Research Article

PERCEPTIONS OF CLOSE AND GROUP RELATIONSHIPS MEDIATE THE RELATIONSHIP BETWEEN ANXIETY AND DEPRESSION OVER A DECADE LATER

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Background: *Previous research has demonstrated that anxiety reliably predicts later depression, but little has been uncovered about the mechanism underlying this connection. Interpersonal relationships appear to be a viable mechanism of the association as anxiety has been shown to predict later deficits in both close (e.g., "best friendships") and group relationships (e.g., classroom peer groups), and deficits in both close and group relationships have been linked to later depressive symptoms. The current study examined close and group relationships as potential mediators between anxiety and depression 12–14 years later.* **Methods:** *In a nationally representative sample of adolescents (N = 6,504), anxiety was measured at baseline, perceptions of close relationships (i.e., feeling loved) and perceptions of group relationships (i.e., feeling part of a group) were measured 6 months later, and depression levels and diagnosis were measured 12–14 years later.* **Results:** *Using structural equation models, the results showed that adolescent perceptions of both close and group relationships significantly mediated the relationship between adolescent anxiety and adult levels of depression. Furthermore, perceptions of not being accepted/loved in close relationships significantly mediated the relationship between adolescent anxiety and clinical depression in adulthood.* **Conclusions:** *These results suggest that a perception of not being accepted in group relationships may be a mechanism by which heightened anxiety in adolescents leads to heightened nonclinical depression in adulthood. On the other hand, adolescent perceptions of not feeling loved or accepted in close relationships may be a mechanism by which heightened anxiety in adolescence leads to clinical depression—in adulthood. Depression and Anxiety 33:66–74, 2016.* © 2015 Wiley Periodicals, Inc.

Anxiety and depressive disorders are highly prevalent, with 29% of the U. S. population meeting criteria for a lifetime anxiety disorder and 21% meeting criteria for a lifetime depressive disorder.[1] These disorders also co-occur at high rates and are highly correlated when measured concurrently.[2–6] Elevated anxiety and depression are also both independently associated with decreased quality of life;[7] worse medication adherence;[8] increased risk of cardiovascular, respiratory, endocrine-metabolic, and autoimmune disorders;[9,10] and increased all-cause mortality rates.[11–13] Given their high

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co-occurrence and independent broad impacts, it is important to understand the relationship between these two constructs.

In addition to their common co-occurrence, hundreds of studies have found that anxious symptoms often precede and predict the development of later depressive symptoms (see[14] for a meta-analysis;[15–18]), with effect sizes ranging from $r = .16$ to $.45$. However, the demonstration of a causal chain, showing the temporal mechanism (i.e., mediator) of how one variable goes on to predict another,[19] would help to provide some initial support for why anxiety is a potential risk factor for depression.

One potential mechanism linking anxiety and depression may be interpersonal relationships. For example, Newman and Erickson[20] theorized that as generalized anxiety is associated with submissive positions,[21] and submissiveness is indicative of passive and unempowered states, anxiety may put one at greater risk of developing depression. These authors also suggested that generalized anxiety negatively impacts interpersonal relationships,[22] and such diminished relationship status may be related to the development of other comorbidities, such as major depression.

Prospective research has linked general anxiety symptoms and later close interpersonal relationships, and close relationships have been linked to later depression. Specifically, general anxiety has been shown to predict having fewer best friends,[23] greater stress from the close relationships they do have,[24] and greater discomfort in discussing personal information with friends.[25] In terms of anxiety-predicting depression, theories of close relationships suggest that feelings of acceptance and love are among the greatest benefits of close relationships.[26,27] Consequently, acceptance and love may be the aspects of a close relationship that would determine whether such relationships impact subsequent depression. In fact, rejection in close relationships longitudinally predicted later depressive symptoms.[28] Moreover, a decreased sense of belonging was longitudinally associated with severity of depression in those with a history of depression.[29] Additionally, perceived marital dissatisfaction longitudinally predicted depression in women.[30] Given that anxiety impacted perceptions of close relationships and close relationship satisfaction predicted later depression, it is possible that perceptions of close interpersonal relationships are a potential mechanism by which anxiety leads to later depression.

Along with close interpersonal relationship satisfaction, deficits in group relationships have also been associated prospectively with anxiety and depression. For example, Hanish et al.[31] found that general anxiety negatively predicted later peer withdrawal. Change in anxiety symptoms over the course of treatment was also prospectively related to social functioning in groups.[32] Additional studies found that peer acceptance negatively predicted subsequent depression,[33,34] whereas peer withdrawal, peer humiliation, and peer victimization positively predicted later depression.[35–37] Thus, deficits

in group relationships may also mediate the relationship between anxiety and depression, such that anxiety negatively predicts perceived group interactions, and these perceived group interactions negatively predict later depression.

Given that anxiety predicts perceptions of close (e.g., feeling accepted/loved) and group relationships (e.g., feeling part of a group) and that perceptions of close and group relationships predict depression, it is important to determine whether perceptions of close versus group relationships represent distinct constructs. In a factor analysis that included items relating to perceived close and group relationships, items relating to perceived close relationships (i.e., items related to the quality of the friendship between two people) loaded onto a separate factor from items related to perceived group relationships (i.e., items relating to feeling left out of a group).[38] Moreover, these two constructs were not significantly correlated ($r = .04$), suggesting that close and group relationships are distinct constructs. Further, close relationships and group relationships have both been jointly used to predict depressive symptoms, and they have been shown to have independent impacts.[39] Hence, perceptions of close relationships appear to be relatively distinct from perceptions of group relationships.

