



## Changes in family cohesion and links to depression during the college transition



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### ABSTRACT

Parent relationships remain an important component in the lives of adolescents, with particular respect to their well-being. In the current study, we sought to understand how changes in family cohesion across the high school–college transition may be related to changes in depressive symptoms. Three hundred and thirty-eight college freshman completed self-report measures prior to attending college and again two months into their first semester. Although depressive symptoms significantly increased, adolescents who reported increases in family cohesion reported declines in depressive symptoms during the college transition. Furthermore, this effect was mediated by changes in self-esteem and optimism. Finally, we show unique associations for male and female adolescents, such that changes in family cohesion were only related to changes in depression for girls. Results suggest that parent relationships may buffer against increased depressive symptoms during this important transition period.

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The alteration of the social milieu during the transition period from high school to college affects the psychological adjustment of college bound students (Alfred-Liro & Sigelman, 1998; Brissette, Scheier, & Carver, 2002; Larose & Boivin, 1998; Rutter & Sroufe, 2000). The college transition occurs in tandem with substantial increases in depression which peak around age 18, rising 500% from childhood to adolescence and 400% by young adulthood (Thapar, Collishaw, Pine, & Thapar, 2012). These findings indicate this is an essential developmental period to study depressive symptoms in order to find the means to promote mental well-being at a time where rates of depression among college freshmen have reached historic heights (Eagan et al., 2014). It is possible that such a decline in psychological well-being may be due, in part, to the changing nature of adolescent–parent relationships. In the current study, we examine whether changes in the quality of parent–adolescent relationships (i.e., changes in family cohesion) are associated with adolescents' psychological adjustment during the transition to college and whether this differs for males and females.

Late adolescence and young adulthood are often perceived as stages in which individuals pursue their own interests and show little connection to their parents (Arnett, 2007). However, existing literature suggests otherwise. Adolescents value the relationship with their parents and possess a desire to maintain cohesive relationships (Fulgini, 1999; Noller & Callan, 1986). Although there is a modest decrease in family cohesion at the onset of adolescence, perhaps due to increased time spent with peers and a desire for autonomy, by the time individuals reach late adolescence, declines in family cohesion stabilize or recuperate to pre-adolescent levels (Shanahan, McHale, Crouter, & Osgood, 2007; Shearer, Crouter, & McHale, 2005).

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This trend continues through late adolescence, where family relationships remain an integral component of an individual's life and even increase in importance two years after high school (Tsai, Telzer, & Fuligni, 2013). Additionally, despite increases in conflicts during adolescence, cohesion is more salient such that adolescents and their parents may quarrel, but both still desire a healthy and nurturing relationship (Feldman & Gehring, 1988; Noller & Callan, 1986; Shearer et al., 2005).

Given the importance of parent relationships in late adolescence, it is not surprising that various aspects of adolescent–parent relationships prior to attending college contribute to later adjustment. In particular, higher levels of family cohesion just prior to the start of college serve as a buffer against increases in depressive symptomatology (Benson, McWey, & Ross, 2006; Kenny & Rice, 1995; Mattanah, Lopez, & Govern, 2011). It is important to note, however, that previous research has not focused on understanding how changes in family cohesion are associated with adjustment outcomes across the high school–college transition. Instead, pre-college levels of family cohesion are used to predict later adjustment outcomes. Since the dynamic of parent–adolescent relationships changes over time (Shanahan et al., 2007; Tsai et al., 2013) it is reasonable to infer that leaving home to attend college will elicit changes in family cohesion. In other words, family cohesion is not a static construct and is likely affected by the college transition. Thus, it is important to understand how such changes may play a role in affecting the mental health of college-bound adolescents. Given the increasing importance of the family for one's sense of identity during this developmental transition (Tsai et al., 2013), adolescents whose family cohesion declines may also experience increases in depressive symptoms.

### **The role of self-esteem and optimism**

There is evidence to suggest that the association between changes in family cohesion and depressive symptoms may be explained, in part, by changes in self-esteem and optimism. Both self-esteem and optimism are buffers against depressive symptoms, and those with low self-esteem tend to be at risk for experiencing higher levels of depressive symptomatology (Brisette et al., 2002; Dumont & Provost, 1999; Sowislo & Orth, 2013). Moreover, the impact of changes in self-esteem and optimism on mental well-being is amplified during major transitory periods (Brisette et al., 2002; Lee, Dickson, Conley, & Holmbeck, 2014). Family cohesion is also associated with self-esteem in both children (Cooper, Holman, & Braithwaite, 1983) and adolescents (Farrell & Barnes, 1993). Furthermore, family cohesion predicts changes in self-esteem during adolescence (Baldwin & Hoffmann, 2002) and the relationship between family cohesion and depressive symptoms is mediated by self-worth among young adults (Kenny & Sirin, 2006). Therefore, increases in family cohesion during the college transition may bolster self-esteem and optimism, which, in turn, may influence the mental health of adolescents during the transition to college.

### **Gender differences**

Family relationships may be especially meaningful for adolescent females. Girls are more likely to use social relationships as an avenue for self-disclosure, emotional intimacy, and support (Cyranowski, Frank, Young, & Shear, 2000; Rudolph, 2002). Higher levels of social support, particularly from parents, are a strong buffer against depressive symptoms for girls (Schraedley, Gotlib, & Hayward, 1999). For example, decreases in family cohesion during adolescence are less pronounced for girls than boys (Tsai et al., 2013), and strong family relationships during this time are associated with lower depressive symptoms, but only for girls (Telzer & Fuligni, 2013), suggesting that girls' well-being may be more dependent on the quality of their family relationships. This strong familial importance among adolescent females continues during the transition into young adulthood. For instance, throughout the transition from adolescence to young adulthood, females tend to identify more with their family and spend more time engaged in daily family leisure activities and familial communication than males (Fuligni & Masten, 2010; Tsai et al., 2013).

