Received: 22 December 2021 | Accepted: 23 December 2021

DOI: 10.1002/jad.12006

RESEARCH ARTICLE

Foundation for PSA WILEY

An examination of the moderating role of growth mindset in the relation between social stress and externalizing behaviors among adolescents

Kelsey A. Walker[1] | **Xu Jiang**[2]

[1]Department of Psychology, University of Memphis, Memphis, Tennessee, USA

[2]Department of Psychological Studies in Education, Temple University, Philadelphia, Pennsylvania, USA

Correspondence

Xu Jiang, Department of Psychological Studies in Education, Temple University, 1301 Cecil B Moore Ave, Philadelphia, PA 19122, USA.
Email: xjiang2@temple.edu

Abstract

Introduction: Experiencing elevated stress increases the risk of further difficulties in mental health, including externalizing behaviors in adolescents. There is a need for understanding the factors that help adolescents mitigate social stress to prevent problematic externalizing behaviors. Growth mindset has been found to be a promising protective factor in adolescent development including mental health. This study aimed to examine the potential buffering role of growth mindset of thoughts-emotion-and-behaviors in the context of two types of social stress (i.e., family and peer) to reduce externalizing behaviors among adolescents.

Methods: The sample is composed of 399 adolescents (age range 14–18 years, $M = 16.22$, $SD = 1.21$; 56.4% female, 42.3% male, 1.3% gender-nonconforming or variant) from a large, urban, diverse high school in the United States. Adolescent self-reports were administered at one time.

Results: Moderation analyses revealed that growth mindset of thoughts, emotion, and behaviors moderate the association between family stress and externalizing behaviors. The magnitude of this association weakened as the level of growth mindset increased, supporting the buffering effect of the moderator. Neither the moderation effect of growth mindset nor the main effects of peer stress and growth mindset were significant in predicting externalizing behaviors.

Conclusion: Taken together, the findings suggested that growth mindset has protective effects in reducing externalizing behaviors when adolescents experience family stress. Future directions and implications are discussed.

KEYWORDS

adolescents, externalizing behaviors, family stress, growth mindset, peer stress

1 | INTRODUCTION

Externalizing behaviors are defined as a set of outward, usually disruptive, behaviors that can be observed by others, including but not limited to aggression, hyperactivity, oppositionality, and impulsivity (Boeldt et al., 2012; Yong et al., 2014). In the Western culture, middle adolescence (around ages 14–17) is marked with peaks in delinquency and increased anxiety and depression (Farrington, 1986; Meeus et al., 2004). It is also the period of having a more fixed social circle, starting to go out and develop intimate relationships, and turbulent parent–adolescent relationships along with peaks in parent–adolescent conflict (Meeus, 2018). Both family stress and peer stress are positively associated with problems including externalizing behaviors within adolescence (Moksnes et al., 2016; Voisin et al., 2016). It is important to address externalizing behaviors in a preventive way to reduce the risk of further escalation, such as utilizing protective factors to help middle adolescents cope with social stress.

One protective factor in adolescent development that has gained research attention is growth mindset, which refers to one's belief in the changeability of certain traits or characteristics (Dweck & Leggett, 1988; Dweck, 1999), as opposed to fix mindset which indicates that one believes personal characteristics cannot be changed. Past studies related to growth mindset and mental health have primarily focused on internalizing problems, which are defined as an internal mood or emotional disturbance (Hughes & Gullone, 2008) and it often co-occurs with externalizing behaviors (McConaughy & Skiba, 1994). For instance, some domain-specific growth mindsets (e.g., regarding perceived stress or anxiety) have shown protective effects against symptoms of depression or anxiety (Jiang et al., 2019; Park et al., 2018; Schroder et al., 2017). However, little is known about whether growth mindset can buffer against stressors to reduce externalizing behaviors in middle adolescence. The current study aimed to bridge this gap by investigating if growth mindset of thoughts-emotion-behavior moderates the relation between two social stressors (i.e., peer and family) and externalizing behaviors in adolescents.

1.1 | Peer and family stress during adolescent development

Stress occurs when an environmental event's demands outweigh a person's available resources to cope with the event (Cohen et al., 1983). The role of such environmental stressors in the etiology and the maintenance of both internalizing and externalizing behaviors in youth has been recognized (Grant et al., 2003). During adolescent years, many transitions occur, and they are often associated with heightened levels of social stress (Faris & Felmlee, 2011), especially from family and peer interactions.

Peer stress is typically induced by problems such as not fitting in, disagreements with peers, being teased due to physical looks, and competitiveness regarding material items, grades, or sports (Byrne et al., 2007; Lau, 2002). Peer stressors have been found to be associated with internalizing and externalizing behaviors in adolescents (Bakker et al., 2012; Hazel et al., 2014; Moksnes et al., 2016). Peer stress, especially if due to peer rejection, was found to predict aggression and rule-breaking behavior in 9th graders (Janssens et al., 2017).

Family stress refers to stress within the adolescent's home, commonly encompassing arguments or disagreements in the home, a lack of trust from parents, or a feeling of not having enough control (Byrne et al., 2007). Parent–child conflict, in particular, is a robust predictor of adolescent externalizing behaviors (Gunlicks-Stoessel & Powers, 2008; Little et al., 2019; Schermerhorn et al., 2013; Steeger et al., 2017). Family stress was associated with a range of severe externalizing behavioral problems, such as delinquent behaviors, substance use, risky sexual behaviors, and antisocial behaviors (Deković et al., 2003; Low et al., 2012; Voisin et al., 2016). In addition, research has shown that family stress is more frequently reported than peer stress among adolescents, and family stress is perceived to be more stressful than problems with peers (Byrne et al., 2007; Persike & Seiffge-Krenke, 2016). Taken together, heightened stress in peer and family contexts increases the probability of more risky behaviors and mental health problems, including externalizing behaviors, in adolescents.

1.2 | Implicit theories and youth development

The concept of growth mindset is rooted in implicit theories, which are core assumptions that an individual has regarding the malleability of their personal qualities (Dweck & Leggett, 1988). Implicit theories are broken down into two theories on opposite ends of a continuum, entity theories, and incremental theories. Entity theory (or fixed mindset) is the belief that characteristics are fixed or unchangeable, while incremental theory (or growth mindset) is the belief that personal qualities can be developed or grown. The origin of mindsets is unclear and beyond the scope of this study, but the existing literature has noted that children as young as 9 years can reliably report their beliefs about intelligence and personality (especially fixed mindset, Blackwell et al., 2007; Erdley & Dweck, 1993) and adults' responses to children's performance, such as success, failure, or mistakes, shape children's own beliefs about their intelligence (Gunderson et al., 2018; Haimovitz & Dweck, 2016; Park et al., 2016; Pomerantz & Kempner, 2013). Further, children's implicit theories can be reinforced by experience that is consistent with their beliefs, or changed if they are receptive to new, influential messages that shift their beliefs (e.g., through growth mindset interventions, Schleider & Weisz, 2016c, 2018). Thus, mindsets appear to emerge as a part of children's cognitive development and are malleable.

