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Depressive Symptoms and Romantic Relationship Qualities from Adolescence Through Emerging Adulthood: A Longitudinal Examination of Influences

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Research has consistently demonstrated the negative consequences of depression on adolescents' functioning in peer and family relationships, but little work has examined how depressive symptoms affect the quality of adolescents' and emerging adults' romantic relationships. Five waves of data on depressive symptoms, romantic relationship conflict, and use of positive problem solving were collected from 188 boys and girls during middle adolescence to emerging adulthood. Latent growth curve models indicated that having more depressive symptoms when 15 years old was associated with both more increase in relationship conflict and less increase in positive problem solving as compared to adolescents with fewer depressive symptoms. These results suggest that depression in middle adolescence may impair subsequent romantic relationship qualities into late adolescence and emerging adulthood.

The consequences of adolescent depression are far-reaching and include deleterious effects on interpersonal functioning in peer and family relationships in both the short and long term (Gotlib, Lewinsohn, & Seeley, 1998; Laible, Carlo, & Raffaelli, 2000; McKeown et al., 1997). In addition, both cross-sectional and longitudinal research on adults finds associations between depression and romantic relationship qualities, including amount of conflict and quality of problem solving (Davila, Karney, Hall & Bradbury, 2003; Gotlib & Beach, 1995). These associations have been less thoroughly examined in adolescents, however, despite the potential implications such research has for understanding how depression and romantic relationship qualities are related from the adolescent years into adulthood. The present study utilizes bivariate latent growth curve models to examine associations between depressive symptoms and relationship qualities over the course of mid-adolescence to emerging adulthood.

DEPRESSION AND INTERPERSONAL FUNCTIONING IN ADOLESCENCE

Interpersonal distress and difficulties in social functioning are viewed as key domains of impairment in individuals with depression and are implicated as both precursors to and consequences of depressive symptoms in adolescents (Allen et al., 2006). The primary body of literature examining such interpersonal dysfunction as it relates to depression in adolescence has thus far focused largely on family and platonic peer relationships. This research suggests that depressive symptoms both precede and result from difficulties in these relationships. Depressed children and adolescents report having less satisfying relationships and feel less competent, more insecure, and less supported in their relationships than their nondepressed peers (Altmann & Gotlib, 1988; Armsden, McCauley, Greenberg, & Burke, 1990).

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They also report more conflict and negative interaction in their peer and family relationships and respond more poorly to conflict when they encounter it, being more likely to display deregulated emotions during stressful peer interactions (Asarnow, Carlson, & Guthrie, 1987; La Greca & Harrison, 2005; Rudoph, Hammen, & Burge, 1994). Further, rejection and conflict with both peers and family are related to the development of depression in adolescence (Nolan, Flynn, & Garber, 2003). More specifically, higher levels of rejection by same-sex peers and problematic relationships with parents are associated with increased odds of following an elevated trajectory of depressed mood in early adolescence (Brendgen, Wanner, Morin, & Vitaro, 2005), and more conflictual family environments are associated with greater levels of depressive symptoms in adolescents one year later (Sheeber, Hops, Alpert, Davis, & Andrews, 1997).

DEPRESSION AND ROMANTIC RELATIONSHIP QUALITIES IN ADULTHOOD

Although little research exists linking the quality of romantic relationships and depression in adolescence, a substantial body of literature exists regarding those associations in adulthood. One of the most prevalent findings in the adult literature is that depression and depressive symptoms are associated with greater levels of relationship conflict and less use of constructive tactics to resolve conflict (Coyne, Thompson, & Palmer, 2002; Whiffen, Foot, & Thompson, 2007; Whisman, 2001; Whisman & Uebelacker, 2009). Depression is associated with more negative verbal and nonverbal interactions, fewer positive interactions (Ruscher & Gotlib, 1988), more coercive problem-solving tactics (Hammen & Brennan, 2002), and less adaptive behavior during problem-solving discussions (Biglan et al., 1985; Gotlib & Whiffen, 1989; Jackman-Cram, Dobson, & Martin, 2006). Depression is also associated with less satisfaction (Whisman, 2001), less support (Wade & Kendler, 2000), less relationship security (Whiffen, Kallos-Lilly, & MacDonald, 2001), and higher rates of divorce in adult romantic relationships (Kessler, Walters, & Forthofer, 1998).

DEPRESSION AND ROMANTIC RELATIONSHIP QUALITIES IN ADOLESCENCE

The existing literature on adolescence has principally focused on depression's association with degree of romantic *involvement*, such as the frequency of dating or whether one has a romantic relationship. What is known suggests that higher levels of romantic involvement are associated concurrently with higher levels of depressive symptoms in adolescence (Compian, Gown, & Hayward, 2004; Davila, Steinberg, Kachadourian, Cobb, & Fincham, 2004; Quatman, Sampson, Roginson, & Watson, 2001). Joyner and Udry (2000) also found that adolescents were more likely to report increases in depressive symptoms over the course of a year if they became romantically involved during that time.

