girls compared to boys from childhood onward. *Journal of Affective Disorders* 2003;74:33–48. [PubMed: 12646297]
- Lahey BB, Applegate B, Waldman ID, Loft JD, Hankin BL, Rick J. The structure of child and adolescent psychopathology: Generating new hypotheses. *Journal of Abnormal Psychology* 2004;113:358–385. [PubMed: 15311983]
- Lahey BB, Hart EL, Pliszka S, Applegate B, McBurnett K. Neurophysiological correlates of conduct disorder: A rationale and a review of research. *Journal of Clinical Child Psychology* 1993;22:141–153.
- Nolen-Hoeksema S, Girgus JS. The emergence of gender differences in depression during adolescence. *Psychological Bulletin* 1994;115:424–443. [PubMed: 8016286]
- Ollendick TH, Yule W. Depression in British and American children and its relation to anxiety and fear. *Journal of Consulting and Clinical Psychology* 1990;58:126–129. [PubMed: 2319046]
- Pina AA, Silverman WK. Clinical phenomenology, somatic symptoms, and distress in Hispanic/Latino and European American youths with anxiety disorders. *Journal of Clinical Child and Adolescent Psychology* 2004;33:227–236. [PubMed: 15136186]
- Reynolds CR. Convergent and divergent validity of the Revised Children's Manifest Anxiety Scale. *Educational and Psychological Measurement* 1982;42:1205–1212.
- Reynolds, CR.; Richmond, BO. Revised Children's Manifest Anxiety Scale manual. Western Psychological Services; Los Angeles: 1997.
- Reynolds WM, Paget KD. Factor analysis of the Revised Children's Manifest Anxiety Scale for blacks, whites, males, and females with a national normative sample. *Journal of Consulting and Clinical Psychology* 1981;49:352–359. [PubMed: 7276324]
- Rose A, Rudolph KD. A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin* 2006;132:98–131. [PubMed: 16435959]
- Schwartz CE, Snidman N, Kagan J. Adolescent social anxiety as an outcome of inhibited temperament in childhood. *Journal of the American Academy of Child and Adolescent Psychiatry* 1999;38:1008–1015. [PubMed: 10434493]
- Shaw SK, Dallos R. Attachment and adolescent depression: The impact of early attachment experiences. *Attachment & Human Development* 2005;7:409–424. [PubMed: 16332584]
- Silverman WK, La Greca AM, Wasserstein S. What do children worry about? Worries and their relation to anxiety. *Child Development* 1995;66:671–686. [PubMed: 7789194]
- Stark KD, Laurent J. Joint factor analysis of the Children's Depression Inventory and the revised Children's Manifest Anxiety Scale. *Journal of Clinical Child Psychology* 2001;30:552–567. [PubMed: 11708242]
- Stein MB, Fuetsch M, Muller N, Hofler M, Lieb R, Wittchen HU. Social anxiety disorder and the risk of depression: A prospective community study of adolescents and young adults. *Archives of General Psychiatry* 2000;58:251–256. [PubMed: 11231832]
- Tabachnick, BG.; Fidell, LS. Using multivariate statistics. Vol. 4th ed. Allyn & Bacon; Boston: 2001.
- Twenge JM, Nolen-Hoeksema S. Age, gender, race, socioeconomic status, and birth cohort differences on the children's depression inventory: A meta-analysis. *Journal of Abnormal Psychology* 2002;111:578–588. [PubMed: 12428771]
- Wittchen HU, Kessler RC, Pfister H, Lieb M. Why do people with anxiety disorders become depressed? A prospective-longitudinal community study. *Acta Psychiatrica Scandinavia Supplementum* 2000;406:14–23.
- Wolfe VV, Finch AJ, Saylor CF, Blount RL, Pallmeyer TP, Carek DJ. Negative affectivity in children: A multitrait-multimethod investigation. *Journal of Consulting and Clinical Psychology* 1987;55:245–250. [PubMed: 3571681]
- Woodward LJ, Fergusson DM. Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry* 2001;40:1086–1093. [PubMed: 11556633]

- Zahn-Waxler, C.; Cole, PM.; Barrett, KC. Guilt and empathy: Sex differences and implications for the development of depression. In: Garber, J.; Dodge, KA., editors. *The development of emotion regulation and dysregulation*. Cambridge University Press; Cambridge: 1991. p. 243-272.
- Zahn-Waxler, C.; Race, E.; Duggal, S. Mood disorders and symptoms: The expression and development of depression in girls. In: Bell, D.; Foster, SL.; Mash, EJ., editors. *Handbook of behavioral and emotional problems in girls (Issues in clinical child psychology)*. Springer; New York: 2005.

