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Pathways from adolescent close friendship struggles to adult negative affectivity

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Abstract

This 19-year prospective study applied a social development lens to the challenge of identifying long-term predictors of adult negative affectivity. A diverse community sample of 169 individuals was repeatedly assessed from age 13 to age 32 using self-, parent-, and peer-reports. As hypothesized, lack of competence establishing and maintaining close friendships in adolescence had a substantial long-term predictive relation to negative affectivity at ages 27–32, even after accounting for prior depressive, anxious, and externalizing symptoms. Predictions also remained robust after accounting for concurrent levels of depressive symptoms, indicating that findings were not simply an artifact of previously established links between relationship quality and depressive symptoms. Predictions also emerged from poor peer relationships within young adulthood to future relative increases in negative affectivity by ages 27–32. Implications for early identification of risk as well as for potential preventive interventions are discussed.

Keywords: Negative affectivity; social relationships; trait anxiety; longitudinal

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Negative affectivity – reflecting fear, anxiety, and a lack of perceived reward in the environment – has been identified as a central factor in anxiety and depressive disorders and as a contributing factor to a host of other forms of psychopathology (Sanislow et al., 2015). The construct and its related components have been conceptualized and described in a variety of ways by different researchers, for example framed as key elements of the “negative valence domain” in NIH Research Domain Criteria (Sanislow et al., 2010, 2015) and as largely synonymous with a widely recognized measure of trait anxiety (Clark & Beck, 2011; Knowles & Olatunji, 2020; Spielberger, 1983). However framed, it is clear that this vulnerability to anxiety, depression, and related symptoms creates a remarkably broad and costly mental health burden (Collins et al., 2011). Understanding its roots thereby becomes critical to supporting early identification and prevention efforts. This paper examined one potential root of future negative affectivity by testing the hypothesis that its development in adulthood can be understood as linked to prior difficulties managing the developmental task of learning to form strong and stable close relationships in adolescence.

Failure to develop strong and stable close relationships is likely to predict the development of negative affectivity for several reasons. The ability to develop and maintain strong close relationships is a fundamental human drive, and being part of a social group is recognized as vital for survival (Baumeister & Tice, 1990; Holt-Lunstad et al., 2010). Accordingly, social baseline theory suggests that the human brain is tuned to a default position of expecting to

be in the presence of others who can act as potential supports in times of threat or stress (Coan & Sbarra, 2015). Failure to establish close and stable relationships is thus likely to decrease the individual’s sense of relative safety and efficacy and increase fear and anxiety – core elements of negative affectivity. Attachment theory has long noted the importance of felt security in close relationships across the lifespan and the anxiety and depressive symptoms likely to follow when this security is absent (Bowlby, 1980; Main et al., 1985). Indeed, meta-analyses reveal that insecure attachment, and the accompanying lack of confidence that relationship partners will be available when needed, especially in times of stress, is a robust predictor of internalizing symptoms (Dagan et al., 2021; Groh et al., 2012).

During the adolescent and young adult transitions, close friendships provide a critical context for learning to establish intimacy and stability in social relationships (Collins & Laursen, 2000; Costello, Allen, et al., 2022). A growing body of evidence supports the idea that success or failure in managing the task of establishing such relationships in adolescence carries forward to predict the quality of close relationships in adulthood (Kansky et al., 2017; Oudekerk et al., 2015; Pascuzzo et al., 2013). Difficulty forming such relationships in adolescence has also been linked to lower long-term romantic and general life satisfaction (Allen et al., 2020; Li et al., 2011; Loeb et al., 2020; Marion et al., 2013). These findings, combined with growing evidence of the sensitivity of the adolescent brain to social experiences (Blakemore, 2008; Somerville, 2013), suggest that establishing strong close friendships in adolescence may be considered a critical developmental task of this life stage. A developmental psychopathology perspective suggests that failure to accomplish such a critical developmental task at a given stage will predict an increased likelihood of

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significant psychopathology emerging at future points in development (Waters & Sroufe, 1983). This perspective suggests that failure to establish stable and positive close relationships in adolescence will create an enduring vulnerability likely to lead to the *development* of higher levels of negative affectivity over time, even beyond what would be expected given simple symptom continuity. This stronger developmental premise is only rarely tested, however, and has never been tested with regard to close friendships and negative affectivity.

Most of what we know empirically about the longer-term social predictors of negative affectivity comes from research on its two major components: anxiety and depressive symptoms. Evidence for social predictors of elements of adult negative affectivity is strongest for depressive symptoms. Within adolescence, poor quality best friendships have been concurrently linked to higher levels of depressive symptoms (La Greca & Harrison, 2005). Similarly, within experimental paradigms, peer rejection has been causally linked to short-term increases in adolescent depressive symptoms (Platt *et al.*, 2013). More recently, a strong link from poor close friendship quality in adolescence to adult depressive symptoms has been identified – a link that remained even after covarying baseline levels of depressive symptoms in adolescence (Allen, Costello, *et al.*, 2022; Allen, Pettit, *et al.*, 2022; Narr *et al.*, 2019). Notably, there is also evidence that, at least for males, this link is to some extent mediated via anxiety symptoms early in adulthood (Allen, Pettit, *et al.*, 2022).