Much less is known about the way depressive symptoms are related to romantic relationship *qualities* during this developmental period. The little work that has examined the links between depression and romantic relationship qualities suggests that higher levels of depressive symptoms are concurrently associated with increased levels of negative qualities of romantic relationships and higher levels of relational aggression (La Greca & Harrison, 2005) as well as lower levels of romantic competence (Steinberg & Davila, 2008). These studies, however, are cross-sectional, eliminating the ability to inform theories about directionality or causality surrounding these associations. In the one existing longitudinal study (Hankin, Mermelstein, & Roesch, 2007), depression was associated with longitudinal increases in stressful romantic events, but changes in relationship qualities were not directly examined. Many of these studies have also included only female samples (Daley & Hammen, 2002; Starr & Davila, 2008; Steinberg & Davila, 2008; Williams, Connolly, & Segal, 2001). Further longitudinal work with both genders is therefore needed to understand what role qualitative features of romantic relationships play in adolescent depression, including what mechanisms link these two constructs and whether the differences in the qualitative features of depressed adolescents' romantic relationships are primarily responsible for or a result of depressive symptoms in adolescence.

SUGGESTED MECHANISMS LINKING DEPRESSION AND ROMANTIC RELATIONSHIPS

Most theorized mechanisms linking depression and romantic relationships in adolescence have assumed a temporal ordering that implicates romantic experiences, including either degree of romantic involvement or qualitative features of romantic relationships, as a cause of depression (Davila, 2008). Proposed theories include the possibility that the challenging nature of romantic relationships puts youth at risk for depression (Davila, Stroud, & Starr, 2009), or that time spent in romantic relationships detracts from the development of other important areas of functioning, resulting in an increased risk of depression (Joyner & Udry, 2000). To date, most

empirical research on the topic has been guided by mechanisms assuming this direction of causality (Davila, 2008).

Although discussed less frequently, depression has also been hypothesized to affect subsequent romantic experiences. For example, depressed adolescents simply could be more likely to seek out romantic relationships (Davila et al., 2009). Depression could also interfere with the normal trajectory of skill development in romantic relationships, reducing an adolescent's ability to be successful in both current and future partnerships (Cicchetti, Rogosch, & Toth, 1994). Finally, Hammen's (1991) stress generation theory suggests that those with depression could be more likely to generate stressful conditions that could lead to poor-quality relationships. Mechanisms implicating this direction of effect are less commonly discussed in the literature and have only begun to be examined empirically. Further longitudinal work simultaneously examining both proposed directions of effect is clearly needed.

PRESENT STUDY

This study was designed to address the methodological and conceptual limitations of prior research evaluating romantic relationship qualities and depression in adolescents and emerging adults. The associations of both conflict and positive problem solving with depressive symptoms were examined longitudinally using bivariate latent growth curve (LGC) modeling in a sample of both boys and girls over the course of 4½ years during middle adolescence to emerging adulthood. We chose to examine conflict and positive problem solving because of the substantial body of research in adults indicating that they play important roles in the relationships of individuals with depression and depressive symptoms. As discussed previously, both amount and type of conflict are key variables in the links between adult romantic relationships and depressive symptoms (Gotlib & Hooley, 1988). Further, depression in adult couples is reliably associated with difficulties with effective problem solving in romantic relationships, including the use of more negative behavior (Jackman-Cram et al., 2006), fewer adaptive tactics (Christian, O'Leary, & Vivian, 1994; Coyne et al., 2002; Hammen & Brennan, 2002), and less positive problem solving (Papp, Goeke-Morey, & Cummings, 2007) when engaged in conflict. Although very little work exists on these associations in adolescent romantic relationships, research has found that adolescents experiencing depression have higher levels of conflict in other key *non*romantic relationships (e.g., with parents and peers; Altmann & Gotlib, 1988; Patton et al., 2008; Rudolph et al., 1994). Similar constructs (negative interaction and relational aggression) have also been found to be concurrently associated with depressive symptoms in adolescent romantic relationships (La Greca & Harrison, 2005).

We chose to conduct bivariate latent growth curve models as they allowed us to examine three important issues about the way in which depressive symptoms and romantic relationship qualities are related in adolescence. These issues are (a) the association of initial levels of depressive symptoms with changes in relationship qualities, (b) the associations of initial levels of relationship qualities with changes in depressive symptoms, and (c) the way in which changes in depressive symptoms are related to changes in romantic relationship qualities. Our study examined all three of these associations.

HYPOTHESES

Guided by the literature on adults' romantic relationships and that on adolescents' peer and family relationships (Gotlib et al., 1998; Laible et al., 2000), we predicted that depressive symptoms in adolescence would be associated with the qualitative features of adolescents' romantic relationships. Specifically, our first hypothesis was that higher initial levels (intercepts) of depressive symptoms would be associated with more growth in conflict and less growth in positive problem solving. It was not anticipated that the associations between initial levels of relationship qualities and growth in depressive symptoms would be significant because of the limited amount of romantic relationship experience participants typically had had when they were middle adolescents; however, we conducted analyses to determine if such associations did exist. Our second hypothesis was that increases in depressive symptoms would be associated with increases in conflict and decreases in positive problem solving over time.

METHOD

Participants

Two hundred 10th-grade high school students (100 boys, 100 girls; M age = 15.87 years, SD = .49) participated in a longitudinal study examining the influences of close relationships on psychosocial adjustment. Participants were recruited through brochures and letters mailed to families in a diverse range of neighborhoods and schools in a large Western metropolitan area. The ascertainment rate could not be determined because we used brochures and because the letters were sent to many families who did not have a 10th grader.

To ensure maximal response, we paid families $25 to hear a description of the project in their home.