Taken together, the literature indicates that while parent relationships continue to be significant social bonds for adolescents and young adults, they are especially so for girls. This is due, in part, to the fact that girls rely on social relationships for greater emotional intimacy and support (Rudolph, 2002). Because girls rely on close relationships for emotional support and are more sensitive to any accompanying interpersonal stressors than boys (Rudolph, 2002), changes in family cohesion are potentially more salient for girls. Thus, adolescent females who experience declines in family cohesion during the college transition may experience greater increases in their depressive symptoms, an effect that may not occur for adolescent males.

### **Current study**

Little research has examined how family cohesion, a dynamic construct, changes during the college transition and what implications this may have for adolescents' well-being. In the current study, we investigated how changes in family cohesion during the college transition are associated with adolescents' depressive symptoms. Notably, we only measured adolescent's self-reported family cohesion. As a result, when we refer to family cohesion, we are more specifically referring to adolescent's perceptions of family cohesion. While this is an important distinction to make, previous work suggests there may be little differences between adolescent and parent perceptions of family cohesion (Feldman &

Gehring, 1988) and that adolescents' perceptions may even be more accurate than those of parents (Feldman, Wentzel, & Gehring, 1989).

We sought to examine three key research questions:

- (1) Does family cohesion change significantly across the transition from high school to college? Because recent research has indicated that family cohesion increases in late adolescence (Shearer et al., 2005; Shanahan et al., 2007; Tsai et al., 2013), we hypothesized that participants would report increases in family cohesion as they made the transition to college.
- (2) Do changes in family cohesion predict changes in depressive symptoms, and is this explained by changes in self-esteem and optimism? Because family cohesion is malleable during this developmental period (Shanahan et al., 2007; Tsai et al., 2013) and is related to the mental health of adolescents (Benson et al., 2006; Kenny & Rice, 1995), we predicted that increases in family cohesion would be a protective factor and be associated with declines in depressive symptoms. Further, we predicted that changes in self-esteem and optimism would mediate the relationship between changes in depression and family cohesion.
- (3) Is the association between changes in family cohesion and changes in depressive symptoms different for boys and girls? Given that females tend to rely more on supportive social relationships (Rudolph, 2002; Telzer & Fuligni, 2013), we hypothesized that females would show a stronger effect between changes in family cohesion and changes in depression.

## Methods

### Participants

Participants included 338 ( $M_{age} = 18.40, SD = .36$ ) first year college students at a large, public university in the Midwestern United States. Our sample is representative of the incoming class with respect to race, in-state status, and international student status. All participants were living in University housing and thus were not living with their parents. Please see Table 1 for participant demographic information. Participants provided consent in accordance with the University's Institutional Review Board.

### Procedure

Incoming freshman students were contacted by their university email with permission from the IRB prior to arriving on campus with an invitation to participate in an online questionnaire study conducted by the psychology department. An inclusion criterion for the study was living in a University residence hall. Therefore, only students living in residence halls were contacted. Students were informed that participation entailed the completion of a questionnaire prior to moving into the residence halls and the completion of a similar questionnaire two months afterwards. Interested students were able to

**Table 1**  
Sample demographics.

Variable	N (Percent of sample)
Ethnicity	
White	127 (37.6)
Black	12 (3.6)
Latino	24 (7.1)
Asian	73 (21.6)
Mixed	44 (13.0)
Other	18 (5.3)
Gender	
Male	121 (35.8)
Female	217 (64.2)
Parent's marital status	
Separated or divorced	55 (16.3)
Family composition	
Only child	49 (14.5)
1–2 Siblings	222 (65.7)
3–4 Siblings	51 (15.0)
5+ Siblings	14 (4.1)
State residency	
In-State	252 (74.6)
International status	
International students	39 (11.5)

Note. Columns that do not add to 100% indicate missing responses.

participate by following a unique survey link sent to them in the email. A similar questionnaire was sent to participants through email approximately two months after the start of the academic semester. 764 students participated at time 1 (T1) and 515 participated at time 2 (T2). A subsample of 338 participants provided data at both time points. Analyses reported in the current study include only those with data at both time points. Participants received a product voucher to a local business and were entered into a drawing to win \$100 (USD).

## Measures

### Depressive symptoms

Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Using a 4-point scale (0 = “Rarely or not at all” to 3 = “Most or all of time”), participants answered 20 questions indicating the extent to which they experienced depressive symptoms during the past week. Example items include, “I felt like I could not shake off the blues even with help from my family or friends” and “I had crying spells.” Participants’ responses were summed into a single score, ranging from 0 to 60. A higher score indicates elevated levels of depressive symptomatology ( $\alpha_1 = .89$ ,  $\alpha_2 = .91$ ). Following established cut-offs of this measure, a score greater than 16 indicates moderate levels of depression, and score greater than 27 indicates high levels of depression (Radloff, 1977; Zich, Attkisson, & Greenfield, 1990).

### Family cohesion

Family cohesion was measured using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). Participants used a 5-point scale (1 = “Almost never or never” to 5 = “Almost always or always”) to answer 20 questions related to the quality of the relationship with their parents. Participants answered 10 questions about mutual trust between adolescents and their parents (e.g., “My parents respect my feelings”) and 10 questions about the quality of communication between adolescents and their parents (e.g., “I tell my parents about my problems and troubles”). Participants’ responses were averaged into a single mean score ( $\alpha_1 = .95$ ,  $\alpha_2 = .95$ ).

### Self-esteem

Self-esteem was assessed using the Rosenberg Self Esteem Inventory (Rosenberg, 1965). Participants used a 4-point scale (1 = “strongly disagree” to 4 = “strongly agree”) to indicate the extent to which they agreed with 10 questions that measured both positive and negative attitudes about themselves. Negative items were reverse scored so that a higher score reflected higher self-esteem. Example items include “on the whole, I am satisfied with myself” and “all in all, I am inclined to feel like a failure.” ( $\alpha_1 = .90$ ,  $\alpha_2 = .92$ ).

### Optimism

Levels of optimism were assessed using the Life Orientation Test Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The test is a unidimensional measure of generalized optimism versus generalized pessimism. Participants were instructed to rate the extent to which they agreed or disagreed with 6 items along a 5-point scale (1 = “I disagree a lot” to 5 = “I agree a lot”). Example items include “in uncertain times, I usually expect the best” and “overall, I expect more good things to happen to me than bad.” ( $\alpha_1 = .81$ ,  $\alpha_2 = .86$ ). Higher scores represent greater optimism, whereas low scores represent pessimism.

