

# Trajectories of Adolescent Hostile-Aggressive Behavior and Family Climate: Longitudinal Implications for Young Adult Romantic Relationship Competence

Gregory M. Fosco  
The Pennsylvania State University

Mark J. Van Ryzin  
Oregon Research Institute, Eugene, Oregon

Mengya Xia and Mark E. Feinberg  
The Pennsylvania State University

The formation and maintenance of young adult romantic relationships that are free from violence and are characterized by love, connection, and effective problem-solving have important implications for later well-being and family functioning. In this study, we examined adolescent hostile-aggressive behavior (HAB) and family relationship quality as key individual and family level factors that may forecast later romantic relationship functioning. Guided by a family systems framework, we evaluated the reciprocal influences of adolescent hostility and family climate, to provide a more comprehensive picture of the etiology of romantic relationship functioning. We drew on a large sample ( $N = 974$ ) of young adults (mean age = 19.5) that were followed starting in the fall of 6th grade, and subsequently in spring of 6th, 7th, 8th, 9th, and 10th grades prior to the young adult assessment. Using a latent difference score cross-lag model (McArdle, 2009), our results indicated that a more positive family climate was associated with decreases in HAB, but HAB was not associated with changes in family climate. Further, the influence of the family climate on HAB was consistent across all time points. HAB and family climate had different predictions for young adult romantic relationships: Increasing HAB over adolescence predicted relationship violence, while maintenance in family climate was a key predictor of relationship problem-solving skills. The only predictor of love and connection in relationships was early family functioning. Implications for developmental theory and prevention science are discussed.

*Keywords:* family climate, hostile-aggressive behavior, interpersonal violence, developmental models of romantic relationships, family systems

Romantic relationships reflect an important, stage-salient developmental domain during the early adult years (Masten et al., 1995; Roisman, Masten, Coatsworth, & Tellegen, 2004; Sassler, 2010). These romantic relationships are best conceptualized over multiple dimensions, including positive indicators of developmental success in forming, engaging in, and maintaining significant relationships, as well as indicators of problematic functioning. In this study, we focus on three important dimensions of romantic rela-

tionship functioning: interpersonal violence, problem-solving skills, and the feelings of connectedness and love for one's partner. Of these three domains, interpersonal violence is perhaps the most widely studied because it is a risk factor for a host of poor outcomes for women and men. Individuals in violent relationships are at significantly higher risk for physical health problems and injury, mental health problems such as depression, posttraumatic stress disorder, suicidality, substance use problems, and poor sexual health (e.g., Campbell, 2002; Campbell & Lewandowski, 1997; Coker, 2007; Coker et al., 2002; Golding, 1999). Thus, relationship violence is a risk factor of considerable social importance.

Constructive problem-solving skills and engaging in loving and connected relationships are indicators of *relationship competence*, which refers to qualities of relationships and skills that promote positive, satisfying, and enduring relationships (Davila, Stroud, Miller, & Steinberg, 2007; Masten et al., 1995). Constructive problem-solving skills, defined as discussing problems calmly, negotiating, and arriving at a mutually beneficial solution to problems, are related to longer-lasting, healthier relationships (Gottman & Notarius, 2002; Roisman et al., 2004). Effective problem-solving skills also help prevent couple conflict from progressing to marital distress (Conger, Rueter, & Elder, 1999). Finally, young adults' willingness to engage in and maintain close and meaningful

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Gregory M. Fosco, Department of Human Development and Family Studies, The Pennsylvania State University; Mark J. Van Ryzin, Oregon Research Institute, Eugene, Oregon; Mengya Xia, Department of Human Development and Family Studies, The Pennsylvania State University; Mark E. Feinberg, Prevention Research Center, The Pennsylvania State University.

This project was supported by the National Institute on Drug Abuse (DA 013709) and the Karl R. and Diane Wendle Fink Early Career Professorship for the Study of Families. We gratefully acknowledge the contributions of the participating youth and families, and the PROSPER staff, to the success of this project.

Correspondence concerning this article should be addressed to Gregory M. Fosco, Department of Human Development and Family Studies, The Pennsylvania State University, 226 Health and Human Development, University Park, PA 16802. E-mail: [gmf19@psu.edu](mailto:gmf19@psu.edu)

romantic relationships is a marker of relationship competence and developmental success in the early adult years (Masten et al., 1995; Roisman et al., 2004). Early adults in committed, positive relationships experience higher levels of well-being (Golding, 1999; Kamp Dush & Amato, 2005) and report better physical health (Williams & Umberson, 2004). Moreover, the quality of early adult relationships plays an important role in predicting later marital quality (Gottman & Notarius, 2002).

Despite the developmental importance of young adult romantic relationship quality, the extant literature examining developmental linkages from early adolescence to young adult romantic relationship quality is scarce (Capaldi, Knoble, Shortt, & Kim, 2012) with a particular need for integration across different key domains of risk and protective factors (Sassler, 2010). In this study, we examined adolescent interpersonal hostility and family relationship quality as key individual and family level factors that may forecast later romantic relationship functioning. Drawing on a family systems perspective, we evaluated the reciprocal influences of adolescent hostility and family climate, which provides a more comprehensive picture of the etiology of romantic relationship functioning. In the following sections, we discuss the evidence for each factor and the need for a more integrated, developmental approach.

### Interpersonal Hostility: Developmental Risk for Young Adult Relationship Problems

There is consistent evidence that adolescents with higher levels of hostile-aggressive behavioral (HAB) problems, such as conduct problems or antisocial behavior, are more likely to be in a violent relationship in their early adult years (Andrews, Foster, Capaldi, & Hops, 2000; Capaldi & Clark, 1998; Capaldi, Dishion, Stoolmiller, & Yoerger, 2001; Ehrensaft et al., 2003; Fergusson, Boden, & Horwood, 2008; Magdol, Moffitt, Caspi, & Silva, 1998), and they tend to have deficits in their effective problem-solving skills (Magdol et al., 1998). Although most work linking HAB and later relationships has focused on violence and ineffective problem-solving, there are some studies that suggest HAB during adolescence may also undermine young adults' tendency to develop close, connected romantic relationships. For example, youth with behavior problems are less likely to demonstrate a normative developmental progression in romantic relationships; rather, they tend to engage in dating relationships either earlier or later than less aggressive peers (Connolly, Nguyen, Pepler, Craig, & Jiang, 2013). In addition, adolescent HAB is related to more ambivalent feelings about one's romantic partner, which undermines the ability to sustain a positive, satisfying romantic relationship (Surjadi, Lorenz, Conger, & Wickrama, 2013).