The sample, which was designed to be relatively representative of the ethnicity of the United States, consisted of 11.5% African American; 12.5% Hispanic; 1.5% Native American; 1% Asian American; 4% biracial; and 69.5% White, non-Hispanics. Participants were of average intelligence (Wechsler Intelligence Scale for Children [3rd ed.] vocabulary score $M = 9.8$, $SD = 2.44$) and comparable to national norms on multiple measures of substance use, internalizing and externalizing symptomatology (see Furman, Low, & Ho, 2009). Virtually all participants completed high school or obtained a GED (96.5% graduated; 99% including those who obtained a GED); 62% attended college.

Romantic relationship status in each wave was assessed by self-report regarding whether the participant was currently or had been in a romantic relationship lasting a month or longer in the past year. As would be expected, the number of participants in relationships in each wave increased over time, with 62% of participants reporting on a relationship in Wave 1, 74% in Wave 2, 82% in Wave 3, 81% in Wave 4, and 80% in Wave 5. On average, participants reported on 3.8 relationships over the course of the study. Those relationships lasted, on average, 10.5 months apiece.

At Wave 1, 95.0% of participants said they were heterosexual/straight, whereas the other participants said they were bisexual, gay, lesbian, or questioning. Compared to those who described themselves as heterosexual, sexual minorities were more depressed at wave 4 ($M = 9.6$ vs. $M = 4.6$, $p = .04$) and had lower problem solving skills at Wave 1 ($M = 3.2$ vs. $M = 4.4$, $p = .04$). The remaining key study variables in our sample did not differ significantly between those who reported they were heterosexual and those who identified as a sexual minority. Therefore, we chose to retain the sexual minorities in the sample.

With regard to family structure, 57.5% were residing with two biological or adoptive parents, 11.5% were residing with a biological or adoptive parent and a stepparent or partner, and the remaining 31% were residing with a single parent or relative. Fifty-five percent of participants' mothers had a college degree, as would be expected from an ethnically representative sample from this metropolitan area.

Procedure

For the purposes of the current study, we used the first through fifth waves of data collection, beginning when the participants were in 10th grade and ending approximately $2\frac{1}{2}$ years after graduation from high school. Data were collected on a yearly basis in Waves 1 through 4, and then $1\frac{1}{2}$ years later for Wave 5. Data for the current analyses were primarily collected by mailing questionnaires to participants to complete at home prior to scheduled in-person interviews. Questionnaire packets were then collected and reviewed when the participants came in for their interviews. Participant retention was excellent; all 200 participated in Waves 1 and 2, 199 participated in Wave 3, 194 participated in Wave 4, and 185 participated in Wave 5.

The research protocol was approved by the Institutional Review Board of the University of Denver. The confidentiality of the participants' data was protected by a Certificate of Confidentiality issued by the U. S. Department of Health and Human Services. All minor participants provided written assent and written consent was obtained from participants' parents. Participants were compensated financially for completing the questionnaires.

Measures

Beck Depression Inventory (BDI). The BDI was administered to assess depressive symptoms (Beck, Rush, Shaw, & Emery, 1979). The BDI is a broadly-used 21 item self-report measure of depressive symptoms designed for individuals 13 and older. The BDI has high coefficient alpha (.80) and test–retest correlations (.70) when used in nonpsychiatric samples, and is frequently used with adolescents (Beck, Steer, & Garbin, 1988). Coefficient alphas in this study ranged from .83 to.88 across all five waves, with an average of .86.

Network of Relationships Inventory. The Network of Relationships Inventory's Conflict scale was used to assess the degree of conflict in adolescents' most important romantic relationship in the last year (Furman & Buhrmester, 2009). Three questions, such as "How much do you and this person disagree and quarrel?" were rated on a 5-point Likert-type scale. The measure has been found to have moderate stability, convergence among different reporters, and relations with observed interactions (Furman & Buhrmester, 1985; Furman & Buhrmester, 2009). Coefficient alphas ranged from .81 to .93 across all five waves, with an average of .89.

Conflict Resolution Styles Inventory (CRSI). The CRSI's (Kurdek, 1994) four-item problem-solving subscale was used to assess use of positive problem solving in participants' most important romantic relationship in the last year. In prior studies, the CRSI has had good concurrent and predictive validity, and test– retest correlations spanning a 1-year period ranged from .46 to .83 (Kurdek, 1994). Coefficient alphas in the current study ranged from .83 to .86, with an average of .85.

Romantic experience. The Dating History Questionnaire (Furman & Wehner, 1992) assessed the degree of participants' romantic experience in Wave 1 by asking whether they had engaged in each of 16 different types of romantic activities or experiences, from having a romantic interest to having a serious committed relationship. Responses on this measure have been found to be related to theoretically relevant variables, including sexual activity and romantic competence (Furman et al., 2009). Because we were interested in assessing the degree which participants had experienced romantic events that were normative at this age, we selected the 14 items that had been experienced by the majority of the participants (see Furman et al., 2009). The *romantic experience* score comprised the proportion of the 14 items endorsed as having been experienced ($\alpha = .86$).

RESULTS

Data Preparation

To prepare data for analyses, we adjusted outliers to fall 1.5 times the interquartile range below the 25th percentile or above the 75th percentile. All resulting data had acceptable levels of skew and kurtosis. In addition, 12 individuals who reported having never had a romantic relationship of at least 1 month in duration throughout the five-wave period were removed from the sample. These 12 individuals did not differ significantly from the remaining sample on either demographic measures (ethnicity, sex, sexual orientation, mother's education, or high school GPA) or psychosocial measures (externalizing behaviors and symptoms of anxiety and depression; for further details on measures used, see Furman et al., 2009). The 12 individuals removed from the final sample did, however, report significantly less substance use at Wave 1 than did those participants retained in the sample, $t(197) = 3.4$, $p < .01$.