Adolescence can be an especially critical time to study mindsets about TEB in social stress context. Compared to children, adolescents are more sensitive to and experience more intense and prolonged physiological responses to social stress (Stroud et al., 2009). Moreover, adolescence is the time when young people increasingly interpret social threat in maladaptive ways, including more fixed attributions about social attributes (Birnbaum et al., 2010; Killen et al., 2010), particularly among those who experience emotional distress (Schleider & Weisz, 2016a, 2016b, 2016c). Thus, researchers have proposed that fixed mindset might be an especially potent vulnerability factor for mental health problems during adolescence (Miu & Yeager, 2015; Schleider et al., 2015; Yeager et al., 2014). Relatedly, fostering growth mindset might be especially meaningful to add a protective factor to prevent or reduce mental health problems in adolescent development (Sisk et al., 2018).

There has been an abundance of growth mindset research in the past few decades, especially in the areas of intelligence and personality (Dweck, 2006; Yeager & Dweck, 2012).

Individuals with stronger growth mindsets (both naturally and enhanced through intervention) have been found to have greater academic achievement than those with fixed mindsets (Blackwell et al., 2007; Dweck & Leggett, 1988). Intervention studies have demonstrated the malleability of mindsets and in general supported positive effects of growth mindset interventions geared toward both academic and nonacademic outcomes. However, statistically nonsignificant effects of such interventions, even with high-quality randomized control designs, were found (Foliano et al., 2019). Additionally, a recent meta-analysis concluded that the overall effect of growth mindset interventions is weak, but such interventions were most beneficial for students considered academically "at-risk" or with low socioeconomic status (Sisk et al., 2018). Yeager and Dweck's (2020) recent responses to controversies about growth mindset indicate that the effects of mindset across studies are meaningfully heterogeneous across individuals and contexts, which cannot be captured by an overall effect size based on meta-analyses (e.g., Sisk et al., 2018) without considering heterogeneity across studies. Yeager and Dweck (2020) also noted that higher levels of obstacles or setbacks (in the academic mindset domain) seem to be a necessary situational factor for growth mindset to exert its positive effects.

Research on mindsets in other domains, such as personality and emotion-related constructs, is emerging, and evidence has suggested a promising linkage between mindsets and social-emotional as well as behavioral outcomes. For example, growth mindset of personality has been found to predict greater resilience in the face of social exclusion or victimization (Yeager & Dweck, 2012). Additionally, fixed mindset of emotions was associated with decreased self-esteem and life satisfaction and increased psychological distress (stress and depression; De Castella et al., 2013).

Implicit theory research has revealed gender differences and the tendency is female adolescents are more likely subscribe to an entity theory of intelligence and academic abilities (e.g., math, Dweck, 2002; Stipek & Gralinski, 1996; Todor, 2014). Research that examined racial differences in implicit theories is rare, but among existing empirical reports, researchers reported compared to European Americans, African Americans are more likely to endorse an incremental theory of ability in learning (Aronson et al., 2002; Lewis, 1999) and sports (Li et al., 2004).

A relatively new area of implicit theory research focuses on a construct closely associated with mental health, including thoughts, emotion, and behavior, called implicit theories of thoughts-emotion-behavior (TEB). This implicit theory construct was found to demonstrate three separate but correlated factors (i.e., thoughts, emotions, and behaviors) through an exploratory factor analysis (Schleider & Weisz, 2016a) and a confirmatory factor analysis (Jiang et al., 2022). Entity theorists (or those who hold a fixed mindset) believe that their thoughts, emotions, and behaviors cannot be changed; whereas incremental theorists (or those who hold a growth mindset) believe that those characteristics are malleable (Schleider & Weisz, 2016b). Only a few studies about implicit theories of TEB are published to this day. Schleider and Weisz (2016a) found that fixed mindsets of TEB were associated with increased mental health problems in a sample of early adolescents (6th–8th grades). They also found that girls endorsed stronger fixed mindsets of TEB than boys; and girls with fixed mindsets in this study reported more mental health problems than boys (Schleider & Weisz, 2016b). Racial differences in implicit theory in the area of mental health are unknown. Overall, research on implicit theories of TEB is promising though more investigation is needed.

Several studies tested the protective function of growth mindsets using moderation models (Jach et al., 2018; Jiang et al., 2019; Park et al., 2018; Schroder et al., 2017). For instance, in one study with a sample of undergraduates, Schroder et al. (2017) found that growth mindset of anxiety moderated the relation between stressful life events (e.g., physical assault and natural disaster) and perceived distress and maladaptive coping behaviors (i.e., alcohol abuse and non-suicidal self-injury). This study measured more serious stressors as opposed to commonly experienced stressors, and more serious behavioral problems in adults instead of adolescents. Nevertheless, it incorporated the use of growth mindset in the mental health context and found promising results suggesting the buffering role of growth mindset. In a longitudinal study with middle schoolers (1343 8th graders), Park et al. (2018) tested the moderating effect of growth mindset of stress, which referred to the belief that stress can be beneficial, in comparison to a fixed mindset of stress, or the belief that stress is necessarily detrimental. They found that growth mindset of stress weakened the relation between adverse life events (e.g., close friend had problems, parents separated or divorced) and perceived distress (Park et al., 2018). In another study, growth mindset of stress was reported to be a moderator between stressful life events and depressive symptoms but not life satisfaction in a sample of 396 young adolescents (ages 10–14) (Jiang et al., 2019). Overall, the findings from these studies supported the protective effects of growth mindset in the context of stress.

