JOURNAL OF
Research on Adolescence

Society for Research on Adolescence
www.s-r-a.org

JOURNAL OF RESEARCH ON ADOLESCENCE, 30(4), 820–834

# Psychological Reactivity to Daily Family Experiences During Adolescence: Individual Differences and Developmental Stability

Joanna J. Kim
*Arizona State University*

Andrew J. Fuligni
*University of California, Los Angeles*

The current study examined adolescent psychological reactivity to daily family experiences, an important feature of emotion regulation that could have significant implications for psychopathology. A total of 428 Mexican-heritage adolescents ($M_{age}$ = 15.02 years, range: 13–18 years) completed daily diary checklists for 14 days and again 1 year later. Results revealed that adolescents' family experiences were associated with negative mood, positive mood, and role fulfillment on a daily basis. Only role fulfillment reactivity was stable across 1 year, suggesting instability in individual differences in positive and negative mood reactivity. Sex moderated the relation between positive and negative mood reactivity during the second year of study, with males exhibiting broad psychological reactivity to daily family experiences. However, females who experienced higher negative mood reactivity exhibited less positive mood reactivity. Implications for possible sex differences in depression risk during the high school years are discussed.

Everyday experiences can shape adolescents' adjustment and regulatory skills. Indeed, day-to-day experiences such as interpersonal interactions and stressful events are far more frequent and may impact psychological well-being above and beyond that of chronic stress (e.g., illness, violent environments) or major life stressors (e.g., death of a loved one; Almeida, 2005; Monat, Lazarus, Reevy, & Duncan, 2007). For instance, patterns of negative affect in response to daily stressors have been linked to later health problems (Piazza, Charles, Sliwinski, Mogle, & Almeida, 2013; Robles, Reynolds, Repetti, & Chung, 2013), impaired sleep (Ong et al., 2013), and mental illness (Almeida, Wethington, & Kessler, 2002; Charles, Piazza, Mogle, Sliwinsky, & Almeida, 2013; O'Neill, Cohen, Tolpin, & Gunthert, 2004; Parrish, Cohen, & Laurenceau, 2011; Wichers et al., 2009). However, everyday experiences do not affect everyone equally and it is critical to consider individual differences in how adolescents respond to everyday experiences. The current study sought to examine individual differences in psychological reactivity, defined as the within-person associations between psychological states (i.e., positive mood, negative mood, role fulfillment) and positive or negative life experiences.

Research on psychological reactivity to everyday experiences has provided valuable insights into youth adjustment. Not only is negative affective reactivity to day-to-day problems associated with heightened depressive symptoms (Bai & Repetti, 2018; Schneiders, Nicolson, Berkhof, Feron, Van Os, & Devries, 2006), but the inverse also appears to be true, with adolescents at greater risk of psychopathology exhibiting greater reactivity to negative events (Schneiders et al., 2006). Given well-established links between emotion regulation and youth psychopathology (e.g., Gilbert, 2012), examining adolescents' psychological reactivity to everyday experiences may help us better understand risk for mental health problems. When doing so, it is important to take an expansive view of psychological reactivity. In addition to reactivity in terms of negative events and affect, examining reactivity in terms of positive events and affect will shed light on the extent to which adolescents take pleasure from positive experiences in their lives—a key indicator of mental health (Layous, Chancellor, & Lyubomirsky, 2014; Froh, Kashdan, Ozimkowski, & Miller, 2009; Froh, Yurkewicz, & Kashdan, 2009). Finally, an underappreciated but potentially significant form of reactivity is the extent to which adolescents feel a sense of role fulfillment such as being a good member of the family or a good friend after having social interactions. Role fulfillment is different and more specific than generic positive or negative mood, and therefore may show distinct patterns during adoles-

This research was supported by funding from the National Institute of Child Health and Human Development (R01 HD057164).

Requests for reprints should be sent to Joanna J. Kim, Department of Psychology, Arizona State University, 900 S. McAllister Avenue, Room 205, Tempe, AZ 85287. E-mail: jjkim32@asu.edu


DOI: 10.1111/jora.12580

cence. Still, role fulfillment has been shown to be consequential for the mental health and well-being of youth (Armstrong-Carter et al., 2020; Chen et al., 2017; Walsh, Shulman, Bar-On, & Tsur, 2006).

Indeed, important developmental questions about psychological reactivity remain. First, we know little about age and sex differences in daily psychological reactivity during adolescence. The few existing studies of age differences have focused on adults and the results are mixed. In one cross-sectional study of adults ages 25–74, researchers found a stronger association between daily stress and negative mood for older adults than for younger adults (Mroczek & Almeida, 2004). Sliwinski, Almeida, Smyth, & Stawski. (2009) examined change in reactivity over time by integrating repetition of daily measurement across years and found that reactivity to daily stressors increased over time. Sex differences have been explored, suggesting higher reactivity among females than males (Almeida, 2005; Charbonneau, Mezulis, & Hyde, 2009; Kiang, Gonzales-Backen, Fuligni, Yip, & Witkow, 2006; Telzer & Fuligni, 2013), but studies among adolescents have been limited.

Second, little research has been done on the fixed or plastic nature of psychological reactivity to daily experiences during adolescence. Laboratory investigations suggest relatively stable psychological reactivity within individuals across several weeks (e.g., Cohen et al., 2000), but there are few studies that have focused on the relative stability versus lability of psychological reactivity in daily life over longer periods of time. One study among adults observed long-term stability in reactivity during middle adulthood with shifts in later adulthood (Sliwinski et al., 2009). We are unaware of similar studies during the adolescent period. Thus, one of the current study aims is to probe the stability of psychological reactivity across the years of adolescence. If psychological reactivity appears to be changing during adolescence, it may point to reactivity as a potential point of intervention for supporting emotion regulatory skills, and in turn overall adjustment, during adolescence.

Third, observations of individual differences in psychological reactivity raise important questions about whether adolescents are uniquely or equally responsive to negative and positive events in their daily life. Much of the research on reactivity has focused on the response to negative daily experiences, such as interpersonal conflict and other stressors, finding a link between heightened negative mood reactivity and psychopathology risk. Studies have also examined positive mood reactivity, finding decreases in positive emotion following daily stressors at school and home (Bai & Repetti, 2018; Schneiders et al., 2006). Yet, research is lacking in adolescents' positive psychological state to response to positive experiences. Individual differences in response to positive experiences have important additional implications for bolstered mental and physical health (Belsky & Pluess, 2009; Telzer & Fuligni, 2013). However, we do not have a clear understanding of whether adolescents' patterns of psychological reactivity are nonspecific to stimulus type (e.g., exhibiting high reactivity regardless of the positive or negative valence of the daily event), if adolescents are highly reactivity to stressful events and less so to pleasant events (i.e., depressogenic mood profile), or vice versa. The existence or lack of association between positive and negative mood reactivity may lend support to theories of broad or distinct types of susceptibility, respectively, as well as provide insights into who might be at heightened risk for psychopathology (Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007).

Finally, many previous studies of psychological reactivity to daily experiences have been conducted with samples low in racial diversity (e.g., Bai & Repetti, 2018; Schneiders et al., 2006). Daily diary studies marked for racial diversity among participants exist (e.g., Flook & Fuligni, 2008; Kiang et al., 2006; Telzer & Fuligni, 2013). Numerous studies in recent years have demonstrated the utility of examining the significance of daily experience for the development of Mexican American adolescents (e.g., Potochnick, Perreira, & Fuligni, 2012; Santiago et al., 2017; Telzer & Fuligni, 2009). The current study is the first to examine the aforementioned developmental questions within a sample of Mexican-heritage adolescents.