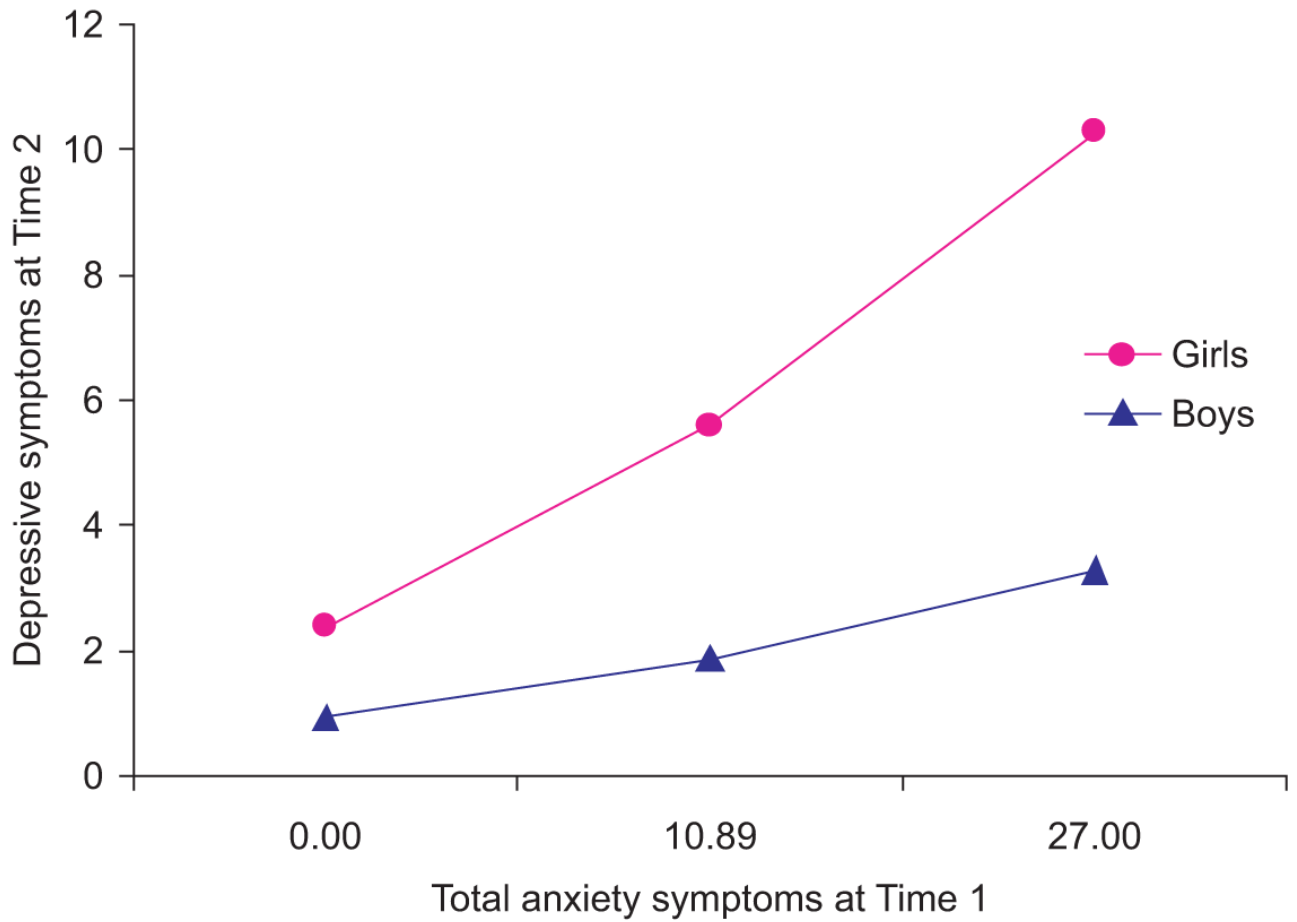


Figure 1. Depressive Symptoms at Time 2 at Minimum, Mean, and Maximum Levels of Time 1 Total Anxiety Symptoms by Gender (Controlling for Depressive Symptoms at Time 1)