## Results

### Analysis plan

In order to examine how changes in family relationships covary with changes in depressive symptoms, we computed change scores for all variables of interest (i.e., T1 scores were subtracted from the T2 scores). Higher scores therefore reflect increases and negative scores reflect decreases. To address our first key research question, we conducted paired-samples t-tests for all variables of interest to test for significant change over time. To address our second key research question testing whether changes in family cohesion are associated with changes in depressive, we conducted a regression analysis with changes in family cohesion predicting changes in depressive symptoms. We ran mediation analyses using the methods specified by Preacher and Hayes (2008), and tested whether self-esteem and optimism mediate the association between changes in family cohesion and changes in depression. Finally, to address our third key question to test for gender differences, we conducted standard moderation analyses in which we examined whether the association between changes in family cohesion and changes in depressive symptoms differed for males and females.

We included the following covariates in all regression models: SES (which reflects the mean of mother and father’s highest level of education), in-state status (coded as in-state = 0, out of state = 1), international status (coded as domestic student = 0, international student = 1), gender (coded as male = 0, female = 1), and ethnicity (coded as white = 0, non-white = 1). These covariates were included in our analyses because each may have significant effects on both depressive symptoms and family cohesion, and we wanted to ensure that our findings were not being driven by these confounds. Notably, the results are nearly identical without these covariates, but to be as conservative as possible, we include them in all regression models.

## Attrition

Participants who participated at both time points did not differ significantly from those who only participated at T1 in terms of depressive symptoms, family cohesion, and optimism. Participants who participated in T1 only ( $M = 3.10$ ,  $SD = .53$ ) reported significantly higher levels of self-esteem than did those who participated in both time points ( $M = 2.99$ ,  $SD = .56$ ),  $t(762) = 2.32$ ,  $p = .02$ .

## Descriptives

### Depressive symptoms

As shown in Table 2, depressive symptoms significantly increased from Time 1 to Time 2 ( $t(324) = 5.33$ ,  $p < .001$ ). Note that values for both males and females exceed 16, the clinical cut-off for moderate depression. In our sample, 44.4% of students scored above 16, with 17.2% scoring above 27. Depressive symptoms at T1 and T2 were highly correlated ( $r = .59$ ,  $p < .001$ ). Males and females did not significantly differ in depressive symptoms at T1 ( $t(323) = .08$ , ns) or T2 ( $t(336) = -1.08$ , ns) nor did they significantly differ in their change in depressive symptoms ( $t(323) = -1.30$ , ns).

### Family cohesion

Family cohesion increased significantly between T1 and T2 ( $t(337) = 5.71$ ,  $p < .001$ ; Table 2). Family cohesion at T1 and T2 were highly correlated ( $r = .77$ ,  $p < .001$ ). Males and females did not differ significantly in their levels of family cohesion at Time 1 ( $t(337) = -.76$ , ns) or Time 2 ( $t(337) = -.72$ , ns) nor did they differ significantly in the change of family cohesion ( $t(337) = .03$ , ns).

### Bivariate correlations

Bivariate correlations between all variables are listed in Table 3. Participants who reported higher levels of family cohesion reported lower levels of depressive symptoms at both Time 1 and Time 2. Changes in family cohesion were inversely associated with changes in depressive symptoms, i.e., increases in family cohesion are associated with decreases in depressive

**Table 2**  
Mean and standard deviation scores for study variables.

Variable	Overall	Male	Female
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )
1. Depressive symptoms time 1	14.41 (8.33)	14.45 (8.31)	14.38 (8.37)
2. Depressive symptoms time 2	16.94 (10.21)	16.26 (9.45)	17.52 (10.69)
3. Δ Depressive symptoms	2.53 (8.58)	1.69 (8.43)	2.99 (8.64)
4. Family cohesion time 1	3.47 (.75)	3.43 (.69)	3.49 (.78)
5. Family cohesion time 2	3.64 (.78)	3.59 (.73)	3.66 (.81)
6. Δ Family cohesion	.17 (.52)	.16 (.56)	.16 (.49)
7. Self-esteem time 1	2.99 (.58)	3.09 (.57)	2.93 (.57)
8. Self-Esteem Time 2	2.91 (.63)	3.00 (.58)	2.86 (.65)
9. Δ Self-esteem values	-.07 (.44)	-.09 (.41)	-.07 (.45)
10. Optimism time 1	3.42 (.86)	3.56 (.83)	3.34 (.87)
11. Optimism time 2	3.34 (.90)	3.39 (.90)	3.31 (.90)
12. Δ Optimism values	-.08 (.64)	-.17 (.56)	-.03 (.69)

Note. Δ = Change in variable.

**Table 3**  
Bivariate correlations of all study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Depressive symptoms time 1	1											
2. Depressive symptoms time 2	.59***	1										
3. Δ Depressive symptoms	-.27***	.62***	1									
4. Family cohesion values time 1	-.32***	-.29***	-.04	1								
5. Family cohesion values time 2	-.31***	-.36***	-.14**	.77***	1							
6. Δ Family cohesion values	-.01	-.12*	-.16**	-.29***	.39***	1						
7. Self-esteem values time 1	-.57***	-.50***	-.02	.39***	.39***	.02	1					
8. Self-esteem values time 2	-.53***	-.70***	-.32***	.29***	.40***	.18**	.74***	1				
9. Δ Self-esteem values	.01	-.35***	-.43***	-.08	.08	.25***	-.26***	.46***	1			
10. Optimism values time 1	-.47***	-.36***	.03	.36***	.34***	.00	.69***	.55***	-.15**	1		
11. Optimism values time 2	-.47***	-.54***	-.17**	.30***	.38***	.12*	.66***	.69***	.12**	.73***	1	
12. Δ Optimism values	-.03	-.26***	-.27***	-.06	.07	.19**	.00	.24***	.37***	-.31***	.42***	1

Note. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ . Δ = Change in variable.