To date, only four studies have examined prospective mediators between anxiety and depression.[40–43] Among these studies, negative life events, reassurance seeking, locus of control, and problem solving have been examined, but none of these mediational relationships were significant.[40,41] The only successful mediators of the relationship between anxiety and later depression were avoidance,[42] sociability, and interpersonal oversensitivity.[43] Most closely related to the current study, Starr et al.[43] showed that sociability and interpersonal oversensitivity mediated the relationship between generalized anxiety disorder and major depressive disorder 8 years later.

Accordingly, the present study investigated two possible mechanisms of the relationship between anxiety and later depression: perceptions of close relationships and perceptions of group relationships. We used a large nationally representative sample of adolescents in which anxiety was assessed at age 16. Perceptions of close relationships and perceptions of group relationships were then assessed 6 months later. Lastly, levels and diagnosis of depression was assessed 12–14 years later. Based on previous research, we hypothesized the following: (1) the relationship between anxiety and depression would be mediated by perceptions of close relationships, such that anxiety would negatively predict perceptions of close relationships and perceptions of close relationships would negatively predict depression, (2) the relationship between anxiety and depression would be mediated by perceptions of group relationships, such that anxiety would negatively predict perceptions of group relationships and that perceptions of group relationships would negatively predict depression, (3) anxiety would predict clinical depression 12–14 years later, (4) anxiety and

clinical depression would be mediated by close relationships, such that anxiety would negatively predict perceptions of close relationships and perceptions of close relationships would negatively predict clinical depression, and (5) anxiety and clinical depression would be mediated by group relationships, such that anxiety would negatively predict perceptions of group relationships and perceptions of group relationships would negatively predict clinical depression.

METHOD

PARTICIPANTS

Participants were recruited through the National Longitudinal Study of Adolescent Health (Add Health), which is a public use dataset.[44] This study utilized three waves of data collection: the first occurred from 1994 to 1995; the second occurred from 1995 to 1996; and the third wave occurred from 2007 to 2008. Data were collected through interviews with participants. The first wave of participants ($N = 6,504$, 48% male, M age $= 16.04$, 66% Caucasian, 25% African American, 1% American Indian, 4% Asian/Pacific Islander, 5% Other) continued with little dropout over the second wave ($N = 4,834$, 48% male, M age $= 16.53$, 67% Caucasian, 23% African American, 1% American Indian, 4% Asian/Pacific Islander, 5% Other) and third wave ($N = 5,114$, 46% male, M age $= 28.89$, 68% Caucasian, 24% African American, 1% American Indian, 3% Asian/Pacific Islander, 4% Other). The Add Health study was performed in compliance by Code of Ethics of the World Medical Association and the University of North Carolina School of Public Health Institutional Review Board.

MEASURES

Anxiety Scale.   Six items that measured physiological symptoms of anxiety were assessed at wave one. These items included (1) "feeling hot all over suddenly, for no reason," (2) "cold sweats," (3) "chest pains," (4) "fearfulness," (5) "a stomach ache or an upset stomach," and (6) "trouble relaxing." Using a confirmatory factor analysis, Jacobson and Newman[42] validated the scale and found that the items held together on a single scale in the current sample ($\chi^2 = 143.14$, $p < .01$, RHO $= .974$, CFI $= .986$, RMSEA $= .053$). Additionally, the internal consistency of this scale was adequate ($\alpha = .62$).

Perceptions of Close and Group Relationships Scales.   Two items that measured perceptions of close relationships included (1) "You feel socially accepted" and (2) "You feel loved and wanted." Each of the items well represents measures of close relationships.[45] Likewise, two items measured perceptions of group relationship, including (1) "Since school started this year, how often have you had trouble getting along with other students?" (reverse-coded) and (2) "You feel like you are part of your school." These items are comparable to items included in other measures of group affiliation.[46, 47] To validate these scales, a confirmatory factor analysis of both scales was conducted in a single model with correlated factor structures (this was necessary because otherwise the model would not have been identifiable). The model resulted in excellent fit ($\chi^2 = 2.98$, $p = .08$, RHO $= .998$, CFI $= .997$, RMSEA $= .020$). The correlations between the perceptions of close relationships factor and the perceptions of group relationships factor were significantly positive with moderate strength ($r = .40$, $p < .001$). Both the excellent fit and the moderate correlation suggest that the factors are moderately related, but to distinct scales. Additionally, the internal consistency for the perceptions of close relationships scale was good ($\alpha = .76$), and the internal consistency for the perceptions of group relationships was excellent ($\alpha = .87$).

Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D is a self-report measure of depression. A portion of the CES-D was administered to participants at the third wave. This included the following items: (1) "You were happy" (reverse-coded), (2) "You could not shake the blues, even with help from your friends and family," (3) "You enjoyed life" (reverse-coded), (4) "You felt depressed," (5) "You felt that you were just as good as other people" (reverse-coded), (6) "You felt sad," (7) "You were bothered by things that usually don't bother you," (8) "You had trouble keeping your mind on what you were doing," (9) "You felt that you were too tired to do things." (10) "You felt that people disliked you." The full CES-D has good concurrent validity ($r = .73$–.89 compared to the Symptom Checklist depression scale)[48] and adequate retest reliability ($r = .57$ averaged from 2 to 8 weeks).[49] Using the same sample, Jacobson and Newman[42] found that a confirmatory analysis of the items in the CES-D yielded adequate fit ($\chi^2 = 1,650.44$, $p < .01$, RHO $= .977$, CFI $= .980$, RMSEA $= .050$). The internal consistency of the scale for the ten items in the current sample was excellent ($\alpha = .979$).