### A Focus on the Family

Adolescence is marked by many transitions, including increasing shifts toward autonomy, influence from nonfamily individuals, and time spent outside the home. Yet, family interactions and relationships remain crucial during this time. Parent–child interactions and sibling interactions within family life continue to include adolescent development and adjustment (Laursen & Collins, 2009; McHale, Updegraff, & Whiteman, 2012). Given the importance of the family during adolescence, we set to examine adolescents' psychological states associated with everyday family experiences in order to address the key questions discussed above.

The family context is highly salient among Mexican-heritage adolescents, in particular. Mexican

families have been found to place great importance upon family togetherness, closeness, and the role of children and adolescents in supporting the family (Delgado-Gaitan, 1994; Updegraff, McHale, Whiteman, Thayer, & Delgado, 2005). Indeed, the cultural value of *familism,* wherein the family is prioritized over the self, is central to the Mexican-heritage experience (Campos et al., 2014). Compared with adolescents from European backgrounds, Latino adolescents endorse stronger values of obligation to one's family, consideration of one's family as an important reference group in decision-making, and the family as a key source of social and emotional support (Marín & Marín, 1991; Stein et al., 2014). Familism promotes intrafamily interdependence and is associated with close and supportive family relationships (Campos et al. 2014; Fuligni et al. 1999). Mexican-heritage youth, therefore, provide a particularly appropriate test of developmental questions regarding adolescent psychological reactivity to day-to-day family experiences. Especially among Mexican and other Latin American heritage youth who are more likely to be poorer and face more stressors in their homes, schools, and neighborhoods than their European-origin White counterparts, the family experience can provide direct and mediating effect on adjustment, well-being, prosociality, and educational outcomes (Bravo, Umaña-Taylor, Guimond, Updegraff, & Jahromi, 2014; Calderon-Tena, Knight, & Carlo, 2011; Cauce, Corona, & Conger, 2011; Knight, Mazza, & Carlo, 2018; Martin, Conger, & Robins, 2019; Telzer, Tsai, Gonzales, & Fuligni, 2015). Meanwhile, though family centrality is largely positively associated with well-being, it can also have deleterious effects within adverse family environments (Yuen, Fuligni, Gonzales, & Telzer, 2018).

Examining adolescents' reactivity to family experiences may provide a window into how daily family experiences lead to these longer-term outcomes. Daily family demands are one example of family experiences to which adolescents are reactive. Perceiving excessive family demands on a daily basis is typically associated with greater negative mood reactivity, having been linked with stress, poorer sleep, anhedonia, and low mood (Fuligni & Hardaway, 2006; O'Neill et al., 2004). In contrast, positive family experiences such as family leisure time and getting along with family members lend themselves to happier emotions among adolescents (Greenberger, Chen, Tally, & Dong, 2000; Yap, Allen, & Ladouceur, 2008). Finally, assistance to the family is an additional family experience to consider, particularly for youth from diverse backgrounds. Although preparing meals and caring for siblings is often thought to add stress and burden on adolescents, family assistance has been associated with family belongingness and a sense of role fulfillment, reflecting achievement and integration within the family (Fuligni & Telzer, 2013; Perez & Cruess, 2014; Telzer & Fuligni, 2009; Telzer, Masten, Berkman, Lieberman, & Fuligni, 2010). Behaviorally, family demands and family assistance may look similar. Indeed, previous daily diary studies with diverse adolescents have demonstrated that family assistance is associated with positive affect and sense of fulfilling a valued role within the family unit (e.g., Telzer & Fuligni, 2009). Assisting the family may function to foster a sense of belongingness, value, and connection among adolescents. Thus, in addition to assessing negative mood reactivity to family demands and positive mood reactivity to family assistance, the current study examined adolescents' role fulfillment reactivity—the sense of role fulfillment adolescents experience in response to family assistance behaviors. Studying role fulfillment reactivity provides a nuanced and unique view of potential individual differences in how daily family experiences may affect adolescents aside from the conventional positive–negative mood dichotomy.

### The Current Study

The current study sought to answer three key questions. First, how are adolescents reactive to daily family experiences and does this vary by age and sex? We expected adolescents to experience more negative mood on days of family demands, more positive mood on days of positive family interactions, and more role fulfillment on days they help their family more. There was not enough information to inform a directional hypothesis regarding potential age-related differences in reactivity among adolescents, though it is plausible that with increasing age we would find attenuated reactivity to family experiences similar to previous studies that found decreased reactivity among older adults (Uchino et al., 2006). With regard to sex, existing daily level research with both adolescents and adults has suggested that females are more reactive and report greater distress to daily stressors, particularly interpersonal stressors (Almeida, 2005; Almeida & Kessler, 1998; Almeida, Wethington, & Kessler, 2002; Birditt, Fingerman, & Almeida, 2005; Shih, Eberhart, Hammen, & Brennan, 2006). Thus, we expected the female adolescents in our study to exhibit heightened

psychological reactivity to family experiences across experience types. That is, we expected females to report stronger negative mood in reaction to family demands, stronger positive mood in reaction to positive family interactions, and stronger role fulfillment in reaction to family assistance compared to their male counterparts.

Second, is adolescents' psychological reactivity to family experiences stable over the course of 1 year and does that vary by age or sex? We know of no studies that have examined stability of psychological reactivity longer than several weeks. However, given stability of negative mood reactivity and physiological reactivity observed in previous examinations (Cohen et al., 2000), we expected to find that negative mood reactivity, positive mood reactivity, and role fulfillment reactivity would be stable across 1 year (i.e., reactivity estimates from 1 year would be significantly associated with reactivity estimates the following year).

Finally, are adolescents discriminately reactive to specific types of everyday family experiences or are they broadly reactive to all experiences? Current research presents mixed evidence on adults' differentiation of positive and negative reactivity (e.g., Ong et al., 2013; Scott, Sliwinski, Mogle, & Almeida, 2014). As we do not know of studies comparing intraindividual reactivity to different experiences among adolescents, this was the most exploratory of our research aims. Should adolescents exhibit broad psychological reactivity, negative mood reactivity, positive mood reactivity, and role fulfillment reactivity would be associated with one other. This would suggest that adolescents who are likely to experience the most negative mood in response to daily negative events are also the ones to experience the most positive mood in response to daily positive events. In contrast, the lack of a relation between types of psychological reactivity would suggest that adolescents are more discriminately reactive to different events. We also examined age and sex as potential moderators of relations between types of daily psychological reactivity.

The current study capitalized on daily diary methodology to derive within-person associations between daily family experiences and daily reported mood and role fulfillment as measures of psychological reactivity among adolescents. Daily diary methods provide a naturalistic way to infer psychological reactivity within individuals' actual lives that increases ecological validity, reduces memory distortions, and allows for examination of within-person process (Almeida, 2005; Neupert & Bellingtier, 2018).

## METHOD

### Participants

A total of 428 Mexican-heritage adolescents in the 9th and 10th grades ($M_{age}$ = 15.02 years, $SD$ = 0.83, range 13–18 years) were recruited from two public high schools in the Los Angeles area. Throughout the 2009–2010 academic year, classrooms were randomly selected from official school rosters each week for the research team to make in-class presentations, mail study information, and phone families regarding the research study. Half the participants were female (50.2%) and in the ninth grade (49.1%) during study enrollment. This represents 63% of the families contacted by telephone and deemed eligible for the study. Most participants were born in the United States (87.2%), were from immigrant families (68.9% second-generation [i.e., at least one parent born outside the United States], 12.6% first-generation immigrants), and virtually of all foreign-born participants were born in Mexico. The median annual household income was $32,000 ($M_{income}$ = $38,282.18, $SD_{income}$ = $29,354.75, range = $0–$270,000). The majority of participants' parents were reported to have completed at most some high school education (66.7% less than a high school degree, 7.6% high school degree only, 5.5% trade or vocational school, and 18.8% at least some college). A total of 336 families took part in the second wave of the study the following year (78.5% of participants from the first wave). Despite attrition, the demographics of the participants from the two waves of data collection did not differ on sex composition, $F(1, 426) = 0.03$, $p = .87$, generation status, $F(1, 426) = 1.32$, $p = .25$, or household income ($t = 1.51$, $p = .13$). Participants who only completed the first wave of data reported assisting the family more often than those who partook in both waves of study ($t = -2.26$, $p < .05$). There were no other significant differences on daily variables of interest.