The mechanism that explains how mindsets work to affect the outcomes have been discussed through different theory lenses. Rooted in attribution theory and achievement goal theory (Dweck & Leggett, 1988; Dweck, 1999; Dweck & Yeager, 2019), mindset theory is thought to orient students toward different "meaning systems" in the face of challenges and setbacks, which result in different attributions, goals, and behaviors. In the academic context, the differences are manifested in how students with different mindsets respond to failure or difficult academic transitions: those with a growth mindset of intelligence would continue to put forth good efforts in learning, whereas those with a fixed mindset of intelligence tend to disengage and feel helpless (Dweck & Leggett, 1988; Yeager et al., 2014). In the social-emotional areas, the meaning system

can be fundamental as well when individuals experience difficult or traumatic life events, mainly through affecting individuals' coping responses (e.g., Lyubomirsky, 2001; Masten, 2007). For example, when experiencing elevated social stress, adolescents who hold fixed mindset of TEB may feel inadequate to change their responses or situation, disengage, and feel helpless. Such interaction between dysfunctional beliefs and negative life events tends to exacerbate the problems, and fixed mindset may serve as a cognitive "vulnerability" to adverse impact of negative life events (cognitive vulnerability–stress model, Beck, 1987). Because of the likely disengagement, fixed mindset of TEB may send adolescents to a downward path whereby they lose chances to learn or practice adaptive coping skills, which could make them ill-prepared for future stress. Conversely, adolescents who hold growth mindset of TEB more likely view the negative experience as temporary and can be altered through effort, and they are more able to distance from negative or dysfunctional thoughts, emotions, and behaviors. For growth mindset-oriented adolescents, social stress even can be an opportunity for gaining and exercising coping skills that lead to self-improvement, which would better prepare them for future obstacles. Thus, growth mindset of TEB may operate as a cognitive *protective* factor that reduces maladaptive coping in the face of elevated social stress and subsequently reduce psychopathology.

1.3 | The current study

Adolescents who experience adverse, elevated, and chronic stress in life are at higher risk of developing externalizing behaviors (Calvete et al., 2017; Steeger et al., 2017). Recent studies on different domains of implicit theories have shown that growth mindset has a positive effect in mitigating the association between stress and maladaptive coping strategies and internalizing problems (Park et al., 2018; Schleider & Weisz, 2018; Schroder et al., 2017). It is plausible that growth mindset also can protect adolescents when they experience family or peer stress from developing externalizing behaviors. The primary research questions for the current study are: Does growth mindset of TEB interact with family stress and peer stress, respectively, to predict externalizing behaviors? See Figure 1 for the conceptual model. It was hypothesized that growth mindset would interact with each type of stress to predict externalizing behaviors, and further, the stronger the growth mindset is, the smaller the magnitude of the association between each type of stress and externalizing behaviors. Gender, age, and race were controlled as covariates based on previous research suggesting group differences across these demographics in externalizing behaviors in adolescents (Bierman & Welsh, 1997; Bongers et al., 2003; Cuffe et al., 2005; Daughters et al., 2009).

2 | METHODS

2.1 | Participants

Participants were students at a large public urban high school from a city in the mid-south region of the United States. The participants include a total of 399 students in grades 9 through 12 and ranged in age from 14 to 18 ($M = 16.22$, $SD = 1.21$). The majority of participants were female (56.4%), with 42.3% being male, and 1.3% identifying as gender-nonconforming or a gender variant. Most participants reported living with a set of two parents (70.4%). There were a variety of parental education levels obtained with the highest being a graduate degree (26.1%), and an undergraduate degree (26.1%), followed by high school (18%), professional school (14.5%), and middle school (4.5%). More than a third of the sample identified as Black (35.1%), while other racial/ethnic groups reported were Asian American (10.8%), White (29.3%), Hispanic or Latinx (12.3%), and Biracial or Multiracial (9.5%). Other racial/ethnic groups reported were Native American and Middle Eastern (1%).

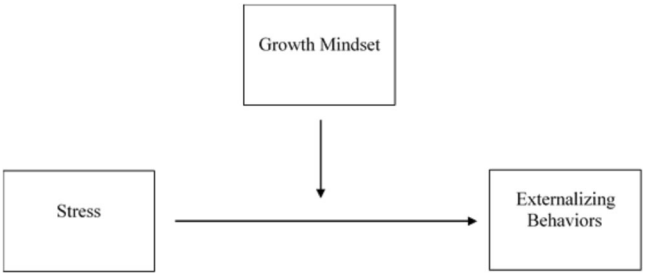

FIGURE 1 Conceptual model of the current study. Each type of normative stress, including family and peer stress, will be a single predictor in each moderation model

2.2 | Procedure

The current study was a part of a larger study that investigated psychological strengths in youth, approved through the Institutional Review Board at the authors' university. The data were cross-sectional and collected via a paper-and-pencil format in January 2020 (before the onset of COVID-19 pandemic in the United States). Only student self-report data was collected due to practical constraints. All students in attendance were given a parental consent to take home the day before the administration day. Those who brought back the signed parental consent were given the measures to fill out in class. Student assent was shown on the front page of the survey, and students were informed that participation was anonymous and voluntary. Homeroom teachers used the standardized protocol to administer the survey and graduate research assistants were available to assist with the administration.

2.3 | Measures

2.3.1 | Peer and family stress

Two subscales from the Adolescent Stress Questionnaire (ASQ; Byrne et al., 2007) were used to measure peer stress (7 items) and family stress (12 items). Participants rated their stress experiences in the past year on a 5-point Likert scale ranging from *not at all stressful or irrelevant to me* to *very stressful*. An example of the items from each subscale is "parents expecting too much from you (family stress)" and "pressure to fit in with peers (peer stress)." The ASQ subscales demonstrated test–retest reliability over the course of 1 week ($r = .68–.88$) and construct validity, convergent validity, and discriminant validity were also supported (Byrne et al., 2007). The alpha coefficients of these subscales based on the current sample are .87 (family stress) and .88 (peer stress).

2.3.2 | Externalizing behaviors

Two subscales from the Strengths and Difficulties Questionnaire (SDQ) were used to measure externalizing behaviors (Goodman et al., 1998). The SDQ has a total of 5 subscales including Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems, and Prosocial Behavior, but research using both exploratory and confirmatory factor analyses has indicated that a three-factor structure of the scale is more stable in youth (Goodman et al., 2010; Muris et al., 2004; Ruchkin et al., 2008). Assuming the three-factor structure, the Hyperactivity and Conduct Problems subscales were combined to measure externalizing problems, with 10 items in total. The SDQ consists of a 3-point scale including *Not True*, *Somewhat True*, and *Very True,* and participants are asked to answer based on the past 6 months. The SDQ is not a standardized measure, and the total raw scores are used. An example item is "I am restless. I cannot stay still for long." Past research showed that internal consistency was good with alpha coefficients of .68–.76 for externalizing behaviors (Muris et al., 2003; Ruchkin et al., 2008). Test–retest reliability was found to be acceptable over the course of 2 months and concurrent validity was supported for Dutch youth aged 12–15 (Muris et al., 2003). The internal consistency of the combined externalizing behaviors subscale used in the current study is .73. Additionally, the self-report form of this measure has been validated by several studies (Goodman et al., 1998; Richter et al., 2011; Ruchkin et al., 2008) and has been widely used for both research and clinical purposes (Black et al., 2021).