Depression Diagnosis.   In the third wave of data collection, participants reported whether they had been diagnosed with a depressive disorder by their doctor, nurse, or health-care provider. These items indicated that 16.2% had been diagnosed with major depression.

PLANNED ANALYSES

Data analysis employed structural equation modeling, using the Lavaan package in R.[50] Latent variables were formed for anxiety, perceptions of close relationships, perceptions of group relationships, and depression scales.[1] A manifest variable was used to represent clinical depression. All variables in this model were ordinal (and not continuous) or binary (in the case of predicting clinical depression). As such, bootstrapping with 10,000 draws was used to estimate all coefficients. Mediation was determined using bootstrapping of the indirect effect ($A \times B$) for the regression coefficient of anxiety predicting the mediator (A), and the mediator-predicting depression (B).[53] In addition to using bootstrapping to estimate the standard errors, the analyses were conducted using robust maximum likelihood (MLR). All regression coefficients were standardized.[50]

Before interpreting each model, the model's identification status was first tested by comparing the model's completely standardized solutions against typically acceptable loadings.[54, 55] Next, the goodness of fit for the model was examined by using the following practical indices of goodness of fit: Tucker Lewis Index or Non-normed Fit Index (RHO, also titled NNFI)[56, 57], Comparative Fit Index (CFI, also titled RNI),[58, 59] and Root Mean Square Error of Approximation (RMSEA).[60, 61] Practical indices of goodness of fit were used in place of the chi-square fit statistics as the chi-square values are highly affected by large sample sizes, as in the present dataset. Missing data (approximately 6.6% missingness for the full sample) was handled using full information maximum likelihood (FIML).

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[1]Baseline depression was not included in the present analyses due to multicollinearity. Specifically, there was a high correlation between anxiety and depression, and unstable model coefficients. The estimate of anxiety predicting depression varied widely when baseline depression was added to the model. Without baseline depression, anxiety significantly ($\beta = .32$, $SE = .02$) positively predicted depression. Despite this strong predictive relationship, when baseline depression was controlled for, the relationship between anxiety-predicting depression became significantly negative ($\beta = -.20$, $SE = .04$). Unstable estimates, such as those noted in this study, are symptomatic of multicollinearity.[51, 52] As such, baseline depression was removed from all models.
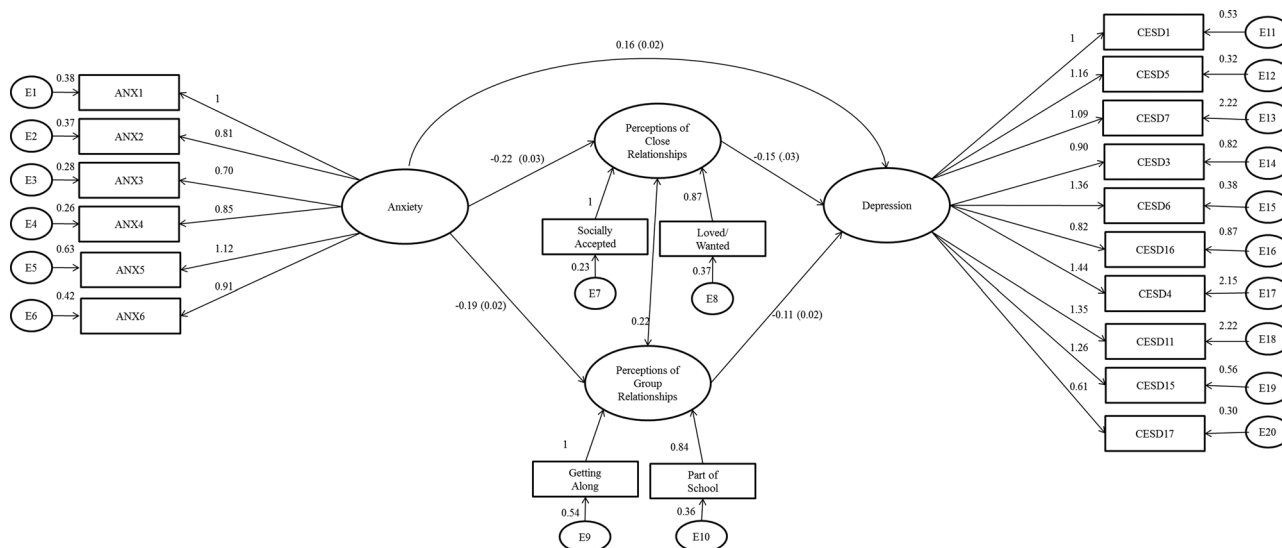
Figure 1. $N = 6,504$. In this figure, anxiety at wave one is predicting depression at wave three. Solid lines represent significant connections ($p < .05$), whereas dotted lines represent insignificant ($p > .05$) connections.

