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## Linking classmate autonomy support with prosocial behavior in Chinese left-behind adolescents: The moderating role of self-esteem and grit

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### ABSTRACT

Framed in a positive youth development framework, the current study examines the association of classmate autonomy support with prosocial behavior in Chinese left-behind adolescents (i.e., adolescents who remain immobile in original regions when one or both of their parents have migrated to find work). Moreover, this study investigates whether left-behind adolescents' individual differences in self-esteem and grit moderated this association. To address these research aims, we examined these associations across two independent samples of left-behind adolescents [Study 1 (exploratory):  $N = 333$ ,  $M_{\text{age}} = 13.16$ ,  $SD = 1.67$ ; 48.3% girls; Study 2 (confirmatory):  $N = 246$ ,  $M_{\text{age}} = 15.78$ ,  $SD = 1.50$ ; 53.6% girls] recruited from different regions of mainland China. Study 1 showed that classmate autonomy support was positively correlated with prosocial behavior; self-esteem and grit moderated this association: for adolescents with low self-esteem, high grit was an important protective factor, fostering the positive association between classmate autonomy support and prosocial behavior. Furthermore, Study 2 replicated the results of Study 1 but also exhibited that, for adolescents with high self-esteem, high grit significantly buffered against the negative effect of low classmate autonomy support on adolescents' prosocial behavior. Taken together, the current study suggests that classmate autonomy support plays a crucial role in facilitating left-behind youths' prosocial behavior, and this association is differentiated by adolescents' self-esteem and grit.

### 1. Introduction

Labor migration has become increasingly prevalent in a few rapidly developing countries that are undergoing continuous urbanization and dramatic economic growth (Antia et al., 2020; Fellmeth et al., 2018; Wickramage et al., 2015). These individuals migrated internationally or intranationally from impoverished regions to more developed areas, chasing financially promising job opportunities and better quality of life. Nevertheless, due to financial considerations and institutional barriers, many migrant parents have to leave their children in their original communities (Wang & Mesman, 2015; Ma Y. et al., 2022). A plethora of empirical studies have consistently shown that these left-behind youth taken care of by their extended family members exhibit high emotional-behavioral difficulties due mainly to separation from a parent for extended periods (Antia et al., 2020; Wang & Mesman, 2015). Despite these findings, extant research on left-behind adolescents' psychosocial

adjustment has disproportionately focused on adverse outcomes; by contrast, adolescents' positive psychosocial outcomes, such as prosocial behavior, are less investigated.

In the current study, we leverage Chinese left-behind adolescents as a reference point in the hope of providing essential insights into worldwide migrant populations and their left-behind families. In recent years, China witnesses the largest proportion of these massive migration flows, and bears a continuously increasing number of left-behind populations (Fellmeth et al., 2018; Wang & Mesman, 2015). According to recent statistics from the National Bureau of Statistics of China (2020), over 200 million people seeking better job opportunities permanently or temporarily migrate from rural/urban regions to other urban cities, particularly in eastern coastal metropolitan areas. Therefore, an empirical study under this societal context would be appropriate to investigate the correlates of left-behind adolescents' prosocial behavior.

Prosocial behavior refers to voluntary behaviors intended to benefit

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others, including helping, sharing, volunteering, and cooperating (Eisenberg et al., 2015). In Chinese society, facilitating prosocial behavior is highly advocated in the school curriculum due to the cultural emphasis on social harmony and interdependence between individuals (Chen, 2010; Tian et al., 2018). The study of prosocial behavior in left-behind adolescents is particularly essential, as high prosocial skills could attract favorable attention from peers and help left-behind adolescents shape harmonious interpersonal relationships, facilitating their social integration (Lerner & Steinberg, 2004). Among existing but limited literature, Gao et al. (2019) found that prosocial tendency of left-behind adolescents was lower than that of non-left-behind adolescents. More recently, Lan and Wang (2020) demonstrated that left-behind experiences during childhood and adolescence had a detrimental effect on individuals' prosocial behavior during adulthood. Given the potential vulnerability of prosocial behavior in left-behind adolescents and the resulting deleterious impact on adaptive functions in later life, it is very important to investigate the contextual and individual correlates of prosocial behavior among left-behind adolescents for developing evidence-based intervention or prevention programs.

To investigate the contextual and individual correlates of prosocial behavior, we employ a positive youth development framework (Lerner et al., 2005). Distinct from deficit views on youth development, the positive youth development framework emphasizes external and internal developmental assets (Lerner et al., 2005). External assets refer to support and acceptance youth receive from their socialization systems (e.g., classmates); internal assets involve youths' positive traits, such as a positive recognition of own potentials and identity (e.g., self-esteem) and resilient competencies (e.g., grit). According to the positive youth development framework, external and internal assets individually and jointly shape several positive psychosocial outcomes, including adolescents' prosocial behavior (Memmott-Elison et al., 2020). This positive youth development perspective and analogous research have been widely applied to understand the correlates of prosocial behavior in Chinese left-behind youths (e.g., Lan & Wang, 2020). Given that adolescents spend a large amount of their daily time at school, interactions with classmates comprise an essential socialization context, especially for left-behind adolescents who reside away from their parents. Therefore, we particularly focus on the crucial role of classmate autonomy support in left-behind adolescents' prosocial behavior and investigate whether two internal developmental assets (i.e., self-esteem and grit) may moderate this association. The rest of the introduction proceeds by reviewing each of focal variables, starting with the presentation of classmate autonomy support.

### 1.1. Classmate autonomy support

Autonomy support refers to an interpersonal style that promotes adolescent's autonomous functioning (e.g., self-endorsed choices and behaviors; Ryan & Deci, 2017; Van Petegem et al., 2012). According to self-determination theory (Ryan & Deci, 2017), autonomy-supportive social contexts could encourage adolescents to pursue their own volition, nurture adolescents' internal motivational resources, and inspire them to internalize the regulation of essential activities. The positive relation between autonomy support and prosocial behavior has been identified in both China and Western societies (Gagné, 2003; Gao et al., 2020; Lan et al., 2019; Simões et al., 2018). However, most empirical studies have focused on perceived autonomy support from hierarchical relationships (e.g., parents and teachers; Feng & Lan, 2020; Ma C. et al., 2020); by contrast, considerably less research attention has been paid to the role of perceived autonomy support from classmates in adolescents' prosocial behavior.