Preliminary Analyses

Gender differences. Past research has demonstrated gender differences in both romantic relationship experiences and depressive symptoms in adolescent samples. For instance, in some reports, girls have been reported to experience more major depressive episodes and boys have reported more negative interactions in romantic relationships (Hankin et al., 1998; La Greca & Harrison, 2005). As such, we chose to determine if the patterns of relations within the models were invariant across genders by utilizing multiple group structural equation modeling in a series of preliminary analyses. We conducted one set of bivariate LGC models with the depression and conflict variables, and a second set with the depression and problem-solving variables. In these models, the slopes and intercepts of the two variables are allowed to covary as are the error terms of the scores at the same wave. We compared models in which covariances were constrained to be equal for boys and girls with corresponding models in which they were not constrained to be equal. The differences in chi-square values were nonsignificant for both the model of depression and conflict, $\chi^2(11) = 16.3$, $p > .05$, and the model of depression and positive problem solving, $\chi^2(11) = 17.22$, $p > .05$, suggesting the pattern of relations between depressive symptoms and relationship variables did not differ for boys and girls. We also conducted bivariate LGC models in which gender was included as a predictor of the intercepts and slopes of depression, conflict, and problem solving. None of the paths were significant (all $ps > .05$). Coupled with the lack of mean-level differences observed between genders (see Table 1), these results suggest single group models were appropriate for both problem solving and conflict.

Sexual orientation. Sexual orientation at Wave 1 was dichotomized into those who were heterosexual and those who were sexual minorities or questioning their identity. We then conducted bivariate LGC models

TABLE 1
Means and Standard Deviations of Relationship Qualities and Depressive Symptoms

	Depressive Symptoms			*Conflict*			*Problem Solving*		
	Boys	*Girls*	*All*	*Boys*	*Girls*	*All*	*Boys*	*Girls*	*All*
Wave 1	6.0 (4.9)	7.2 (6.2)	6.6 (5.6)	1.9 (0.8)	1.8 (0.8)	1.8 (0.8)	4.3 (1.5)	4.3 (1.4)	4.3 (1.5)
Wave 2	5.7 (5.7)*	7.3 (5.9)*	6.5 (5.9)	1.8 (0.8)	1.7 (0.8)	1.8 (0.8)	4.7 (1.3)	4.7 (1.5)	4.7 (1.4)
Wave 3	5.5 (5.2)	6.1 (5.1)	5.8 (5.1)	2.1 (1.1)	2.0 (1.1)	2.1 (1.1)	4.6 (1.4)	4.7 (1.3)	4.6 (1.4)
Wave 4	4.8 (5.1)	5.3 (5.0)	5.1 (5.0)	2.0 (1.1)	1.8 (0.8)	1.9 (0.9)	4.7 (1.6)	5.0 (1.4)	4.9 (1.5)
Wave 5	5.2 (4.7)	5.6 (5.2)	5.4 (4.9)**	2.2 (1.0)	2.0 (1.1)	2.1 (1.1)**	4.9 (1.2)	4.9 (1.5)	4.9 (1.3)**

*Means of genders differ significantly, $p = .05$. **Significant linear change over the five waves, $p < .01$.

in which sexual orientation was included as a predictor of the intercepts and slopes of depression and the two relationship variables. In both models, sexual orientation was significantly related to the depression intercept, with sexual minorities being more depressed at Wave 1. As such, it was decided to retain sexual orientation in the model as a predictor of the latent variables.

Descriptive analyses. To better understand the course of depressive symptoms, romantic relationship conflict, and positive problem-solving skills during adolescence, slopes from the LGC models were examined. Analyses indicated that all variables showed significant linear change from mid-adolescence to emerging adulthood, $ps < .05$ (see means in Table 1). On average, depressive symptoms showed significant decrease into emerging adulthood, whereas positive problem-solving skills and relationship conflict showed significant increases during this period. Correlations among variables are provided in Table 2.

Primary Analyses

Primary analyses consisted of a series of bivariate LGC models. We conducted one set of bivariate LGC models with the depression and conflict variables and a second set with the depression and problem-solving variables. In these models, the slopes and intercepts of the two variables were allowed to covary as were the error terms of the scores at the same wave. Goodness of fit for each model was obtained by examining the comparative fit index (CFI) and root mean square error of approximation (RMSEA); according to conventional guidelines, a CFI of .95 and an RMSEA of .08 or less are considered to be an adequate fit (Browne & Cudeck, 1993; Hu & Bentler, 1999).

An average of 27% of the data on the three primary variables was missing due primarily to individuals who did not have a romantic relationship in one or more waves. The amount of missing data varied significantly as a function of gender (boys 24% vs. girls 30%), $t(186) = 2.08$, $p = .04$, and wave (Wave 1 = 33%, Wave 2 = 26%, Wave 3 = 22%, Wave 4 = 28%, Wave 5 = 27%), $F(4, 184) = 3.41$, $p = .01$. As the data were not missing completely at random, we used full information maximum likelihood estimates to address these differences in the amount of missing data and help meet the assumption of missing at random. When data are missing, full information maximum likelihood estimates yields substantially less biased results than either pairwise or listwise deletion (Schafer & Graham, 2002). The structural models also included six auxiliary variables that were either predictive of missingness or correlated with variables containing missingness in each model. The inclusion of such auxiliary variables helps meet the missing at random assumption and enhances the estimation of missing data without compromising the substantive aspects of the model (see Graham, 2003, for details). The six auxiliary variables included in the model were gender, three measures of romantic experience and dating behaviors at Wave 1 as assessed by the Dating History Questionnaire (Furman & Wehner, 1992), a self-report measure of substance use at Wave 1 (Drug Involvement Scale for Adolescence; Eggert, Herting, & Thompson, 1996), and participants' self-reported romantic competence at Wave 3 (Adolescent Self-Perception Profile; Harter, 1988).