Empirical support for long-term links from relationship difficulties to the anxiety components of negative affectivity in adulthood is far more limited. As with depressive symptoms, concurrent links of anxiety and poor friendship quality within adolescence have been observed (La Greca & Harrison, 2005). In addition, poor peer relationships can lead to a vicious cycle of negative self-evaluation and increasingly problematic relationships, culminating in victimization and anxiety symptoms including high perceived threat, uncertainty, and hypervigilance (Roza *et al.*, 2003). Several studies have reported predictions from peer problems in childhood to future anxiety, though never in designs that accounted for baseline anxiety levels or potential reverse causal relationships (Krygsman & Vaillancourt, 2022; Modin *et al.*, 2011). Other research has failed to identify relationships between childhood peer status and anxiety in adolescence (Woodward & Fergusson, 1999). Unlike with research on depressive symptoms, only very modest evidence exists of long-term homotypic continuities with respect to the anxiety components of negative affectivity (Shanahan *et al.*, 2015).

In addition to its obvious links to depression and anxiety, significant links of markers of negative affectivity to externalizing symptoms have also been observed (Roza *et al.*, 2003; Zoccolillo, 1992). Thus, consideration of the joint and separate impact of each of these aspects of psychopathology becomes critical to adequately modeling the development of negative affectivity. Thoroughly assessing the development of negative affectivity over time also requires consideration of the timing of any effects observed. For example, do peer relationship factors continue to matter beyond adolescence, given both the neural maturation and numerous social changes that occur during the transition from adolescence to early adulthood?

The current study sought to address these issues by examining an integrative model of the adolescent-era social predictors of adult negative affectivity. The model was examined using a prospective, multimethod approach within a demographically diverse community sample assessed repeatedly from ages 13 to 32. This study examined negative affectivity using a measure of trait anxiety, which has been repeatedly identified as one of the best core

markers of broad negative affectivity (in spite of the apparent narrow focus on anxiety in its label) (Bados *et al.*, 2010; Balsamo *et al.*, 2013). This measure has also previously been independently linked to a host of negative outcomes beyond mental health symptoms, including impairment of REM sleep, increased ambulatory blood pressure, and decreased efficiency of working memory and cognitive control and is thus clearly important in its own regard (Berggren & Derakshan, 2013; Horváth *et al.*, 2016; Räikkönen *et al.*, 1999; Salthouse, 2012). Markers of peer relationship quality were obtained via multiple methods, including assessments of both stability and quality of relationships. In addition, baseline measures of anxious, depressive, and externalizing symptoms were obtained. Given the episodic nature of some aspects of negative affectivity (e.g., depressive symptoms), repeated annual assessments were obtained and aggregated to identify enduring stable underlying propensities.

Although the lack of long-term research in this area renders this study as somewhat exploratory, three specific hypotheses were assessed:

1. Close friendship instability and lack of closeness in the closest adolescent friendships will predict negative affectivity in young adulthood, even after accounting for adolescent-era depressive, anxious, and externalizing symptoms.
2. Poor friendship quality *within* young adulthood will also predict relative increases in negative affectivity from young adulthood into the early thirties.
3. Long-term links from adolescent-era friendship quality to negative affectivity in the early thirties will be observed, including both direct and indirect links via intervening levels of young adult negative affectivity.

In considering these hypotheses, we assessed both direct predictions to adult negative affectivity, as well as predictions made after covarying the level of concurrent depressive symptoms. This latter approach was used to determine the extent to which relationship predictors have implications beyond just to the depressive elements of negative affectivity, with which they have been previously linked (Allen, Pettit, *et al.*, 2022). Given substantial evidence that negative affectivity captures a combination of depression and anxiety (see review by Knowles & Olatunji, 2020), analyses of predictions that covary depressive symptoms also provide an estimate of the degree to which relationship predictors can account specifically for the anxiety components of negative affectivity.

Finally, given the well-established role of gender differences in both anxious and depressive symptoms and in social relationships (Hankin *et al.*, 1998; Knowles & Olatunji, 2020; Nolen-Hoeksema & Hilt, 2009), gender was also examined as both a predictor and a moderator of key social processes for each hypothesis.

Method

Participants

This report is drawn from a larger longitudinal investigation of adolescent social development in familial and peer contexts. Original participants included 184 seventh and eighth graders (86 identified as male and 98 as female) followed over a 19-year period from ages 13 to 32, along with collateral data collected from mothers and close friends of these adolescents. The sample was racially/ethnically and socioeconomically diverse: 107 adolescents (58%) identified as White, 53 (29%) as African American, 15 (8%)

as of mixed race/ethnicity, and 9 (5%) as being from other minority groups. Adolescents' parents reported a median family income in the \$40,000–\$59,999 range at the initial assessment.