We argue that focusing on positive relations with classmates and the associated effects on left-behind adolescents' adaptive psychosocial functions is very important. During adolescence, youth gain increasing autonomy and independence from their families and spend much of their daytime hours at school in the company of their same-aged

classmates (Fredrick et al., 2017). Interactions with classmates may compensate for the absence of parents as one of the critical socialization agents for the development of prosocial behavior (Busching & Krahé, 2020; Fredrick et al., 2017; La Greca & Harrison, 2005). Moreover, left-behind adolescents and their classmates exist on the same level of hierarchy with no formal authority over each other (Eccles & Roeser, 2003). Classmates offer equal participation opportunities among members and this context represents an important medium to enable adolescents to experience self-determination. In the school setting, when adolescents realize that their behaviors are valued and accepted by their classmates, they may become more motivated to self-regulate their prosocial tendencies (Logis et al., 2013; Reeve et al., 2008; Ryan & Deci, 2017). In addition, with the rapid development of China's economy, dramatic socio-cultural changes have correspondingly taken place in China, and autonomy and independence have become more valued, particularly among young generations (Nalipay et al., 2020). Because of this, promotion of autonomous behaviors among classmates becomes more practical and increasingly essential to their optimal functioning.

Although further investigating the crucial role of classmate autonomy support in volitional engagement of left-behind adolescents' prosocial behavior is essential, probably not every left-behind adolescent in the same classroom is expected to exhibit similar levels of prosocial behavior (Fabes et al., 1999; Thielmann et al., 2020). Therefore, it is important to examine possible individual differences of this association by investigating the moderating role of adolescents' characteristics, such as self-esteem.

### 1.2. Self-esteem

Self-esteem refers to the individuals' subjective evaluation of their own worth, reflecting the discrepancy between self-image and ideal self (Rosenberg, 1965). A large number of studies have revealed that self-esteem can promote a wide range of adolescents' positive psychosocial outcomes (Harris & Orth, 2020; Sowislo & Orth, 2013), including prosocial behavior (Fu et al., 2017). Thus, an investigation into the role of self-esteem in left-behind adolescents is crucial, as these youth encounter a variety of challenges, such as discrimination and being ridiculed, due to their parental migration, thereby possibly resulting in low self-esteem and hypervigilant self-views (Gao et al., 2019).

Recent studies have suggested that, beyond its direct associations with positive psychosocial outcomes, self-esteem may moderate the beneficial effect of classmate autonomy support on adolescent's prosocial behavior. For instance, empirical investigations have demonstrated that adolescents with low self-esteem are anxious about being accepted by their friends, and are more likely to negatively interpret positive signals and episodes as a way to validate their negative self-views (Lee & Way, 2019; Liu et al., 2013; Marigold et al., 2007). Similarly, Tobia et al. (2017) have shown that adolescents with low self-esteem suffer more from poor social experiences with peers. These adolescents are more frustrated and adopt passive coping strategies when experiencing socially threatening episodes, which often harms their positive social adjustment. Based on these empirical findings, we assume that low self-esteem may significantly weaken the positive association between classmate autonomy support and prosocial behavior among left-behind adolescents.

Furthermore, as low self-esteem may potentially mitigate the beneficial effect of classmate autonomy support on left-behind adolescents' prosocial behavior, it would be important to investigate one dispositional buffer, such as grit, that could ameliorate stress responses and foster positive adjustment.

### 1.3. Grit

Grit is characterized by perseverance and passion for achieving long-term goals (Duckworth et al., 2007). An accumulating body of empirical studies show that gritty individuals are likely to demonstrate better

academic performance and well-being, and work strenuously to overcome adversities (Credé, 2018; Datu, 2021). Likewise, prior research has shown a positive relation between grit and prosocial behavior (Lan et al., 2019; Wenner & Randall, 2016). In addition to this direct association, however, there is a paucity of research examining the buffering role of grit between contextual factors and prosocial behavior. This knowledge gap is particularly striking, considering that youth may benefit from the availability of grit resources hinging on the specific context (Khan et al., 2021). Furthermore, elucidating the moderating role of grit in under-investigated associations is particularly relevant for left-behind adolescents because grit may help them stay engaged and be resilient in the face of challenges to achieve better prosocial tendencies and social integration. Additionally, grit as a relatively stable yet malleable trait could serve as one focus of intervention aimed at facilitating left-behind adolescents' adaptive psychosocial functions (Credé, 2018).

Prior research has demonstrated that grit buffers against the risk of an unfavorable context on adolescents' adverse outcomes. For example, Lan and Radin (2020) found that high grit buffered against the negative effect of peer attachment insecurity on left-behind adolescents' externalizing symptoms. The authors explained that left-behind adolescents with high grit might regain hope and optimism by focusing on long-term ambitions and determination, and thus were less affected by unfavorable conditions triggered by parental migration. Following these arguments, we assume that high grit may buffer against the negative effect of low classmate autonomy support on left-behind adolescents' prosocial behavior. Furthermore, adolescents with low self-esteem often perceive less autonomy support from social contexts (Tobia et al., 2017). Thus, we hypothesize that the buffering effect of grit in the relationship between classmate autonomy support and prosocial behavior is more pronounced in left-behind adolescents exhibiting low self-esteem.

#### 1.4. Overview of studies

Based on the positive youth development framework (Lerner et al., 2005) and relevant empirical work, the present research aimed at investigating the association between classmate autonomy support and prosocial behavior in Chinese left-behind adolescents, as well as the moderating role of two personal characteristics (i.e., self-esteem and grit) therein. To address these aims, we employed two independent samples recruited from different locations in mainland China. Due to the scarcity of prior knowledge on these under-investigated associations in left-behind adolescents, Study 1 was more exploratory in nature; on the basis of the findings obtained from Study 1, Study 2 aimed to replicate the results of Study 1 with another independent sample. If robust findings could be gathered in support of the studied associations across two independent samples, the generalization of our findings could be extended, and more robust conclusions could be made.