TABLE 2
Patterns of Correlations Between Depressive Symptoms and Romantic Relationship Variables

	Wave 1 BDI	*Wave 2 BDI*	*Wave 3 BDI*	*Wave 4 BDI*	*Wave 5 BDI*	*Wave 1 Con*	*Wave 2 Con*	*Wave 3 Con*	*Wave 4 Con*	*Wave 5 Con*	*Wave 1 PS*	*Wave 2 PS*	*Wave 3 PS*	*Wave 4 PS*	*Wave 5 PS*
Wave 1 BDI	**1.0**														
Wave 2 BDI	.41*	1.0													
Wave 3 BDI	.36*	.54*	1.0												
Wave 4 BDI	.30*	.38*	.50*	1.0											
Wave 5 BDI	.32*	.28*	.43*	.50*	1.0										
Wave 1 Con	.01	–.12	–.14	–.08	–.07	1.0									
Wave 2 Con	–.05	–.03	–.04	–.06	–.01	.26*	1.0								
Wave 3 Con	–.01	–.11	.13	.02	.13	.19	.41*	1.0							
Wave 4 Con	.06	.00	.09	.19*	.19*	.31*	.25*	.35*	1.0						
Wave 5 Con	.19*	.05	.14	.18	.23*	–.02	.11	.30*	.52*	1.0					
Wave 1 PS	–.08	–.02	.12	.00	–.08	–.16	–.17	–.28*	–.05	–.35*	1.0				
Wave 2 PS	–.01	–.04	.09	–.02	.04	.03	–.28*	–.02	.02	–.18	.39*	1.0			
Wave 3 PS	–.09	.01	–.08	–.16	–.03	–.13	–.20*	–.19*	–.20*	–.25	.34*	.35*	1.0		
Wave 4 PS	–.10	.06	.03	–.14	–.10	–.16	–.12	–.02	–.25*	–.15	.30*	.37*	.48*	1.0	
Wave 5 PS	–.15	–.18*	–.11	–.18*	–.18*	.03	–.07	–.16	–.14	–.34*	.45*	.10	.41*	.48*	1.0

Note: BDI = Beck Depression Inventory; Con = conflict; PS = problem solving. *$p < .05$.

Depressive Symptoms and Conflict

A bivariate LGC model consisting of measures of depressive symptoms and romantic relationship conflict in Waves 1 through 5 was examined (see Figure 1). The hypothesized model provided an excellent fit to the data, $\chi^2(36,\ N=188)=43.1,\ p=.19$ (CFI = .99, RMSEA = .03). Results indicate that relatively higher depressive symptoms at Wave 1 (depressive symptoms intercept) predicted greater increases in romantic relationship conflict over the course of adolescence and emerging adulthood. Depressive symptom and conflict intercepts were not significantly related, nor were their slopes. Further, we did not find that the conflict intercept was significantly predictive of the depressive symptom slope.

Depressive Symptoms and Positive Problem Solving

A bivariate LGC model examining depressive symptoms and positive problem-solving skills in Waves 1 through 5 was conducted (see Figure 2). The present model provided an adequate fit to the data, $\chi^2(36,\ N=188)=64.7,\ p=.002$ (CFI = .95, RMSEA = .07). Results indicate that relatively higher depressive symptoms at Wave 1 (depressive symptoms intercept) predicted less growth in positive problem-solving skills over the course of adolescence and emerging adulthood. Depressive symptom and positive problem-solving intercepts were not significantly related, nor were their respective slopes. Further, we did not find that the problem-solving intercept was significantly predictive of the depressive symptom slope.

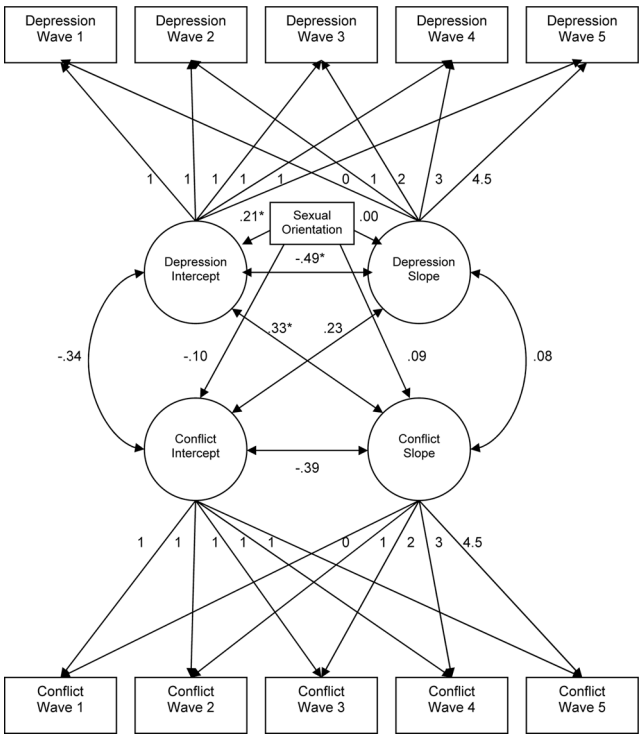

FIGURE 1 Latent growth curve model relating depressive symptoms to romantic relationship conflict over late adolescence. *Note:* For the sake of simplification, the figure depicts neither the error terms of the manifest variables nor the covariances between these error terms at each time point. The figure also omits the six auxiliary variables included in the model to improve data estimation.