### Procedures

Spanish–English bilingual interviewers visited adolescents' homes where parents provided parental consent and adolescent participants provided written assent for study participation. Consent and survey procedures were available to participants in both English and Spanish. Almost all adolescent participants elected for English materials (98.4%).

At the initial study visit, the participants were provided with 14 daily checklists to be completed by the adolescent every night for the subsequent

two weeks. Checklists were three pages long, took an average of 5–10 min to complete, and asked adolescents to report on their experiences, events, and mood for that day as well as whether or not the participant attended school. After completing the day's checklist, participants sealed the form and recorded the time of completion with an electronic stamper. The study team contacted the adolescent during the 14-day period to answer questions about study procedures and to encourage study compliance. At the end of the 14-day period, study staff collected the completed checklists and paid adolescents $30 for their participation. Adolescents also received a movie theater gift certificate if diaries were completed correctly and on time. The interview and daily checklist procedures were repeated the next academic year for the second wave of data collection. Compliance was high; 96% of diaries were completed and 86% of diaries being completed on time (i.e., before noon the following day). All study procedures were reviewed and approved by the university's Institutional Review Board.

## Measures

Each of the daily checklist measures of mood and experiences has been successfully used in previous studies including with Mexican American samples and has demonstrated good reliability and predictive validity (Fuligni & Hardway, 2006; Telzer & Fuligni, 2013; Telzer & Fuligni, 2009).

***Daily family experiences.*** *Family demands.* Each evening, adolescents responded "Yes (1)" or "No (0)" to report if they had "a lot of work at home" and "a lot of family demands" that day. Responses to the two items were summed for each day in order to calculate an index of the adolescent's family demands for each study day. Adolescents reported having a mean of 0.21 family demands daily (*SD* = 0.31) during the first year and 0.17 demands daily (*SD* = 0.30) the next year.

*Positive family interactions.* Participants marked "Yes (1)" or "No (0)" to report if they spent "leisure time with family," spent "time with extended family," "ate a meal with family," "got along with parents," or "got along with other family" each day. Participants' responses to the five items were summed for each day to create a daily index of positive family interactions for each study day. Adolescents reported a mean of 2.60 positive family interactions a day (*SD* = 1.20) during the first year and 2.18 positive interactions a day (*SD* = 1.55) the next year.

*Family assistance.* Adolescent participants indicated "Yes (1)" or "No (0)" if they engaged in any of the following family assistance behaviors that day: "helped clean the apartment/house," "took care of brothers/sisters," "ran errands for parents/family," "helped siblings with school work," "translated for parents," "helped parents with official business," "helped cook a meal for family," "helped parents at their work," "anything else to help/assist family," "provided emotional support (e.g., listening, advice, comfort) to parents," "provided emotional support to other family members." Participants' responses to the 11 items were summed for each day; adolescents reported a mean of 1.95 helping behaviors a day (*SD* = 1.41) across the 14-day study period for the first year and 1.21 helping behaviors a day (*SD* = 1.25) the next year.

***Daily psychological states.*** *Negative mood.* Adolescents reported their experience of negative mood (seven items: feeling on edge, nervous, uneasy, unable to concentrate, sad, hopeless, discouraged) each day on a 5-point Likert-type scale (1 = *not at all* to 5 = *extremely*). Negative emotion items were taken from the Profile of Mood States (POMS; Lorr & McNair, 1971). Responses to each item were averaged for one index of negative mood for each day. The measure of negative mood had strong reliability each study day for both waves (range: $\alpha_{Wave1}$ = .76–.87, $\alpha_{Wave2}$ = .83–.87).

*Positive mood.* Adolescents reported their experience of positive mood (three items: calm, joyful, happy) every day. Positive mood items were modeled after prior studies of daily experience and have been successfully used with Mexican American adolescents (e.g., Kiang et al., 2006). For each item, participants rated their daily mood on a 5-point Likert-type scale (1 = *not at all* to 5 = *extremely*). Responses to each item were averaged for one index of positive mood for each day. The measure of positive mood had acceptable reliability for waves (range: $\alpha_{Wave1}$ = .68–.75, $\alpha_{Wave2}$ = .68–.76).

*Role fulfillment.* Adolescents reported the extent to which they felt that they were "a good family member" and "a good son/daughter" every day. For each item, participants rated their sense of familial role fulfillment on a 7-point Likert-type scale (1 = *not at all* to 7 = *extremely*) and these ratings were averaged for the two items to create an index of role fulfillment for each day. The two-item daily measure of role fulfillment had good

reliability each study day for both waves (range: $\alpha_{Wave1}$ = .67–.77, $\alpha_{Wave2}$ = .90–.95).

***Control variables.*** *School attendance.* Participants reported on whether or not they attended school for each study day (0 = attended school, 1 = did not attend school).

*Age and sex.* Participants reported their age (recorded in full years) and sex (male = 0, female = 1).

### Analytic Plan

All analyses were conducted in Stata 14.2 (StataCorp LP, College Station, TX) with multilevel analyses performed using MIXED. In our preliminary analyses, we examined potential age and sex differences in main variables. We conducted a series of three-level models (i.e., days within individuals within waves) where age, sex, and school attendance were the sole predictors of daily family experiences (i.e., family demands, positive family interactions, family assistance) and psychological experiences (i.e., negative mood, positive mood, role fulfillment). Age was centered at the sample mean for all analyses.

In order to examine main study questions regarding psychological reactivity, we estimated adolescents' daily reactivity to family experiences using methods previously used by studies computing mood and stress reactivity also from daily diary studies (e.g., Bai & Repetti, 2018; Bai, Reynolds, Robles, & Repetti, 2017; Bellingtier and Neupert, 2018; Dasch et al., 2008; Parrish, Cohen, & Laurenceau, 2011). We extracted Empirical Bayes estimates of individual slopes of the association between daily family experiences and daily psychological states at each wave as measures of psychological reactivity. In other words, individuals' negative mood reactivity was operationalized as the association between daily family demands and daily negative mood, positive mood reactivity as the association between daily family interactions and positive mood, and role fulfillment reactivity as the association between daily family assistance and role fulfillment.

Using role fulfillment reactivity as an example, we ran a three-level model (i.e., days within waves within individual) in which role fulfillment was predicted by family assistance while controlling for positive family interactions, family demands, age, sex, and whether or not the participant attended school that day. Age was mean-centered within each wave. Daily family assistance behaviors, positive family interactions, and family demands were all centered within each individual's mean at the respective wave such that deviations from the zero-point indicate an individual's daily deviation from their average level of behaviors, interactions, and demands. Family assistance was included as a random effect at both the wave level and the individual level. This process was repeated to derive estimates of negative mood reactivity and positive mood reactivity. In order to examine potential moderation by age and sex, three-level analyses were rerun with interaction terms between daily events and age and daily events and sex, respectively.

For Aim 2 where we examined longitudinal stability in reactivity, we conducted three regression models, in which reactivity estimates from Wave 2 were regressed on their corresponding reactivity estimates from Wave 1 while controlling for participant age and sex. Possible moderation by age and sex was examined by including reactivity estimate by age and reactivity estimate by sex interactions terms in the regression models.

For Aim 3, we examined if adolescents were broadly reactive or discriminately reactive to specific types of events and if that differed by age or sex by conducting bivariate correlations between the reactivity estimates for each wave. Significant positive associations between reactivity types would indicate that adolescents are broadly reactive, whereas no association may indicate discriminate reactivity. We also examined interactions of age and sex with reactivity estimates to predict other reactivity types (e.g., negative mood reactivity from positive mood reactivity) in order to identify if associations between different types of reactivity were moderated by age and/or sex.