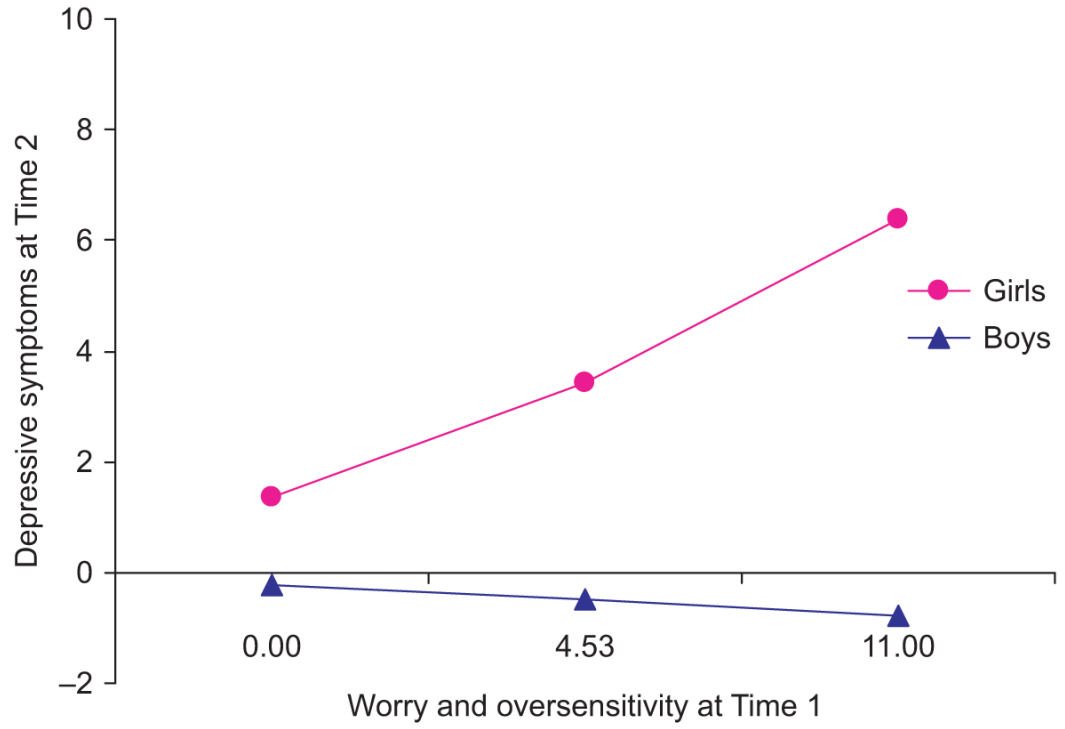


Figure 2. Depressive Symptoms at Time 2 at Minimum, Mean, and Maximum Levels of Time 1 Worry and Oversensitivity by Gender (Controlling for Depressive Symptoms at Time 1)

Table 1

Means and Standard Deviations for Anxious and Depressive Symptoms for Girls and Boys at Time 1 and Time 2

	$\bar{X}(SD)$	
	Girls	Boys
Total anxiety		
Time 1	11.19(7.35) _a <i>n</i> = 56	10.67 (8.09) _a <i>n</i> = 57
Time 2	9.32 (7.64) _a <i>n</i> = 56	7.24 (7.51) _a <i>n</i> = 56
Worry and oversensitivity		
Time 1	5.04 (3.42) _a <i>n</i> = 56	4.04 (3.42) _a <i>n</i> = 57
Time 2	4.41 (3.76) _a <i>n</i> = 56	2.59 (3.33) _b <i>n</i> = 56
Physiological anxiety		
Time 1	3.57 (2.66) _a <i>n</i> = 56	3.54 (2.73) _a <i>n</i> = 57
Time 2	2.91 (2.51) _a <i>n</i> = 56	2.70 (2.58) _a <i>n</i> = 56
Social concerns and concentration		
Time 1	2.58 (1.99) _a <i>n</i> = 56	3.00 (2.60) _a <i>n</i> = 57
Time 2	2.00 (2.16) _a <i>n</i> = 56	1.95 (2.26) _a <i>n</i> = 56
Depressive symptoms		
Time 1	10.32 (8.72) _a <i>n</i> = 56	11.15 (8.97) _a <i>n</i> = 57
Time 2	8.72 (9.25) _a <i>n</i> = 56	7.65 (8.55) _a <i>n</i> = 57

Note: Means in the same row that do not share subscripts are different from each other at a $p < .05$ level in t tests.

Prediction of Depressive Symptoms at Time 2 From Gender, Anxiety Symptoms, and the Interaction Between Gender and Anxiety Symptoms at Time 1

Depressive Symptoms at Time 2						
	B	β	R ²	t or F	df	P
1. Overall equation (total anxiety)				19.33	3,108	.00
Step 1			.38			
Depressive symptoms at Time 1	.03	.62		8.24	111	.00
Step 2			.42			
Gender	.04	.07		0.55	108	.58
Total anxiety at Time 1	.02	.25		1.89	108	.06
Gender \times Total Anxiety at Time 1	.01	.13		1.72	108	.09
Overall equation (worry)				18.98	4,108	.00
Step 1			.38			
Depressive symptoms at Time 1	.03	.62		8.24	111	.00
Step 2			.41			
Gender	.04	.04		0.56	108	.58
Worry at Time 1	.01	.09		0.83	108	.41
Gender \times Worry at Time 1	.05	.16		2.17	108	.03
Overall equation (physiological anxiety)				19.77	4,108	.00
Step 1			.38			
Depressive symptoms at Time 1	.03	.62		8.24	111	.00
Step 2			.42			
Gender	.05	.05		0.67	108	.50
Physiological anxiety at Time 1	.05	.29		2.69	108	.01
Gender \times Physiological Anxiety at Time 1	.01	.03		0.42	108	.68
Overall equation (Social concerns)				18.29	4,108	.00
Step 1			.38			
Depressive symptoms at Time 1	.03	.62		8.24	111	.00
Step 2			.40			
Gender	.07	.07		0.92	108	.36
Social concerns at Time 1	.03	.12		0.92	108	.36
Gender \times Social Concerns at Time 1	.06	.14		1.85	108	.07