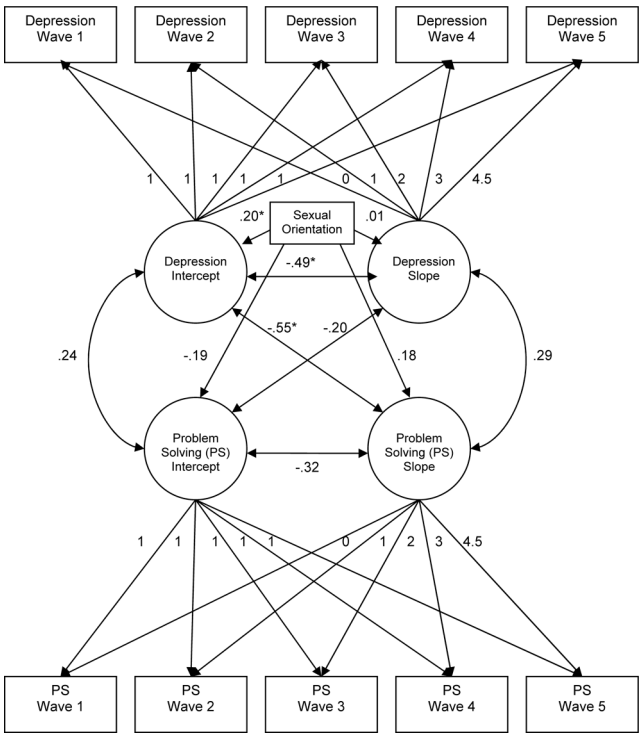

FIGURE 2 Latent growth curve model relating depressive symptoms to positive problem solving in romantic relationships over late adolescence. *Note:* For the sake of simplification, the figure depicts neither the error terms of the manifest variables nor the covariances between these error terms at each time point. The figure also omits the six auxiliary variables included in the model to improve data estimation.

Follow-Up Analyses

Prior research has demonstrated that having a romantic relationship in adolescence is associated with increases in depression (see Davila, 2008). Similarly, amount of prior romantic experience could be predictive not only of depression but also of relationship qualities. To determine if romantic status and relationship experience were predictive of either depressive symptoms or relationship qualities, we reran the two bivariate analyses including relationship status and the romantic experience scale score as predictors of the intercept and slope terms. Having had a relationship during Wave 1 was associated with a greater depression intercept in both models ($r=.27,\ p=.02$). The relations between the depression

intercept and the conflict and problem-solving slopes were similar in magnitude to those in the original models, and remained significant or near significant ($r = .33$, $p = .05$; $r = -.47$, $p = .055$, respectively). The remaining parameters in the models and the overall fit of the model were also consistent with those in the primary analyses: Depressive Symptoms and Conflict Model, $\chi^2(48, N = 188) = 53.13$, $p = .28$ (CFI = .99, RMSEA = .024); Depressive Symptoms and Problem Solving Model, $\chi^2(48, N = 188) = 73.65$, $p = .01$ (CFI = .96, RMSEA = .053).

DISCUSSION

The present study furthers our understanding of the association between depressive symptoms and romantic *relationship qualities* in adolescence while addressing methodological and conceptual limitations of prior work with this population. Prior longitudinal studies with adolescents have focused primarily on the association between degrees of *romantic involvement* and changes in depressive symptoms (Compian et al., 2004; Davila et al., 2004; Joyner & Udry, 2000; Quatman et al., 2001). Those few studies that have examined relationship qualities in adolescence as it relates to depressive symptoms have typically done so cross-sectionally (Galliher, Rostosky, Welsh, & Kawaguchi, 1999; La Greca & Harrison, 2005; Steinberg & Davila, 2008). To our knowledge, this is one of the first studies to examine longitudinal associations between adolescent depressive symptoms and romantic relationship qualities over several years during mid-adolescence to emerging adulthood.

As predicted, higher initial levels of depressive symptoms in mid-adolescence were associated with less favorable romantic relationship qualities over the course of approximately 5 years during late adolescence and emerging adulthood. More specifically, higher initial levels of depressive symptoms were associated with both less increase in positive problem solving and greater increase in relationship conflict from mid-adolescence to emerging adulthood. These findings are generally consistent with research that has linked depressive symptoms with decreased relationship quality in both nonromantic relationships in adolescents (Allen et al., 2006) and romantic relationships in adults (Davila, Bradbury, Cohan, & Tochluk, 1997; Davila et al., 2003).

Conflict and Depressive Symptoms

The average level of romantic relationship conflict increased significantly over the course of adolescence and emerging adulthood. Such change may be as a result of difficulties adjusting to the increased relationship involvement that comes with age during adolescence (Carver, Joyner, & Udry, 2003; Cooksey, Mott, & Neubauer, 2002). Whereas couples are likely to spend more time together from mid- to late adolescence, their skill sets may not be increasing fast enough to keep up with the increasing demands of more involved relationships, leading to increased levels of conflict. Alternatively, many adolescents are initially idealistic about romantic relationships and see conflict as diagnostic of relationship failure (Montgomery, 2005; Shulman, 2003). Accordingly, they may avoid conflictual interactions in romantic relationships. As they age and gain more relationship experience, adolescents may engage in conflict more often, even though their problem-solving skills are improving as well.