Most studies linking HAB with young adult romantic relationships have evaluated HAB at one point in time and thus cannot capture the developmental progression of HAB over adolescence. There are considerable individual differences in adolescents' trajectories of HAB (e.g., Nagin & Tremblay, 1999; Thompson et al., 2011). Although most adolescents exhibit consistently low levels of HAB over time, there are meaningful subsets of adolescents that may have high initial levels of HAB that tend to remain elevated over adolescence, while others start with low levels and steadily increase over adolescence (Broidy et al., 2003; Herrenkohl et al., 2007; Thompson et al., 2011).

The relatively few studies testing developmental changes in HAB over time indicate that early onset of HAB and escalating levels of HAB over adolescence each signify risk for perpetrating interpersonal violence in young adulthood (Herrenkohl et al., 2007; Woodward, Fergusson, & Horwood, 2002). However, this approach disentangling initial levels and change over time is rare, but also suggests that each may have unique predictive value for long-term outcomes, and reflect different developmental risk processes. To a degree, initial levels capture an adolescents' "history" of HAB. Thus, adolescents who start at high levels of HAB may fit an "early starter" profile for interpersonal aggression which places them at risk for long-term problems in relationships. Whereas change over adolescence may reflect a risk process in which adolescents are developing an interpersonal style of increasingly frequent hostile behaviors that undermines their later ability to engage competently in romantic relationships (Bryant & Conger, 2002; Capaldi et al., 2012). This is consistent with other studies documenting escalations in HAB over adolescence are related to problems in romantic relationships later in life (Magdol et al., 1998).

### An Enduring Family Influence Hypothesis for Young Adult Relationships

Family relationship quality also is a key factor underlying romantic relationship competence in young adulthood. In this study, we draw on several aspects of family level functioning, including family conflict, cohesion, and organization, that when combined reflect the general *family climate*. Families with a positive climate would be relatively high in cohesion and organization, and low in family conflict. Each of these aspects are related to youth outcomes. Across theoretical frameworks (e.g., conflict theory, social interactional learning theory), high levels of poorly managed family conflict are a consistent risk factor for problems in social relationships within the peer, adolescent dating, and young adult romantic relationship domains (Andrews et al., 2000; Capaldi et al., 2012; Dishion & Patterson, 2006; Foshee et al., 2011; Patterson, DeBaryshe, & Ramsey, 1989). Other work has emphasized the value of positive characteristics of the family for promoting competence in young adult relationships (e.g., Ackerman et al., 2013). Adolescents in cohesive families characterized by close, trusting relationships may benefit from social-interactional learning that can occur as family members support each other and solve problems together. Youth from cohesive families not only have lower risk for aggression problems and emotional distress in early adulthood (Fosco, Caruthers, & Dishion, 2012), but they also are more likely to develop and maintain positive romantic relationships and social support in early adulthood (e.g., Collins & Feeney, 2004; Roisman, Collins, Sroufe, & Egeland, 2005). Moreover, when families of adolescents work together as a unit to solve problems effectively, it decreases the risk of progressions in problem behavior and association with deviant peers (Capaldi, Forgatch, & Crosby, 1994; Forgatch & Stoolmiller, 1994). Young men from families characterized by higher cohesion and organization are less likely to be violent in relationships (Gorman-Smith, Tolan, Sheidow, & Henry, 2001). Similarly, nurturant-involved parenting during adolescence has proven to be a robust predictor of higher quality romantic relationships (Conger, Cui, Bryant, &

Elder, 2000; Donnellan, Larsen-Rife, & Conger, 2005; Rauer, Pettit, Lansford, Bates, & Dodge, 2013).

Prior work suggests that family influences persist into young adulthood, even when accounting for individual-level factors. For example, the family climate during adolescence is related to young adult well-being, above and beyond the effects of individual-level self-regulation (e.g., Fosco, Caruthers, et al., 2012). Similarly, positive family relationships during adolescence predict young adult romantic relationship functioning, even when controlling for the target individuals' personality (Donnellan et al., 2005), self-esteem and depression (Johnson & Galambos, 2014), or positive engagement with the family (Ackerman et al., 2013).

Similar to HAB, the family climate also appears to change over the course of adolescence. Prior studies indicate that there is a normative decline in family functioning over adolescence. For example, many families exhibit increases in family conflict during adolescence (e.g., Collins & Laursen, 2006; Fosco, Van Ryzin, Stormshak, & Dishion, 2014; Van Ryzin & Dishion, 2012). In addition, aspects of family management, such as parental monitoring and positive parental involvement, decrease during this period (Dishion, Nelson, & Bullock, 2004; Van Ryzin & Nowicka, 2013). Despite evidence for a developmentally normative change in family climate during adolescence, few studies have looked at how *change* in the family climate confers risk for violence in later romantic relationships or undermines relationship competence or love/connection (e.g., Capaldi et al., 2012).

### Family Climate and Adolescent HAB: Implications for Young Adult Romantic Relationship Competence

The current study seeks to take two important next steps in understanding the developmental underpinnings of young adult relationship competence. First, we evaluated the nature and direction of influence between adolescent HAB and family climate during adolescence. Specifically, we ascertained whether the direction of effects were best described as family driven effects on adolescent HAB (e.g., Van Ryzin & Dishion, 2012), as child-driven effects on family functioning (e.g., Bell, 1968), or as reciprocal influences (e.g., Minuchin, 1985). Using a latent difference score cross-lag approach, we were able to simultaneously test whether: (a) a more positive family climate would be related to less increase in HAB over time (family driven effects); (b) HAB predicts decreases in family climate (child-driven effects); or (c) adolescent and family functioning each influence the other (reciprocal influences) over time. Drawing on similar work that found bidirectional associations of warm-nurturant parenting and negative affectivity (e.g., Donnellan et al., 2005), we expected to find support for a reciprocal influences model.