**Table 4**  
Mediation of changes in family cohesion and changes in depression by changes in self-esteem and optimism.

	Model 1		Model 2	
	B (SE)	$\beta$	B (SE)	$\beta$
$\Delta$ Family cohesion	−2.80 (1.01)	−.17**	−.61 (.96)	−.04
Gender	.57 (1.10)	.03	1.46 (1.01)	.08
SES	−.38 (.27)	−.09	−.36 (.25)	−.09
State residency	−1.98 (1.47)	−.10	−.06 (1.35)	.00
International student	−.24 (1.94)	−.01	.04 (1.76)	.00
Ethnicity	.25 (1.12)	.02	.20 (1.02)	.01
$\Delta$ Self-esteem	—	—	−7.45 (1.20)	−.38***
$\Delta$ Optimism	—	—	−1.70 (.81)	−.13*

Note. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ . SES = Socioeconomic status.  $\Delta$  = Change in variable.

symptoms. Both optimism and self-esteem were inversely correlated with depressive symptoms at both time points. Changes in self-esteem and optimism were also found to be inversely associated with changes in depression. Changes in family cohesion, self-esteem and optimism were not associated with Time 1 depressive symptoms. Participants who reported higher changes in family cohesion also reported higher changes in self-esteem and optimism. Family cohesion was associated with both self-esteem and optimism at both time points.

#### *Association between changes in family cohesion and changes in depressive symptoms*

To examine whether changes in family cohesion were associated with changes in depressive symptoms, we conducted a linear regression analysis. Changes in family cohesion were entered to predict changes in depressive symptoms along with all control variables. Results indicate that increases in family cohesion were associated with decreases in depressive symptoms during the transition period from high school to college ( $B = -2.80$ ,  $SE = 1.01$ ,  $\beta = -.17$ ,  $p < .01$ ; Table 4, Model 1).

#### *Changes in self-esteem and optimism as mediators of changes in family cohesion and depressive symptoms*

Mediation analyses were conducted in order to examine whether changes in self-esteem and changes in optimism accounted for the relationship between changes in both family cohesion and depressive symptoms. First we tested whether changes in family cohesion were related to changes in optimism and changes in self-esteem. Changes in family cohesion were significantly associated with both changes in optimism ( $B = .23$ ,  $SE = .07$ ,  $\beta = .19$ ,  $p < .01$ ) and changes in self-esteem ( $B = .24$ ,  $SE = .05$ ,  $\beta = .29$ ,  $p < .001$ ). Next, we conducted regression analyses using the same model described above (i.e., changes in family cohesion predicting changes in depressive symptoms), this time with the inclusion of changes in self-esteem and changes in optimism. As shown in Table 4, Model 2, the association between changes in family cohesion and changes in depressive symptoms was reduced when self-esteem and optimism were entered into the model. Using the methods specified by Preacher and Hayes (2008), we used bootstrapping with 10,000 samples and a bias-corrected confidence interval (CI) was created for the indirect effect. The indirect effect of changes in family cohesion on changes in depressive symptoms via changes in both self-esteem and optimism was significant (Total:  $B = -2.19$ ,  $SE = .54$ ; Self-Esteem:  $B = -1.82$ ,  $SE = .46$ ; Optimism:  $B = -.34$ ,  $SE = .23$ ) and accounts for 78.21% of the variance in the original effect of changes in family cohesion predicting changes in depressive symptoms. The confidence intervals do not include zero, consistent with statistically significant mediation (CI self-esteem:  $[-2.86, -1.04]$ ; CI optimism:  $[-1.00, -.04]$ ). In addition, we conducted a moderated mediation analysis in order to determine whether our mediation results differed between females and males. The results of the analysis were not significant, suggesting that the indirect effect of changes in family cohesion on changes in depression through self-esteem and optimism is similar for both genders.

#### *Moderation of changes in family cohesion and depressive symptoms by gender*

To examine whether the association between changes in both family cohesion and depression differed for males and females, we conducted moderation analyses. Given that family cohesion is a continuous variable, we computed an interaction term by centering changes in family cohesion and multiplying it by gender (dummy coded male = 0, female = 1). The interaction term was then entered into multiple regression analyses along with the centered changes in family cohesion score, gender, and the controls from the initial regression model to predict changes in depressive symptoms. Results indicate that the interaction term is significant ( $B = -2.07$ ,  $SE = 1.03$ ,  $\beta = -.18$ ,  $p < .05$ ). To explore this interaction, we ran separate regression analyses for males and females. Whereas changes in family cohesion were associated with changes in depressive symptoms for females ( $B = -4.53$ ,  $SE = 1.29$ ,  $\beta = -.25$ ,  $p < .01$ ), changes in family cohesion were not associated with depressive symptoms for males ( $B = -.12$ ,  $SE = 1.54$ ,  $\beta = -.01$ , ns; Fig. 1).

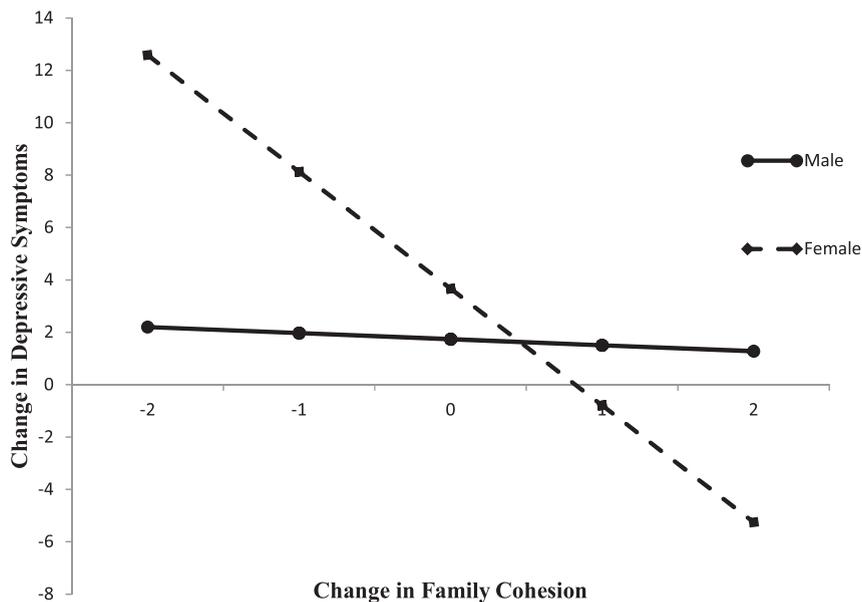


Fig. 1. Changes in family cohesion are associated with changes in depression across the college transition for girls but not boys.