## RESULTS

### Preliminary Analyses

As shown in Table 1, mixed models revealed that daily levels of positive mood significantly declined with increasing age. Female participants reported significantly higher levels of daily negative mood and marginally higher levels of daily family assistance. There were no other significant age and sex differences in daily experiences and mood.

### Aim 1: Psychological Reactivity to Daily Family Experiences

Adolescents' daily family events were robustly associated with their daily psychological states (see

TABLE 1
Age and Sex Differences in Daily (a) Family Experiences (b) Psychological Experience

| | B | SE | B | SE | B | SE |
|---|---|---|---|---|---|---|
| (a) | Daily family demands | | Daily family interactions | | Daily family assistance | |
| Constant | 0.11*** | .01 | 0.50*** | .01 | 0.16*** | .01 |
| Age | −0.00 | .01 | −0.02 | .01 | −0.001 | .01 |
| Female | 0.01 | .01 | 0.01 | .02 | 0.02† | .01 |
| No school day | 0.00 | .00 | 0.07*** | .00 | 0.01*** | .00 |
| (b) | Daily negative mood | | Daily positive mood | | Daily role fulfillment | |
| Constant | 1.49*** | .03 | 3.42*** | .05 | 4.95*** | .08 |
| Age | −0.01 | .03 | −0.10* | .04 | 0.01 | .07 |
| Female | 0.15** | .05 | −0.11 | .07 | −0.18 | .12 |
| No school day | −0.09*** | .01 | 0.06*** | .01 | 0.09*** | .02 |

*Note.* †$p < .10$,
*$p < .05$,
**$p < .01$,
***$p < .001$.

Table 2 Model 1). Adolescents reported an increase in negative mood on days with increased daily family demands ($B = 0.06$, $p < .05$), an increase in positive mood in response to daily positive family interactions ($B = 0.29$, $p < .001$), and an increase in role fulfillment in response to daily family assistance behaviors ($B = 0.51$, $p < .001$).[1]

As shown in Table 2 models 2 and 3, neither age nor sex were significant moderators of the daily associations between negative mood and family demands ($B_{age} = -.02$, $p = .60$; $B_{sex} = -.03$, $p = .76$), positive mood and family interactions ($B_{age} = .01$, $p = .84$; $B_{sex} = -.03$, $p = .82$), or role fulfillment and family assistance ($B_{age} = -.02$, $p = .87$; $B_{sex} = .16$, $p = .52$).

### Aim 2: Longitudinal Stability in Psychological Reactivity

As presented in Figure 1, negative mood reactivity ($B = -0.03$, $p = .59$) and positive mood reactivity ($B = 0.04$, $p = .69$) were not associated with respective reactivity estimates for the next year. Role fulfillment reactivity was significantly and positively associated with role fulfillment reactivity the next year ($B = 0.30$, $p < .001$). The interactions between first wave reactivity estimates and sex and age in subsequent models were nonsignificant, suggesting no age or sex differences in the stability in reactivity.

### Aim 3: Associations Between Different Types of Psychological Reactivity

There were no significant associations between negative mood reactivity and positive mood reactivity ($r_{Wave1} = -.04$, $p = .47$; $r_{Wave2} = .04$, $p = .33$) or role fulfillment reactivity ($r_{Wave1} = .08$, $p = .16$; $r_{Wave2} = -.09$, $p = .08$) at either wave. Role fulfillment reactivity was significantly correlated with positive mood reactivity at both waves ($r_{Wave1} = .13$, $p < .05$; $r_{Wave2} = .12$, $p < .05$).

As presented in Figure 2, sex-by-reactivity estimate interaction terms revealed that sex significantly moderated the association between negative psychological reactivity and positive psychological reactivity at Wave 2 ($B = -0.20$, $p < .01$), but not at Wave 1 ($B = -0.13$, $p = .22$). At Wave 2, an increase in negative psychological reactivity was associated with a decrease in positive psychological reactivity for girls ($B = -0.34$, $p < .05$), but an increase in positive reactivity for boys ($B = 0.36$, $p < .05$; see Figure 2). There were no other significant interactions between reactivity and sex or age.

## DISCUSSION

The current study sought to address previously unanswered questions about adolescents' psychological reactivity to daily family experiences. Due to the daily diary method utilized in the current study combined with the Mexican-heritage sample,

[1]Models were also conducted with parental reports of participants' household income and generation status included as covariates. Pattern of results did not vary from those presented in the current study.

TABLE 2
(a) Daily Negative Mood Reactivity to Family Demands, (b) Daily Positive Mood Reactivity to Positive Family Interactions, (c) Daily Role Fulfillment Reactivity to Family Assistance

| | *Model 1* | | *Model 2* | | *Model 3* | |
|---|---|---|---|---|---|---|
| | B | SE | B | SE | B | SE |
| (a) | | | | | | |
| Constant | 1.48*** | .03 | 1.48*** | .03 | 1.48*** | .03 |
| Family demands | 0.06* | .03 | 0.06* | .03 | 0.04 | .04 |
| Positive family interactions | −0.15*** | .02 | −0.15*** | .02 | −0.15*** | .02 |
| Family assistance | 0.13** | .05 | 0.13** | .05 | 0.13** | .05 |
| Age | −0.01 | .03 | −0.01 | .03 | −0.01 | .03 |
| Female | 0.14** | .05 | 0.14** | .05 | 0.15** | .05 |
| No school day | −0.08*** | .01 | −0.08*** | .01 | −0.08*** | .01 |
| Family demands*Age | | | −0.02 | .04 | | |
| Family demands*Female | | | | | 0.03 | .06 |
| (b) | | | | | | |
| Constant | 3.42*** | .05 | 3.42*** | .05 | 3.42*** | .05 |
| Positive family interactions | 0.29*** | .03 | 0.29*** | .03 | 0.26*** | .05 |
| Family demands | −0.04 | .03 | −0.04 | .03 | −0.04 | .03 |
| Family assistance | 0.12* | .06 | 0.12* | .06 | 0.11* | .06 |
| Age | −0.10* | .04 | −0.10* | .04 | −0.10* | .04 |
| Female | −0.10 | .07 | −0.10 | .07 | −0.10 | .07 |
| No school day | 0.04** | .01 | 0.04** | .01 | 0.04** | .01 |
| Family interactions*Age | | | 0.10 | .04 | | |
| Family interactions*Female | | | | | 0.07 | .06 |
| (c) | | | | | | |
| Constant | 4.97*** | .08 | 4.97*** | .08 | 4.97*** | .08 |
| Family assistance | 0.51*** | .12 | 0.51*** | .12 | 0.43* | .18 |
| Positive family interactions | 0.86*** | .04 | 0.86*** | .04 | 0.86*** | .04 |
| Family demands | −0.19*** | .05 | −0.19*** | .05 | −0.19*** | .05 |
| Age | 0.01 | .07 | 0.01 | .07 | 0.01 | .07 |
| Female | −0.17 | .12 | −0.17 | .12 | −0.18 | .12 |
| No school day | 0.02 | .02 | 0.02 | .02 | 0.02 | .02 |
| Family assistance*Age | | | −0.02 | .15 | | |

TABLE 2 (Contd.)
(a) Daily Negative Mood Reactivity to Family Demands, (b) Daily Positive Mood Reactivity to Positive Family Interactions, (c) Daily Role Fulfillment Reactivity to Family Assistance

| | *Model 1* | | *Model 2* | | *Model 3* | |
|---|---|---|---|---|---|---|
| | B | SE | B | SE | B | SE |
| Family assistance*Female | | | | | 0.16 | .24 |

*Note.* *$p < .05$,
**$p < .01$,
***$p < .001$.

we were well positioned to probe questions about daily associations between events and psychological states, stability, and the discriminate or broad nature of psychological reactivity to family experiences. We were also able to probe questions about age and sex differences for each of the above. We found adolescents' daily family experiences were linked with positive mood, negative mood, and role fulfillment, but that there were no sex or age differences in these associations. Negative and positive mood reactivity was not stable across 1 year, but role fulfillment reactivity was related to role fulfillment reactivity the next year. Finally, female and male adolescents demonstrated different patterns in the associations between reactivity to negative and positive experiences at the second wave of study participation.