According to the current literature review, the following hypotheses (H) are proposed: H1: classmate autonomy support is positively associated with prosocial behavior among left-behind adolescents; H2: low self-esteem may significantly weaken the positive association between classmate autonomy support and prosocial behavior among left-behind adolescents; H3: high grit may buffer against the negative effect of low classmate autonomy support on prosocial behavior (H3a); the buffering effect of grit in the relationship between classmate autonomy support and prosocial behavior is more pronounced in left-behind adolescents exhibiting low self-esteem (H3b).

## 2. Study 1

In Study 1, we aimed to explore preliminary evidence for our tested hypotheses that self-esteem and/or grit may moderate the positive association between classmate autonomy support and prosocial behavior in Chinese left-behind adolescents.

### 2.1. Method

#### 2.1.1. Participants and procedures

A total of 1398 early to middle adolescents participated in this investigation, with grade levels ranging from fourth to eighth (adolescents in the 9th grade prepared for high school entrance exam, and thus they did not participate in this survey due to high exposure to academic pressure). Of those participants, 333 ( $M_{\text{age}} = 13.16$ ,  $SD = 1.67$ ; age ranged from 10 to 17 years old; 48.34% girls) were left-behind adolescents, 23.81% of the total sample. In terms of parental migration status, most of left-behind adolescents reported that only their father migrated (61.3%;  $n = 204$ ), one-third reported both of their parents migrated (33.0%;  $n = 110$ ), and a minority reported that only their mothers migrated (5.7%;  $n = 19$ ). The duration of their parental migration ranged from half one year to 15 years ( $M = 4.49$  years). Most fathers (56.5%) and mothers (54.4%) had just completed primary or secondary education. The family wealth of these left-behind adolescents was moderate ( $M = 3.94$ ,  $SD = 2.07$ ; total score ranged from 0 to 9), as measured by the Family Affluence Scale (Boyce et al., 2006).

We first asked for the approval about our research protocol outlining research aims, questionnaires, methodologies, and ethical considerations from the first author's affiliation. After obtaining this approval, the authors contacted four local public schools, including two primary schools and two secondary schools, in Linxia city (Gansu province, northwest mainland China). After negotiating with education authorities and school principals, we, along with head teachers, distributed a battery of questionnaires written in simplified Chinese to the students during public school hours. This investigation using uniform instructions was voluntary, anonymous, and confidential in nature. The duration of completing this investigation took approximately 15–20 min, and once completed, the questionnaires were returned to our research team members immediately. The dataset of this study is publicly available on the Open Science Framework repository [DOI: 10.17605/OSF.IO/2BHCU].

#### 2.1.2. Measures

**2.1.2.1. Prosocial behavior.** Prosocial behavior was assessed using the Chinese version of the self-reported Strengths and Difficulties Questionnaires (SDQ) developed by Goodman (1997). The SDQ has been previously translated and validated in Chinese adolescents (Lai et al., 2010). This subscale contains five items, and one item example is "I often volunteer to help others." Participants were asked to rate each item on the Likert scale ranging from 0 (*not true*) to 2 (*certainly true*). A summed score of these items was calculated, and higher scores represented higher levels of prosocial behavior. The Chinese version of the SDQ has demonstrated good reliability and validity among school-aged adolescents (Liu et al., 2013; Lan et al., 2021). For the present sample, Cronbach's alpha was 0.67.

**2.1.2.2. Classmate autonomy support.** In the present study, we applied the Chinese translation of the Learning Climate Questionnaire (Black & Deci, 2000), following standard translation-back translation techniques (Vijver & Leung, 1997). Due to our research purpose, the wordings of each item were slightly adjusted. In the instructions of this questionnaire, we highlighted that the classmates were restricted in the same classrooms as the participants, since they spend most of the school time together and would have more opportunities to provide sufficient autonomy support. The LCQ consists of 15 items, and example items are "I feel understood by my classmate;" "My classmate listens to how I would like to do things." Participants were asked to rate each item on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). In this study, higher averaged scores of all items represented higher levels of perceived autonomy support from the classmates. The Chinese version of the LCQ has demonstrated good internal consistency in previous

studies (e.g., Ma et al., 2020), and Cronbach's alpha was 0.95 for the present sample.

**2.1.2.3. Self-esteem.** Self-esteem was assessed using the scale developed by Rosenberg (1965). This 10-item scale has been translated and validated in Chinese adolescents by Li et al. (2008). One item example is, "I take a positive attitude toward myself." Participants were asked to rate each item on a Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). An average score of these items was calculated, with higher scores representing higher levels of self-esteem. Good internal consistency coefficient with Chinese adolescents was reported in prior research (e.g., Gao et al., 2019). In the current study, Cronbach's alpha was 0.71.

**2.1.2.4. Grit.** Grit was assessed using the Chinese version of the Short Grit Scale initially developed by Duckworth and Quinn (2009), subsequently translated and validated in Chinese adolescents by Li et al. (2018). This scale consists of 8 items, and one item example is "setbacks do not discourage me." Participants were asked to rate each item on a Likert scale from 1 (*not at all like me*) to 5 (*very much like me*). Of all these items, the first item (i.e., "new ideas and projects sometimes distract me from previous ones") decreased the reliability estimate of this scale, indicating that this item may be complicated for students to comprehend compared to the other items in this scale. Therefore, this item was omitted from further analyses. The average score of all the remaining items was calculated, with higher scores indicating higher levels of grit. In the current study, Cronbach's alpha ( $\alpha = 0.62$ ) was borderline acceptable but consistent with prior research on adolescents (Datu et al., 2016).