## Discussion

The college transition is a time during which adolescents are vulnerable to depression. In our sample, mean levels of self-reported depression rose to exceed clinical levels just two months following the college transition. Identifying protective factors against this rise should be seen as a significant public health concern. In the current study we found evidence suggesting that changes in family cohesion may serve as a buffer against increases in depression. Family relationships are important within the socioemotional landscape of adolescents. While prior research has treated family cohesion as a static construct, we provide novel evidence that changes in family cohesion are associated with changes in depressive symptoms during the college transition, particularly for females. These findings highlight the continued importance of family relationships throughout adolescence and into young adulthood, and may help elucidate the mechanism by which family cohesion affects adolescent mental health.

### *Changes in family cohesion and depressive symptoms*

Our first analyses examined whether family relationships change during the college transition. We found that family cohesion increased during this important developmental transition. Moreover, family cohesion increased similarly for males and females suggesting that parent–adolescent relationships are meaningful to both boys and girls during this transition. This increase in positive family relationships may be because as adolescents grow into adults, they better identify with their parents and thus identify more with their role within the family (Tsai et al., 2013). Moreover, the bulk of adolescent–parent conflicts during the high school years seem to be caused by discrepant views of what constitutes age-appropriate increases in autonomy (Steinberg & Morris, 2001). It could be that these types of arguments are no longer relevant as adolescents transition to college and parent relationships improve as a result.

It is unclear whether increases in family cohesion are explained by frequency of familial contact (e.g., adolescents telephone their parents a few occasions during the week), by increased quality of communication (e.g., adolescents feel interactions with their parents are more meaningful), or a combination of both (Fulgini & Masten, 2010). If it is the former, it could be that regular contact with parents maintains a sense of normalcy and stability during the transitory period which benefits adolescents. If the latter is true, it is possible that adolescents are using their parents as a means of emotional support to cope with adult-like problems that have potentially not been encountered hitherto. These suggestions are useful in the context of measuring adolescent's perceptions of family cohesion without other objective measures or parents' perceptions. It could be that actual cohesion has not changed substantially, yet adolescents still perceive that it has. Given that adolescents' perceptions of their family relationship quality often predict well-being above more objective measures or parents' perceptions (Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003; Vandeleur, Jeanpretre, Perrez, & Schoebi, 2009), it may be appropriate to consider factors that are not necessarily involved in improving the objective quality of adolescent–parent relationships, but instead focus on boosting adolescents' perceptions of family cohesion. This line of reasoning would suggest that explanations such as better identification with parents due to their own maturation

are perhaps more likely to explain our observed increases in family cohesion than factors such as quality of interactions or frequency of conflict.

Although family cohesion showed improvements, we also observed increases in depressive symptoms during the college transition, a finding consistent with prior work (Alfred-Liro & Sigelman, 1998; Brissette et al., 2002). Further, the mean scores following the college transition for both males and females were above clinical cut-off levels for moderate depression with 47.9% of participants scoring above the cutoff for moderate depression. We did not find gender differences in this effect, such that males and females showed similar increases in depressive symptoms. While rates of depression are disproportionately higher for girls in early and mid-adolescence, gender differences appear to be ameliorated between the ages of 14–18 (Rudolph, Troop-Gordon, Lambert, & Natsuaki, 2014).

There are a panoply of factors that have been found to influence the psychological adjustment of adolescents during the college transition, ranging from self-esteem to cognitive vulnerability, to shyness and sociability (Haefel & Hames, 2014; Lee et al., 2014; Mounts, Valentiner, Anderson, & Boswell, 2006). Available literature has demonstrated that there is no singular, uniform cause that prompts the increases in depression across the college transition. Rather, it appears that a myriad of diatheses leave adolescents with a reduced ability to handle the numerous stressors that accompany the move to university, such as establishing new peer relationships and heightened academic and intellectual demands (Haefel & Hames, 2014; Lee et al., 2014; Mattanah et al., 2011).

It is important to note, however, that this transition is not necessarily an inherently tumultuous one. For those who report increased levels of depression, social anxiety, and loneliness when first arriving at college, there are also many who report better adjustment (Dyson & Renk, 2006; Gladstone & Koenig, 1994). The broader focus when contemplating this problem needs to be directed towards a view which accepts that vulnerabilities to maladjustment exist and that there are factors that can amend and buffer these vulnerabilities. Indeed, the quality of parent–adolescent relationships appears to be one such factor.

Despite normative increases in depressive symptoms during the college transition, those who reported increased family cohesion showed longitudinal decreases in depressive symptoms. This finding contributes to the growing literature that supports the belief that parents remain significant in the lives of their offspring beyond childhood, especially as a means of emotional support during a major transitory period (Fulgini & Masten, 2010; Telzer & Fulgini, 2013; Tsai et al., 2013). While there are some who do indeed experience ‘storm and stress’ with regards to parent relationships during the teenage years (Buchanan & Hughes, 2009; Fulgini, 1999), our findings not only illustrate that these relationships are actually improving during the college transition, but that such improvements may potentially confer benefits to the mental health of youth. These findings can potentially be incorporated by universities in a variety of programs to better ensure the mental health of their first-semester freshman.