RESULTS

ANXIETY AND DEPRESSION MEDIATED BY PERCEPTIONS OF CLOSE RELATIONSHIPS AND PERCEPTIONS OF GROUP RELATIONSHIPS

The first and second hypotheses were tested by using anxiety to predict perceptions of close relationships, perceptions of group relationships, and depression; and perceptions of close and group relationships were used to predict depression. Note that both close and group relationships were included in the same model, and, as such, analyses of the effects of close relationships controlled for the impact of group relationships (and vice versa). The goodness of fit indices indicated that the model had a good fit ($\chi^2 = 1,397.76$, $p < .01$, RHO = .935, CFI = .944, RMSEA = .034). Supporting our first hypothesis, anxiety significantly ($\beta = -.22$, $SE = .03$, $Z = -6.39$, $p < .01$) negatively predicted perceptions of close relationships, and perceptions of close relationships significantly ($\beta = -.16$, $SE = .03$, $Z = -6.16$, $p < .01$) negatively predicted depression (see Fig. 1). The estimate of the indirect effect of perceptions of close relationships was also significant ($\beta = .034$, $SE = .01$, $Z = 4.98$, $p < .01$), suggesting that perceptions of close relationships partially mediated the relationship between anxiety and depression. Additionally, perceptions of close relationships uniquely explained 16% of the total variation of anxiety-predicting depression. Supporting our second hypothesis, anxiety significantly ($\beta = -.19$, $SE = .02$, $Z = -7.63$, $p < .01$) negatively predicted perceptions of group relationships, and perceptions of group relationships significantly ($\beta = -.11$, $SE = .02$, $Z = -5.36$, $p < .01$) negatively predicted depression. Likewise, the indirect effect of perceptions of group relationships was also significant ($\beta = .02$, $SE = .00$, $Z = 4.54$, $p < .01$), signifying that perceptions of group relationships also partially mediated the relationship between anxiety and depression. Perceptions of group relationships uniquely explained 10% of the total variation between anxiety and later depression.

ANXIETY PREDICTING CLINICAL DEPRESSION

The hypothesis that anxiety would significantly predict later clinical depression was tested next. The goodness of fit indices indicated that the model had an excellent fit ($\chi^2 = 113.10$, $p < .01$, RHO = .948, CFI = .965, RMSEA = .033). Supporting our third hypothesis, wave one anxiety significantly ($\beta = .17$, $SE = .02$, $Z = 7.15$, $p < .01$) positively predicted wave three clinical depression, see Fig. 2.

ANXIETY AND CLINICAL DEPRESSION MEDIATED BY PERCEPTIONS OF CLOSE AND GROUP RELATIONSHIPS

Lastly, we tested the hypotheses that the relationship between anxiety and clinical depression would be mediated by close and group relationships. The goodness of fit indices indicated that the model had a good fit ($\chi^2 = 424.139$, $p < .01$, RHO = .936, CFI = .954, RMSEA = .038). Supporting our fourth hypothesis, anxiety significantly ($\beta = -.21$, $SE = .03$, $Z = -6.17$, $p < .01$) negatively predicted perceptions of close relationships, and perceptions of close relationships significantly ($\beta = -.09$, $SE = .02$, $Z = -4.08$, $p < .01$) negatively predicted clinical depression. Likewise, the indirect effect of perceptions of close relationships was significant ($\beta = .02$, $SE = .01$, $Z = 3.82$, $p < .01$), suggesting that close relationships partially mediated the relationship between anxiety and clinical depression and explained 11% of the total variation of anxiety predicting clinical depression. In contrast to our fifth hypothesis, although anxiety
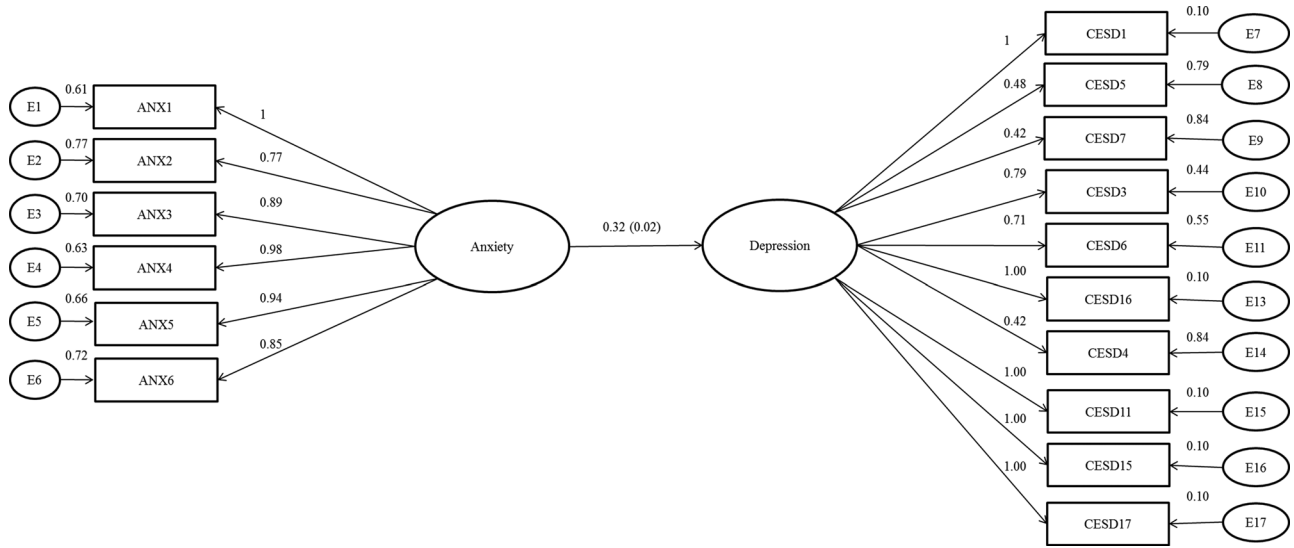
Figure 2. *N* = 6,504. In this figure, anxiety at wave one is predicting depressive disorder at wave three. Solid lines represent significant connections (*p* < .05), whereas dotted lines represent insignificant (*p* > .05) connections.