Adolescents were initially recruited from the seventh and eighth grades of a public middle school drawing from suburban and urban populations in the Southeastern United States. Students and their peers were recruited via an initial mailing to all parents of students in the school along with follow-up contact efforts at school lunches. Families of adolescents who indicated they were interested in the study were contacted by telephone. If a student was identified as a close peer of a participant and agreed to participate in that capacity, they were no longer eligible to participate as primary participants, to reduce redundancies in the data. Of all students eligible for participation, 63% agreed to participate as either target participants or as peers providing extensive collateral information in a 3-hr session. All participants provided informed assent/consent (depending upon whether they were an adolescent or an adult) before each interview session, and parents provided informed consent for adolescents. Initial interviews took place in private offices within a university academic building. Follow-up assessments were conducted in the same setting, or for participants' living at a distance, were conducted either in local settings (e.g., hotel conference rooms), or via mail.

Participants were first assessed annually over a five-year period across adolescence from ages 13 to 17 (Mean age at first assessment = 13.35 ($SD = .64$), Mean age at last assessment = 17.32 ($SD = .88$)). For the adult follow-up assessments, data were obtained from participants annually from age 24 ($M = 23.78$, $SD = .97$) to 32 ($M = 31.78$, $SD = .98$). In adolescence, participants also nominated the person they currently identified as "the peer to whom they were closest" to be included in the study. Close friends came in during a visit along with the target participant during adolescence and were assessed individually in adulthood. Friends were close in age to participants (i.e., their average age differed by less than a month from target adolescents' ages). Close friends within adolescence were specified to be same-gender friends, but the same friend need not be specified across different waves. Close friends in adolescence reported that they had known participants for an average of 4.3–5.7 years ($SD = 3.1$ to 3.8) across the adolescent assessment periods; close friends in adulthood reported that they knew participants for an average of 10.3–11.2 years ($SDs = 6.6$ – 7.1). Data were also obtained from the adolescents' mother (at participant mean ages 13.35 ($SD = .64$), 16.35 ($SD = .87$), and 22.80 ($SD = .96$)).

Attrition analyses

Adult negative affectivity data were obtained from 92% of the original sample ($N = 169$). Attrition analyses comparing those participants with vs. without data on adult negative affectivity revealed no significant differences on any predictor variables except for adolescent gender (16% attrition rate for boys vs. 1% for girls). To best address any potential biases due to attrition in longitudinal analyses, full information maximum likelihood (FIML) methods were used with analyses including all variables that were linked to future missing data (i.e., where data were not missing completely at random). Because these procedures have been found to yield the least biased estimates when all available data are used for longitudinal analyses (vs. listwise deletion of missing data) (Arbuckle, 1996), the entire original sample of 184 was utilized for these analyses. This full sample thus provides the best possible estimates of variances and covariances in measures of interest and was least likely to be biased by missing data.

Procedure

In the initial introduction and throughout all sessions, confidentiality was assured to all study participants and adolescents were told that their parents and friends would not be informed of any of the answers they provided. Participants' data were protected by a Confidentiality Certificate issued by the U.S. Department of Health and Human Services, which protected information from subpoena by federal, state, and local courts. Transportation and childcare were provided if necessary. Adolescent/adult participants, their parents, and peers were all paid for participation.

Measures

Negative affectivity (ages 24–26, 27–32) was assessed annually via the 20-item trait anxiety scale from the State-Trait Anxiety Inventory (Spielberger et al., 1999). Items assessed frequency of experiencing various states of mind on a 4-point scale ranging from "Almost never" to "Almost always." Item content focused on enduring patterns of negative thought, e.g., "I worry too much over something that really doesn't matter," and emotion, e.g., "I feel happy (reverse-coded)." Internal consistency was strong (Cronbach's $\alpha s = .92$ – $.94$). The measure has previously been identified as related to both depressive and anxiety symptoms and described as 'essentially the same' and 'almost synonymous' with broad negative affectivity (Knowles & Olatunji, 2020; Clark & Beck, 2011). Scores were aggregated across years 24–26 and 27–32 to yield measures of negativity in both the young adulthood (age 24–26) and early thirties (age 27–32) periods.

Depressive symptoms (ages 13–17, 24–26, 27–32) were self-reported annually via the 27-item Childhood Depression Inventory (Kovacs & Beck, 1977) at ages 13–17, and the 21-item Beck Depression Inventory (Beck & Steer, 1987) at all later ages. These instruments are both well-validated and widely accepted self-report measures of depressive symptomatology (Kazdin, 1990). Items were rated on a Likert scale, summed for each year, and then aggregated across years to yield separate depressive symptom scores for the periods covered by ages 13–17, ages 24–26, and ages 27–32.

Adolescent anxiety symptoms (ages 15–17) were assessed annually using the 21-item Beck Anxiety Inventory (Beck et al., 1988). Internal consistency was strong (Cronbach's αs across all scales ranged from $.90$ to $.94$). Scores were aggregated across years 15–17 to yield a measure of adolescent anxiety symptoms.

Adolescent externalizing symptoms (ages 13, 16). Target adolescents' mothers reported on adolescents' externalizing behaviors at ages 13 and 16 using the short form of the externalizing scales from the Child Behavior Checklist (Achenbach & Edelbrock, 1981; Achenbach, 1991). The short form versions of the aggression, delinquency, and hyperactivity externalizing subscales (total 21 items) were validated using a large sample of delinquent youth where these subscales reliably predicted delinquency similarly to the full scales (Lizotte et al., 1992). Cronbach's αs for the scale of all externalizing items ranged from $.85$ to $.89$. Scores were aggregated across years to yield a single measure of adolescent externalizing symptoms.