Second, we evaluated the impact of the initial status and rate of change for each construct on long-term romantic relationship adjustment (i.e., relationship violence, competence, and love/connection). We used a latent difference score model (LDS; McArdle, 2009), which conceptualizes change over time as a series of "differences scores" at each wave that capture the amount of change from the previous wave. This model provided the ability to estimate reciprocal influences between constructs (i.e., HAB and family climate) and initial levels and a constant rate of change over time for each construct, independent of the reciprocal influences, which we then used to predict romantic relationship functioning.

To date, no study has evaluated the impact of family relationships on romantic relationship outcomes while controlling for the effects of adolescent hostile-aggressive behavior (HAB) and vice versa. Thus, our findings can shed light on what process is "driving" the change in the model, as well as whether there are timing effects in which change is most prominent (e.g., family influences may be more potent earlier in adolescence). By examining the direction and timing of effects, our findings may inform developmental science and intervention science alike. Our findings could also have direct implications for intervention research that aims to alter the developmental trajectories of HAB or family functioning. In addition, we sought to capture a more complete characterization of developmental change by differentiating initial levels prior to adolescence and developmental change over adolescence for both family climate and HAB; both of which may be important predictors of young adult romantic relationship functioning.

Prior work has established adolescent HAB as a key predictor of relationship violence (Capaldi et al., 2012). High levels of HAB at the start of adolescence may reflect early onset problem behavior, which is typically related to a proclivity toward negative emotionality (anger, anxiety, irritability) which may be related relationship problems such as violence; but may also have poor interpersonal problem-solving skills, and perhaps a diminished ability to feel love and connection for one's partner later in life (Capaldi & Clark, 1998; Magdol et al., 1998; Moffitt, Krueger, Caspi, & Fagan, 2000). On the other hand, capturing changes in HAB during adolescence may provide insight into the process in which adolescents systematically refine their interpersonal behaviors during this period, either by maintaining prosocial relations (e.g., stable low HAB), improving interpersonal relations (e.g., decreasing HAB), or by escalating in their use of aggressive tactics with others over time (e.g., increasing HAB). This latter pattern of escalation in HAB over the course of adolescence would reflect developmental risk processes that impact adolescents' interpersonal skills and/or self-regulation that develop during adolescence and have lasting effects into adulthood.

Family interactional patterns found in the family climate were expected to be particularly relevant for forecasting problem-solving and emotional bonds in relationships. Family functioning also often changes over the course of adolescence, raising questions about how early experiences (e.g., initial levels) and change over adolescence may impact later romantic relationships. Initial levels of family climate can be seen as reflecting the cumulative experience prior to adolescence. Thus, levels of family functioning prior to adolescence may have lasting effects on young adult relationships (e.g., Colman & Widom, 2004; Raby, Roisman, Fraley, & Simpson, 2015). On the other hand, change in family functioning over adolescence may also have important implications for young adult outcomes. Families that are better able to maintain close relationships and effectively manage their conflicts may be better able to promote positive social relationships that set the foundation for later romantic relationships. Another perspective argues that the family context has diminishing importance for later functioning given adolescents' preoccupation with peer experiences (e.g., Cleveland, Feinberg, Bontempo, & Greenberg, 2008) and the increasing value they place in peer feedback about social interactions (e.g., Dishion & Tipsord, 2011). Because very little prior work has included initial levels and rates of change as predictors of relationship functioning, it is difficult to disentangle

the unique implications of early family experiences from family changes during adolescence for young adult relationships. In this study, we regressed romantic relationship outcomes on both initial levels and rates of change in HAB and family climate simultaneously to gain a more nuanced understanding of developmental precursors of young adult romantic relationship functioning.

In summary, this study posed these questions:

1. What is the nature and direction of influence between HAB and family climate over adolescence?
2. What are the long-term implications of initial levels (age 12) and change over time (ages 12–16) in HAB and family climate for young adult relationship violence, competence, and love and connection?
3. Are these models consistent for males and females? To date, there have been inconsistent findings for the moderating role of gender in developmental models of young adult romantic relationship competence. Thus, we felt the role of gender in explaining the influence of adolescent HAB and family climate trajectories on young adult relationship functioning remains an open question that warrants continued exploration.

## Method

### Sample and Procedure

Participants were drawn from the PROSPER project (PROmoting School-community-university Partnerships to Enhance Resilience), a large-scale effectiveness trial of preventive interventions aimed at reducing substance use initiation among rural adolescents (Spoth, Greenberg, Bierman, & Redmond, 2004). Recruitment occurred at the school district level in 28 rural communities and small towns in Iowa and Pennsylvania. Communities randomly assigned to the intervention condition implemented two evidence-based programs designed to reduce adolescent substance use, which offered to all involved families (see Spoth et al., 2004 for more details about the sample and the PROSPER project). This study was conducted over two successive cohorts of sixth graders, spaced 1 year apart (2003 and 2004). Baseline assessments were conducted with 11,960 youth across both cohorts (90% of all eligible sixth-graders), subsequent assessments were conducted in Spring of Grade 6 (Wave 2 [W2]), 7 (W3), 8 (W4), 9 (W5), and 10 (W6). A young adult long-term follow-up assessment was conducted with 1,988 participants who were randomly selected from the original baseline sample, with oversampling for youth with risk factors at the baseline assessment (e.g., single-parent households, problem behaviors, low-income family status). For the purposes of the current study, young adults were selected for analysis if they indicated that they were either (a) engaged with their partner, (b) living with their partner, or (c) in a steady relationship with one girlfriend or boyfriend. This resulted in 974 participants at the young adult assessment (mean age = 19.5), which was the basis for forming the current analytic sample.