significantly ($\beta = -.18$, $SE = .02$, $Z = -7.45$, $p < .01$) negatively predicted perceptions of group relationships, perceptions of group relationships did not significantly ($\beta = -.03$, $SE = .02$, $Z = -1.61$, $p < .01$) predict clinical depression. The indirect effect of perceptions of group relationships was also not significant ($\beta = .01$, $SE = .00$, $Z = 1.57$, $p = .11$), suggesting that group relationships did not mediate the relationship between anxiety and clinical depression, see Fig. 3.

DISCUSSION

These results suggest that close relationships may be a mechanism by which heightened levels of adolescent anxiety lead to clinical adult depression 12–14 years later. Thus, high anxiety prospectively makes one more likely to feel less loved and accepted in adolescence, and not feeling loved or accepted in adolescence predicts clinical depression in adulthood (explaining 16% of the variation between anxiety and adult levels of depression measured
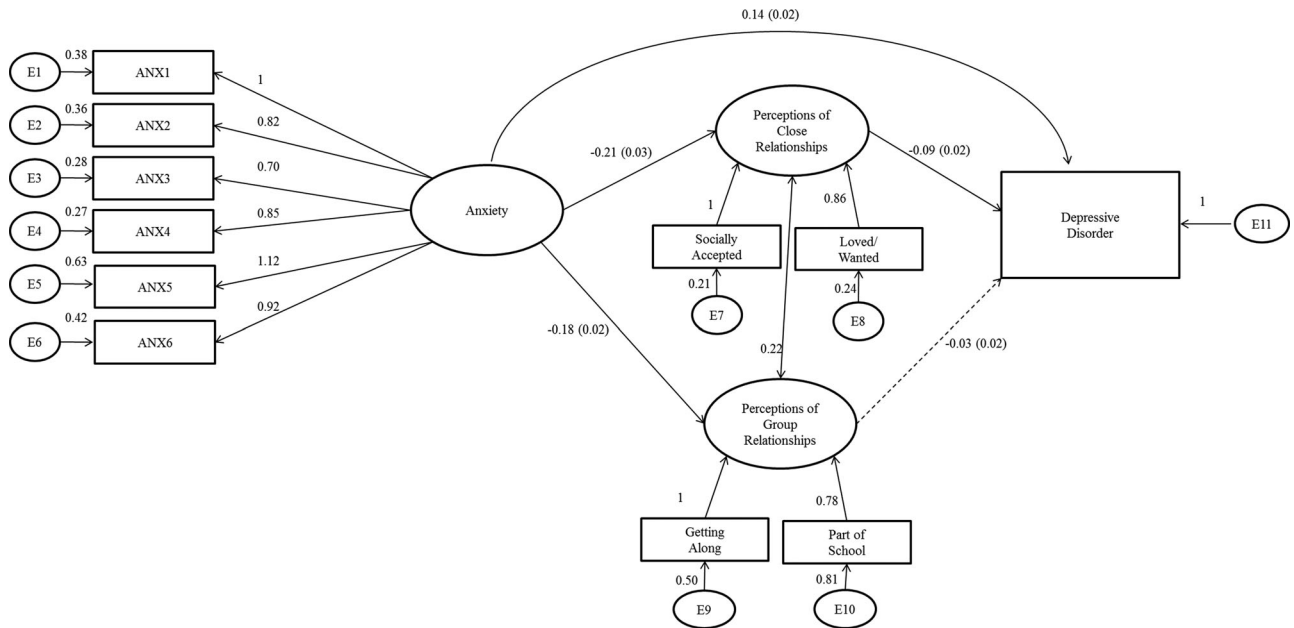

Figure 3. *N* = 6,504. In this figure, anxiety at wave one is predicting major depressive disorder at wave three. Solid lines represent significant connections (*p* < .05), whereas dotted lines represent insignificant (*p* > .05) connections.

continuously, and 11% of the variation between adolescent anxiety and adult clinical depression).

These findings are largely consistent with the longitudinal association between close relationships and later levels of depression. Specifically, prior studies have found rejection in close relationships,[28] sense of belonging (Choenarom et al.),[29] and perceived marital dissatisfaction;[30] each predicted later levels of depression. However, this is the first study to show that, in addition to the longitudinal association between anxiety and depression levels, close relationships also predicted clinical depression.

In addition to close relationships, perceptions of group relationships mediated the relationship between levels of anxiety in adolescence and levels of depression in adulthood, explaining 10% of the variation between anxiety and depression for the general population. Specifically, high anxiety in adolescence prospectively makes one more likely to have trouble relating to others and fitting into one's school, and trouble relating to others and feeling like one cannot fit in predicts high levels of depression in adulthood. However, these group relationships did not significantly predict clinical depression in adulthood. Thus, although both close and group relationships in adolescence independently predicted levels of depression in adulthood, only close relationships significantly impacted the pathogenesis of clinical depression.