### *The role self-esteem and optimism*

Self-esteem and optimism mediated the relationship between changes in family cohesion and changes in depressive symptoms. Specifically, increases in family cohesion were associated with increases in self-esteem and optimism, which in turn were associated with declines in depressive symptoms. Our findings are consistent with prior work demonstrating that family cohesion can bolster self-esteem (Baldwin & Hoffmann, 2002). Perhaps feelings of warmth and value from family members instill a greater sense of worth and self-efficacy. Moreover, family cohesion appears to boost optimism. Since optimism is conceptualized as the attitudes attributed to the favorability of future outcomes (see Carver, Scheier, & Segerstrom, 2010), it is interesting to understand how increases in family cohesion may affect the cognitive approach one takes to reasoning whether or not future events unfold favorably or unfavorably. Prior work has demonstrated that very high self-esteem has the potential to bestow an individual with a self-perceived aura of invincibility, thus spawning the belief that very little events could go against their self-interests (Bosson, Brown, Zeigler-Hill, & Swann, 2003). This suggests that self-esteem and optimism are mediators ‘in tandem.’ For instance, perhaps increases in family cohesion boost self-esteem, which also triggers an increase in optimism. Consequently, both self-esteem and optimism buffer against depressive symptoms, although increases in optimism may not have occurred without the initial elevation of self-esteem. An alternative explanation is centered around the finding that optimism is associated with increases in social support (Brissette et al., 2002). Given that the quality of existing social relationships influences the quality of future social relationships (Connolly, Furman, & Konarski, 2000), it is possible that increases in family cohesion can go on to affect the quality of newly formed social bonds at college. Subsequently, peer relationships that are more emotionally intimate bolster social support, a factor shown to be associated with lower levels of depression (Symister & Friend, 2003). More work is needed to pinpoint precisely how changes in self-esteem and optimism are affected by parent–adolescent relationship dynamics.

While our findings suggest a potential mediational pathway, we acknowledge that mediation analyses are most suitably conducted involving three time points in order to assess the temporal relationship between the variables. Our results do not allow us to infer how and whether self-esteem and optimism are implicated in any sort of potential causality in the overall framework of the associations investigated in the present study. Accordingly, future work investigating such variables should utilize at least three time points to better test the mediating pathways. We hope that the current study stimulates future research efforts aimed at investigating the roles that self-esteem and optimism play in the relationship between close social bonds and mental health.

### *Gender, family cohesion, and depression*

We found that gender moderated the relationship between family cohesion and depressive symptoms. Specifically, changes in family cohesion seem to act as a buffer against depressive symptoms only for girls. Our findings are consistent with prior research showing that social support, particularly stemming from parents, can reduce gender effects associated with internalizing symptoms (Schraedley et al., 1999; Symister & Friend, 2003; Telzer & Fuligni, 2013). Our finding adds to the growing body of literature which suggests that social relationships are particularly important to the mental health of adolescent females. Of particular importance is that both male and female adolescents reported nearly identical increases in family cohesion, yet it was only for girls that such changes were protective and served as a buffer against increases in depressive symptoms. This suggests that changes in family cohesion are more salient for girls compared to boys, likely due to their greater interpersonal sensitivity (Rudolph, 2002). This could be further explained by the possibility that adolescent–parent interactions are qualitatively different between boys and girls in a manner that lends more emotional support to girls. While males and females may report similar changes in their relationship quality, there may actually be qualitative aspects of their relationships that may differ. Perhaps girls contact their parents more frequently or engage in higher levels of disclosure in an effort to seek nurturance. If so, this could mean that increases for girls are marked by qualities that confer emotional support and resilience. While these increases do not appear to benefit males with respect to internalizing symptoms, it is possible that increases in family cohesion could influence other constructs, such as rates of externalizing behaviors.

### *Limitations and future directions*

While our study used longitudinal methods, we are uncertain if changes in cohesion may directly cause changes in depressive symptoms since each measurement was taken at the same time. Accordingly, we draw our conclusions conservatively and intend for these results to provide guidance for future work. While we suggest that family cohesion may buffer against increases in depressive symptoms, the opposite could also be the case, with increases in depression eroding family relationships. Additionally, the relationship between family cohesion and depression could be more complex in that changes in family cohesion and depression interact together in an iterative fashion such that change in one variable provokes change in the other, which prompts a further change in the initial variable. Thus, while we cannot infer causality, our findings are useful for understanding how adolescents' perceptions of the quality of their family relationships change across the transition to college.

Additionally, we would like to note that utilizing only two longitudinal measurements and calculating difference scores between the two time points is not necessarily the most effective way of measuring change over time. For example, measuring at least three time points is more ideal for examining longitudinal trajectories so that one can run sophisticated multilevel analyses that model change over time. However, several previous studies that have utilized other methods of measuring longitudinal change with multiple time points have found similar effects with respect to the trajectories of depression and family cohesion during this period of development (Brisette et al., 2002; Lee et al., 2014; Shearer et al., 2005; Shanahan et al., 2007; Tsai et al., 2013). Given the consistency with previous work, our findings are relatively reflective of developmental changes occurring during this time. Nonetheless, future studies should utilize multiple data points to more closely unpack the causal direction of the effects.

Finally, our findings may not be limited to parent relationships, and may apply to other close social relationships. Thus, future studies should examine how peer relationships change during this developmental period. Moreover, it is unknown whether the findings in the current study are specific to life transitions and whether our findings would generalize to youth who do not attend college but still move away from home during this time in development or experience some sort of comparable life transition that does not involve attending university. While our findings indicate the important changes that occur in terms of family relationships and depression, it is possible these effects are transitory and that depression and family relationship quality will return to similar levels as prior to the college transition. Future work should sample students at various points in their college career (e.g., second semester freshman, seniors, etc.) in order to better understand the extended temporal properties of the effects studied here.

### **Conclusion**

In summary, our results highlight the importance that parents play in the lives of their adolescent offspring. Increases in adolescents' perceptions of family cohesion are associated with decreases in depressive symptoms across the college transition, which is explained, in part, by changes in optimism and self-esteem. These findings reinforce the growing notion that parent relationships remain important through and beyond adolescence. Thus, bolstering improvements in perceived relationship quality with their parents may significantly improve the well-being of students as they make the transition to college, a time that may be marred by upheaval in several life domains. Positive family relationships may therefore offer a means of buffering against any ill-effects of the college transition.