At the young adult assessment, none of the participants reported being married, 10.6% ( $n = 103$ ) reported being engaged (63 of which were cohabiting), 15.1% ( $n = 147$ ) reported living with

their romantic partner (but were not engaged), and 74.3% ( $n = 724$ ) reported that they were in a steady relationship with one girl/boyfriend. Overall, 21.6% of the sample were cohabiting (engaged or not engaged;  $n = 210$ ). The median duration for romantic relationship duration was 19 months (range = 1 to 108 months). Of interest to the current longitudinal analyses, 77% of the sample at the young adult assessment reported that their romantic relationship had lasted 36 months or less, indicating that it had started following the last adolescent measurement occasion. Ninety-two percent of the participants identified as heterosexual ( $n = 892$ ), 2% were homosexual ( $n = 17$ ), 5% were bisexual ( $n = 48$ ), and 1% identified as other ( $n = 17$ ). At the young adult assessment, 89.4% participants reported that they were full-time students ( $n = 717$ ), 9.5% were half-time students ( $n = 76$ ), and 1.1% ( $n = 9$ ) did not provide information about education status. Of students, 51.7% ( $n = 415$ ) were enrolled in a 4-year college or university. Regarding employment status, 12.7% ( $n = 124$ ) participants reported they were working full-time, 33.7% ( $n = 328$ ) were working part-time, 2.5% ( $n = 24$ ) were in military service, 50.8% ( $n = 495$ ) were unemployed, and 0.3% ( $n = 3$ ) were missing data.

At the baseline assessment, 62.1% ( $n = 605$ ) of youth were female, 80.1% ( $n = 780$ ) came from two-parent families, and 27.9% ( $n = 272$ ) reported that they received free or reduced priced lunch (FRPL). Participants identified their race as White (91.0%), Hispanic (2.3%), African American (1.5%), Native American (0.9%), Asian (0.4%), or "Other" (3.1%), and some elected not to report their race (0.8%). Fifty-one percent of the sample was in the intervention group, and 49% was in the control group.

Because the analytic sample was derived of available cases at the final measurement occasion, when several youth were successfully reengaged in the study, attrition was evaluated for prior measurement occasions. Of the 974 participants at W1, 910 (93.4%) provided data at W2, 890 (91.4%) provided data at W3, 886 (91.0%) provided data at W4, 904 (92.8%) provided data at W5, and 796 (81.7%) provided data at W6.

For the sample as a whole, a Littles' MCAR test indicated that data were not missing completely at random,  $\chi^2(1062) = 1366.76$ ,  $p < .01$ . We then examined whether family income (FRPL status), youth gender, household status (two-parent household vs. single-parent household) or intervention condition (intervention group vs. control group) were related to rates of missingness. FRPL was the only correlate of missingness at W4,  $r = .07$ ,  $p < .05$ , and at W6,  $r = .08$ ,  $p < .05$ . To minimize bias caused by missing data, the structural equation model was estimated using full information maximum likelihood estimation and included FRPL as a covariate (Widaman, 2006).

**Adolescent hostile/aggressive behavior (HAB).** Adolescents completed the hostile/aggressive behaviors scale, which was derived from the National Youth Survey (Elliott, Huizinga, & Ageton, 1985) and has been found to be sensitive to change (Spoth, Redmond, & Shin, 2000). This scale included four items that assessed how often adolescents had engaged in hostile behavior in the last 12 months. They were asked how many times they had: (a) beat up someone or physically fought with someone because they made you angry (other than just playing around); (b) purposely damaged or destroyed property that did not belong to you; (c) thrown objects such as rocks or bottles at people to hurt or scare them; and (d) carried a hidden weapon. Items were rated on a 5-point scale to indicate the frequency of this behavior ranging

from 1 (*never*), 1 (*once*), 3 (*twice*), 4 (*three or four times*), or 5 (*five or more times*). Scale reliability was adequate across the six waves ranging from  $\alpha = .63$  to  $.80$ .

**Family climate.** Adolescents' perception of their family climate was assessed using items from the Family Environment Scale (Moos & Moos, 1994), to capture aspects of family cohesion (e.g., "family members really help and support each other"), conflict (e.g., "family members rarely become openly angry") and organization (e.g., "activities in our family are pretty carefully planned"). Items were rated on a 5-point scale ranging from 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), and 5 (*strongly agree*). Items were coded such that higher values reflect a more positive family climate (higher cohesion, higher organization, and low levels of family conflict). Scale reliability was acceptable, ranging from  $.68$  to  $.79$  across the six waves.

Young adult relationship functioning was measured using three different scales to assess violence, problem-solving skills, and love and connectedness. To relate to the concept of relationship competence, we selected measures that assessed the target young adults' behaviors toward their partners, rather than their assessment of their partners' behavior toward them. Thus, these measures focus on young adults' perpetration of violence, skill at problem-solving, and feelings of love and connection to their partner. These measures were not collected prior to this time point.

**Young adult relationship violence.** Seven items were drawn from the physical violence subscale from the Conflict Tactics Scale (Strauss, 1979) to assess the frequency in which young adults perpetrated different types of interpersonal violence with their partner in the past year, including: throwing things at their partner, pushing or shoving their partner, punching or hitting their partner, and kicking their partner. Responses were given on a 7-point scale, ranging from 0 (*zero times*), 1 (*one time*), 2 (*two times*), 3 (*three to five times*), 4 (*six to 10 times*), 5 (*11 to 20 times*), 6 (*more than 20 times*). Scale reliability was good ( $\alpha = .86$ ). Approximately 27% of young adults (33% of women, 17% of men) reported that they had engaged in any (endorsing any of the items) violent behavior.

**Young adult relationship problem-solving skills.** Young adults responded to the 7-item scale on relationship problem solving skills, the cooperative problem solving measure (Assad, Donnellan, & Conger, 2007) and one additional item: "How often do you have good ideas about how to solve the problem?" They were instructed to think about what happens when they have a problem to solve with their partner and report on their own behaviors. Sample items include "listen to your partner's ideas about how to solve the problem," "show a real interest in helping to solve the problem," "blame your partner for the problem," and "insist that your partner agree with your solution to the problem." Participants rated items on a 7-point scale, ranging from 1 (*always*), 2 (*almost always*), 3 (*fairly often*), 4 (*about half the time*), 5 (*not too often*), 6 (*almost never*), 7 (*never*). Scales were computed by rescoring items such that higher values reflect more constructive problem solving behaviors. Scale reliability was acceptable ( $\alpha = .79$ ).