Further, in contrast to those who were not as depressed, participants with more initial depressive symptoms had significantly larger increases in relationship conflict over time. Supplementary analyses revealed that this relation cannot be attributed to relationship status or the amount of romantic experience one has had. Consistent with prior work (Davila, 2008), having had a romantic relationship during Wave 1 was associated with greater depression, but the association between initial depression and growth in conflict remained even when relationship status and romantic experience had been taken into account. Thus, the results do not simply reflect the indirect effects of current or past experience but instead suggest that depressive features have an impact on relationship qualities.

These findings may be understood through Hammen's (1991) stress generation theory, which posits that individuals with depression create stressful conditions in relationships, which lead to poor relationship functioning, including higher levels of interpersonal conflict. Adolescents with greater levels of depressive symptoms may also be more likely to make negative interpretations regarding their partners' behaviors or intentions that could prompt relationship conflict (Beck, 1987). Both ideas suggest that the behaviors and cognitive biases of adolescents with depressive symptoms could be contributing to the development of conflict above and beyond normative increases in conflict experienced by nondepressed peers.

The results of this study also did not indicate significant slope-to-slope relationships as hypothesized. Increases in depressive symptoms were not concurrently related to increases in conflict over the course of adolescence. Concurrent fluctuations/changes in conflict and depressive symptoms may be more likely to happen on a microlevel (i.e., from week to week; see Whitton, Stanley, Markman, & Baucom, 2008). Future research with adolescent and emerging adulthood samples would ideally obtain measures across shorter intervals to test this idea.

Positive Problem Solving and Depressive Symptoms

Positive problem solving demonstrated a significant linear increase from mid-adolescence to emerging adulthood. This finding is in line with prior research indicating better conflict resolution from early to late adolescence in both platonic and romantic relationships (Laursen, Finkelstein, & Townsend Betts, 2001; Tuval-Mashiach & Shulman, 2006). It is likely that increasing relationship experience affords practice in negotiations, which serve to avoid disrupting these close relationships (Laursen et al., 2001). In addition, as positive conflict resolution is thought to be a product of social cognitive maturity (Dunn, 1993; Smetana, 1988), the use of positive problem solving in romantic relationships may continue to increase as an adolescent matures and becomes more sophisticated about such relationships. For both amount of conflict and problem-solving skills, increases over time could also simply be related to having longer lasting relationships at later ages, which provide more opportunity to engage in conflict or utilize problem-solving skills.

Further, results of this study indicated higher initial levels of depressive symptoms were related to less growth in the use of positive problem solving in adolescent and emerging adulthood romantic relationships. Supplementary analyses suggest these associations do not stem from one's romantic status or experience. Specifically, the associations remained significant or close to significant after these variables were controlled for. Instead, stressors, such as depressive symptoms, may tax adaptational capacities and hinder the acquisition of newly emerging skills, such as those necessary to navigate challenges specific to romantic relationships (Cicchetti et al., 1994). As such, depressive symptoms may make the successful mastery of relational skills more difficult. In addition, because early incompetence can result in later incompetence (Cicchetti et al., 1994), skill deficits may persist despite changes in depressive symptoms. Such an ongoing effect of either depressive symptoms or an early failure to acquire appropriate problem-solving skills might also explain why increasing levels of depressive symptoms were not significantly associated with decreasing levels of positive problem solving (i.e., no significant slope to slope association was found).

Notably, we did not find that initial levels of depressive symptoms were significantly related to initial levels of either positive problem-solving skills or levels of conflict. This was somewhat surprising, as prior research with adolescents has demonstrated concurrent associations between depression and poorer social problem-solving skills in nonromantic relationships (Puig-Antich, Kaufman, Ryan, & Williamson, 1993) as well as between depression and negative qualities of romantic relationships more generally (La Greca & Harrison, 2005). Research with adult married couples has also found that even moderate levels of depressive symptoms were related to difficulty negotiating disagreements and increased levels of conflict (Beach, Martin, Blum, & Roman, 1993; Whisman, 2001). It may be that the associations between depressive symptoms and relationship skills are not present in our initial wave of data collection as these associations take time to develop and do not appear until later in adolescence.

Finally, this study did not find associations between the slopes for romantic relationship quality and depressive symptoms, as has been found in recent studies of adults (Davila et al., 2003; Whitton et al., 2008). This may be a function of the length of data collection intervals or the nature of ongoing skill deficits, as discussed previously, or it may also stem from how adult studies have chosen to operationalize relationship quality. In particular, all studies but one (Whitton et al., 2008) have assessed relationship quality as relationship satisfaction. No study to date has examined the associations between the slopes of depressive symptoms and either problem solving or conflict over a similar time frame. As such, it is unknown whether such associations would exist for these variables in the adult literature either, or if this type of association in adulthood is specific to relationship satisfaction. It may also be that these associations do not emerge until later because of inherent differences in the nature of relationships between adolescence and adulthood. For instance, qualities of romantic relationships may influence the course of depressive symptoms only as romantic relationships gain increasing significance into adulthood. Future research is needed that utilizes multiple indicators of romantic relationship qualities and has samples that bridge the gap between adolescence and later adulthood. Doing so will likely provide a wealth of information regarding the nature of the association between romantic relationship qualities and depressive symptoms from more casual dating experiences into committed adult relationships such as marriage.