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## References

- Alfred-Liro, C., & Sigelman, C. K. (1998). Sex differences in self-concept and symptoms of depression during the transition to college. *Journal of Youth and Adolescence*, 27(2), 219–244. <http://dx.doi.org/10.1023/A:1021667813858>.
- Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence*, 16(5), 427–454. <http://dx.doi.org/10.1007/BF02202939>.
- Arnett, J. J. (2007). Suffering, selfish, slackers? Myths and reality about emerging adults. *Journal of Youth and Adolescence*, 36(1), 23–29. <http://dx.doi.org/10.1007/s10964-006-9157-z>.
- Baldwin, S. A., & Hoffmann, J. P. (2002). The dynamics of self-esteem: a growth-curve analysis. *Journal of Youth and Adolescence*, 31(2), 101–113. <http://dx.doi.org/10.1023/A:1014065825598>.
- Benson, M. J., McWey, L. M., & Ross, J. J. (2006). Parental attachment and peer relations in adolescence: a meta-analysis. *Research in Human Development*, 3(1), 33–43. [http://dx.doi.org/10.1207/s15427617rhd0301\\_4](http://dx.doi.org/10.1207/s15427617rhd0301_4).
- Bosson, J. K., Brown, R. P., Zeigler-Hill, V., & Swann, W. B. (2003). Self-enhancement tendencies among people with high explicit self-esteem: the moderating role of implicit self-esteem. *Self and Identity*, 2(3), 169–187. <http://dx.doi.org/10.1080/15298860309029>.
- Brisette, I., Scheier, M. F., & Carver, C. S. (2002). The role of optimism in social network development, coping, and psychological adjustment during a life transition. *Journal of Personality and Social Psychology*, 82(1), 102. <http://dx.doi.org/10.1037/0022-3514.82.1.102>.
- Buchanan, C. M., & Hughes, J. L. (2009). Construction of social reality during early adolescence: can expecting storm and stress increase real or perceived storm and stress? *Journal of Research on Adolescence*, 19(2), 261–285. <http://dx.doi.org/10.1111/j.1532.00596.x.7795.2009>.
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30, 879–889. <http://dx.doi.org/10.1016/j.cpr.2010.01.006>.
- Connolly, J., Furman, W., & Konarski, R. (2000). The role of peers in the emergence of heterosexual romantic relationships in adolescence. *Child Development*, 71(5), 1395–1408. <http://dx.doi.org/10.1111/1467-8624.00235>.
- Cooper, J. E., Holman, J., & Braithwaite, V. A. (1983). Self-esteem and family cohesion: the child's perspective and adjustment. *Journal of Marriage and the Family*, 153–159.
- Cyranowski, J. M., Frank, E., Young, E., & Shear, M. K. (2000). Adolescent onset of the gender difference in lifetime rates of major depression: a theoretical model. *Archives of General Psychiatry*, 57(1), 21–27. <http://dx.doi.org/10.1001/archpsyc.57.1.21>.
- Dumont, M., & Provost, M. A. (1999). Resilience in adolescents: protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of Youth and Adolescence*, 28(3), 343–363. <http://dx.doi.org/10.1023/A:1021637011732>.
- Dyson, R., & Renk, K. (2006). Freshmen adaptation to university life: depressive symptoms, stress, and coping. *Journal of Clinical Psychology*, 62(10), 1231–1244. <http://dx.doi.org/10.1002/jclp.20295>.
- Eagan, K., Stölzenberg, E., Ramirez, J. J., Aragon, M. C., Suchard, M., & Hurtado, S. (2014). *The American freshman: National fall 2014*. Los Angeles: Higher Education Research Institute, UCLA.
- Farrell, M. P., & Barnes, G. M. (1993). Family systems and social support: a test of the effects of cohesion and adaptability on the functioning of parents and adolescents. *Journal of Marriage and the Family*, 119–132.
- Feldman, S. S., & Gehring, T. M. (1988). Changing perceptions of family cohesion and power across adolescence. *Child Development*, 1034–1045. <http://dx.doi.org/10.2307/1130269>.
- Feldman, S. S., Wentzel, K. R., & Gehring, T. M. (1989). A comparison of the views of mothers, fathers, and pre-adolescents about family cohesion and power. *Journal of Family Psychology*, 3(1), 39. <http://dx.doi.org/10.1037/h0080523>.
- Fuligni, A. J. (1999). Authority, autonomy, and parent–adolescent conflict and cohesion: a study of adolescents from Mexican, Chinese, Filipino, and European backgrounds. *Developmental Psychology*, 34(4), 782. <http://dx.doi.org/10.1037/0012-1649.34.4.782>.
- Fuligni, A. J., & Masten, C. L. (2010). Daily family interactions among young adults in the United States from Latin American, Filipino, East Asian, and European backgrounds. *International Journal of Behavioral Development*. <http://dx.doi.org/10.1177/0165025409360303>.
- Gladstone, T. R., & Koenig, L. J. (1994). Sex differences in depression across the high school to college transition. *Journal of Youth and Adolescence*, 23(6), 643–669. <http://dx.doi.org/10.1007/BF01537634>.
- Haefliger, G. J., & Hames, J. L. (2014). Cognitive vulnerability to depression can be contagious. *Clinical Psychological Science*, 2(1), 75–85. <http://dx.doi.org/10.1177/2167702613485075>.
- Kenny, M. E., & Rice, K. G. (1995). Attachment to parents and adjustment in late adolescent college students: Current status, applications, and future considerations. *The Counseling Psychologist*, 23(3), 433–456. <http://dx.doi.org/10.1177/0011000095233003>.
- Kenny, M. E., & Sirin, S. R. (2006). Parental attachment, self-worth, and depressive symptoms among emerging adults. *Journal of Counseling & Development*, 84(1), 61–71. <http://dx.doi.org/10.1002/j.1556-6678.2006.tb00380.x>.
- Larose, S., & Boivin, M. (1998). Attachment to parents, social support expectations, and socioemotional adjustment during the high school–college transition. *Journal of Research on Adolescence*, 8(1), 1–27. [http://dx.doi.org/10.1207/s15327795jra0801\\_1](http://dx.doi.org/10.1207/s15327795jra0801_1).
- Lee, C., Dickson, D. A., Conley, C. S., & Holmbeck, G. N. (2014). A closer look at self-esteem, perceived social support, and coping strategy: a prospective study of depressive symptomatology across the transition to college. *Journal of Social and Clinical Psychology*, 33(6), 560–585. <http://dx.doi.org/10.1521/jscp.2014.33.6.560>.
- Mattanah, J. F., Lopez, F. G., & Govern, J. M. (2011). The contributions of parental attachment bonds to college student development and adjustment: a meta-analytic review. *Journal of Counseling Psychology*, 58(4), 565. <http://dx.doi.org/10.1037/a0024635>.
- Mounts, N. S., Valentiner, D. P., Anderson, K. L., & Boswell, M. K. (2006). Shyness, sociability, and parental support for the college transition: relation to adolescents' adjustment. *Journal of Youth and Adolescence*, 35(1), 68–77. <http://dx.doi.org/10.1007/s10964-0059002-9>.
- Noller, P., & Callan, V. J. (1986). Adolescent and parent perceptions of family cohesion and adaptability. *Journal of Adolescence*, 9(1), 97–106. [http://dx.doi.org/10.1016/S0140-1971\(86\)80030-6](http://dx.doi.org/10.1016/S0140-1971(86)80030-6).
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. <http://dx.doi.org/10.3758/BRM.40.3.879>.
- Radloff, L. S. (1977). The CES-D scale: a self-report depression scale for research in the general public. *Applied Psychology Measurement*, 1, 385–401. <http://dx.doi.org/10.1177/014662167700100306>.
- Reinherz, H. Z., Paradis, A. D., Giaconia, R. M., Stashwick, C. K., & Fitzmaurice, G. (2003). Childhood and adolescent predictors of major depression in the transition to adulthood. *American Journal of Psychiatry*, 160(12), 2141–2147. <http://dx.doi.org/10.1176/appi.ajp.160.12.2141>.
- Rosenberg, M. (1965). *Society and the adolescent self-image* (p. 326). Princeton, NJ: Princeton University Press.
- Rudolph, K. D. (2002). Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health*, 30(4), 3–13. [http://dx.doi.org/10.1016/S1054139X\(01\)00383-4](http://dx.doi.org/10.1016/S1054139X(01)00383-4).
- Rudolph, K. D., Troop-Gordon, W., Lambert, S. F., & Natsuaki, M. N. (2014). Long-term consequences of pubertal timing for youth depression: identifying personal and contextual pathways of risk. *Development and Psychopathology*, 26, 1423–1444. <http://dx.doi.org/10.1017/S0954579414001126>.