**Young adult relationship love and connection.** Young adults completed the 5-item love subscale from the Love and Conflict Scale (Braiker & Kelley, 1979). Items were rated on a 5-point scale from 1 (*not at all*) to 5 (*very much*). Example items in love scale include: "To what extent do you have a sense of 'belonging' with your partner?"

and "To what extent do you love your partner at this stage?" The scale was computed so that higher score reflects more love and connection in their romantic relationship ( $\alpha = .81$ ).

## Analysis Plan

We took an iterative approach to data analysis. We first fit the LDS model (McArdle, 2009) for family climate and hostile-aggressive behavior in order to explore the direction of effects between family climate and hostile-aggressive behavior (i.e., unidirectional vs. reciprocal). Difference scores essentially decompose the overall growth trajectory into a series of segments representing the amount of change from one wave to the next. In our sample, this resulted in five difference scores for each variable (e.g., change from W1 to W2, from W2 to W3, from W3 to 4, etc.). These difference scores were then used in a traditional cross-lagged framework to illustrate the degree to which each variable influenced change in the other over time (e.g., whether family climate at W1 predicted change in hostile-aggressive behavior from W1 to W2 and vice versa).

The difference scores for each construct were also consolidated into latent variables representing a constant rate of change over time, controlling for the influence of the cross-lag and auto-regressive paths. In our second step, these latent change constructs (and the initial levels of each construct) were used to predict long-term outcomes (i.e., relationship violence, relational competence, and love/connectedness).

All modeling was conducted using Mplus 7.1 (Muthén & Muthén, 2008). We used robust maximum likelihood (ML) analysis, which can provide unbiased estimates in the presence of missing and/or non-normal data (the hostile-aggressive behavior data demonstrated negative skew). For each model, standard measures of fit are reported, including the chi-square ( $\chi^2$ ), comparative fit index (CFI), nonnormed or Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). CFI values greater than  $.95$ , TLI values greater than  $.90$ , and RMSEA values less than  $.05$  indicate good fit (Bentler, 1990; Bentler & Bonett, 1980; Hu & Bentler, 1999).

Because FRPL was correlated with missingness in the data, it was included as an auxiliary variable in conditional models to reduce bias. In addition, four covariates were included in the model predicting romantic relationship competence: young adult gender, age of the young adult at the W9 assessment (19- or 20-years-old), whether they were cohabiting with their partner, and the length of the romantic relationship at the time of the W9 assessment. To reduce complexity of the model, these covariates were treated as auxiliary variables in the analysis.

For each step, we evaluated whether intervention condition or youth gender moderated the results using a multigroup invariance or deviance test. Our criterion for a significant difference was based upon the CFI, which is independent of sample size (rather than chi-square, which can be inflated with large sample such as ours; Kaplan, 1990). If the initial omnibus test was significant (i.e., a change in CFI of greater than  $.01$ ; Cheung & Rensvold, 2002), we then tested individual paths to ascertain which differed across condition.

## Results

After examining descriptive data and intercorrelations (see Table 1), we fit the bivariate latent difference score model to assess

Table 1  
Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Fam (W1)	—														
2. Fam (W2)	.65*	—													
3. Fam (W3)	.56*	.67*	—												
4. Fam (W4)	.52*	.63*	.66*	—											
5. Fam (W5)	.45*	.53*	.63*	.69*	—										
6. Fam (W6)	.42*	.51*	.58*	.67*	.75*	—									
7. HAB (W1)	-.32*	-.28*	-.25*	-.20*	-.17*	-.12*	—								
8. HAB (W2)	-.28*	-.33*	-.31*	-.22*	-.21*	-.12*	.63*	—							
9. HAB (W3)	-.22*	-.26*	-.34*	-.22*	-.20*	-.13*	.45*	.59*	—						
10. HAB (W4)	-.23*	-.27*	-.30*	-.33*	-.23*	-.24*	.41*	.38*	.58*	—					
11. HAB (W5)	-.14*	-.20*	-.26*	-.25*	-.18*	-.23*	.33*	.35*	.47*	.48*	—				
12. HAB (W6)	-.12*	-.18*	-.22*	-.20*	-.19*	-.19*	.24*	.23*	.35*	.36*	.55*	—			
13. Violence (19 yo)	-.10*	-.12*	-.10*	-.13*	-.13*	-.15*	.07	.09*	.11*	.12*	.17*	.13*	—		
14. Prob. solve (19 yo)	.16*	.16*	.17*	.24*	.13*	.17*	-.19*	-.19*	-.20	.16*	-.14*	-.10*	-.27*	—	
15. Love (19yo)	.10*	.09*	.12*	.15*	.13*	.06	-.02	-.05	-.07	-.03	-.08	-.05	-.03	.35*	—
<i>N</i>	974	895	881	877	899	782	974	907	886	883	903	796	853	770	783
<i>M</i>	3.89	3.63	3.51	3.42	3.35	3.33	1.18	1.21	1.23	11.26	1.27	1.25	.19	5.65	4.70
<i>SD</i>	.74	.76	.80	.79	.76	.76	.45	.50	.51	.56	.57	.58	.51	.70	.49

Note. Fam = family climate; HAB = hostile-aggressive behavior.  
\*  $p < .05$ .

the direction of effects between family climate and HAB. Following McArdle (2009), autoregressive and cross-lag paths were initially constrained to be equal across time; in an iterative process, these were freed to determine the impact on model fit. We determined that optimal model fit was obtained when the autoregressive paths and the effects of hostile-aggressive behavior on change in family climate and vice versa were constrained to be equal across time. Residuals for observed scores were also constrained to be equal across time to establish measurement invariance (McArdle, 2009). The final model demonstrated an adequate fit to the data, where  $\chi^2(74) = 261.65, p < .001$ ; CFI = .93; TLI = .94; RMSEA = .051 (90% CI [.044, .058]). Results are presented in Table 2 (initial status and constant change coefficients; see Model 1). The autoregressive paths in which difference scores were regressed on their baseline levels, were significant and negative, suggesting that a higher (lower) baseline predicted a smaller (greater) amount of change. Regarding the substantive question of the direction of effects of hostile-aggressive behavior and family climate, cross-lagged paths were examined to determine the degree

to which levels in one predicted changes in the other. Adolescent hostile-aggressive behavior was not related to change in the family climate ( $\beta = -.03$  to  $-.05, ns$ ); however, a positive family climate was consistently associated with decreases in hostile-aggressive behavior at each time point ( $\beta = -.17$  to  $-.24, p < .05$ ; despite the equality constraints, standardized coefficients varied slightly across time due to differences in standard errors at each wave). Most of the correlations among initial level and constant change latent variables were nonsignificant and constrained to zero to aid model fit.