Close friendship closeness (friend report, ages 15–17). Participants' closest peer was asked annually at each age from 15 through 17 to rate the overall closeness of the friendship with the participant on a scale ranging from 1 – Not Very Close to 5 – Best Friend. This approach to ratings has previously been found valid and predictive of longer-term relationship outcomes (Allen et al., 2020). Even though ratings were often from different friends

and therefore rating different friendships, they nevertheless coalesced over time, yielding a Cronbach's α of .62, which is considered high for a measure that is actually an inventory of friendship closeness across relationships rather than a scale.

Close friendship competence (maternal rating; age 16). Mothers rated their teen using a modified version of the four-item friendship competence scale of the Adolescent Self-Perception Profile, modified to obtain ratings from mothers instead of oneself (Harter, 1988). Items focused on the extent to which a teen was perceived as having "a friend close enough to share really personal thoughts with," and a "really close friend to share things with." Internal consistency was good (Cronbach's $\alpha = .82$).

Close friendship stability (age 16 to age 17). This dichotomous behavioral variable denoted whether or not participants selected the same peer as their closest peer to participate in the study from age 16 to age 17. This measure of instability has been found to correlate with close-friend-rated closeness in the following year ($r = .22, p < .05$) and is predictive of future romantic relationship satisfaction (Allen *et al.*, 2020).

Peer relationship quality (maternal report, age 23). Young adult peer relationship quality was assessed by mothers of participants using the Young Adult Adjustment Scale (Capaldi *et al.*, 1992) in which participants were rated on seven items using a 5-point scale tapping qualities such as getting along well with friends and having a hard time finding friends (reverse-scored). Internal consistency was good (Cronbach's $\alpha = .76$).

Close friendship quality (friend report, ages 24–26). The named closest peer of the target participant completed the peer scale of the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987) annually to assess their perception of the overall quality of their relationship with the target participant in terms of the degree of trust, communication, and alienation (reverse-scored) in the relationship. This was a slight modification of this measure, which typically asks an individual to report on their friends more generally. The modification asked the closest peer to report on the participant specifically (e.g., instead of asking the close peer to respond about the prompt "I like to get my friends" point of view . . . the close peer was asked to respond to the prompt "I like to get my friend's point of view" and was told to answer specifically about the study participant). A composite score of the peer's perceptions of the overall quality of this relationship was obtained from 25 five-point Likert scale items. Scores were aggregated across this 3-year span to yield the final measure. Cronbach's α s ranged from .91 to .92 across this period.

Results

Preliminary analyses

Table 1 presents means, standard deviations, and correlations among measures used in the study. The relatively low correlations among the adolescent-era friendship measures suggested that each was capturing a different aspect of friendship quality; thus, these were considered individually in analyses (vs. being combined into a single construct). Gender and family of origin income were examined as potential moderators of all effects below by creating an interaction term from the products of gender or income and each predictor variable (all standardized). No significant moderating effects of gender or family of origin income were found.

Primary analyses

Analytic plan. For all primary analyses, SAS PROC CALIS (version 9.4, SAS Institute, Cary, NC) was employed using FIML handling

of missing data. Hierarchical linear regressions were used to examine hypotheses 1 and 2. Participant gender and baseline family income were entered in Step 1, with anxiety, depressive, and externalizing symptoms entered in Step 2. Following this, two different analytic approaches were used: First, direct predictions to negative affectivity were examined by adding relationship predictors as the next step (left columns of Tables 2–4). Second, to test whether these relationship predictors are doing anything more than simply capturing previously observed links of relationship qualities to depressive symptoms, a set of alternative analyses was conducted next (right columns of Tables 2–4). In these analyses, the *concurrent* level of depressive symptoms in adulthood (assessed contemporaneously with the negative affectivity assessment), was included as a predictor and then followed by relationship predictors in a final step.

For hypothesis 3, a path analytic approach was used. All potential predictors for each path were entered into an initial model, with non-significant paths then deleted and fit indices used to assure that no significant, temporally feasible paths were omitted.

Hypothesis 1. Close friendship instability and lack of closeness in close friendships will predict negative affectivity in young adulthood, even after accounting for adolescent-era depressive, anxious, and externalizing symptoms.

Results presented in the first four columns of Table 2 revealed significant continuities from levels of anxious and depressive symptoms in adolescence to negative affectivity in young adulthood (ages 24–26). When relationship predictors were added next, both friend-reported lack of friendship closeness and observed instability in close friendships from 16 to 17 were predictive of higher levels of young adult negative affectivity.

When parallel analyses were examined with concurrent depressive symptoms in young adulthood also entered (right four columns of Table 2), predictions from relationship factors remained largely intact, though somewhat weakened, with both lack of friendship closeness and friendship instability predicting young adult negative affectivity, even after accounting for the aspects that overlapped with young adult depressive symptoms.

Hypothesis 2. Poor peer relationship quality within young adulthood will also predict relative increases in negative affectivity from young adulthood into the early thirties.