**2.1.2.5. Covariates.** We asked students to report their date of birth and biological gender. Moreover, they completed the four-item Chinese version of the Family Affluence Scale (FAS), a brief assets-based measure of family wealth (Boyce et al., 2006). The FAS has been translated and validated in Chinese adolescents by Liu et al. (2012), demonstrating good psychometric properties. We decided to use the Family Affluence Scale as an alternative indicator of family SES because conventional indicators of parental educational level and parental occupational status are challenging to collect in young adolescents, resulting in a high percentage of missing values. Example items of this scale are, "does your family own a car, van, or truck? do you have your own bedroom for yourself?" Adolescents were asked to respond to these items based on the frequency per their family assets. Following the guidelines of the FAS (i.e., Boyce et al., 2006; Liu et al., 2012), different response categories, ranging from 0 (*no*) to 3 (*more than two*), were employed, according to the societal patterns of consumption and lifestyles of families with adolescents. A summed score of all items was calculated and applied in the further course of analyses, with higher scores indicating higher levels of family wealth. Previous studies have demonstrated that the FAS is a valid indicator for assessing family SES in Chinese adolescents (e.g., Zou et al., 2018). In the current study, we did not report internal consistency of the FAS, as Cronbach's alpha is often sensitive to the measurement having different response categories.

These sociodemographic variables are controlled for because previous research suggests that older children, females, and adolescents from high family SES backgrounds are more likely to exhibit high levels of prosocial behavior (Eisenberg et al., 2015; Main et al., 2017).

### 2.1.3. Data analytic plan

Data analytical plan was organized in the following steps using IBM SPSS version 27.0 (IBM Corporation, Armonk, NY, USA) and Jamovi (The jamovi project, 2020). First, we computed descriptive statistics and Pearson's correlations to overview study variables and assessed their preliminary associations. Meanwhile, we conducted a series of confirmatory factor analyses (CFA) to examine the instruments' structural validity, and the results were presented in Table S1 in the supplemental

materials. Second, a four-step hierarchical linear regression model was employed to address our research aims. In the first step, we included age, gender, and family SES in the model; in the second step, we added independent variables (i.e., classmate autonomy support, self-esteem, and grit); in the third step, we added three two-way interaction terms between classmate autonomy support and grit, between classmate autonomy support and self-esteem, and between grit and self-esteem into the model; in the fourth step, we incorporated the three-way interaction (i.e., classmate autonomy support x self-esteem x grit) into the model. In the case of significant interaction, we applied simple slopes analyses and plotted graphs to probe interactive patterns (Aiken & West, 1991).

## 2.2. Results

### 2.2.1. Descriptive statistics and correlations

Table 1 presents the results of descriptive statistics and bivariate correlations among study variables. The results showed that classmate autonomy support, self-esteem, and grit were each positively associated with prosocial behavior. In terms of covariates, adolescents from high family SES backgrounds reported high levels of prosocial behavior.

Furthermore, we conducted a MANOVA to examine whether variables of interest exhibited group differences across different parental migration statuses (i.e., both-parent migration, father-only migration, and mother-only migration). Results showed that variables of interest were not significantly different across these three parental migration statuses in Study 1. The detailed results have been supplemented in Table S2.

### 2.2.2. The associations of classmate autonomy support, self-esteem, and grit with prosocial behavior

Table 2 presents the results of hierarchical linear regression predicting prosocial behavior. In total, this model explained 27.0% of the variance in prosocial behavior.

As shown in Table 2, the first step (covariates only) explained 6.0% of the variance in prosocial behavior. Results showed that the levels of prosocial behavior decreased by adolescents' age, and female adolescents reported higher levels of prosocial behavior than male adolescents. Subsequently, the main effects of independent variables were entered into the model (the second step), explaining an additional 17% of the variance in prosocial behavior. Results showed that classmate autonomy support, self-esteem, and grit were each positively associated with prosocial behavior. Moreover, the three two-way interaction terms between independent variables were added in the third step, which explained an additional 3% of the variance in prosocial behavior. However, none of the two-way interaction terms were significantly linked to prosocial behavior. Finally, the three-way interaction was entered in the fourth step, explaining an additional 1% variance of prosocial behavior. The results demonstrated that the three-way interaction was significantly and negatively related to prosocial behavior, and the interactive patterns were further examined by simple slopes analyses.

Fig. 1 presents the interactive patterns of the significant three-way interaction. For adolescents with higher levels of self-esteem, the association between classmate autonomy support and prosocial behavior was significant and positive, regardless of the levels of grit ( $b = 0.73$ ,  $SE = 0.17$ ,  $t = 4.20$ ,  $p < .001$  for lower grit;  $b = 0.49$ ,  $SE = 0.15$ ,  $t = 3.30$ ,  $p < .001$  for higher grit). For adolescents with lower levels of self-esteem, the association between classmate autonomy support and prosocial behavior was significant and positive at higher levels of grit ( $b = 0.50$ ,  $SE = 0.20$ ,  $t = 2.42$ ,  $p = .01$ ), but not significant at lower levels of grit ( $b = 0.23$ ,  $SE = 0.13$ ,  $t = 1.78$ ,  $p = .07$ ).

### 2.3. Brief discussion of Study 1

The results from Study 1 supported the hypothesis of H1 and H3b, but not H2 and H3a. To briefly summarize, classmate autonomy support

**Table 1**  
Descriptive statistics and bivariate correlations between study variables for Chinese left-behind adolescents in Study 1.

Variable	M	SD	Range	Skewness	Kurtosis	1	2	3	4	5	6	7
1. Prosocial behavior	7.26	2.08	1–10	−0.58	−0.35	–						
2. Classmate autonomy support	4.83	1.27	1–7	−0.55	0.05	0.38***	–					
3. Self-esteem	2.80	0.46	1–4	−0.01	−0.42	0.33***	0.43***	–				
4. Grit	3.23	0.68	1–5	−0.02	−0.10	0.30***	0.30***	0.43***	–			
5. Age	13.16	1.67	10–17	−0.41	−0.83	−0.20***	−0.06	−0.01	−0.09	–		
6. Gender <sup>a</sup>	–	–	1–2	–	–	0.09	0.01	−0.05	−0.06	0.05	–	
7. Socioeconomic status	3.94	2.07	0–9	0.23	−0.37	0.11*	0.12*	0.12*	0.12*	−0.29***	−0.01	–

Note. N = 333.

<sup>a</sup> Coded as 1 = male, 2 = female.

\* p < .05.

\*\*\* p < .001.