2.3.3 | Growth mindset

Implicit Thoughts-Emotion-Behavior Questionnaire (ITEB-Q) is a self-report measure designed for youth populations and developed using other implicit theory measures (Schleider & Weisz, 2016c). This measure includes 12 items and uses a 6-point Likert scale ranging from *Very False* to *Very True* to measure how participants feel about the changeability of thoughts, feelings, and behavior among youth their age. The scale scores represent a continuum from fixed mindset (or entity theory) to growth mindset (or incremental theory) with higher total scores meaning stronger growth mindset beliefs. An example of an item is "You can always choose how you behave." Test–retest reliability using correlation coefficients was shown to be acceptable for 3 months (.46–.57) and 6 months (.57–.60; Schleider & Weisz, 2016a). Additionally, Cronbach's alphas for the past study for the three individual scales (i.e., feelings, thoughts, and behaviors) ranged from .74 to .82. This instrument was modeled after other implicit theory instruments that have been shown to have moderate to high internal consistency, test–retest reliability, and construct validity (Da Fonseca et al., 2008, 2009; Dweck, 1999; Schleider et al., 2015). Evidence supporting the factorial and criterion validity of the scale was reported in multiple studies (Schleider & Weisz, 2016a; Jiang et al., 2022). The internal consistency of the scale for the current study is .91.

2.4 | Planned analyses

Analyses were completed using the IBM Statistical Package for Social Sciences 26.0 (IBM SPSS, IBM Corp, 2019). The current data were, initially, analyzed for missing data, normality, and outliers (Tabachnik & Fidell, 2013). Missing data is less than 8% across all main variables (8% of family stress, 6.5% of peer stress, 7.8% of growth mindset, and 4% of externalizing behavior problems). Expectation maximization was used for missing data (Schlomer et al., 2010). The PROCESS macro for SPSS was used to run two simple moderation analyses (Hayes, 2013). The interaction between stress and growth mindset was analyzed and an effect was considered statistically significant if there was not a zero included in the 95% confidence interval (CI; Preacher & Hayes, 2008). If the interaction effect was statistically significant, conditional analyses were run to determine how the direction and the strength of the association between stress and externalizing behaviors change across the PROCESS macro's three default levels (Hayes, 2015), low (16th percentile), moderate (50th percentile), and high (84th percentile) levels of growth mindset.

3 | RESULTS

3.1 | Preliminary analyses

Averages reported for family stress ($M = 2.77$) and peer stress ($M = 2.30$) were between *A Little Stressful* and *Moderately Stressful*. The skewness and kurtosis indicated a normal distribution of the data. Externalizing behavior problems were normally distributed with an average indicative of mild problems in this sample ($M = 5.70$, $SD = 3.34$). The average level of the mindset scores ($M = 4.37$) suggested a relatively higher level of growth mindset. Gender differences revealed that male participants had statistically significantly stronger levels of growth mindset ($M = 4.48$) than females ($M = 4.30$; $t(388) = 2.33$, $p < .05$). Black adolescents reported statistically significantly stronger growth mindset ($M = 4.46$) than White adolescents ($M = 4.19$; $t(255) = -2.74$, $p < .01$). Correlations between main variables were all in the expected directions. Both stress types were positively and strongly correlated with each other. Both stressors have positive correlations with externalizing behaviors in the small range. Growth mindset was negatively correlated with externalizing behaviors and both stress types in the small range. See Table 1 for descriptive statistics and correlational results.

3.2 | Moderation analyses

In the first model with family stress as the predictor, both gender and race significantly predicted externalizing behaviors. The overall model was found to be statistically significant, $R^2 = .17$, $F(6, 381) = 13.03$, $p < .001$. The interaction term for family stress and growth mindset accounted for a significant proportion of the variance in externalizing behaviors, $\Delta R^2 = .01$, $\Delta F(1, 381) = 6.78$, $p < .01$, $b = -0.61$, 95% CI [−1.07, −0.15], $t = -2.60$, $p < .01$. The moderation effect of growth mindset is statistically significant in the relation between family stress and externalizing behaviors. The conditional effect analysis revealed that across low (16th percentile), moderate (50th percentile), and high (84th percentile) levels of growth mindset, the associations between family stress and externalizing behaviors were positive and statistically significant ($bs = 1.51, 1.05, 0.64$, all $ps < .01$). As the level of growth mindset increased, the association between family stress and externalizing behaviors weakened. Based on the CIs, the interaction effect size as well as the conditional effect size are unlikely to be zero. The regression and the conditional effect results are shown in Table 2 and Figure 2.

In the model with peer stress as the predictor, the overall model accounted for a significant amount of the variance in externalizing behaviors, $R^2 = .11$, $F(6, 381) = 8.05$, $p < .001$. The interaction between peer stress and growth mindset was not statistically significant, neither the main effects of peer stress nor growth mindset (see Table 3).

TABLE 1 Descriptive statistics and correlations of stress, externalizing behaviors, and growth mindset

Measure $N = 399$	Mean	*SD*	Range	Skewness	Kurtosis	1.	2.	3.	4.
1. Family stress	2.77	0.93	1–5	−0.03	−0.75	–	–	–	–
2. Peer stress	2.30	0.98	1–5	0.62	−0.33	.61**	–	–	–
3. Externalizing behaviors	5.70	3.34	0–16	0.60	0.10	.30**	.22**	–	–
4. Growth mindset	4.37	0.81	2–6	−0.28	0.11	−.22**	−.24**	−.27**	–

**Significance at the .01 level.

TABLE 2 Moderating effects of growth mindset on the relation between family stress and externalizing behaviors

	R^2	F	b	se	t	ΔR^2	LLCI	ULCI
Model summary	.17	13.03**						
$N = 388$								
Constant			2.71	3.93	0.69		−5.01	10.44
Gender			−0.83	0.32	−2.63**		−1.46	−0.21
Race			0.25	0.11	2.27*		0.03	0.46
Age			−0.21	0.13	−1.57		−0.46	0.05
Family stress			3.76	1.08	3.49**		1.64	5.87
Growth mindset			0.87	0.70	1.24		−0.51	2.26
Family stress × growth mindset		6.78**	−0.61	0.24	−2.60**	.01	−1.07	−0.15
Conditional effects		**Growth mindset levels**	b	se	t		LLCI	ULCI
		Low (3.67)	1.51	0.27	5.68**		0.99	2.03
		Moderate (4.41)	1.05	0.18	5.89**		0.70	1.41
		High (5.08)	0.64	0.22	2.88**		0.20	1.08

Note: Significant interactions were probed using the 16th, 50th, and 84th percentiles to estimate the conditional effects of the predictor at low, moderate, and high levels of the moderator. Gender: Male or Female; Race: Asian or Asian American, Black or African American, Hispanic or Latinx, White or European American, Native American, Biracial or Multiracial, Other (e.g., Middle Eastern).

*$p < .05$; **$p < .01$.