Results (presented in Table 3) indicated significant continuity in levels of negative affectivity from young adulthood into the early thirties. Maternal report of young adult peer relationship quality also added significant increments to this prediction, whether or not concurrent depressive symptoms at ages 27–32 were included in models. Young adult friends' report of close friendship quality was not a significant predictor in either model.

Hypothesis 3. Long-term links from adolescent-era friendship quality to negative affectivity in the early thirties will be observed, including both direct links and links via intervening levels of young adult negative affectivity and relationship difficulties.

A path model was used to test Hypothesis 3, considering prediction of negative affectivity into the early thirties from adolescent-era relationship and symptom measures, while considering young adult measures of peer relationship quality and depressive and externalizing symptoms as potential mediators in addition to young adult levels of negative affectivity. The measure of close friendship quality as reported by the close friend at ages

Table 1. Correlations among primary constructs

	Mean	SD	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Gender (1 = M, 2 = F)	–	–	.06	.22*	.04	.19*	–.09	–.12	.16*	.06	–.16	.21**	.12	.04
2. Depressive symptoms (13–17)	6.22	4.32		.54***	.17*	–.10	–.20*	–.02	.34***	.44***	–.05	–.02	.26***	.43***
3. Anxiety symptoms (15–17)	6.52	6.84			.12	–.02	–.20*	–.08	.31***	.34***	–.10	–.03	.25**	.33***
4. Externalizing symptoms (13, 16)	5.52	4.74				–.06	.01	–.05	–.00	.03	–.30***	–.10	–.03	.05
5. Close-friendship closeness (close-friend report; 15–17)	4.38	0.63					.05	.11	–.24**	–.30***	.12	.08	–.20*	–.30***
6. Close-friendship competence (maternal report; 16)	13.1	1.45						–.03	–.24**	–.18*	.08	–.05	–.26**	–.20*
7. Close friendship stability (observed; 16–17)	0.34	0.48							–.17	–.14	.24*	.12	–.24*	–.27**
8. Depressive symptoms (24–26)	5.23	4.80								.77***	–.17*	.01	.61***	.70***
9. Negative affectivity (24–26)	36.5	8.95									–.17*	–.01	.56***	.85***
10. Peer relationship quality (maternal report, 23)	30.5	3.81										.13	–.24**	–.28***
11. Close friendship quality (friend report, 24–26)	108.2	9.80											–.03	–.07
12. Depressive symptoms (27–32)	5.14	5.39												.78***
13. Negative affectivity (27–32)	34.1	8.63												

Note. Participant age(s) at time of assessment are in parentheses along with reporter source if other than self-report. ****p* < .001. ***p* < .01. **p* < .05.

Table 2. Adolescent predictors of negative affectivity at ages 24–26

	Negative affectivity (Ages 24–26)							
	Simple predictions				Predictions covarying concurrent depressive symptoms (24–26)			
	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2
Step I. Demographic predictors								
Gender (M = 1, F = 2)	.07 (.08)	.04 (.07)			.07 (.08)	–.06 (.05)		
Statistics for step			.004	.004			.004	.004
Step II. Symptom predictors								
Anxiety symptoms (15–17)	.15* (.07)	.15* (.07)			.15* (.07)	.06 (.06)		
Depressive symptoms (13–17)	.36*** (.08)	.34*** (.08)			.36*** (.08)	.18** (.06)		
Externalizing symptoms (13–16) (Maternal report)	–.03 (.07)	–.06 (.07)			–.03 (.07)	–.00 (.05)		
Statistics for step			.200***	.204***			.200***	.204***
Step III. Concurrent depressive symptoms								
Statistics for step	–	–					.426***	.630***
Step IV. Relationship predictors								
Close-friendship closeness (close-friend report; 15–17)	–.27*** (.06)	–.27*** (.06)			–.11* (.05)	–.11* (.05)		
Close-friendship competence (maternal report; 16)	–.06 (.07)	–.06 (.07)			–.04 (.057)	.04 (.05)		
Close friendship stability (observed; 16–17)	–.14* (.07)	–.14* (.07)			–.10* (.05)	–.10* (.05)		
Statistics for step			.105***	.309***			.022*	.652***

Note. Participant age(s) at time of assessment are in parentheses along with reporter source if other than self-report. ****p* < .001. ***p* < .01. **p* < .05 + *p* = .05.

24–26 was not included in analyses, given its previously observed lack of relation to later negative affectivity.

The final model fit the data well ($\chi^2(18) = 15.9, p = .60, GFI = .98, AGFI = .92, RMSEA = .000$). Results are presented in Figure 1. For clarity, the figure does not depict non-significant

pathways, nor correlations among constructs assessed contemporaneously. As seen in Figure 1, adolescent-era close friendship quality assessed via close friend report of lack of friendship closeness and via friendship instability were linked to negative affectivity at ages 27–32 via their links to negative affectivity in