Limitations

Several limitations of this study could be addressed in subsequent research. First, as romantic relationships are inherently transactional in nature, obtaining self-report data from only one partner may not provide the most accurate estimate of the actual levels of conflict or problem solving present in adolescent romantic relationships. Research has suggested, however, that there is some degree of convergence in perceptions of close relationship qualities in adolescence (Furman &

Buhrmester, 2009). Further, individual perceptions of relationship interactions, even if not accurate, may still be important when predicting psychological symptoms (Carnelley, Pietromonaco, & Jaffee, 1994; Wethington & Kessler, 1986). Nonetheless, future studies assessing romantic relationship qualities would be strengthened by the addition of multi-informant data, as self-report questionnaires may inflate obtained associations due to shared method variance.

In addition, the first point of data collection in this study was mid-adolescence, a time when depressive symptoms are thought to peak (e.g., Cole et al., 2002). As such, it may be an ideal time for understanding the prospective impact of depressive symptoms. It is possible, however, that the theoretical mechanisms examined in this study may have begun earlier in adolescence or even childhood. Research examining the association between depressive symptoms and romantic relationship qualities in the future would ideally observe participants from earlier in adolescence to determine when these associations first emerge.

It is important to note that the results obtained in this study may not be specific to adolescent romantic relationships but rather may reflect problems related to depressive symptoms that are present in all major social relationships (Coyne, 1976). However, no single study has assessed how depressive symptoms are related to similarities in dysfunction across family, peer, and romantic relationships, either cross-sectionally or longitudinally. Whereas it is possible that similarities may exist because there is convergence in the degree of conflict or negative interaction present in different types of relationships (Shortt, Capaldi, Dishion, Bank, & Owen, 2003), other research suggests that that the link between depression and relationship qualities within different types of relationships may differ. For example, whereas initial levels of depressive symptoms in adolescence are predictive of changes in levels of romantic stressors over adolescence, they are not predictive of changes in any other type of stressor (including peer and family stressors; Hankin et al., 2007). Future research should simultaneously examine how the qualities of family, peer, and romantic relationships may be related to depression to clarify what is associated with the characteristics of multiple types of relationships and what is unique to romantic relationships.

This study did not examine moderation or mediation of the relationship between depressive symptoms and relationship qualities. Conflict in one's family of origin, neuroticism, and attachment styles have all been linked to both depressive symptoms and relationship qualities (Carnelley et al., 1994; Davila et al., 2003; Davila et al., 2004; Nelson, Hammen, Brennan, & Ullman, 2003; Patterson & Capaldi, 1990; Steinberg & Davila, 2008). In addition, this study did not examine other relationship variables that may underlie the association between depressive symptoms and the relationship qualities measured in this study, such as relationship maintenance and adverse relationship outcomes such as relational aggression. Further research should aim to examine the role that constructs such as these may play in explaining or influencing the association between depressive symptoms and romantic relationship dysfunction in later adolescence. On a similar note, this study also only examined two facets of myriad relationship qualities. As other facets of relationship quality, such as satisfaction and intimacy, may show different patterns of relations with depressive symptoms over time, it would be important for future research to additionally examine these constructs to get a bigger picture as to the association between relationship qualities and depressive symptoms in adolescence.

The nature of depressive symptoms observed in this sample was somewhat incongruent with what has been observed in past research in adolescent samples. Most notably, girls in this sample did not report significantly higher levels of depressive symptoms than boys. Prior research utilizing diagnoses of depression (Hankin et al., 1998) and studies assessing depressive symptoms in clinical samples (Compas et al., 1997) have consistently demonstrated higher prevalence rates and greater severity of depressive symptoms in girls. However, in nonreferred samples, gender differences are not always observed (La Greca & Harrison, 2005). Further, results from two large national samples of nonreferred adolescents found that gender differences in depressive symptoms were either nonsignificant or small in magnitude (Compas et al., 1997). As such, the nonreferred nature of the present sample may explain the lack of gender differences observed in depressive symptoms.

In addition, the present study found that levels of depressive symptoms decreased from mid-adolescence into emerging adulthood. Whereas this is inconsistent with some prior research demonstrating increases in depressive *diagnoses* during this time (Hankin et al., 1998; Olino, Klein, Lewinsohn, Rohde, & Seeley, 2009), findings from several other studies focusing on depressive *symptoms* are consistent with our results. Namely, these studies have also demonstrated decreases in the course of depressive symptoms from adolescence through emerging adulthood (Adkins, Wang, Dupre, can den Oord, & Elder, 2009; Galambos, Barker, & Krahn, 2006; Ge, Natsuaki, & Conger, 2006). Therefore, the pattern of findings in the present study may be as a result of the use of symptom levels rather than diagnoses in assessing depression.

Implications for Research, Policy, and Practice

Results of the current investigation may have significant implications for understanding relational development and the treatment of depression in adolescence. First, the present data suggest that even subsyndromal levels of depression could have significant long-term consequences for subsequent romantic relationships in adolescence and perhaps even early adulthood. Therefore, the early identification and treatment of even subsyndromal levels of depression during the teenage years could have important consequences for the development of romantic relationships.

Results of the present study also suggest that adolescents experiencing depressive symptoms may have emergent skill deficits in romantic relationships. As most well-validated treatments for depression already contain modules aimed at improving social skills (Kaslow, McClure, & Connell, 2002; Mufson & Moreau, 1999), adding skills training specific to romantic relationships may be a small but important change that could further improve outcomes and build competencies that are lacking in adolescents with depression.

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