**Table 2**  
Hierarchical regression analysis predicting prosocial behavior from classmate autonomy support, self-esteem, and grit in Study 1.

	b	b SE	t	p	R <sup>2</sup>	ΔR <sup>2</sup>	ΔF
<b>Step 1</b>							
Age	−0.23	0.07	−3.24	.001			
Gender <sup>a</sup>	0.47	0.23	2.09	.040			
Socioeconomic status	0.07	0.06	1.15	.250	0.06	0.06	6.24***
<b>Step 2</b>							
Age	−0.22	0.07	−3.33	.001			
Gender	0.52	0.21	2.51	.010			
Socioeconomic status	0.004	0.05	0.07	.950			
Classroom Autonomy Support (CAS)	0.52	0.11	4.51	<.001			
Self-esteem	0.28	0.12	2.34	.020			
Grit	0.33	0.12	2.89	.004	0.23	0.17	23.73***
<b>Step 3</b>							
Age	−0.22	0.07	−3.42	.001			
Gender	0.46	0.21	2.16	.030			
Socioeconomic status	−0.002	0.05	−0.03	.980			
CAS	0.56	0.12	4.81	<.001			
Self-esteem	0.26	0.12	2.10	.040			
Grit	0.32	0.11	2.78	.010			
CAS × self-esteem	−0.02	0.11	−0.21	.830			
CAS × grit	0.15	0.11	1.37	.170			
Self-esteem × grit	0.18	0.11	1.62	.110	0.26	0.03	3.04*
<b>Step 4</b>							
Age	−0.20	0.07	−3.15	.002			
Gender	0.41	0.21	1.98	.050			
Socioeconomic status	0.001	0.05	0.03	.980			
CAS	0.63	0.12	5.21	<.001			
Self-esteem	0.30	0.12	2.43	.020			
Grit	0.41	0.12	3.34	.001			
CAS × self-esteem	0.01	0.11	0.08	.930			
CAS × grit	0.13	0.11	1.18	.230			
Self-esteem × grit	0.16	0.11	1.40	.160			
CAS × grit × self-esteem	−0.16	0.08	−2.02	.045	0.27	0.01	4.06*

Note. N = 333.

<sup>a</sup> Coded as 1 = male, 2 = female.

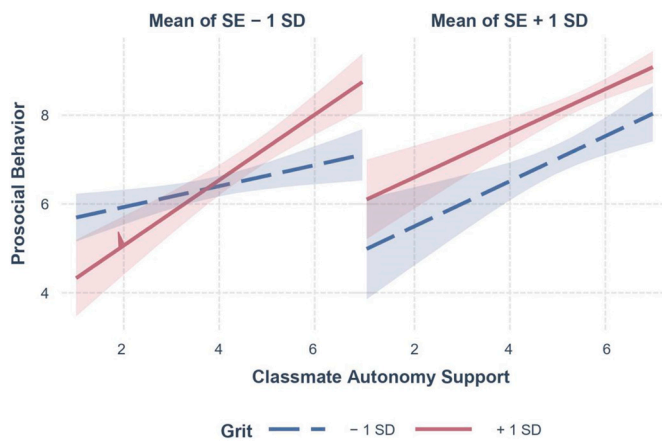
\* p < .05.

\*\*\* p < .001.

was positively associated with prosocial behavior in left-behind adolescents, and the buffering role of grit in the association between classmate autonomy support and prosocial behavior was more heightened for those left-behind adolescents reporting low self-esteem.

Although the findings from Study 1 partially supported our research hypotheses, several notable limitations should be addressed, and the studied associations should be re-examined in Study 2. First, in line with prior research (e.g., Datu et al., 2016; Weisskirch, 2018), the internal consistencies of the prosocial behavior and grit scale are relatively low. Second, this study employed self-reported prosocial behavior and self-esteem, and thus adolescents may respond to each item based on a

socially desirable manner or report an inflated view of self (Salmivalli, 2001). Third, the situation of parental migration also varies by individuals; for instance, adolescents reporting both-parent migration may perceive less positive family functioning than those with one-parent migration, which could obscure studied associations (Lan & Radin, 2020). Taken together, attempting to address these limitations of Study 1 and replicate the findings from Study 1, we conducted Study 2, including different assessment tools concerning grit and prosocial behavior, and controlled for the levels of family functioning and social desirability.



**Fig. 1.** Interaction effect of classroom autonomy support, self-esteem, and grit on prosocial behavior in Study 1. Self-esteem and grit were divided into different levels based on means and standard deviations.

Note.  $N = 333$ . SE = self-esteem.

### 3. Study 2

In Study 2, we recruited another independent sample of left-behind adolescents from different locations in China in order to test our hypotheses and possibly replicate the findings obtained from Study 1.

#### 3.1. Method

##### 3.1.1. Participants and procedures

We contacted several public schools in Beijing (located in north mainland China). Eight secondary schools showed interest in participating in our study. The procedures of Study 2 were in line with those described in Study 1. Approximately 2000 adolescents finally agreed to participate in this study. Of these participants, 246 were identified as left-behind adolescents (53.6% girls;  $M_{\text{age}} = 15.77$ ;  $SD = 1.50$ ). Most adolescents reported that only their father migrated (67.9%;  $n = 167$ ), whereas about one-fourth reported both parents migrated (23.2%;  $n = 57$ ), and a minority reported only their mother migrated to other urban regions for work (8.9%;  $n = 22$ ). The duration of their parental migration ranged from one year to 10 years ( $M = 5.6$  years). Most fathers (63.2%) and mothers (61.7%) achieved a secondary school education background. In addition, adolescents reported their family living standard was moderate, as rated on a single 5-point Likert item ranging from 1 (*very poor*) to 5 (*very affluent*). The dataset for this study is publicly accessible through the Open Science Framework repository [DOI: 10.17605/OSF.IO/2BHCU].

##### 3.1.2. Measures

**3.1.2.1. Prosocial behavior.** Prosocial behavior was measured using the Prosocial Behavior Scale (PBS) initially developed for Chinese adolescents by Zhang and Kou (2012). The PBS consists of 21 items, and one item example is, "I am glad to donate money and materials to a disaster area." All items were rated on a 7-point scale ranging from 1 (*definitely does not apply to me*) to 7 (*definitely applies to me*), indicating the frequency of prosocial behavior. The score for prosocial behavior was calculated by averaging the scores of all items (Yang et al., 2017). Higher scores indicated greater prosocial behavior. Previous studies have exhibited good internal consistency of the PBS in Chinese adolescents (e.g., Li et al., 2020). In Study 2, Cronbach's alpha was 0.93.