We then fit multiple group models to test invariance, focusing on the cross-lag paths. The omnibus test for intervention condition was not significant ( $\Delta CFI = .001$ ). The omnibus test for sex was also nonsignificant ( $\Delta CFI = .006$ ). These findings indicated that the pattern of results were consistent for boys and girls, and for those in the intervention and control conditions.

Our next step was to insert the long-term outcomes into the model. The final model demonstrated an adequate fit to the data, where  $\chi^2(98) = 305.77, p < .001$ ; CFI = .94; TLI = .94; RMSEA = .047 (90% CI [.041, .053]). Initial status and constant change coefficients did not differ from Model 1 (see Model 2 in Table 2); nor did cross-lag paths for HAB predicting change in family climate or family climate predicting changes in HAB (see Figure 1). Examining initial status and change in HAB and family climate as predictors of young adult relationship functioning yielded a different pattern of results for each outcome (see Table 3). First, adolescents who had higher initial levels of HAB tended to report less effective problem-solving skills ( $\beta = -.21, p < .001$ ). Yet, change in HAB over adolescence was related to relationship violence ( $\beta = .15, p < .01$ ), suggesting that youth who had escalating patterns of HAB over adolescence were more likely to perpetrate violence in their early adult relationships. Family climate was related to different outcomes. Adolescents with more positive family climates at the initial time point were more likely to more loving and connected relationships with their partners

Table 2  
LDS Model Results (Unstandardized)

Coefficients	Model 1	Model 2
	LDS Cross-lag model	LDS cross-lag with age 19.5 outcomes
Initial status mean (HAB)	1.19*** (.02)	1.19*** (.02)
Initial status variance (HAB)	.13*** (.03)	.13*** (.03)
Constant change mean (HAB)	.21** (.08)	.21** (.08)
Constant change variance (HAB)	.01*** (<.01)	.01*** (<.01)
Initial status mean (FAM)	3.64*** (.02)	3.64*** (.02)
Initial status variance (FAM)	.40*** (.02)	.40*** (.02)
Constant change mean (FAM)	.20*** (.07)	.20*** (.07)
Constant change variance (FAM)	.02*** (<.01)	.02*** (<.01)

\*\*  $p < .01$ . \*\*\*  $p < .001$ .

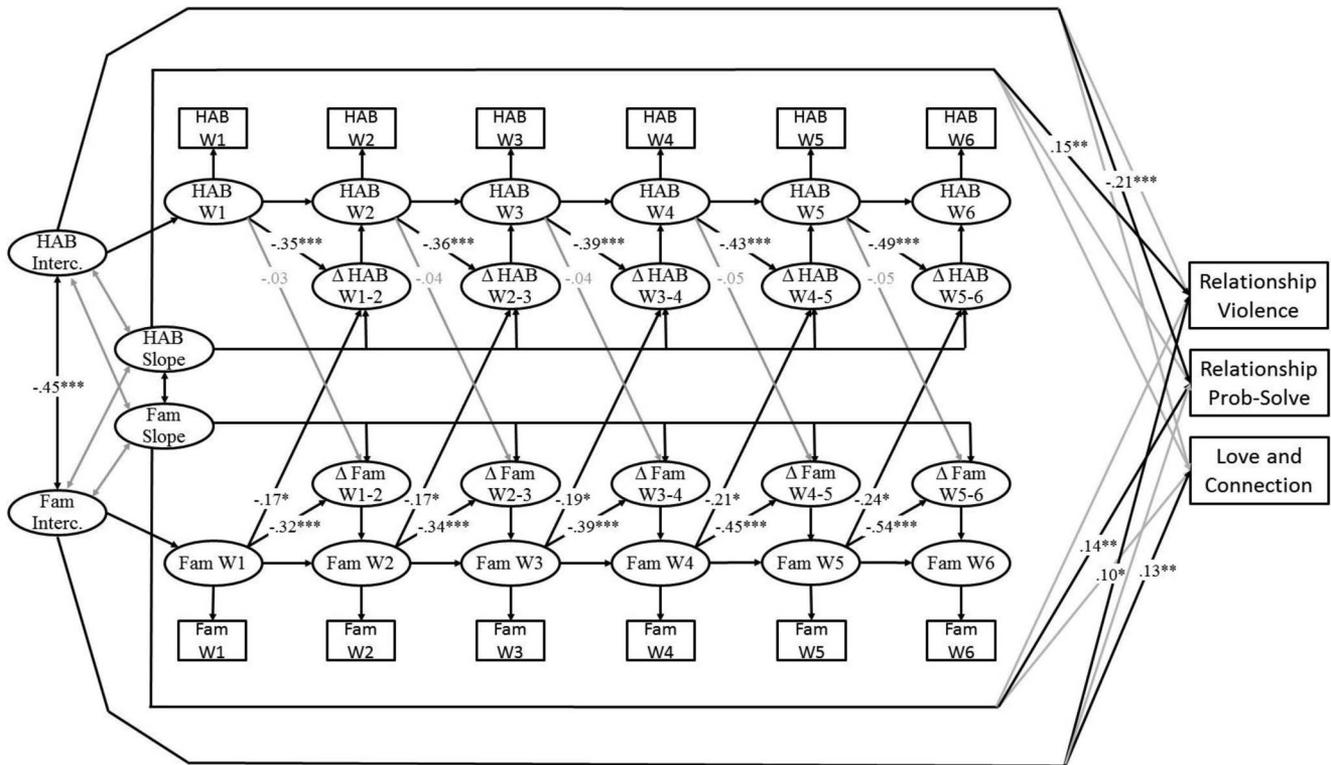


Figure 1. Bivariate latent difference score model predicting age 19.5 romantic relationship outcomes (Model 2). Fam = family climate; HAB = hostile-aggressive behavior; Δ = latent difference score. Black lines were statistically significant. Gray lines were not statistically significant. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

( $\beta = .13, p < .01$ ) and less likely to engage in relationship violence ( $\beta = -.10, p < .05$ ). However, change in family climate over adolescence was related to young adults' problem-solving skills in their relationships ( $\beta = .14, p < .01$ ), suggesting that families who possessed a higher-quality family climate had youth who were better at managing disagreements in their early adult relationships. Multiple group model comparisons indicated that these results did not vary based upon intervention condition ( $\Delta CFI = .008$ ) or gender ( $\Delta CFI = .007$ ).