Table 3. Young adult predictors of negative affectivity at ages 27–32

	Negative affectivity (ages 27–32)							
	Simple predictions				Predictions covarying concurrent depressive symptoms (27–32)			
	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2
Step I. Demographic predictors								
Gender (M = 1, F = 2)	.04 (.08)	-.08 (.06)			.04 (.04)	-.07 (.03)		
<i>Statistics for step</i>			.002	.002			.002	.002
Step II. Symptom predictors								
Negative affectivity (24–26)	.78*** (.06)	.77*** (.06)			.69*** (.05)	.69*** (.05)		
Depressive symptoms (24–26)	.11 (.07)	.09 (.06)			-.13* (.02)	-.13* (.05)		
<i>Statistics for step</i>			.734***	.736***			.734***	.736***
Step III. Concurrent depressive symptoms								
<i>Statistics for step</i>					.46*** (.04)	.44*** (.04)	.112**	.848***
Step IV. Relationship predictors								
Peer relationship quality (maternal report, 23)	-.15*** (.04)	-.15*** (.04)			-.10** (.04)	-.10** (.04)		
Close friendship quality (friend report, 24–26)	-.05 (.04)	-.05 (.04)			-.03 (.03)	-.03 (.03)		
<i>Statistics for step</i>			.034***	.762***			.012**	.860***

Note. Participant age(s) at time of assessment are in parentheses along with reporter source if other than self-report. *** $p < .001$. ** $p < .01$. * $p < .05$ + $p = .05$. (s.e.) = standard error of the estimate.

young adulthood. In addition, adolescent friendship instability was also directly predictive of negative affectivity at ages 27–32, even after accounting for young adult negative affectivity. Furthermore, maternal report of peer relationship quality at age 23 also predicted future negative affectivity at ages 27–32. Maternal report of low peer relationship quality was in turn predicted by higher levels of externalizing behavior in adolescence. As seen in Table 3 and Figure 1, young adult negative affectivity was a very strong predictor of negative affectivity into the early thirties. Although the model identified a number of adolescent-era predictors to depressive symptoms in young adulthood, depressive symptoms were not predictive of negative affectivity into the early thirties in this model.

Post-hoc analyses

Given the findings above, as well as the potential value in assessing the pure long-term predictive value of adolescent-era relationship qualities, a final set of analyses examined direct predictions from adolescent-era measures to negative affectivity into the early thirties. Results, presented in Table 4, indicate significant predictions from lack of closeness in the closest friendship and friendship instability to negative affectivity assessed as much as 19 years later. In direct predictions, the final block of relationship quality markers accounted for 12% of the variance in adult negative affectivity, over and above all other predictors. Even after accounting for concurrent depressive symptoms (right hand columns of Table 4), lack of friendship closeness in adolescence continued to add significant variance to the prediction of adult negative affectivity.

Discussion

This study found significant evidence supporting a social relationship perspective on the development of negative affectivity, assessed in terms of trait anxiety, from adolescence through the early thirties. Adolescent-era close friendships that lacked

closeness and stability were found to be predictive of higher levels of negative affectivity nearly two decades later, and this finding held even after accounting for baseline levels of anxious, depressive, and externalizing symptoms. Confidence in results was strengthened by the use of multiple reporters other than the participant to assess relationship quality at each stage of the study.

The adolescent-to-adult transition appeared as a key period in terms of the predictive value of relationship qualities. Although these correlational findings cannot establish causal relations, they are consistent with the hypothesis that an inability to develop strong and stable close friendships in adolescence influences future development in a way that creates a risk for emerging negative affectivity. This is consistent with predictions from a developmental task perspective: Failure to accomplish a developmental task may not only create concurrent distress, but also leave the individual vulnerable to future emerging difficulties (Waters & Sroufe, 1983).

Beyond adolescence, in the period from young adulthood into the early thirties, the very high stability of negative affectivity was the most striking feature observed. Even given this stability, however, maternal reports of poor peer relationship quality were nevertheless predictive of relative increases in negative affectivity across this period. Although clearly stability of negative affectivity takes precedence during this period in terms of the magnitude of the effects observed, these findings are nevertheless consistent with a continuing role of peer relationship quality in the development of negative affectivity beyond adolescence.

Given prior findings of long-term links from adolescent relationship competence to adult depressive symptoms (Allen, Costello, et al., 2022; Allen, Pettit, et al., 2022; Narr et al., 2019), this study also examined whether current findings could be simply an artifact of these links together with the overlap of depression and negative affectivity. Analyses thus examined predictions from adolescent close friendship qualities to negative affectivity in models that also covaried out concurrent (in addition to prior)