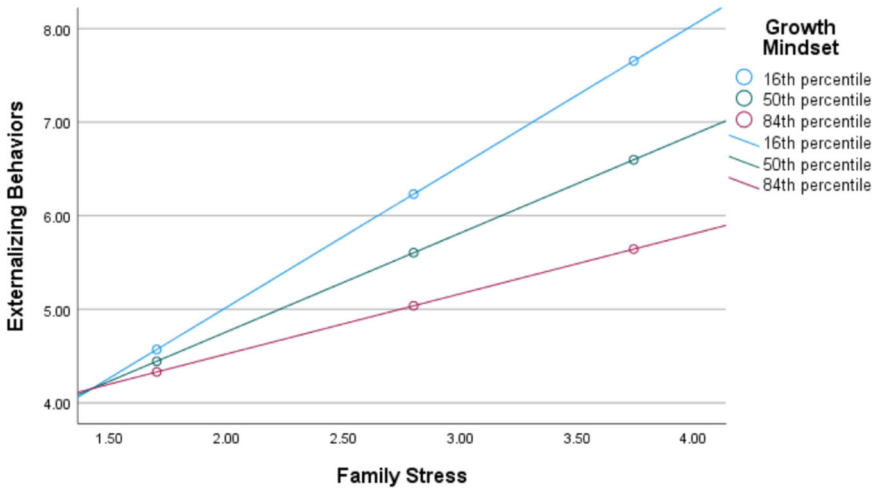

FIGURE 2 Conditional effects of growth mindset in the relation between family stress and externalizing behaviors [Color figure can be viewed at wileyonlinelibrary.com]

4 | DISCUSSION

The current study sought to examine the buffering role of growth mindset of TEB in affecting adolescents' externalizing behaviors, represented by conduct problems and hyperactivity, in the context of family and peer stress. The primary finding is that growth mindset moderated the relation between family stress and externalizing behaviors. Specifically, as the level of growth mindset increased, the magnitude of the relation between family stress and externalizing behaviors weakened. The moderation effect of growth mindset was not significant in the peer stress model. Major findings are discussed in more detail below.

First, despite the relatively high levels of growth mindset of TEB in this sample, girls reported lower levels of growth mindset, or higher levels of fixed mindset, than boys, which is consistent with past research (Schleider & Weisz, 2016a). Schleider and Weisz (2016a) postulated that these gender differences might be due, in part, to more interpersonal conflict and perceived social stress among early adolescent girls, which increases the negative experiences associated with such stress and contribute to more fixed mindset about their abilities to change the experiences. However, more research is needed to explore

TABLE 3 Moderating effects of growth mindset on the relation between peer stress and externalizing behaviors

	R^2	F	b	se	t	ΔR^2	LLCI	ULCI
Model summary	.11	8.05**						
$N = 388$								
Constant			11.36	2.46	3.29**		4.57	18.16
Gender			−0.58	0.32	−1.80		−1.22	0.06
Race			0.27	0.11	2.38*		0.05	0.49
Age			−0.16	0.14	−1.20		−0.43	0.10
Peer stress			0.57	0.93	0.62		−1.25	2.40
Growth mindset			−0.97	0.53	−1.82		−2.01	0.08
Peer stress × growth mindset		0.00	0.00	0.21	0.00	.00	−0.41	0.41

Note: Gender: Male or Female; Race: Asian or Asian American, Black or African American, Hispanic or Latinx, White or European American, Native American, Biracial or Multiracial, Other (e.g., Middle Eastern).

*Significance at the .05 level.

**Significance at the .01 level.

the potential mechanisms in which gender differences develop. We also found that Black students reported significantly stronger growth mindsets than White students, which aligns with the pattern found in previous few studies of implicit theories in academic and sport abilities (Aronson et al., 2002; Lewis, 1999; Li et al., 2004). Our results suggested this pattern can be generalized to growth mindset of thoughts, emotions, and behaviors. It is possible that this type of growth mindset has a stronger adaptive function and thus is fostered in the cultural context in which Black adolescents grow up, thereby making it more cognitively accessible to Black adolescents. This proposition, as well as other reasons that might lead to differences across races or cultural groups, need to be tested in future research.

Second, the most important finding is the moderation effect of growth mindset in the linkage between family stress and externalizing behaviors. When adolescents displayed higher levels of growth mindset, the positive association between family stress and externalizing behavior problems was weakened. This finding supported the protective effects of growth mindset in the context of stress reported in previous studies that used internalizing problems as the outcome, such as depression, distress, or maladaptive coping strategies (Jiang et al., 2019; Park et al., 2018; Schroder et al., 2017). On the flip side, in the context of a high level of family stress, if growth mindset is weak then it appears to be a risk factor for externalizing problems. Overall, the current study's findings indicate that the protective effect of growth mindset may extend to externalizing behaviors among adolescents, at least in the context of family stress.

How growth mindset works to buffer against family stress remains a question. Both non-intervention studies and intervention studies provided some evidence regarding how growth mindset facilitates or how fixed mindset inhibits positive functioning, which shed light on the mechanism that may explain the buffering function of growth mindset. For example, Yeager and Dweck (2012) posited that youth with fixed mindsets have more negative interpretations of stressful situations and these negative interpretations more likely lead to greater mental health problems than in those who have more positive interpretations of stress. Fixed mindsets have also been found to be associated with maladaptive thinking after difficulties, which would lead to negative consequences for adolescents' mental health (Schleider et al., 2019; Yeager & Dweck, 2012). In the context of family stress, adolescents with fixed mindsets tend to believe that they are unable to control their thoughts, emotions, and behaviors that result from stress. Then, it is less likely for them to think in a positive way, find constructive solutions, or resolve the problems related to stress; instead, they are more likely interpret stress (e.g., arguments with parents) negatively, feel less in control of regulating their thoughts and emotions, and resort to more maladaptive coping, such as displaying externalizing behaviors.

Last but not least, it is interesting that growth mindset functions as a moderator for family stress but not for peer stress. On one hand, given the increasing importance of peer interaction in adolescents' lives, how growth mindset interacts with peer stress to affect behaviors might be more complicated (e.g., depending on types or severity of the stress, or affecting behaviors that are more closely associated with peer interactions, such as aggression and hostility, rather than hyperactivity and conduct problems) and was not captured in the proposed model in the current study. Future research needs to incorporate other variables and effects to reveal the mechanism of how growth mindset works in the context of peer stress. On the other hand, the protective role of growth mindset (of anxiety) indicated in previous findings (e.g., predicting decreased PTSD symptoms, depression symptoms, substance abuse, and non-suicidal self-injury in undergraduates; Schroder et al., 2017) was in the context of significant life stressors, which might be different from the context of nonsignificant stress, such as peer stress measured in the current study. However, it is a robust finding that adolescents tend to report family stress

as more stressful than peer stress and that family stress has strong effects on adolescent mental health (Francisco et al., 2015; Henderson et al., 2006; Persike & Seiffge-Krenke, 2016). It is possible that there are more similarities between family stress, especially when it is chronic and accumulative, and significant life stress, and hence the function of growth mindset in the family stress model might be similar to that in the context of significant stress. Clearly, these propositions need future research to discover and to examine the possible mechanism that can explain the differential interactions between different types of stress (e.g., family vs. peer) and growth mindset.