Although previous studies have established a concurrent relationship between anxiety and group relationships,[62, 63] this was the first study to find that heightened levels of general anxiety were prospectively associated with later perceptions of group relationships (the only other prospective study examined social anxiety as a predictor).[64] Such findings are consistent with previous data that perceptions of group relationships prospectively negatively predicted depression.[33, 34] This is also the first study to examine the effect of group relationships in predicting later heightened depression and later clinical depression.

In regard to interpersonal factors as mediators between anxiety and later depression, the current findings parallel previous findings, suggesting that sociability and interpersonal oversensitivity mediated the relationship between generalized anxiety disorder and major depressive disorder 8 years later.[43] In combination with the current study, it is possible that concerns about being loved and accepted among close relationships may be more impactful in developing later clinical depression than disappointing others and facing others' criticism within the context of groups. Likewise, interpersonal avoidance and difficulty making close friendships may be more impactful than socializing within the context of a group in predicting clinical levels of depression in adulthood. Moreover, both of these findings suggest that perceptions of interpersonal relationships and behaviors impacting interpersonal relationships may be mechanisms by which earlier anxiety leads to later depression.

These results also may have some important treatment implications. For example, an intervention that facilitates close relationships (or perceptions of close relationships) in adolescents with high anxiety may be useful in preventing the development of symptoms of adult depression. Moreover, if such an intervention was broadened to address group relationships, it also might be useful in reducing later subthreshold symptoms of depression.

Although the current study contains many strengths, it is important to mention several potential limitations. One of these is that we cannot specify the mechanisms by which anxiety predicts later deficits in close and group relationships, and how these close and group relationships go on to predict depression. The relationships between (1) anxiety and close relationships and (2) anxiety and group relationships could be due to conflict avoidance, lack of assertion, or overdependence on relationships among those with high levels of anxiety.[65] Additionally, close and group relationship satisfaction have been suggested to influence depressed feelings via loneliness.[66, 67] As such, future studies should examine if these and other constructs are potential mediators between group relationships and depressive symptoms in clinically anxious and clinically depressed participants.

Additionally, due to multicollinearity, the current study could not control for baseline depression within the analyses conducted. Moreover, as the Add Health study did not measure levels of anxiety at wave three, we were unable to examine the bilateral impact of depression at wave one on later anxiety. Thus, future studies should examine these relationships while controlling for baseline depression and also should examine the impact of depression on later anxiety.

Examining whether anxiety unidirectionally predicts depression or whether the relationship is bidirectional is important. Specifically, if anxiety unidirectionally predicts depression, it may suggest that anxiety is an early manifestation (i.e., prodrome) of depression. However, previous literature is mixed on whether depression predicts later anxiety. Some studies have not found a relationship between depression predicting later anxiety,[68, 69] whereas others have found that depression predicts later anxiety.[70–72] Thus, previous evidence is currently inconclusive about whether anxiety is a unilateral or bilateral predictor of later depression. Future research should further examine whether depression also predicts anxiety.

The current study results are particularly noteworthy given that in prior studies only three constructs (avoidance, sociability, and interpersonal oversensitivity) significantly mediated the relationship between anxiety and later depression.[42, 43, 73] Broadly, these findings highlight the large influence of interpersonal relationships as a pathway from anxiety in adolescents to depression in adulthood.