**3.1.2.2. Classmate autonomy support.** Classmate autonomy support was assessed by the Chinese version of the LCQ (Black & Deci, 2000; see Study 1). In Study 2, Cronbach's alpha was 0.88.

**3.1.2.3. Self-esteem.** Self-esteem was assessed using the Chinese version of Rosenberg's Self-Esteem Scale (Rosenberg, 1965; see Study 1). In Study 2, Cronbach's alpha was 0.88.

**3.1.2.4. Grit.** The 12-item Chinese version of the Grit Scale (Duckworth et al., 2007) was used to assess grit, which is the longer version of the Short Grit Scale (Duckworth & Quinn, 2009). This 12-item grit scale was translated and back-translated by Song et al. (2021) following standardized procedures. Prior research has shown good internal consistency of this scale in Chinese adolescents (e.g., Lan & Wang, 2020). In Study 2, Cronbach's alpha was 0.79.

**3.1.2.5. Covariates.** At the beginning of this survey, we asked adolescents to report their age and biological gender. They were also required to respond to a few items (i.e., parental educational level, parental occupational status, and family monthly income) assessing their family SES. The scores of these items were summed to yield an overall score, with higher scores indicating higher family SES. Additionally, adolescents completed two instruments assessing their family functioning (Shek, 2002) and social desirability (Schuessler et al., 1978). The detailed information with regard to these measurements can be found in supplementary materials.

##### 3.1.3. Data analytic plan

Study 2 used the same analytic plan as Study 1, in which we first computed descriptive statistics, Pearson's correlations, and CFA for variables of interest (see Table S3). Second, we performed a hierarchical linear regression to assess studied associations. The studied variables were entered into the model based on four steps (see Study 1 for elaboration), with additionally controlling for family functioning and social desirability in the first step.

### 3.2. Results

#### 3.2.1. Descriptive statistics and correlations

Table 3 shows that classmate autonomy support, self-esteem, and grit were each positively associated with prosocial behavior. In terms of the covariates, females reported higher levels of prosocial behavior than males; family functioning and social desirability were each positively correlated with prosocial behavior.

Furthermore, results from a MANOVA showed that adolescents experiencing father-only migration reported higher levels of prosocial behavior than adolescents experiencing mother-only migration, and adolescents experiencing father-only migration showed higher levels of grit than adolescents experiencing both-parent migration. The detailed results have been supplemented in Table S4.

#### 3.2.2. The associations of classmate autonomy support, self-esteem, and grit with prosocial behavior

Table 4 presents the results of hierarchical linear regression predicting prosocial behavior in Study 2. In total, this model explained 56.0% of the variance in prosocial behavior.

As shown in Table 4, in the first step, all covariates were entered into the regression, explaining 50% variance of prosocial behavior. Results showed that family functioning and social desirability were positively associated with prosocial behavior. In the second step, classmate autonomy support, self-esteem, and grit were entered into the regression, additionally explaining 3% variance of prosocial behavior. Results showed that classmate autonomy support was significantly and positively related to prosocial behavior. In the third step, three two-way interactions between independent variables were entered into the regression and explained an additional 2% variance in prosocial behavior, but none were significantly linked to prosocial behavior. In the final step, the three-way interaction between the independent variables was entered into the model and explained 1% variance of prosocial

**Table 3**

Descriptive statistics and bivariate correlations between study variables for Chinese left-behind adolescents in Study 2.

Variable	<i>M</i>	<i>SD</i>	Range	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9
1. Prosocial behavior	5.55	0.88	1–10	−0.71	1.10	–								
2. Classmate autonomy support	4.84	0.73	1–7	−0.35	−0.24	0.59***	–							
3. Self-esteem	3.07	0.53	1–4	−0.30	−0.31	0.55***	0.63***	–						
4. Grit	3.13	0.65	1–5	−0.01	0.10	0.26***	0.31***	0.40***	–					
5. Age	15.77	1.50	10–17	−0.37	−1.00	0.01	−0.03	0.08	−0.12	–				
6. Gender <sup>a</sup>	–	–	1–2	–	–	0.15*	0.04	0.04	−0.06	0.10	–			
7. Socioeconomic status	0.00	1.98	−6.72–6.30	0.62	1.88	0.06	0.01	0.03	−0.02	0.07	0.09	–		
8. Family functioning	3.72	0.91	1–5	−0.43	−0.56	0.43***	0.36***	0.40***	0.22***	0.11	0.08	0.05	–	
9. Social desirability	5.25	0.82	1–7	−0.61	1.40	0.69***	0.67***	0.63***	0.29***	0.05	0.13*	0.10	0.43***	–

Note. *N* = 246.

<sup>a</sup> Coded as 1 = male, 2 = female.

\* *p* < .05.

\*\*\* *p* < .001.

**Table 4**

Hierarchical regression analysis predicting prosocial behavior from classmate autonomy support, self-esteem, and grit in Study 2.