Past studies with adult samples have provided mixed findings for age, with some reporting that negative reactivity increases with age (e.g., Sliwinski et al., 2009) and others reporting older adults to have decreased negative reactivity compared with younger adults (e.g., Uchino, Berg, Smith, Pearce, & Skinner, 2006). Age did not moderate the association between daily family experiences and psychological experiences in our adolescent sample. However, our study included a somewhat limited age range, and it remains unclear if psychological reactivity increases, attenuates, or remains unchanged across a longer span of the adolescent period.

Contrary to predictions, we found that role fulfillment reactivity, but not negative mood reactivity and positive mood reactivity, was stable from 1 year to the next. Despite perceptions of emotional reactivity as unchanging and trait-like and evidence of short-term stability (e.g., Cohen et al., 2000; Mills, Berry, Dimsdale, Nelesen, & Ziegler, 1993), we found that reactivity to negative and positive family experiences across the year was not stable. Results provide preliminary evidence that psychological reactivity may shift, even within 1 year of adolescence. As adolescents navigate evolving family relationships, responsibilities, and expectations of autonomy change, along with the proportion of interactions with family members versus peers, the association of positive and negative mood with family interactions also appears to be changing. In fact, just as emotion regulation skills can be honed throughout the lifespan (e.g., John & Gross, 2004), adolescence may be a distinctly ripe period in which psychological reactivity may be subject to intervention (Charbonneau et al., 2009; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011).

Role fulfillment reactivity, on the other hand, was stable from the first year of study to the next. Unlike positive and negative mood reactivity, which are focused on individuals' emotional response, the association between family assistance and role fulfillment taps into a sense of achievement, contribution, and belongingness for one's helping behaviors (Telzer & Fuligni, 2009). Perhaps, the stability of role fulfillment reactivity reflects the early reinforcement and internalization of cultural values of familism and family obligation among our Mexican-heritage participants. In line with previous research, there is a strong link between role fulfillment and family helping behaviors among ethnic minority youth, in particular (Fuligni & Telzer, 2013; Telzer et al., 2010). According to social identity theory (Hogg, 2003), adolescents' behaviors providing instrumental and emotional support to the family buttress their sense of belonging within the family (Perez & Cruess, 2014; Telzer & Fuligni, 2009; Telzer, et al., 2010), which in turn may be contributing to the stability of their role fulfillment reactivity. Against the

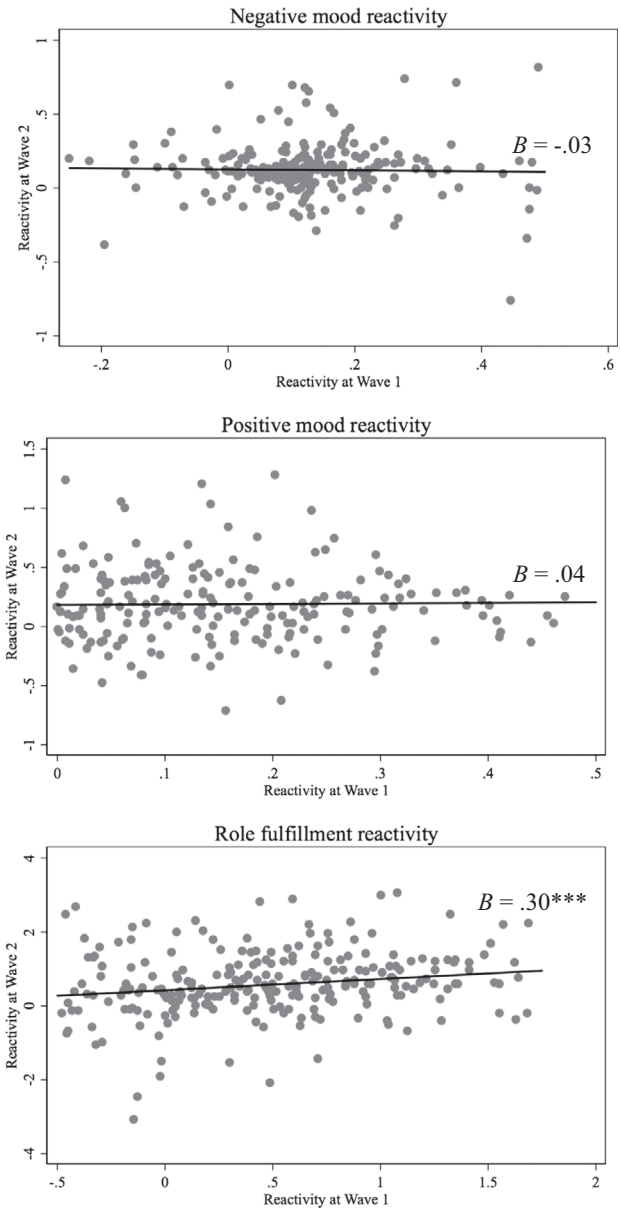


FIGURE 1 Estimates of role fulfillment reactivity from Wave 1 were significantly associated with reactivity estimates from Wave 2. Estimates of positive and negative mood reactivity from Wave 1 were not significantly associated with estimates from Wave 2. ***$p < .001$.

backdrop of Mexican cultural values that already place high emphasis on the family and interconnectedness, it is plausible that this association between family assistance and a sense of fulfillment, achievement, and belonging toward the family is magnified for the current sample. Additionally, role fulfillment reactivity derived from family assistance was associated with positive reactivity (Telzer & Fuligni, 2009). Given the relative stability of role fulfillment reactivity, findings suggest that family assistance could be one way to cultivate lasting positive mood reactivity, which in turn may have downstream effects on adolescent mental health (Catalino & Fredrickson, 2011; Ruten et al., 2013; Tugade, Fredrickson, & Barrett, 2004). Future studies linking role fulfillment reactivity with prospective longitudinal data on adolescent mental health could help answer questions about the long-term impact of high positive reactivity to helping the family.

Several interesting findings emerged with regard to sex differences in reactivity. Consistent with past studies, female participants reported higher levels of daily negative mood (Shih et al., 2006; Wilson, Pritchard, & Revalee, 2005) and reported engaging in more family helping behaviors than males (Tsai et al., 2013). However, these significant sex differences in average negative mood and assistance behaviors were not reflected in differences negative mood or role fulfillment reactivity in response to daily family experiences. Coupled with the finding that sex did not moderate the relation between daily family experience and daily psychological experience among our sample of Mexican American high school-aged adolescents, results suggest that girls are not significantly more or less reactive to daily family experiences. This is in contrast to previous research with other diverse ethnic samples that found girls to be more reactive (Charbonneau, Mezulis, & Hyde, 2009; Kiang et al., 2006; Telzer & Fuligni, 2013). Unlike previous studies that operationalized reactivity as responses to stressful experiences and demands in general, the current study focused on reactivity to *family* experiences. It is possible that there were no sex differences in reactivity to family experiences given the particular emphasis on familism for both sexes within Mexican and other Latin American heritage adolescent socialization (Knight, Mazza, & Carlo, 2018; Marin & Marin, 1991; Stein et al., 2014).