Following up on findings that (a) there was a unidirectional pattern of effects of the family climate on adolescent HAB and (b) change in HAB was the only predictor of young adult relationship violence, we conducted post hoc analyses to determine if HAB might function as an intervening process by which the family climate was related to relationship violence in young adulthood. We reestimated the model by constraining cross-lag path coeffi-

cients to be zero, allowing us to regress the constant change term for family climate. This model yielded adequate fit with the data  $\chi^2(97) = 294.02, p < .001, CFI = .94, TLI = .94, RMSEA = .046$  (90% CI [.040, .052]). Change in the family climate predicted decreases in HAB over time ( $\beta = -.28, p < .001$ ). In turn, HAB was related to relationship violence ( $\beta = .15, p < .05$ ). Thus, the family climate had a modest indirect effect on young adult relationship violence through change in HAB over time (standardized indirect effect:  $-.04, p < .05$ ; 95% CI  $[-.01, -.08]$ ).

### Discussion

This study sought to provide new insights into the complex etiology of young adult romantic relationship functioning, with consideration to the shared influence of two key predictors (ado-

Table 3  
LDS Model 2 Results Predicting Long-Term Outcomes (Standardized)

Predictor	Relationship violence	Problem solving	Love and connection
Initial status mean (HAB Interc.)	.04	-.21***	.01
Constant change mean (HAB Slope)	.15**	-.02	-.04
Initial status mean (FAM Interc.)	-.10*	.09	.13**
Constant change mean (FAM Slope)	-.08	.14**	.03

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

lescent behavior problems and family functioning) and their ultimate impact in young adulthood. The goals of this study were: (a) to examine the direction and timing of influence among family climate and HAB during adolescence, and (b) to examine the developmental implications of adolescent HAB and family climate for young adult romantic relationship competence. This study complements existing developmental work studying the family and individual precursors to young adult romantic relationship competence by examining developmental change over time and by considering the nature of change among the developmental fore-runners of young adult relationship functioning. In addition, this study also treated young adult romantic relationship functioning as a multivariate outcome, making it possible to identify specific pathways to these outcomes that might be obscured by univariate approaches that treat adult relationship quality as a broad composite variable.

### Family Climate and Adolescent HAB: Timing and Direction of Influence

The first goal of this study was to evaluate the timing and direction of influence between family climate and adolescent HAB. Using a six-wave, cross-lag latent difference score modeling approach, it was possible to simultaneously test whether effects were adolescent-driven, family driven, or bidirectional in nature. Across all five time intervals, a more positive family climate was associated with smaller increases in HAB. However, none of the five paths from HAB to changes in the family climate were statistically significant. Thus, the current findings did not support adolescent-driven or reciprocal influence hypotheses, but were consistent with a family driven perspective for escalations in adolescent HAB.

Support for the family driven hypothesis for adolescent HAB is consistent with developmental literature that suggests that changes in the family environment are critical risk factors for adolescent problem behaviors. Prior work documents that the family climate is typically in decline during the adolescent years, characterized by normative increases in family conflict (e.g., Collins & Laursen, 2006; Fosco et al., 2014; Van Ryzin & Dishion, 2012) and degradation in family management practices and organization around planning, structure, and monitoring of adolescent activities (Dishion, Nelson, & Bullock, 2004; Laird, Pettit, Dodge, & Bates, 2003). These findings suggest that intervention efforts to reduce adolescent HAB during early to middle adolescence would be best directed toward promoting and maintaining high levels of family cohesion and organization, such as effective family conflict management strategies. These findings are consistent with the established literature that emphasizes a family focus for interventions aimed at reducing adolescent problem behavior (for a review, see Van Ryzin, Kumpfer, Fosco, & Greenberg, 2015).

### Predicting Young Adult Romantic Relationships

The second aim of this study was to examine the unique and relative predictive power of initial levels and developmental changes in the family climate and adolescent HAB for young adult romantic relationship violence and competence. Turning first to the role of family functioning, we found that initially more positive family climates were associated with more feelings of love and

connectedness in romantic relationships and lower levels of relationship violence, while families that experience less decline (possibly even increases) in their climate over adolescence were related to more effective problem-solving skills in young adult relationships.

The association between initial family climate and young adult love and connection in romantic relationships may be interpreted in a couple of ways. First, it may reflect timing effects in which early family experiences (e.g., infant or childhood attachment to parents) may set the foundation for later romantic relationships more than the changes that occur during adolescence. This finding is consistent with work describing an enduring effects model in which early childhood experiences in family relationships (e.g., maternal sensitivity) impact an individual's relationship competence much later in life, accounting for intervening social competence (Fraleigh & Roisman, 2015). Our findings suggest that the family climate during childhood may have enduring effects on the degree to which individuals form strong bonds with their romantic partners in young adulthood; however, this association was not found for other aspects of relationship functioning. Second, a possible alternative explanation is that, because the average rate of change in family climate was not large in general, a high initial level may be more reflective of high overall levels of family functioning over the course of adolescence. However, because our model accounted for autoregressive effects, this latter explanation is less likely the case. Regardless, it seems that family relationships in early adolescence that are cohesive, organized, and low in conflict help set the stage for loving, strong romantic relationships in young adulthood.

A different story emerged for problem-solving skills, where changes in family functioning, rather than initial levels, was the key predictor of this outcome. This pattern of results suggest that the maintenance of the family climate during adolescence is critical for adolescents' developing behavioral repertoires within interpersonal relationships. It may be that cohesive, organized, low-conflict families may provide a context that includes adolescents in planning family activities and in problem-solving discussions that teach youth effective interpersonal problem-solving skills (e.g., Rueter & Conger, 1995), which may generalize to later romantic relationships.