	<i>b</i>	<i>b SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>	Δ <i>R</i> <sup>2</sup>	Δ <i>F</i>
<b>Step 1</b>							
Age	−0.01	0.03	−0.35	.720			
Gender <sup>a</sup>	0.11	0.08	1.40	.160			
Socioeconomic status	−0.01	0.02	−0.33	.740			
Family functioning	0.16	0.05	3.27	.001			
Social desirability	0.65	0.06	11.91	.010	0.50	0.50	47.82***
<b>Step 2</b>							
Age	−0.01	0.03	−0.26	.790			
Gender	0.13	0.08	1.67	.100			
Socioeconomic status	0.00	0.02	−0.05	.960			
Family functioning	0.13	0.05	2.64	.010			
Social desirability	0.46	0.07	6.51	.010			
Classroom Autonomy Support (CAS)	0.16	0.06	2.82	.010			
Self-esteem	0.09	0.06	1.54	.130			
Grit	0.01	0.04	0.11	.910	0.53	0.03	5.16**
<b>Step 3</b>							
Age	−0.01	0.03	−0.25	.810			
Gender	0.09	0.08	1.12	.260			
Socioeconomic status	0.00	0.02	0.10	.920			
Family functioning	0.15	0.05	3.12	.002			
Social desirability	0.48	0.07	6.76	.010			
Classroom Autonomy Support	0.16	0.06	2.77	.010			
Self-esteem	0.09	0.06	1.65	.100			
Grit	−0.01	0.04	−0.26	.800			
CAS × self-esteem	0.07	0.04	1.67	.100			
CAS × grit	0.01	0.05	0.11	.920			
Self-esteem × grit	0.06	0.05	1.19	.240	0.55	0.02	3.04*
<b>Step 4</b>							
Age	−0.01	0.03	−0.09	.930			
Gender	0.10	0.08	1.23	.220			
Socioeconomic status	0.003	0.02	0.14	.890			
Family functioning	0.13	0.05	2.74	.010			
Social desirability	0.50	0.07	7.06	.007			
Classroom Autonomy Support	0.18	0.06	3.14	.010			
Self-esteem	0.11	0.06	1.91	.060			
Grit	0.05	0.05	0.96	.340			
CAS × self-esteem	0.04	0.04	0.99	.320			
CAS × grit	−0.01	0.05	−0.04	.970			
Self-esteem × grit	0.05	0.05	0.93	.350			
CAS × grit × self-esteem	−0.07	0.03	−2.51	.010	0.56	0.01	6.28*

Note. *N* = 246.

<sup>a</sup> Coded as 1 = male, 2 = female.

\* *p* < .05.

\*\* *p* < .01.

\*\*\* *p* < .001.

behavior. Results showed that this three-way interaction term was negatively related to prosocial behavior, and the interactive patterns were further examined by simple slopes analyses.

As shown in Fig. 2, for left-behind adolescents reporting lower levels of self-esteem, the positive association between classmate autonomy support and prosocial behavior was enhanced at higher levels of grit ( $b = 0.56$ ;  $SE = 0.14$ ,  $t = 3.91$ ,  $p < .001$ ), compared with lower levels of grit ( $b = 0.39$ ;  $SE = 0.10$ ,  $t = 3.81$ ,  $p < .001$ ). For left-behind adolescents reporting higher levels of self-esteem, this positive association remained significant both at higher levels of grit ( $b = 0.47$ ;  $SE = 0.12$ ,  $t = 3.69$ ,  $p < .001$ ), and at lower levels of grit ( $b = 0.65$ ;  $SE = 0.13$ ,  $t = 4.79$ ,  $p < .001$ ). However, from a descriptive perspective, in the context of higher levels of self-esteem, high grit significantly buffered against the negative effect of low levels of classmate autonomy support on prosocial behavior.

### 3.3. Brief discussion of study 2

The results from Study 2 replicated the findings obtained from Study 1, supporting the hypothesis of H1 and H3b, but again H2 and H3a were not confirmed. In addition, results from Study 2 showed that, in the context of high levels of self-esteem, high grit significantly buffered against the negative effect of low levels of classmate autonomy support on prosocial behavior.

## 4. General discussion

Massive labor migration becomes a crucial engine for maintaining economic development, but serious health concerns regarding left-behind adolescents' psychosocial adjustment have also been raised (Antia et al., 2020; Fellmeth et al., 2018; Wickramage et al., 2015). Past research has substantially documented left-behind youth's psychopathology and negative psychosocial functions (e.g., Gao et al., 2019; Lan & Radin, 2020). In contrast, empirical studies on their positive psychosocial outcomes, such as prosocial behavior, and their contextual and individual correlations, are rather limited. To expand previous studies, the present research, based on the positive youth development framework (Lerner et al., 2005), examined the association between classmate autonomy support and prosocial behavior in two independent samples of Chinese left-behind adolescents. Moreover, we examined whether this association varied by self-esteem and/or grit. The results from both studies confirmed that classmate autonomy support was positively associated with left-behind adolescents' prosocial behavior. Moreover, for left-behind adolescents with low self-esteem, high grit was an important protective factor, ensuring the positive association between classmate autonomy support and prosocial behavior. In addition, the

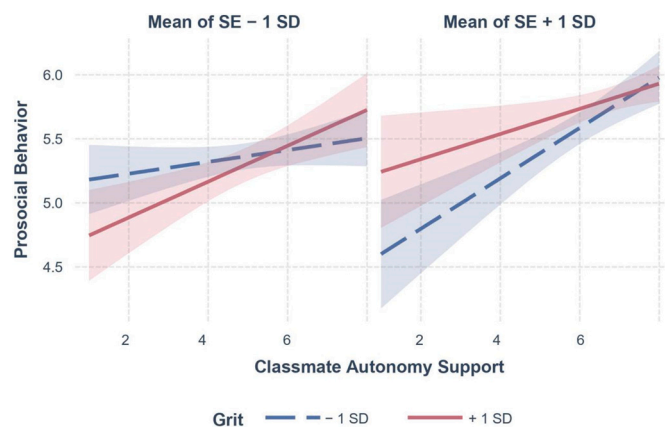


Fig. 2. Interaction effect of classroom autonomy support, self-esteem, and grit on prosocial behavior in Study 2. Self-esteem and grit were divided into different levels based on means and standard deviations.

Note.  $N = 246$ . SE = self-esteem.

findings from Study 2 exhibited that high grit buffered against the negative effect of low levels of classmate autonomy support on prosocial behavior.

Our first purpose was to examine the association between classmate autonomy support and prosocial behavior in Chinese left-behind adolescents. Consistent with our first hypothesis (H1), the results from both studies exhibited that classmate autonomy support was positively associated with prosocial behavior. In agreement with the self-determination theory and previous research findings on the beneficial role of perceived autonomy support (Gagné, 2003; Gao et al., 2020; Ryan & Deci, 2017), individuals are inclined to be prosocial if social contexts around them could take their perspectives and feelings into account, provide opportunities for choices, and fulfill their basic psychological needs. Moreover, as youth enter adolescence, they spend an increasing amount of time with their classmates, as they gain increasing independence and autonomy from their families (Fredrick et al., 2017). In this context, classmate autonomy support may counterbalance parental absence, weaken stress possibly stemming from the school environment, and play an important role in adolescents' volitional motivation for prosocial activities.