4.1 | Limitations and future directions

Despite the use of a diverse middle adolescent sample in a study with a relatively novel research question, several limitations should be noted. First, the participants were all middle adolescents from one urban high school in one region of the United States, which do not represent adolescents across other developmental substages (early and late adolescence), or in other geographical regions or from rural and suburban areas. Also, given the setting of a large, well-resourced public school and a large portion of parents having either a bachelor's or master's degree, this sample may not represent adolescent populations that experience more elevated levels of family or peer stress. It is also a normatively developed sample and thus the results may not be able to be generalized to clinical populations with significantly elevated externalizing behaviors. Future studies should strive to include adolescents from more diverse geographic, economic, and cultural backgrounds, as well as clinical samples. Second, though one-time data point is sufficient for moderation analysis and appropriate to answer the research questions in the present study, the cross-sectional nature of the data does not allow for causal inferences to be made or track the effect of mindset over time. Future studies should incorporate a longitudinal, experimental, or interventional design to draw further conclusions about associations between the variables.

Third, the current study relied solely on self-report methods of stress, growth mindset, and externalizing behavior problems. Some limitations of self-report include participants reporting more socially desirable answers than accurate responses and participants' ability to assess themselves accurately. Especially self-reports tend to be less reliable to detect externalizing problems than observer reports. In future studies, researchers should consider including parent or teacher reports as well as self-reports to assess externalizing problems, which can yield more accurate results and be more sensitive to change or group differences. Finally, the effect size of the detected interaction effect as well as conditional effects are small and may not indicate meaningful practical value of changing the mindsets and need to be interpreted with caution. Replication and further studies are needed to confirm the buffering role of growth mindset. Also, there is a lack of knowledge regarding the mechanisms of the plausible moderating effect of growth mindset in specific contexts (e.g., family stress), and thus more studies are needed to explore these mechanisms.

ACKNOWLEDGMENTS

The authors received no financial support for the conduct of the research and preparation of this article.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

ETHICS STATEMENT

Ethics approval was obtained from the ethics committee at the first author (KW)'s university.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, XJ, upon reasonable request.

ORCID

Xu Jiang https://orcid.org/0000-0001-7324-7125

REFERENCES

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, *38*, 113–125. https://doi.org/10.1006/jesp.2001.1491

Bakker, M. P., Ormel, J., Verhulst, F. C., & Oldehinkel, A. J. (2012). Childhood family instability and mental health problems during late adolescence: A test of two mediation models—The TRAILS study. *Journal of Clinical Child & Adolescent Psychology*, *41*(2), 166–176.

Beck, A. T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy: An International Quarterly*, *1*, 5–37.

Bierman, K. L., & Welsh, J. A. (1997). Social relationship deficits. In E. J. Mash, & L. G. Terdal (Eds.), *Assessment of childhood disorders* (pp. 328–365). Guilford Press.

Birnbaum, D., Deeb, I., Segall, G., Ben-Eliyahu, A., & Diesendruck, G. (2010). The development of social essentialism: The case of Israeli children's inferences about Jews and Arabs. *Child Development*, *81*(3), 757–777.

Black, L., Mansfield, R., & Panayiotou, M. (2021). Age appropriateness of the self-report strengths and difficulties questionnaire. *Assessment*, *28*(6), 1556–1569.

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, *78*(1), 246–263.

Boeldt, D. L., Rhee, S. H., DiLalla, L. F., Mullineaux, P. Y., Schulz-Heik, R. J., Corley, R. P., Young, S. E., & Hewitt, J. K. (2012). The association between positive parenting and externalizing behaviour. *Infant and Child Development*, *21*(1), 85–106.

Bongers, I. L., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology*, *112*(2), 179–192.

Byrne, D., Davenport, S., & Mazanov, J. (2007). Profiles of adolescent stress: The development of the adolescent stress questionnaire. *Journal of Adolescence*, *30*(3), 393–416.

Calvete, E., Orue, I., & Sampedro, A. (2017). Does the acting with awareness trait of mindfulness buffer the predictive association between stressors and psychological symptoms in adolescents? *Personality and Individual Differences*, *105*, 158–163.

De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Dweck, C. S., & Gross, J. J. (2013). Beliefs about emotion: Links to emotion regulation, well-being, and psychological distress. *Basic and Applied Social Psychology*, *35*(6), 497–505.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396.

Cuffe, S. P., Moore, C. G., & McKeown, R. E. (2005). Prevalence and correlates of ADHD symptoms in the national health interview survey. *Journal of Attention Disorders*, *9*(2), 392–401.

Daughters, S. B., Reynolds, E. K., MacPherson, L., Kahler, C. W., Danielson, C. K., Zvolensky, M., & Lejuez, C. W. (2009). Distress tolerance and early adolescent externalizing and internalizing symptoms: The moderating role of gender and ethnicity. *Behaviour Research and Therapy*, *47*(3), 198–205.

Da Fonseca, D., Cury, F., Fakra, E., Rufo, M., Poinso, F., Bounoua, L., & Huguet, P. (2008). Implicit theories of intelligence and IQ test performance in adolescents with Generalized Anxiety Disorder. *Behaviour Research and Therapy*, *46*(4), 529–536.

Da Fonseca, D., Cury, F., Santos, A., Payen, V., Bounoua, L., Brisswalter, J., Rufo, M., Poinso, F., & Deruelle, C. (2009). When depression mediates the relationship between entity beliefs and performance. *Child Psychiatry and Human Development*, *40*(2), 213–222.

Deković, M., Janssens, J. M., & Van As, N. M. (2003). Family predictors of antisocial behavior in adolescence. *Family Process*, *42*, 223–235.

Dweck, C. S. (1999). Caution—Praise can be dangerous. *American Educator*, *23*(1), 4–9.

Dweck, C. S. (2006). The perils and promises of praise. *Kaleidoscope: Contemporary and Classic Readings in Education*, *12*(2), 34–39.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256–273.

Dweck, C. S. (2002). The development of ability conceptions. In A. Wigfield, & J. S. Eccles (Eds.), *The development of achievement motivation*. Academic Press.