REFERENCES

1. Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62(6):593–602.
2. Norton S, Cosco T, Doyle F, et al. The hospital anxiety and depression scale: a meta confirmatory factor analysis. J Psychosom Res 2013;74(1):74–81.
3. Watson D, Weber K, Assenheimer JS, et al. Testing a tripartite model: I. Evaluating the convergent and discriminant validity of anxiety and depression symptom scales. J Abnorm Psychol 1995;104(1):3–14.
4. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale: an updated literature review. J Psychosom Res 2002;52(2):69–77.
5. Morgan CD, Wiederman MW, Magnus RD. Discriminant validity of the SCL-90 dimensions of anxiety and depression. Assessment 1998;5(2):197–201.
6. Cannon MF, Weems CF. Do anxiety and depression cluster into distinct groups? A test of tripartite model predictions in a community sample of youth. Depress Anxiety 2006;23(8):453–460.
7. Giardino ND, Curtis JL, Andrei A-C, et al. Anxiety is associated with diminished exercise performance and quality of life in severe emphysema: a cross-sectional study. Respir Res 2010;11(1):29–29.
8. Sundbom LT, Bingefors K. The influence of symptoms of anxiety and depression on medication nonadherence and its causes: a population based survey of prescription drug users in Sweden. Patient Prefer adherence 2013;7:805–811.
9. Harter MC, Conway KP, Merikangas KR. Associations between anxiety disorders and physical illness. Eur Arch Psychiatry Clin Neurosci 2003;253(6):313–320.
10. Stover E, Fenton W, Rosenfeld A, Insel TR. Depression and co-morbid medical illness: the National Institute of Mental Health perspective. Biol Psychiatry 2003;54(3):184–186.
11. Ringbäck Weitoft G, Rosén M. Is perceived nervousness and anxiety a predictor of premature mortality and severe morbidity? A longitudinal follow up of the Swedish survey of living conditions. J Epidemiol Commun Health 2005;59(9):794–798.
12. Eaker ED, Sullivan LM, Kelly-Hayes M, et al. Tension and anxiety and the prediction of the 10-year incidence of coronary heart disease, atrial fibrillation, and total mortality: the Framingham offspring study. Psychosom Med 2005;67(5):692–696.
13. Kamphuis MH, Kalmijn S, Tijhuis MA, et al. Depressive symptoms as risk factor of cardiovascular mortality in older European men: the Finland, Italy and Netherlands elderly (FINE) study. Eur J Cardiovasc Prev Rehabil 2006;13(2):199–206.
14. Jacobson NC, Newman MG. The Temporal Relationship Between Anxiety and Depression: A Meta-Analysis. Maryland City, MD: National Harbor; 2012.
15. Alipour Z, Lamyian M, Hajizadeh E. Anxiety and fear of childbirth as predictors of postnatal depression in nulliparous women. Women Birth 2012;25(3):e37–e43.
16. Borelli JL, Prinstein MJ. Reciprocal, longitudinal associations among adolescents' negative feedback-seeking, depressive symptoms, and peer relations. J Abnorm Child Psychol 2006;34(2):159–169.
17. Gazelle H, Ladd GW. Anxious solitude and peer exclusion: a diathesis-stress model of internalizing trajectories in childhood. Child Dev 2003;74(1):257–278.
18. Herren JA. Investigation of anxiety symptoms in a cognitive-stress mediational model of depression in early adolescent girls. University of Texas Libraries: University of Texas at Austin, 2009.
19. Kraemer HC, Stice E, Kazdin A, et al. How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. Am J Psychiatry 2001;158(6):848–856.
20. Newman MG, Erickson TM. Generalized anxiety disorder. In: Beck JG, editor. Interpersonal Processes in the Anxiety Disorders: Implications for Understanding Psychopathology and Treatment. Washington , DC: American Psychological Association; 2010:235–259.
21. Erickson TM, Newman MG. Interpersonal and emotional processes in generalized anxiety disorder analogues during social interaction tasks. Behav Ther 2007;38(4):364–377.
22. Erickson TM, Newman MG, Siebert EC, et al. Do worriers care too much? Differentiating the interpersonal specificity of worry from social anxiety and depression symptoms. Manuscript submitted for publication; 2015.
23. Pedersen S, Vitaro F, Barker ED, Borge AI. The timing of middle-childhood peer rejection and friendship: linking early behavior to early-adolescent adjustment. Child Dev 2007;78(4):1037–1051.
24. Shapero BG, Hankin BL, Barrocas AL. Stress generation and exposure in a multi-wave study of adolescents: transactional processes and sex differences. J Soc Clin Psychol 2013;32(9):989–1012.
25. Chang L. College students' search for sexual health information from their best friends: an application of the theory of motivated information management. Asian J Soc Psychol 2014;17(3):196–205.
26. Levinger G, Huesmann LR. An 'incremental exchange' perspective on the pair relationship: interpersonal reward and level of involvement. In: Gergen KJ, Greenberg MS, Willis RH, editors. Social Exchange. New York , NY: Wiley; 1978:165–188.
27. Myers DG. Close relationships and quality of life. In: Kahneman D, Diener E, Schwarz N, editors. Well-Being: Foundations of Hedonic Psychology. New York , NY: Russell Sage Foundation Publications; 2003:374–391.
28. Kistner J, Balthazor M. Predicting dysphoria in adolescence from actual and perceived peer acceptance in childhood. J Clin Child Psychol 1999;28(1):94–104.

29. Choenarom C, Williams RA, Hagerty BM. The role of sense of belonging and social support on stress and depression in individuals with depression. Arch Psychiatr Nurs 2005;19(1):18–29.

30. Fincham FD, Beach SRH. Marital satisfaction and depression: different causal relationships for men and women? Psychol Sci 1997;8(5):351–357.

31. Hanish LD, Eisenberg N, Fabes RA, et al. The expression and regulation of negative emotions: risk factors for young children's peer victimization. Dev Psychopathol 2004;16(2):335–353.

32. Wood J. Effect of anxiety reduction on children's school performance and social adjustment. Dev Psychol 2006;42(2):345–349.

33. Kupersmidt J, Patterson C. Childhood peer rejection, aggression, withdrawal, and perceived competence as predictors of self-reported behavior problems in preadolescence. J Abnorm Child Psychol 1991;19(4):427–449.

34. Panak WF, Garber J. Role of aggression, rejection, and attributions in the prediction of depression in children. Dev Psychopathol 1992;4(01):145–165.

35. Boivin M, Hymel S, Bukowski WM. The roles of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood. Dev Psychopathol 1995;7(04):765–785.

36. Lund R, Nielsen KK, Hansen DH, et al. Exposure to bullying at school and depression in adulthood: a study of Danish men born in 1953. Eur J Public Health 2009;19(1):111–116.

37. Kendler KS, Hettema JM, Butera F, et al. Life event dimensions of loss, humiliation, entrapment, and danger in the prediction of onsets of major depression and generalized anxiety. Arch Gen Psychiatry 2003;60(8):789–796.

38. McCloskey LA, Stuewig J. The quality of peer relationships among children exposed to family violence. Dev Psychopathol 2001;13(1):83–96.

39. La Greca AM, Harrison HM. Adolescent peer relations, friendships, and romantic relationships: do they predict social anxiety and depression? J Clin Child Adolesc Psychol 2005;34(1):49–61.

40. Joiner TE, Katz J, Lew A. Harbingers of depressotypic reassurance seeking: negative life events, increased anxiety, and decreased self-esteem. Pers Soc Psychol Bull 1999;25(5):632–639.