Additionally, we found that sex moderated the relation between positive and negative psychological reactivity during the second year of study, but not the first. Specifically, male adolescents who experienced more negative mood on days of greater family demands were also likely to experience a greater boost in positive mood on days of more positive family interactions. Males, therefore, evidenced a pattern more consistent with theories of a generalized differential sensitivity to environmental experiences (Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007).

However, female adolescents who reported a greater impact of high family demands on their

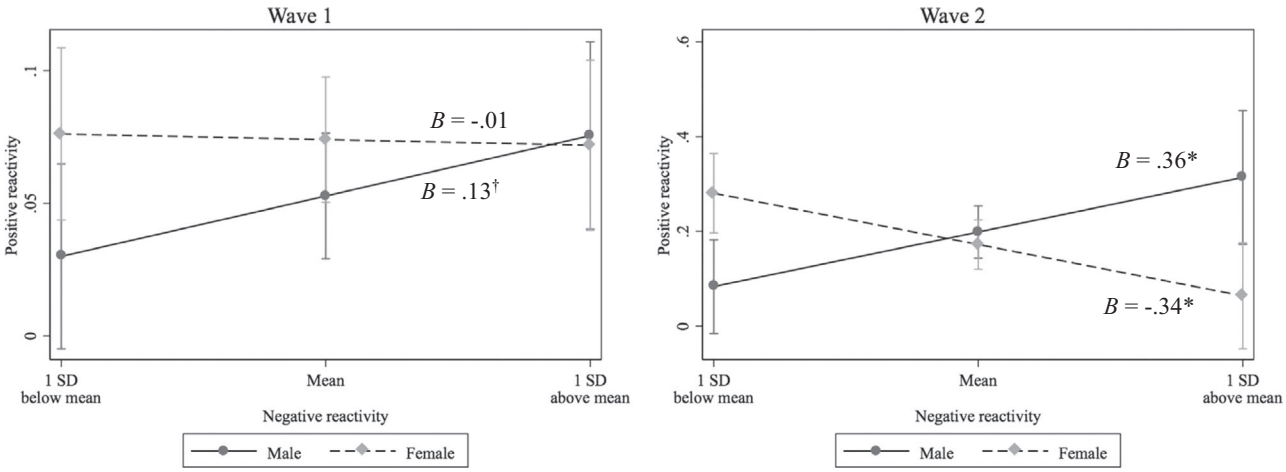


FIGURE 2 Sex moderates the relation between negative and positive psychological reactivity at Wave 2 only $^{\dagger}p < .10$, $^{*}p < .05$.

negative mood were less likely to glean positive mood from positive experiences. This pattern of reactivity is akin to that of depressed individuals wherein high negative emotional reactivity may be coupled with anhedonia (Pizzagalli, 2014). Given established links between positive mood, resilience, and mental health (Catalino & Fredrickson, 2011; Ong, 2010), this pattern of high negative mood reactivity coupled with blunted positive mood reactivity among girls in our sample may help explain sex-related disparities in mental illnesses during adolescence (Nolen-Hoeksema & Girgus, 1994). Indeed, Latina adolescents are at higher risk of depression, clinical anxiety, and suicidality than their male counterparts (Silva & Van Orden, 2018; Kim et al., 2018; Langhinrichsen-Rohling, Friend, & Powell, 2009; Zayas et al., 2005). However, since this sex difference only emerged in the second wave of data, future research should probe this question further.

Notably, the current study sample consists solely of Mexican-heritage youth, living largely among other families of Mexican origin or similar immigrant backgrounds. Mexican-heritage youth are historically found to hold strong cultural values of interdependence and familism, making the current study sample apt for probing developmental questions about family experiences (Germán, Gonzales, & Dumka, 2009; Rodriguez, Mira, Paez, & Myers, 2007). At the same time, the rates of family demands among the sample's Mexican-heritage youth were similar to that recorded in other studies with ethnically diverse samples of similarly aged adolescents (e.g., Chiang et al., 2016; Levine, Hoffer, & Chen, 2017), suggesting that the experience of family demands, and perhaps associated reactivity, is common among adolescents of diverse backgrounds. As such, our findings on age and sex differences in daily psychological reactivity, stability of reactivity within adolescence, and the discrete nature of reactivity for females may point to a universal process and generalize to samples of non-Mexican origin adolescents. Future replications with diverse samples (e.g., adolescents from different ethnic backgrounds, nonimmigrant families, or rural and urban environments) are needed to confirm the generalizability of findings across ethnic groups.

Limitations of the study must be considered. First, our analyses to estimate psychological reactivity imply a unidirectional path from experiences to emotion. Adolescents reported their collective mood and experiences at the end of the day and we cannot establish temporal precedence within a given day. It is plausible that adolescents' emotional states may have preceded the reported experiences (Hammen, 2006) or that that participants' reports of mood and experiences were influenced by their emotional state while completing the daily checklist. Additionally, adolescents were the sole reporters of their daily family experiences and psychological states. Finally, unlike the measurement of family assistance behaviors which consisted of a checklist of behaviors that day, family demands were captured from adolescents' responses to two items: if they had "a lot of work at home" and "a lot of family demands." It is possible that adolescents' perceptions of "a lot" of work and demands may be influenced by the perceived fairness of their family and home expectations. Likewise, it is possible that the reactivity to family demands is moderated by perceived fairness (Kuperminc, Jurkovic, & Casey, 2009). Future studies should examine the role of perceived fairness on adolescent

perceptions of family demands and subsequent mood.

Limitations notwithstanding, the current study represents a step toward answering important developmental questions about the nature of psychological reactivity in adolescence. Among our sample of Mexican-heritage adolescents for whom family centrality and connectedness are typically emphasized throughout socialization, we found significant associations between daily family experiences and adolescents' daily negative mood, positive mood, and sense of role fulfillment, underscoring the significant impact that day-to-day family experiences have on adolescent psychological states. At the same time, there was limited evidence for longitudinal stability and broad reactivity across different experiences, suggesting psychological reactivity may not be a strong individual difference trait. Future studies linking patterns of reactivity to mental health outcomes will help researchers identify potential targets for clinical intervention and addressing sex-related disparities in risk for psychopathology.

## REFERENCES


Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, *14*(2), 64–68. https://doi.org/10.1111/j.0963-7214.2005.00336.x

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, *9*(1), 41–55. https://doi.org/10.1177/1073191102091006

Almeida, D. M., & Kessler, R. C. (1998). Everyday stressors and gender differences in daily distress. *Journal of Personality and Social Psychology*, *75*(3), 670.

Armstrong-Carter, E., Ivory, S., Lin, L. C., Muscatell, K. A., & Telzer, E. H. (2020). Role fulfillment mediates the association between daily family assistance and cortisol awakening response in adolescents. *Child Development*, *91*(3), 754–768. https://doi.org/10.1111/cdev.13213

Bai, S., & Repetti, R. L. (2018). Negative and positive emotion responses to daily school problems: Links to internalizing and externalizing symptoms. *Journal of Abnormal Child Psychology*, *46*(3), 423–435. https://doi.org/10.1007/s10802-017-0311-8

Bai, S., Reynolds, B. M., Robles, T. F., & Repetti, R. L. (2017). Daily links between school problems and youth perceptions of interactions with parents: A diary study of school-to-home spillover. *Social Development*, *26*(4), 813–830. https://doi.org/10.1111/sode.12229

Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science*, *16*(6), 300–304.

Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, *135*(6), 885.

Bravo, D. Y., Umaña-Taylor, A. J., Guimond, A. B., Updegraff, K. A., & Jahromi, L. B. (2014). Familism, family ethnic socialization, and Mexican-origin adolescent mothers' educational adjustment. *Cultural Diversity and Ethnic Minority Psychology*, *20*(3), 389.

Birditt, K. S., Fingerman, K. L., & Almeida, D. M. (2005). Age differences in exposure and reactions to interpersonal tensions: A daily diary study. *Psychology and Aging*, *20*(2), 330.