Our second purpose was to examine whether the positive association between classmate autonomy support and prosocial behavior varied by personal characteristics, such as self-esteem and/or grit. The results from both studies did not support the second and the third hypothesis (H3a) that self-esteem and grit can individually moderate the under-investigated association. One possible explanation is that, for left-behind adolescents, the irreplaceable role of classmate autonomy support in the absence of parents may have a strong main effect on their psychosocial adaptation, which may hold regardless of the separate levels of self-esteem or grit. In this vein, the independent moderating effect of self-esteem and grit may not be so pronounced.

Furthermore, both studies confirmed our third hypothesis (H3b), showing that when adolescents reported low levels of self-esteem, high grit could enhance the positive association between classmate autonomy support and prosocial behavior. This finding is consistent with previous research, documenting that grit is an essential buffer that mitigates stress responses and fosters positive adjustment, as adolescents with high grit are better at self-regulation and are more likely to adopt adaptive coping strategies to handle stress (Duckworth et al., 2007; Lan & Radin, 2020). One possible explanation is that adolescence is a crucial period for developing self-esteem, and the absence of parents and possible discrimination may make adolescents very sensitive to their self-views (Fu et al., 2017; Orth et al., 2018). In agreement with previous research (Fu et al., 2017; Marigold et al., 2007), adolescents with low self-esteem usually have a negative attitude toward themselves. In this context, adolescents with high grit may take unfavorable conditions as a challenge, think from alternative perspectives, and employ positive strategies to cope with stress. Indeed, grit as a resilient trait could buffer against the adverse effect of negative self-views on autonomy support from their classmates, facilitating their long-term determination and volitional engagement in prosocial behavior (Duckworth et al., 2007). In addition, our findings supported the differential susceptibility theory (Pluess, 2015), documenting that sensitive individuals exhibit differences in their responses to both negative and positive environmental influences. Adolescents with high grit but low self-esteem seem more sensitive to their environmental influences, for better and for worse. In unfavorable contexts (low classmate autonomy support), adolescents with low self-esteem and high grit reported the lowest level of prosocial behavior, whereas, in favorable environments (high classmate autonomy support), they reported the highest.

Additionally, the findings from Study 2 also exhibited that, for left-behind adolescents reporting high self-esteem, high grit buffered against the negative effect of low levels of classmate autonomy support on prosocial behavior. However, this finding was not exhibited in Study 1. One possible explanation could be related to sampling location. Study 1 was conducted in a middle-sized city located in northwest mainland



China, in which the economic situation may be less developed than the metropolis, such as Beijing. In this regard, the autonomy-supportive atmosphere may not be highly valued, as socioeconomic situations often indirectly influence human behaviors and the manifestation of their autonomy support (Nalipay et al., 2020). Therefore, for left-behind adolescents reporting high levels of self-esteem, the negative effect of low classmate autonomy support on prosocial behavior may not be pronounced in Study 1. Another possible interpretation could be ascribed to age differences between these two studies. Older adolescents may increasingly value an autonomy-supportive interpersonal style and are increasingly able to appreciate others' perspectives due to increasing independence and cognitive maturation (Ryan & Deci, 2017; Soenens et al., 2007). In this perspective, the salient role of autonomy support in positive psychosocial outcomes may be more strengthened for older adolescents than younger adolescents. Therefore, the negative effect of low classmate autonomy support on prosocial behavior in older adolescents may be heightened, and in this context, grit may effectively buffer against this negative effect. Meanwhile, readers should bear in mind that the internal reliabilities of prosocial behavior and grit in Study 1 were borderline acceptable, whereas the internal reliability of classmate autonomy support was fairly high, potentially influencing the strength of the studied associations.

Coupled with these significant findings, the current study involves several limitations that need to be addressed in future studies. First, this study is based on cross-sectional design and self-reported measurements. Future studies should employ a multi-wave longitudinal design using multiple methods to address these methodological limitations. Second, this study regards prosocial behavior and self-esteem as global constructs, and does not differentiate the subtypes of prosocial behavior (see Eisenberg et al., 2015) or the multidimensional constructs of self-esteem (see Chen et al., 2020; Garcia et al., 2018). Future studies should consider unpacking these constructs to provide a more comprehensive analysis of the associations under investigation. Third, the current study focuses on relatively limited predictors, such as perceived autonomy support from classmates. It is undeniable that family support is one of the central institutions for adolescents' optimal psychosocial development, and thus family autonomy support would be another crucial variable facilitating left-behind adolescents' adaptive psychosocial functions. This claim is somewhat reflected in the linear regression of Study 2, as the R-square value significantly increased when the variable of family functioning was entered. We recommend future studies to focus on a more broad view of left-behind adolescents' social spheres, such as considering their classmates and their families simultaneously, to gain a more comprehensive view of the association of perceived autonomy support with left-behind youth's prosocial behavior. Fourth, in line with previous studies of left-behind adolescents (e.g., Zhao et al., 2019), the number of adolescents experiencing mother-only migration was relatively small, preventing us from performing further analysis to detect group differences based on parental migration status (i.e., both-parent migration, father-only migration, and mother-only migration) in variables of interest and studied associations. Future studies should use sufficient and balanced sample sizes to provide a more detailed investigation of whether the studied associations vary according to adolescents' parental migration status. Finally, our findings should be interpreted within the cultural boundaries of Chinese society, as the under-investigated associations are examined in Chinese left-behind adolescents only. Future studies should address this limitation by employing a more culturally broad selection of left-behind populations to assure the generalization of current findings.

In conclusion, the present research highlights the vital role of classmate autonomy support in left-behind adolescents' prosocial behavior. Moreover, activities facilitating their positive self-views and grit could be considered essential intervention targets to foster adolescents' prosocial tendencies.

## CRediT authorship contribution statement

C. Ma and X. Lan conceived and designed these studies. C. Ma conducted data collection and X. Lan performed the data analysis and interpretation. C. Ma and X. Lan drafted the manuscript, and S. Mastrotheodoros provided critical revisions. All authors approved the final version of the manuscript for submission.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2022.111679>.

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