41. Ceyhan AA, Ceyhan E. Relationship between early separation anxiety and depressive symptoms: the mediating role of locus of control and problem solving skills. Pak J Soc Clin Psychol 2009;7(1):3–17.

42. Jacobson NC, Newman MG. Avoidance mediates the relationship between anxiety and depression over a decade later. J Anxiety Disord 2014;28(5):437–445.

43. Starr LR, Hammen C, Connolly NP, Brennan PA. Does relational dysfunction mediate the association between anxiety disorders and later depression? Testing an interpersonal model of comorbidity. Depress Anxiety 2014;31(1):77–86.

44. Harris KM, Udry JR. National Longitudinal Study of Adolescent Health (Add Health), 1994–2008 [Public Use]. ICPSR21600-v15. Chapel Hill, NC: Carolina Population Center, University of North Carolina-Chapel Hill/Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributors], 2014-05-14. http://doi.org/10.3886/ICPSR21600.v15.

45. Dubow EF, Ullman DG. Assessing social support in elementary school children: the Survey of Children's Social Support. J Clin Child Psychol 1989;18(1):52–64.

46. Weitzman M, Gortmaker S, Sobol A. Maternal smoking and behavior problems of children. Pediatrics 1992;90(3):342–349.

47. McNeely CA, Nonnemaker JM, Blum RW. Promoting school connectedness: evidence from the National Longitudinal Study of Adolescent Health. J Sch Health 2002;72(4):138–146.

48. Weissman MM, Sholomskas D, Pottenger M, et al. Assessing depressive symptoms in five psychiatric populations: a validation study. Am J Epidemiol 1977;106(3):203–214.

49. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas 1977;1(3):385–401.

50. Rosseel Y. lavaan: an R package for structural equation modeling. J Stat Softw 2012;48(2):1–36.

51. Lin F.-J. Solving multicollinearity in the process of fitting regression model using the nested estimate procedure. Qual Quant 2008;42(3):417–426.

52. Wax Y. Collinearity diagnosis for a relative risk regression analysis: an application to assessment of diet-cancer relationship in epidemiological studies. Stat Med 1992;11(10):1273–1287.

53. Cheung GW, Lau RS. Testing mediation and suppression effects of latent variables: Bootstrapping with structural equation models. Organizational Research Methods 2008;11(2):296–325.

54. Graham JW. Structural Equation Modeling. Unpublished Manuscript, The Pennsylvania State University; 2005.

55. Jöreskog KG, Sörbom D. LISREL 8: User's reference guide. Chicago, IL: Scientific Software International. 1996.

56. Tucker LR, Lewis C. A reliability coefficient for maximum likelihood factor analysis. Psychometrika 1973;38(1):1–10.

57. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. Psychol Bull 1980;88(3):588–606.

58. Bentler PM. Comparative fit indexes in structural models. Psychol Bull 1990;107(2):238–246.

59. McDonald RP, Marsh HW. Choosing a multivariate model: non-centrality and goodness of fit. Psychol Bull 1990;107(2):247–255.

60. Steiger JH. Structural model evaluation and modification: an interval estimation approach. Multivar Behav Res 1990;25(2):173–180.

61. Browne MW, Cudeck R. Alternative ways of assessing model fit. Sociol Methods Res 1992;21(2):230–258.

62. Strauss CC, Lahey BB, Frick P, et al. Peer social status of children with anxiety disorders. J Consult Clin Psychol 1988;56(1):137–141.

63. Ginsburg G, La Greca A, Silverman W. Social anxiety in children with anxiety disorders: relation with social and emotional functioning. J Abnorm Child Psychol 1998;26(3):175–185.

64. Siegel RS, La Greca AM, Harrison HM. Peer victimization and social anxiety in adolescents: prospective and reciprocal relationships. J Youth Adolesc 2009;38(8):1096–1109.

65. Davila J, Beck JG. Is social anxiety associated with impairment in close relationships? A preliminary investigation. Behav Ther 2002;33(3):427–446.

66. Hagerty BM, Williams RA. The effects of sense of belonging, social support, conflict, and loneliness on depression. Nurs Res 1999;48(4):215–219.

67. Prince MJ, Harwood RH, Blizard RA, et al. Social support deficits, loneliness and life events as risk factors for depression in old age. The Gospel Oak Project VI. Psychol Med 1997;27(2):323–332.

68. Snyder J, Bullard L, Wagener A, et al. Childhood anxiety and depressive symptoms: trajectories, relationship, and association with subsequent depression. J Clin Child Adolesc Psychol 2009;38(6):837–849.

69. Silberg JL, Rutter M, Eaves L. Genetic and environmental influences on the temporal association between earlier anxiety and later depression in girls. Biol Psychiatry 2001;49(12):1040–1049.

70. Sears HA, Armstrong VH. A prospective study of adolescents' self-reported depressive symptoms: are risk behaviours a stronger predictor than anxiety symptoms? Can J Behav Sci 1998;30(4):225–233.

71. Aronson TA, Logue CM. On the longitudinal course of panic disorder: developmental history and predictors of phobic complications. Compr Psychiatry 1987;28(4):344–355.

72. Skouteris H, Wertheim EH, Rallis S, et al. Depression and anxiety through pregnancy and the early postpartum: an examination of prospective relationships. J Affect Disord 2009;113(3):303–308.

73. Moitra E, Herbert JD, Forman EM. Behavioral avoidance mediates the relationship between anxiety and depressive symptoms among social anxiety disorder patients. J Anxiety Disord 2008;22(7):1205–1213.