Catalino, L. I., & Fredrickson, B. L. (2011). A Tuesday in the life of a flourisher: The role of positive emotional reactivity in optimal mental health. *Emotion*, *11*(4), 938. https://doi.org/10.1037/a0024889

Calderón-Tena, C. O., Knight, G. P., & Carlo, G. (2011). The socialization of prosocial behavioral tendencies among Mexican American adolescents: The role of familism values. *Cultural Diversity and Ethnic Minority Psychology*, *17*(1), 98. https://doi.org/10.1037/a0021825

Campos, B., Ullman, J. B., Aguilera, A., & Dunkel Schetter, C. (2014). Familism and psychological health: The intervening role of closeness and social support. *Cultural Diversity and Ethnic Minority Psychology*, *20*(2), 191.

Cauce, A. M., Cruz, R., Corona, M., & Conger, R. (2011). The face of the future: Risk and resilience in minority youth. *Nebraska Symposium on Motivation*, *57*, 13–32.

Chen, E., Brody, G. H., & Miller, G. E. (2017). Childhood close family relationships and health. *American Psychologist*, *72*(6), 555. https://doi.org/10.1037/amp0000067

Chiang, J. J., Tsai, K. M., Park, H., Bower, J. E., Almeida, D. M., Dahl, R. E., ... Fuligni, A. J. (2016). Daily family stress and HPA axis functioning during adolescence: The moderating role of sleep. *Psychoneuroendocrinology*, *71*, 43–53. https://doi.org/10.1016/j.psyneuen.2016.05.009

Cohen, S., Hamrick, N. M., Rodriguez, M. S., Feldman, P. J., Rabin, B. S., & Manuck, S. B. (2000). The stability of and intercorrelations among cardiovascular, immune, endocrine, and psychological reactivity. *Annals of Behavioral Medicine*, *22*(3), 171–179. https://doi.org/10.1007/BF02895111

Charbonneau, A. M., Mezulis, A. H., & Hyde, J. S. (2009). Stress and emotional reactivity as explanations for gender differences in adolescents' depressive symptoms. *Journal of Youth and Adolescence*, *38*(8), 1050–1058. https://doi.org/10.1007/s10964-009-9398-8

Charles, S. T., Piazza, J. R., Sliwinski, M. J., Mogle, J., & Almeida, D. M. (2013). The wear and-tear of daily stressors on mental health. *Psychological Science*, *24*(5), 733–741. https://doi.org/10.1177/0956797612462222

Delgado-Gaitan, C. (1994). Consejos: The power of cultural narratives. *Anthropology & Education Quarterly*, *25*

(1), 298–316. https://doi.org/10.1525/aeq.1994.25.3.04x0146p

Flook, L., & Fuligni, A. J. (2008). Family and school spillover in adolescents' daily lives. *Child Development*, *79*(3), 776–787.

Froh, J. J., Kashdan, T. B., Ozimkowski, K. M., & Miller, N. (2009). Who benefits the most from a gratitude intervention in children and adolescents? Examining positive affect as a moderator. *The Journal of Positive Psychology*, *4*(5), 408–422. https://doi.org/10.1080/17439760902992464

Froh, J. J., Yurkewicz, C., & Kashdan, T. B. (2009). Gratitude and subjective well-being in early adolescence: Examining gender differences. *Journal of Adolescence*, *32*(3), 633–650. https://doi.org/10.1016/j.adolescence.2008.06.006

Fuligni, A. J., Tseng, V., & Lam, M. (1999). Attitudes toward family obligations among American adolescents with Asian, Latin American, and European backgrounds. *Child Development*, *70*(4), 1030–1044.

Fuligni, A. J., & Hardway, C. (2006). Daily variation in adolescents' sleep, activities, and psychological well-being. *Journal of Research on Adolescence*, *16*(3), 353–378.

Germán, M., Gonzales, N. A., & Dumka, L. (2009). Familism values as a protective factor for Mexican-origin adolescents exposed to deviant peers. *The Journal of Early Adolescence*, *29*(1), 16–42. https://doi.org/10.1177/0272431608324475

Gilbert, K. E. (2012). The neglected role of positive emotion in adolescent psychopathology. *Clinical Psychology Review*, *32*(6), 467–481.

Greenberger, E., Chen, C., Tally, S. R., & Dong, Q. (2000). Family, peer, and individual correlates of depressive symptomatology among U.S. and Chinese adolescents. *Journal of Consulting and Clinical Psychology*, *68*(2), 209–19. https://doi.org/10.1037/0022-006X.68.2.209

Hammen, C. (2006). Stress generation in depression: Reflections on origins, research, and future directions. *Journal of Clinical Psychology*, *62*(9), 1065–1082.

John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality*, *72*(6), 1301–1334.

Kiang, L., Gonzales-Backen, M., Fuligni, A. J., Yip, T., & Witkow, M. (2006). Ethnic identity and the daily psychological well-being of adolescents from Mexican and Chinese backgrounds. *Child Development*, *77*(1), 1338–1350. https://doi.org/10.1111/j.1467-8624.2006.00938.x

Kim, J. J., Kodish, T., Bear, L., El-Hendi, T., Duong, J., & Lau, A. S. (2018). Disparities in follow-up care for Asian American youth assessed for suicide risk in schools. *Asian American Journal of Psychology*, *9*(4), 308. https://doi.org/10.1037/aap0000136

Knight, G. P., Mazza, G. L., & Carlo, G. (2018). Trajectories of familism values and the prosocial tendencies of Mexican American adolescents. *Developmental Psychology*, *54*(2), 378. https://doi.org/10.1037/dev0000436

Kuperminc, G. P., Jurkovic, G. J., & Casey, S. (2009). Relation of filial responsibility to the personal and social adjustment of Latino adolescents from immigrant families. *Journal of Family Psychology*, *23*(1), 14.

Langhinrichsen-Rohling, J., Friend, J., & Powell, A. (2009). Adolescent suicide, gender, and culture: A rate and risk factor analysis. *Aggression and Violent Behavior*, *14*(5), 402–414. https://doi.org/10.1016/j.avb.2009.06.010

Laursen, B., & Collins, A. W. (2009). Parent-adolescent relationships and influences. *Handbook of Adolescent Psychology*, *2*, 3–42.

Layous, K., Chancellor, J., & Lyubomirsky, S. (2014). Positive activities as protective factors against mental health conditions. *Journal of Abnormal Psychology*, *123*(1), 3.

Levine, C. S., Hoffer, L. C., & Chen, E. (2017). Moderators of the relationship between frequent family demands and inflammation among adolescents. *Health Psychology*, *36*(5), 493. https://doi.org/10.1037/hea0000469

Marin, G., & Marin, B. V. (1991). *Research with Hispanic populations*. Newbury Park, CA: Sage.

Martin, M. J., Conger, R. D., & Robins, R. W. (2019). Family stress processes and drug and alcohol use by Mexican American adolescents. *Developmental Psychology*, *55*(1), 170. https://doi.org/10.1037/dev0000629

McHale, S. M., Updegraff, K. A., & Whiteman, S. D. (2012). Sibling relationships and influences in childhood and adolescence. *Journal of Marriage and Family*, *74*(5), 913–930.

McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy*, *49*(9), 544–554. https://doi.org/10.1016/j.brat.2011.06.003

Mills, P. J., Berry, C. C., Dimsdale, J. E., Nelesen, R. A., & Ziegler, M. G. (1993). Temporal stability of task-induced cardiovascular, adrenergic, and psychological responses: The effects of race and hypertension. *Psychophysiology*, *30*(2), 197–204. https://doi.org/10.1111/j.1469-8986.1993.tb01732.x

Monat, A., Lazarus, R. S., Reevy, G., & Duncan, D. F. (2007). *The Praeger handbook on stress and coping*. Westport, CT: Praeger.