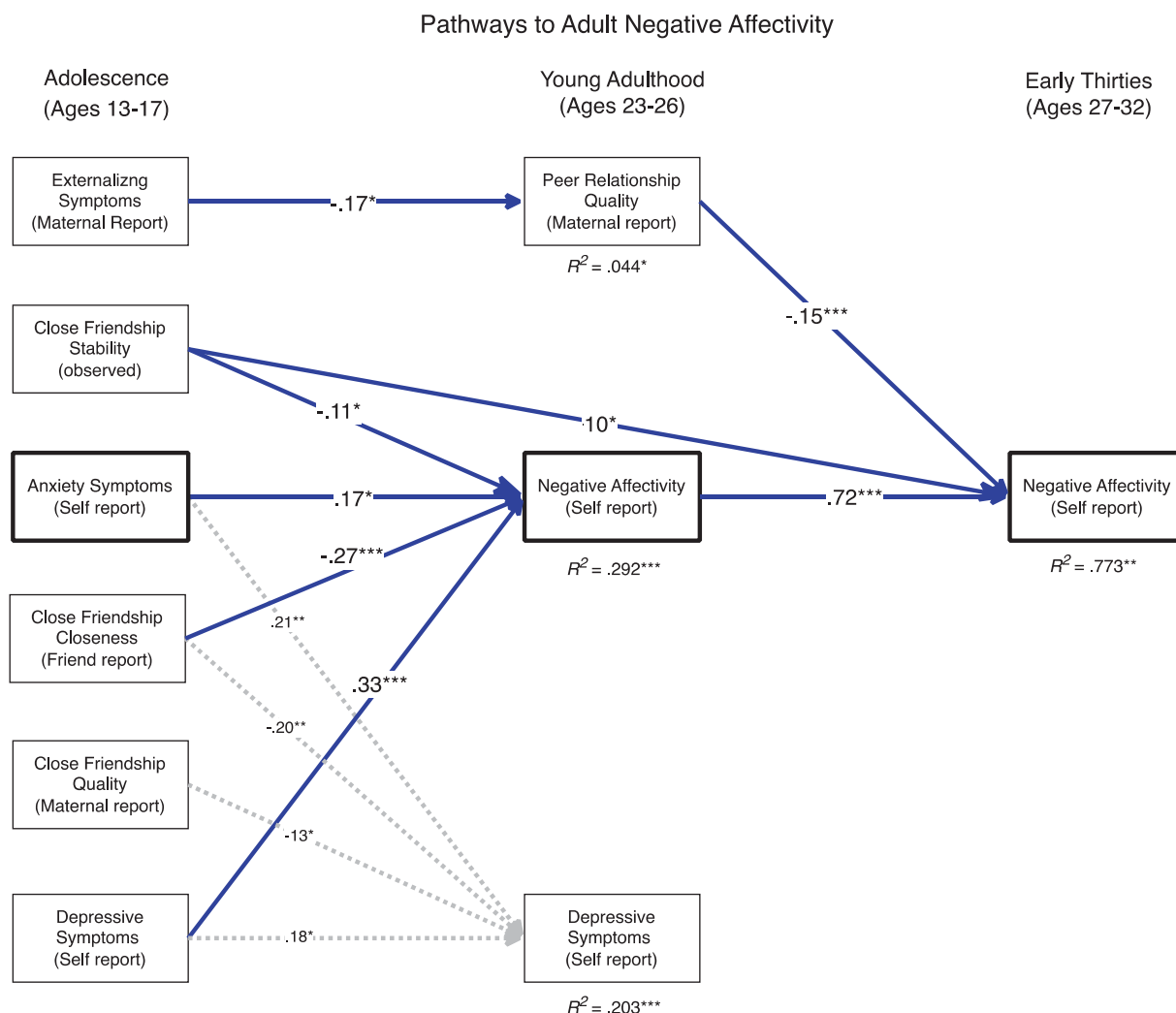


Figure 1. Pathways to adult negative affectivity. For clarity only significant pathways are depicted and correlations among constructs collected at the same era are not shown. $^{***}p < .001$. $^{**}p < .01$. $^*p < .05$.

levels of depressive symptoms. Even using this highly conservative approach, adolescent close friendship quality remained a significant long-term predictor of negative affectivity.

Negative affectivity has been viewed as capturing a combination of anxiety and depressive symptoms and several analyses suggest it is comprised primarily of a combination of a depression factor and an anxiety factor (Bieling et al., 1998; Knowles & Olatunji, 2020). Thus, one interpretation of predictions covarying concurrent depressive symptoms is that the predictors identified are capturing long-term links to anxiety in adulthood, which have only rarely been studied previously. When these findings are considered together with prior research linking adolescent relationship qualities to future depressive symptoms (Allen, Costello, et al., 2022), the combination of findings strongly suggests a broad linkage of adolescent close relationships to the future development of internalizing symptomatology.

The relationship predictions observed in this study were from highly specific aspects of close friendships in adolescence: the degree to which an adolescent's closest friendship was both close but also stable across time. The capacity for real adult-like intimacy and closeness in relationships is largely developing for the first time in adolescence, as capacities for empathy and perspective-taking

grow. Hence, the adolescent close friendship provides a key opportunity to learn to establish depth, support, and stability within close relationships (Costello, Allen, et al., 2022; Rubin et al., 2010; Stern et al., 2021). Prior research has linked friendship instability to numerous concurrent markers of adjustment difficulties, including depressive symptoms (Bowker & Weingarten, 2022). Similarly, friendship closeness has been found predictive of functioning in relationships beyond adolescence, such as adult romantic relationships, which in turn have been linked to mental health across the adult lifespan (Braithwaite & Holt-Lunstad, 2017; Oudekerk et al., 2015; Roisman et al., 2004). The current findings thus add to a growing body of evidence to suggest that early adolescent relationship qualities may form a substrate that is crucial to key aspects of adult mental health.