Our findings for adolescent functioning indicated that higher initial levels of HAB was related to less effective problem-solving skills, while increases in HAB over the course of adolescence was associated with higher levels of violence perpetration in relationships. In follow-up analyses, we found that changes in the family climate (i.e., declines in functioning) were related to increases in HAB, and in turn, indirectly related to relationship violence. Our findings indicate that there is a relatively stable and consistent influence of the family climate on adolescent HAB. These findings also emphasize the role of change in HAB, and suggest that there also is malleability in aggressive interpersonal behavior during this period. As several have suggested, these interpersonal behaviors are systematically refined in several contexts, including the family, peer, and dating relationship domains (Dishion & Tipsord, 2011; Fosco, Frank, & Dishion, 2012; Van Ryzin & Dishion, 2013). Our findings more specifically fit with a social interactional learning perspective for violent behavior (Dishion & Patterson, 2006; Patterson et al., 1989), which focuses on how angry and aversive interactions in the family (e.g., low cohesion and high conflict) can

translate to poorly regulated anger and more aggressive behavior in romantic relationships.

Finally, youth with higher initial levels of HAB were at greater risk for ineffective problem solving skills in young adulthood. This finding is consistent with the general profile of “early-starters” for adolescent problem behavior, which may in part reflect personality traits in which individuals have a propensity toward negativity emotionality; such individuals tend to have problems managing minor irritations, have a tendency to experience strong negative reactions to minor events, and possess a perceptual bias that others have malicious intentions toward them (Moffitt et al., 2000). Other work documents low agreeableness as a common companion to early aggressive behavior, which impedes an individuals’ ability to engage in effective problem-solving discussions with others (e.g., Laursen & Richmond, 2014).

It is interesting to note that HAB was consistently not associated with young adult love and connection in romantic relationships. This finding is consistent with Woodward, Fergusson, and Horwood (2002) who compared youth with early onset antisocial behavior problems, late-onset antisocial behavior problems, and a no-problem comparison group and found that these groups did not differ on a similar measure of love in intimate relationships in young adulthood. These findings argue for specificity in the implications of antisocial or hostile interpersonal behavior with regard to the behavioral repertoire, rather than how one feels toward one’s partner.

This study provided an opportunity to test for gender differences in these developmental models of romantic relationship violence and competence. Across all of our analyses, we failed to find any gender differences, indicating that our developmental model of romantic relationship competence was not different for males and females. This is consistent with several other studies that have found no evidence of gender moderation for developmental models linking family influences on young adults’ behaviors with their romantic partners (Ackerman et al., 2013; Conger et al., 2000; Fergusson et al., 2008). However, some work points to gender differences in family risk factors for young adult victimization (e.g., Fergusson et al., 2008), which may point to different risk processes, possibly related to mate selection, which reach beyond the scope of this study. However, it is also interesting to note that other work predicting young adult relationships do not find gender differences in target adults’ partners (nonviolent) conflict behavior in the romantic relationship (Ackerman et al., 2013), suggesting a need for systematic work to understand the moderating role of gender in developmental models of young adult romantic relationships.

Another possibility is that gender differences in developmental pathways to early adult relationship competence may surface through different avenues than were tested in this study. For example, Johnson and Galambos (2014) found that adolescent girls were more likely to experience depression, which in turn was related to romantic relationship functioning. Further work that identifies gender differences in pathways to relationship functioning are warranted.

### Limitations and Future Directions

This study is not without limitations. Our sample was largely White, rural, Midwestern adolescents, and replication of these

findings with other populations and over broader developmental periods is warranted. In addition, this study was limited to single-informant data, which may bias or overestimate the degree to which particular variables are correlated. In addition, reliance on adolescent report for all constructs means that the measurement approach may better reflect adolescent perceptions of their family and own behaviors, that can differ from other perspectives (e.g., observational, or other-report assessments) of family, individual, and relationship functioning. Future studies should seek to use multiinformant approaches to assessing family, individual, and romantic relationships, as well as multimethod approaches that draw on objective assessments (e.g., observations of family or romantic relationship functioning), would avoid problems with shared method variance. In this study, we focus on the development of interpersonal interaction skills (or deficits, i.e., violence) that generalize from family of origin experiences to young adult romantic relationships. In doing so, this study excludes processes that underlie the selection of one’s romantic partner (Caspi & Herbener, 1990), which likely contributes to the reciprocal interactions that occur within relationships (Davila, 2001). Unfortunately, this study did not collect data from romantic partners or observations of their relationships, making it problematic to expand beyond our focus on competence in this study. Our measure of HAB was a broad assessment of aggressive behavior, making it impossible to pinpoint whether this might include dating violence or other violence. Thus, it is unclear whether these trajectories of HAB truly reflect aggression in general or whether it was a long-standing pattern of violence in dating relationships. Finally, our focus on HAB was a relatively narrow assessment of individual skills that may contribute to young adult romantic relationship functioning, such as positive interpersonal or social skills including assertiveness or problem-solving skills during adolescence, cognitions about romantic relationships, or emotion regulation skills (e.g., Capaldi et al., 2012; Kinsfogel & Grych, 2004).

### Intervention Implications

Overall, this study has implications for intervention work. As one would expect, our results indicate that youth with lower levels of risk at the start of adolescence have better young adult romantic relationship quality, which supports the value of early interventions. However, the current findings also indicate plasticity in the patterns of interpersonal hostility (HAB) and family climate over adolescence. Our analyses tested the intercept and slope as unique predictors of young adult relationship outcomes, consistent with an additive effects model. Our findings suggest that interventions that effect change in these trajectories over time may either negate early risk or offer additional benefit. These findings were particularly true for young adult relationship violence, but also for relationship problem-solving skills.

Drawing on our findings that the family climate may be driving changes in HAB over time, this study supports family centered interventions as an optimal target for researchers and clinicians aiming to reduce adolescents’ long-term risk for violence or poor relationship outcomes in young adulthood. Interventions that focus on family interactions may be able to influence young adult relationship outcomes through the improvements in the family functioning and the reductions in adolescent HAB.

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Received August 10, 2015

Revision received March 16, 2016

Accepted March 22, 2016 ■