- Rutter, M., & Sroufe, L. (2000). Developmental psychopathology: concepts and challenges. *Development and Psychopathology*, 12(03), 265–296. <http://dx.doi.org/10.1017/S0954579400003023>.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a re-evaluation of the life orientation test. *Journal of Personality and Social Psychology*, 67, 1063–1078. <http://dx.doi.org/10.1037/0022-3514.67.6.1063>.
- Schraedley, P. K., Gotlib, I. H., & Hayward, C. (1999). Gender differences in correlates of depressive symptoms in adolescents. *Journal of Adolescent Health*, 25(2), 98–108. [http://dx.doi.org/10.1016/S1054-139X\(99\)00038-5](http://dx.doi.org/10.1016/S1054-139X(99)00038-5).
- Shanahan, L., McHale, S. M., Crouter, A. C., & Osgood, D. W. (2007). Warmth with mothers and fathers from middle childhood to late adolescence: within- and between-families comparisons. *Developmental Psychology*, 43(3), 551. <http://dx.doi.org/10.1037/0012-1649.43.3.551>.
- Shearer, C. L., Crouter, A. C., & McHale, S. M. (2005). Parents' perceptions of changes in mother-child and father-child relationships during adolescence. *Journal of Adolescent Research*, 20(6), 662–684. <http://dx.doi.org/10.1177/0743558405275086>.
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 139(1), 213. <http://dx.doi.org/10.1037/a0028931>.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Journal of Cognitive Education and Psychology*, 2(1), 55–87. <http://dx.doi.org/10.1891/194589501787383444>.
- Symister, P., & Friend, R. (2003). The influence of social support and problematic support on optimism and depression in chronic illness: a prospective study evaluating self-esteem as a mediator. *Health Psychology*, 22(2), 123. <http://dx.doi.org/10.1037/0278-6133.22.2.123>.
- Telzer, E. H., & Fuligni, A. J. (2013). Positive daily family interactions eliminate gender differences in internalizing symptoms during adolescence. *Journal of Youth and Adolescence*, 42(10), 1498–1511. <http://dx.doi.org/10.1007/s10964-013-9964-y>.
- Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet*, 379(9820), 1056–1067. [http://dx.doi.org/10.1016/S0140-6736\(11\)60871-4](http://dx.doi.org/10.1016/S0140-6736(11)60871-4).
- Tsai, K. M., Telzer, E. H., & Fuligni, A. J. (2013). Continuity and discontinuity in perceptions of family relationships from adolescence to young adulthood. *Child Development*, 84(2), 471–484. <http://dx.doi.org/10.1111/j.1467-8624.2012.01858.x>.
- Vandeleur, C. L., Jeanpretre, N., Perrez, M., & Schoebi, D. (2009). Cohesion, satisfaction with family bonds, and emotional well-being in families with adolescents. *Journal of Marriage and Family*, 71(5), 1205–1219. <http://dx.doi.org/10.1111/j.1741-3737.2009.00664.x>.
- Zich, J. M., Attkisson, C. C., & Greenfield, T. K. (1990). Screening for depression in primary care clinics: the CES-D and the BDI. *The International Journal of Psychiatry in Medicine*, 20(3), 259–277. <http://dx.doi.org/10.2190/LYKR-7VHP-YJEM-MKM2>.