The present findings cannot, of course, establish causal relations in the data; however, what they can do without qualification is identify a promising avenue for risk assessment. Lack of ability to establish and maintain close friendships in adolescence was identifiable by external parties (e.g., friends and mothers) and is potentially actionable via interventions to enhance adolescent capacities for social connection, which have been shown to reduce depressive symptoms (Allen et al., 2021; Costello, Nagel,

Table 4. Direct predictions from adolescent predictors to negative affectivity at ages 27–30

	Negative affectivity (ages 27–32)							
	Simple predictions				Predictions covarying concurrent depressive symptoms (27–32)			
	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2	β_{entry} (s.e.)	β_{final} (s.e.)	ΔR^2	R^2
Step I. Demographic predictors								
Gender (M = 1, F = 2)	.07 (.08)	-.01 (.07)			.07 (.08)	-.04 (.05)		
<i>Statistics for step</i>			.002	.002			.002	.002
Step II. Symptom predictors								
Anxiety symptoms (15–17)	.14* (.08)	.13 (.08)			.14* (.08)	.03 (.05)		
Depressive symptoms (13–17)	.35*** (.08)	.34*** (.08)			.35*** (.08)	.23*** (.05)		
Externalizing symptoms (13, 16) (maternal report)	-.00 (.07)	-.03 (.07)			-.00 (.07)	.03 (.05)		
<i>Statistics for step</i>			.192***	.194***			.192***	.194***
Step III. Concurrent depressive symptoms								
<i>Statistics for step</i>					.72*** (.04)	.69*** (.04)	.462***	.656***
Step IV. Relationship predictors								
Close-friendship closeness (close-friend report; 15–17)	-.23*** (.07)	-.23*** (.07)			-.13** (.05)	-.13** (.05)		
Close-friendship competence (maternal report; 16)	-.08 (.07)	-.08 (.07)			-.06 (.05)	.06 (.05)		
Close friendship stability (observed; 16–17)	-.22** (.07)	-.22* (.07)			-.09 (.05)	-.09 (.05)		
<i>Statistics for step</i>			.119***	.313***			.026**	.682***

Note. Participant age(s) at time of assessment are in parentheses along with reporter source if other than self-report.
 *** $p < .001$. ** $p < .01$. * $p < .05$ + $p = .05$. (s.e.) = standard error of the estimate.

et al., 2022). Given that the predictions in this study were observed over and above baseline symptom levels, there is clearly potential value in attending to teens who may not be currently experiencing symptoms but who are at risk for future negative affectivity given an absence of close, stable friendships. In this way, a developmental tasks perspective can suggest a means of risk assessment that extends well beyond a focus on current symptomatic functioning.

The comprehensive model tested also yielded several secondary findings of note. Adolescent-era depressive symptoms were a particularly strong predictor of negative affectivity in young adulthood, even after accounting not only for prior anxiety and externalizing symptoms, but also for concurrent levels of depressive symptoms in young adulthood. One explanation for this heterotypic continuity is that the withdrawal that results from depressive symptoms may impair broader social development. In this way, it may create a maladaptive developmental cascade (Masten & Cicchetti, 2010) that leads to elements of negative affectivity (e.g., social anxiety), that extend beyond simple depressive symptomatology. This explanation is consistent with findings of prior studies of links between depression in adolescence and future social impairment (Allen et al., 2014; Daley & Hammen, 2002; Roisman et al., 2004; Stice et al., 2004). Conversely, externalizing behavior in adolescence, which some studies have suggested is predictive of elements of future negative affectivity, did not demonstrate any direct correlation with future negative affectivity in this study. However, it did predict maternal perceptions of more problematic peer relationships in young adulthood which in turn predicted negative affectivity, suggesting one route by which it may be indirectly linked to negative affectivity.

There were also several important limitations to note regarding the findings presented. Most importantly, as noted above, no results in this study were sufficient to establish causal relations

among constructs. It may well be, for example, that other unmeasured factors were driving both adolescent relational difficulties and future negative affectivity. Also, the specific measure of negative affectivity used in this study, trait anxiety, reflects just one way of measuring the broader construct of negative affectivity. Although it is considered a strong measure of this construct (Clark & Beck, 2011), other measures may yield different results. In addition, although we accounted for adolescent levels of anxiety, depressive, and externalizing symptoms, we did not have available in our adolescent data the exact measure of negative affectivity used later in the study. Further, aspects of our assessment of friendship quality in mid-adulthood appeared less than optimal: Maternal ratings may be based on less than full information and could well reflect more general perceptions of offspring functioning. Further, our peer rating measure was originally designed for adolescents and did not correlate well with any other measure in the study, thus calling into question its usefulness. Finally, although it is now well-established that sub-clinical levels of symptoms linked to negative affectivity are associated with quite significant levels of distress and dysfunction (Ingram & Siegle, 2002; Lewinsohn et al., 2000), further research is needed to assess the generalizability of the current findings to individuals demonstrating more severe psychological symptoms.

Given these limitations, what is nevertheless clear is that difficulties in establishing stable and high-quality close relationships in adolescence are linked to a significant long-term risk for negative affectivity. Taken together with other findings noted above regarding relationship predictors of depressive symptoms and of functioning in career and romantic domains more broadly, the current findings contribute to a growing body of evidence that the task of establishing stable, close relationships in adolescence is fundamental to mental health and functioning across the lifespan.

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