Dweck, C. S., & Yeager, D. S. (2019). Mindsets: A view from two eras. *Perspectives on Psychological Science*, *14*(3), 481–496.

Erdley, C. A., & Dweck, C. S. (1993). Children's implicit personality theories as predictors of their social judgments. *Child Development*, *64*(3), 863–878.

Faris, R., & Felmlee, D. (2011). Status struggles: Network centrality and gender segregation in same-and cross-gender aggression. *American Sociological Review*, *76*(1), 48–73.

Farrington, D. (1986). Age and crime. *Crime and Justice*, *7*, 189–250. https://doi.org/10.1086/449114

Foliano, F., Rolfe, H., Buzzeo, J., Runge, J., & Wilkinson, D. (2019). *Changing mindsets: Effectiveness trial*. National Institute of Economic and Social Research.

Francisco, R., Loios, S., & Pedro, M. (2015). Family functioning and adolescent psychological maladjustment: The mediating role of coping strategies. *Child Psychiatry & Human Development*, *47*(5), 759–770.

Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British parents, teachers and children. *Journal of Abnormal Child Psychology*, *38*(8), 1179–1191.

Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European Child & Adolescent Psychiatry*, *7*(3), 125–130.

Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin*, *129*(3), 447–466.

Gunderson, E. A., Sorhagen, N. S., Gripshover, S. J., Dweck, C. S., Goldin-Meadow, S., & Levine, S. C. (2018). Parent praise to toddlers predicts fourth grade academic achievement via children's incremental mindsets. *Developmental Psychology*, *54*(3), 397–409.

Gunlicks-Stoessel, M. L., & Powers, S. I. (2008). Adolescents' emotional experiences of mother–adolescent conflict predict internalizing and externalizing symptoms. *Journal of Research on Adolescence*, *18*(4), 621–642.

Haimovitz, K., & Dweck, C. S. (2016). What predicts children's fixed and growth intelligence mind-sets? Not their parents' views of intelligence but their parents' views of failure. *Psychological Science*, *27*(6), 859–869.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications Incorporated.

Hayes, A. F. (2015). Hacking PROCESS for estimation and probing of linear moderation of quadratic effects and quadratic moderation of linear effects. *Unpublished White Paper*. Ohio State University.

Hazel, N. A., Oppenheimer, C. W., Technow, J. R., Young, J. F., & Hankin, B. L. (2014). Parent relationship quality buffers against the effect of peer stressors on depressive symptoms from middle childhood to adolescence. *Developmental Psychology*, *50*(8), 2115–2123.

Henderson, C. E., Dakof, G. A., Schwartz, S. J., & Liddle, H. A. (2006). Family functioning, self-concept, and severity of adolescent externalizing problems. *Journal of Child and Family Studies*, *15*(6), 719–729.

Hughes, E. K., & Gullone, E. (2008). Internalizing symptoms and disorders in families of adolescents: A review of family systems literature. *Clinical Psychology Review*, *28*(1), 92–117.

IBM Corp. (2019). IBM SPSS Statistics for Windows, Version 26.0.

Jach, H. K., Sun, J., Loton, D., Chin, T. C., & Waters, L. E. (2018). Strengths and subjective wellbeing in adolescence: Strength-based parenting and the moderating effect of mindset. *Journal of Happiness Studies*, *19*(2), 567–586.

Janssens, A., Van Den Noortgate, W., Goossens, L., Verschueren, K., Colpin, H., Claes, S., Heel, M. V., & Van Leeuwen, K. (2017). Adolescent externalizing behaviour, psychological control, and peer rejection: Transactional links and dopaminergic moderation. *British Journal of Developmental Psychology*, *35*(3), 420–438.