Mroczek, D. K., & Almeida, D. M. (2004). The effect of daily stress, personality, and age on daily negative affect. *Journal of Personality*, *72*(2), 355–378. https://doi.org/10.1111/j.0022-3506.2004.00265.x

Neupert, S. D., & Bellingtier, J. A. (2018). Daily diary designs in lifespan developmental psychology. In *Oxford research encyclopedia of psychology*.

O'Neill, S. C., Cohen, L. H., Tolpin, L. H., & Gunthert, K. C. (2004). Affective reactivity to daily interpersonal stressors as a prospective predictor of depressive symptoms. *Journal of Social and Clinical Psychology*, *23*(2), 172–194. https://doi.org/10.1521/jscp.23.2.172.31015

Ong, A. D., Exner-Cortens, D., Riffin, C., Steptoe, A., Zautra, A., & Almeida, D. M. (2013). Linking stable and dynamic features of positive affect to sleep. *Annals of Behavioral Medicine*, *46*(1), 52–61. https://doi.org/10.1007/s12160-013-9484-8

Parrish, B. P., Cohen, L. H., & Laurenceau, J. P. (2011). Prospective relationship between negative affective reactivity to daily stress and depressive symptoms. *Journal of Social and Clinical Psychology*, *30*(3), 270–296. https://doi.org/10.1521/jscp.2011.30.3.270

Perez, G., & Cruess, D. (2014). The impact of familism on physical and mental health among Hispanics in the United States. *Health Psychology Review*, *8*(1), 95–127.

Piazza, J. R., Charles, S. T., Sliwinski, M. J., Mogle, J., & Almeida, D. M. (2013). Affective reactivity to daily stressors and long-term risk of reporting a chronic physical health condition. *Annals of Behavioral Medicine*, *45*(1), 110–120.

Potochnick, S., Perreira, K. M., & Fuligni, A. (2012). Fitting in: The roles of social acceptance and discrimination in shaping the daily psychological well-being of Latino youth. *Social Science Quarterly*, *93*(1), 173–190. https://doi.org/10.1111/j.1540-6237.2011.00830.x

Robles, T. F., Reynolds, B. M., Repetti, R. L., & Chung, P. J. (2013). Using daily diaries to study family settings, emotions, and health in everyday life. *Journal of Social and Personal Relationships*, *30*(2), 179–188. https://doi.org/10.1177/0265407512457102

Santiago, C. D., Brewer, S. K., Fuller, A. K., Torres, S. A., Papadakis, J. L., & Ros, A. M. (2017). Stress, coping, and mood among Latino adolescents: A daily diary study. *Journal of Research on Adolescence*, *27*(3), 566–580. https://doi.org/10.1111/jora.12294

Schneiders, J., Nicolson, N. A., Berkhof, J., Feron, F. J., Van Os, J., & Devries, M. W. (2006). Mood reactivity to daily negative events in early adolescence: Relationship to risk for psychopathology. *Developmental Psychology*, *42*(3), 543.

Scott Stacey B., Sliwinski Martin J., Mogle Jacqueline A., Almeida David M. (2014) Age, stress, and emotional complexity: Results from two studies of daily experiences.. *Psychology and Aging*, *29* (3), 577–587. http://dx.doi.org/10.1037/a0037282

Silva, C., & Van Orden, K. A. (2018). Suicide among Hispanics in the United States. *Current opinion in psychology*, *22*, 44–49.

Shih, J. H., Eberhart, N. K., Hammen, C. L., & Brennan, P. A. (2006). Differential exposure and reactivity to interpersonal stress predict sex differences in adolescent depression. *Journal of Clinical Child and Adolescent Psychology*, *35*(1), 103–115.

Sliwinski, M. J., Almeida, D. M., Smyth, J., & Stawski, R. S. (2009). Intraindividual change and variability in daily stress processes: Findings from two measurement-burst diary studies. *Psychology and Aging*, *24*(4), 828. https://doi.org/10.1037/a0017925

Stein, G. L., Cupito, A. M., Mendez, J. L., Prandoni, J., Huq, N., & Westerberg, D. (2014). Familism through a developmental lens. *Journal of Latina/o Psychology*, *2*(4), 224. https://doi.org/10.1037/lat0000025

Telzer, E. H., & Fuligni, A. J. (2009). Daily family assistance and the psychological well-being of adolescents from Latin American, Asian, and European backgrounds. *Developmental Psychology*, *45*(4), 1177–1189. https://doi.org/10.1037/a0014728

Telzer, E. H., Tsai, K. M., Gonzales, N., & Fuligni, A. J. (2015). Mexican American adolescents' family obligation values and behaviors: Links to internalizing symptoms across time and context. *Developmental Psychology*, *51*(1), 75. https://doi.org/10.1037/a0038434

Telzer, E. H., & Fuligni, A. J. (2013). Positive daily family interactions eliminate gender differences in internalizing symptoms among adolescents. *Journal of Youth and Adolescence*, *42*(10), 1498–1511.

Telzer, E. H., Masten, C. L., Berkman, E. T., Lieberman, M. D., & Fuligni, A. J. (2010). Gaining while giving: An fMRI study of the rewards of family assistance among White and Latino youth. *Social Neuroscience*, *5* (5–6), 508–518.

Tsai, K. M., Telzer, E. H., Gonzalez, N. A., & Fuligni, A. J. (2013). Adolescents' daily assistance to the family in response to maternal need. *Journal of Marriage and the Family*, *75*(4), 964–980. https://doi.org/10.1111/jomf.12035

Tugade, M. M., Fredrickson, B. L., & Feldman Barrett, L. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality*, *72*(6), 1161–1190.

Uchino, B. N., Berg, C. A., Smith, T. W., Pearce, G., & Skinner, M. (2006). Age-related differences in ambulatory blood pressure during daily stress: Evidence for greater blood pressure reactivity with age. *Psychology and Aging*, *21*(2), 231–239. https://doi.org/10.1037/0882-7974.21.2.231

Updegraff, K. A., McHale, S. M., Whiteman, S. D., Thayer, S. M., & Delgado, M. Y. (2005). Adolescent sibling relationships in Mexican American families: Exploring the role of familism. *Journal of Family Psychology*, *19*(4), 512–522. https://doi.org/10.1037/0893-3200.19.4.512

Walsh, S., Shulman, S., Bar-On, Z., & Tsur, A. (2006). The role of parentification and family climate in adaptation among immigrant adolescents in Israel. *Journal of Research on Adolescence*, *16*(2), 321–350.

Wichers, M. C., Barge-Schaapveld, D. Q. C. M., Nicolson, N. A., Peeters, F., de Vries, M., Mengelers, R., & Os, J. V. (2009). Reduced stress-sensitivity or increased reward experience: The psychological mechanism of response to antidepressant medication. *Neuropsychopharmacology*, *34*(4), 923–931. https://doi.org/10.1038/npp.2008.66

Yap, M. B., Allen, N. B., & Ladouceur, C. D. (2008). Maternal socialization of positive affect: The impact of invalidation on adolescent emotion regulation and depressive symptomatology. *Child Development*, *79*(5),

1415–1431. https://doi.org/10.1111/j.1467-8624.2008.01196.x

Yuen, C. X., Fuligni, A. J., Gonzales, N., & Telzer, E. H. (2018). Family first? The costs and benefits of family centrality for adolescents with high-conflict families. *Journal of Youth and Adolescence*, *47*(2), 245–259.

Zayas, L. H., Lester, R. J., Cabassa, L. J., & Fortuna, L. R. (2005). Why do so many Latina teens attempt suicide? A conceptual model for research. *American Journal of Orthopsychiatry*, *75*(2), 275–287. https://doi.org/10.1037/0002-9432.75.2.275