Jiang, X., Paley, N., & Shi, D. (2022). Examining the validity and measurement invariance across gender and race of the implicit thoughts, emotion, and behavior questionnaire. [Manuscript submitted for publication].
Jiang, Y., Zhang, J., Ming, H., Huang, S., & Lin, D. (2019). Stressful life events and well-being among rural-to-urban migrant adolescents: The moderating role of the stress mindset and differences between genders. *Journal of Adolescence*, *74*, 24–32.
Killen, M., Kelly, M. C., Richardson, C., & Jampol, N. S. (2010). Attributions of intentions and fairness judgments regarding interracial peer encounters. *Developmental Psychology*, *46*(5), 1206–1213.
Lau, B. W. K. (2002). Does the stress in childhood and adolescence matter? A psychological perspective. *The Journal of The Royal Society for the Promotion of Health*, *122*(4), 238–244.
Lewis, P. B. (1999). *Stereotype threat, implicit theories of intelligence, and racial differences in standardized test performance*. Unpublished dissertation, Kent State University.
Li, W., Harrison, L., Jr., & Solmon, M. (2004). College students' implicit theories of ability in sports: Race and gender differences. *Journal of Sport Behavior*, *27*(3), 291–304.
Little, S. A., Germeroth, C., & Garber, J. (2019). Father–adolescent conflict and adolescent symptoms: The moderating roles of father residential status and type. *Journal of Child and Family Studies*, *28*(11), 3193–3206.
Low, N. C., Dugas, E., O'Loughlin, E., Rodriguez, D., Contreras, G., Chaiton, M., & O'Loughlin, J. (2012). Common stressful life events and difficulties are associated with mental health symptoms and substance use in young adolescents. *Biomed Central*, *12*(1), 116.
Lyubomirsky, S. (2001). Why are some people happier than others? The role of cognitive and motivational processes in well-being. *American Psychologist*, *56*(3), 239–249.
Masten, A. S. (2007). Resilience in developing systems: Progress and promise as the fourth wave rises. *Development and Psychopathology*, *19*(3), 921–930.
McConaughy, S., & Skiba, R. (1994). Comorbidity of externalizing and internalizing problems. *School Psychology Review*, *22*(3), 421–436.
Meeus, W. (2018). *Adolescent development: Longitudinal research into the self, personal relationships and psychopathology*. Routledge.
Meeus, W., Branje, S., & Overbeek, G. (2004). Parents and partners in crime: A six-year longitudinal study on changes in supportive relationships and delinquency in adolescence and young adulthood. *Journal of Child Psychology and Psychiatry*, *45*, 1288–1298. https://doi.org/10.1111/j.1469-7610.2004.00312.x
Miu, A. S., & Yeager, D. S. (2015). Preventing symptoms of depression by teaching adolescents that people can change: Effects of a brief incremental theory of personality intervention at 9-month follow-up. *Clinical Psychological Science*, *3*(5), 726–743.
Moksnes, U. K., Bradley Eilertsen, M. E., & Lazarewicz, M. (2016). The association between stress, self-esteem and depressive symptoms in adolescents. *Scandinavian Journal of Psychology*, *57*(1), 22–29.
Muris, P., Meesters, C., & van den Berg, F. (2003). The strengths and difficulties questionnaire (SDQ). *European Child & Adolescent Psychiatry*, *12*(1), 1–8.
Muris, P., Meesters, C., Eijkelenboom, A., & Vincken, M. (2004). The self-report version of the Strengths and Difficulties Questionnaire: Its psychometric properties in 8-to 13-year-old non-clinical children. *British Journal of Clinical Psychology*, *43*(4), 437–448.
Park, D., Gunderson, E. A., Tsukayama, E., Levine, S. C., & Beilock, S. L. (2016). Young children's motivational frameworks and math achievement: Relation to teacher-reported instructional practices, but not teacher theory of intelligence. *Journal of Educational Psychology*, *108*(3), 300–313.
Park, D., Yu, A., Metz, S. E., Tsukayama, E., Crum, A. J., & Duckworth, A. L. (2018). Beliefs about stress attenuate the relation among adverse life events, perceived distress, and self-control. *Child Development*, *89*(6), 2059–2069.
Persike, M., & Seiffge-Krenke, I. (2016). Stress with parents and peers: How adolescents from 18 nations cope with relationship stress. *Anxiety, Stress, & Coping*, *29*(1), 38–59.
Pomerantz, E. M., & Kempner, S. G. (2013). Mothers' daily person and process praise: Implications for children's theory of intelligence and motivation. *Developmental Psychology*, *49*(11), 2040–2046.
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.
Richter, J., Sagatun, Å., Heyerdahl, S., Oppedal, B., & Røysamb, E. (2011). The strengths and difficulties questionnaire (SDQ)–Self-Report. An analysis of its structure in a multiethnic urban adolescent sample. *Journal of Child Psychology and Psychiatry*, *52*(9), 1002–1011.
Ruchkin, V., Jones, S., Vermeiren, R., & Schwab-Stone, M. (2008). The strengths and difficulties questionnaire: The self-report version in American urban and suburban youth. *Psychological Assessment*, *20*(2), 175–182.
Schermerhorn, A. C., Bates, J. E., Goodnight, J. A., Lansford, J. E., Dodge, K. A., & Pettit, G. S. (2013). Temperament moderates associations between exposure to stress and children's externalizing problems. *Child Development*, *84*(5), 1579–1593.
Schleider, J., & Weisz, J. (2018). A single-session growth mindset intervention for adolescent anxiety and depression: 9-month outcomes of a randomized trial. *Journal of Child Psychology and Psychiatry*, *59*(2), 160–170.
Schleider, J. L., Abel, M. R., & Weisz, J. R. (2015). Implicit theories and youth mental health problems: A random-effects meta-analysis. *Clinical Psychology Review*, *35*, 1–9.
Schleider, J. L., Burnette, J. L., Widman, L., Hoyt, C., & Prinstein, M. J. (2019). Randomized trial of a single-session growth mind-set intervention for rural adolescents' internalizing and externalizing problems. *Journal of Clinical Child & Adolescent Psychology*, *49*, 1–13.
Schleider, J. L., & Weisz, J. R. (2016a). Implicit theories relate to youth psychopathology, but how? A longitudinal test of two predictive models. *Child Psychiatry & Human Development*, *47*(4), 603–617.
Schleider, J. L., & Weisz, J. R. (2016b). Mental health and implicit theories of thoughts, feelings, and behavior in early adolescents: Are girls at greater risk? *Journal of Social and Clinical Psychology*, *35*(2), 130–151.
Schleider, J. L., & Weisz, J. R. (2016c). Reducing risk for anxiety and depression in adolescents: Effects of a single-session intervention teaching that personality can change. *Behaviour Research and Therapy*, *87*, 170–181.
Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology*, *57*(1), 1–10.
Schroder, H. S., Yalch, M. M., Dawood, S., Callahan, C. P., Donnellan, M. B., & Moser, J. S. (2017). Growth mindset of anxiety buffers the link between stressful life events and psychological distress and coping strategies. *Personality and Individual Differences*, *110*, 23–26.
Sisk, V. F., Burgoyne, A. P., Sun, J., Butler, J. L., & Macnamara, B. N. (2018). To what extent and under which circumstances are growth mind-sets important to academic achievement? Two meta-analyses. *Psychological Science*, *29*(4), 549–571.
Steeger, C. M., Cook, E. C., & Connell, C. M. (2017). The interactive effects of stressful family life events and cortisol reactivity on adolescent externalizing and internalizing behaviors. *Child Psychiatry & Human Development*, *48*(2), 225–234.

Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. *Journal of Educational Psychology*, *88*, 397–407. https://doi.org/10.1037/0022-0663.88.3.397

Stroud, L. R., Foster, E., Papandonatos, G. D., Handwerger, K., Granger, D. A., Kivlighan, K. T., & Niaura, R. (2009). Stress response and the adolescent transition: Performance versus peer rejection stressors. *Development and Psychopathology*, *21*(1), 47–68.

Tabachnik, B. G., & Fidell, S. L. (2013). Multicollinearity and singularity, *Using multivariate statistics* (pp. 88–91). Pearson Education Inc.

Todor, I. (2014). Investigating "The Old Stereotype" about Boys/Girls and Mathematics: Gender differences in implicit theory of intelligence and mathematics self-efficacy beliefs. *Procedia - Social and Behavioral Sciences*, *159*, 319–323. https://doi.org/10.1016/j.sbspro.2014.12.380

Voisin, D. R., Elsaesser, C., Kim, D. H., Patel, S., & Cantara, A. (2016). The relationship between family stress and behavioral health among African American adolescents. *Journal of Child and Family Studies*, *25*(7), 2201–2210.

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist*, *47*(4), 302–314.

Yeager, D. S., & Dweck, C. S. (2020). What can be learned from growth mindset controversies? *American Psychologist*, *75*(9), 1269–1284.

Yeager, D. S., Johnson, R., Spitzer, B. J., Trzesniewski, K. H., Powers, J., & Dweck, C. S. (2014). The far-reaching effects of believing people can change: Implicit theories of personality shape stress, health, and achievement during adolescence. *Journal of Personality and Social Psychology*, *106*(6), 867–884.

Yong, M., Fleming, C. B., McCarty, C. A., & Catalano, R. F. (2014). Mediators of the associations between externalizing behaviors and internalizing symptoms in late childhood and early adolescence. *The Journal of Early Adolescence*, *34*(7), 967–1000.

How to cite this article: Walker, K. A., & Jiang, X. (2022). An examination of the moderating role of growth mindset in the relation between social stress and externalizing behaviors among adolescents. *Journal of Adolescence*, 94, 69–80. https://doi.org/10.1002/jad.12006