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# Direct and interactive effects of perceived teacher-student relationship and grit on student wellbeing among stay-behind early adolescents in urban China

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ABSTRACT

This cross-sectional study aimed to compare student wellbeing operationalized as learning engagement, satisfaction with peer relations, and school satisfaction between urban stay-behind early adolescents and their non-stay-behind counterparts in Mainland China. Furthermore, we tested whether the expected relationship between perceived teacher-student relationship quality and student wellbeing was moderated by grit. Participants were 143 stay-behind (43.4% girls) and 297 non-stay-behind (52.9% girls) Chinese early adolescents aged 10–13 years, who completed a questionnaire survey. Results indicated that the two groups did not differ in learning engagement and school satisfaction, but stay-behind children scored lower on satisfaction with peer relations than their non-stay-behind counterparts. Moreover, in the context of a negative teacher-student relationship, students with high levels of grit reported more learning engagement and school satisfaction than students with low levels of grit, irrespective of stay-behind status. Implications for theory and educational practice are discussed.

## 1. Introduction

With China's rapidly developing economy and increasing economic relevance of large cities (e.g. Beijing, Shanghai), many adults from urban areas migrate to other cities for better job opportunities, especially in metropolitan areas as the fierce competition for a decent job steadily increases. Based on a recent migration population developmental report in China (National Health and Family Planning Commission, 2017), 245 million people migrated across the country, of whom about 100 million have moved between cities. The unbalanced development among different parts of China (e.g., Southeastern coastal cities vs. Western cities) has also contributed to a dramatic increase in the mobility between metropolitan areas. A side effect of this migration is that school-aged adolescents frequently stay behind and live with only one parent or other relatives.

Abundant evidence indicates that parental migration has a negative impact on children's psychological adaptation and school adjustment across different cultures (e.g., Yeh, 2003). In particular, previous studies have shown that left-behind children in rural China have several difficulties in psychosocial development and academic functioning (Wen & Lin, 2012; Zhou et al., 2015). While research on rural left-behind children has flourished in the past decade (see a meta-analytical review at Wang & Mesman, 2015), much less is known about Chinese stay-behind children in urban contexts who generally live in households with higher socioeconomic status (SES) and face highly competitive settings (Li, 2017). In the current study, the term 'urban stay-behind' refers to children holding permanent residence in an urban context and who have been taken care of by grandparents, relatives, or other appointed guardians due to both or one of their parents migrating to another urban area for at least 6 months (Ge, Se, & Zhang, 2015). These children are similar to rural left-behind children to some degree (e.g., one or both parents leave their home for another city owing to better job opportunities; separation of family members for prolonged periods of time; grandparents, relatives, or other appointed guardians take childcare responsibility), but the two groups also differ in important aspects, such as SES and educational resources. Indeed, Chinese urban stay-behind children are generally wealthier and have better educational opportunities than their rural left-behind peers. Yet, the few available studies indicate that they also experience distress and isolation, since they often lack a supportive socioemotional environment (Sun et al., 2017). For instance, Ge et al. (2015) found that stay-behind children living in urban settings reported higher levels of internet

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addiction problems; similarly, Sun et al. (2017) showed that stay-behind children were at higher risk for psychotic-like experiences and suffered more traumatic events than their non-stay behind counterparts. In an international report, Chen, Yang, and Ren (2015) emphasized that both urban and rural left-behind children in China exhibit high levels of health problems due to the disrupted family structure. Indeed, previous research suggests that the degree of family stability and type of co-residence substantially contribute to the quality of youths' social relationships and school functioning (e.g., Gilman, Kawachi, Fitzmaurice, & Buka, 2003; Magnuson & Berger, 2009). The atypical family arrangement patterns which often characterize Chinese urban stay- behind youth (i.e., discontinuous co-residence of both parents and their offspring) may increase their vulnerability to adjustment problems in everyday life settings, including the school context.

Given the dearth of studies on this specific population, our paper aimed to examine urban stay-behind children's wellbeing at school to shed light on possible difficulties and/or strengths and to inform educational policy and practice. In doing so, we use a risk and resilience perspective to address the correlates of Chinese students' well-being by focusing on both individual (i.e., grit) and environmental (i.e., student-teacher relationship) factors that have been previously identified as protective factors for school adjustment in at-risk populations (Jenson & Fraser, 2006; Masten, 2013). Specifically, we draw upon the social and emotional learning model (SEL) proposed by Zins and Elias (2007), who conceptualize school wellbeing as the result of students' skills in the realm of social relationships and self-management in combination with a caring, supportive, and well-managed learning environment. As this model has been successfully applied to the Chinese cultural context (see Yu & Jiang, 2017), we focused on learning engagement, satisfaction with peer relations, and school satisfaction as potential indicators of urban stay-behind and non-stay-behind Chinese students' wellbeing at school.

### 1.1. Student wellbeing

Student wellbeing is a multidimensional construct involving the quality of school conditions as well as a positive subjective, emotional, and cognitive evaluation of school reality (Scrimin, Moscardino, Altoè, & Mason, 2016). It provides a basis for adolescents' subsequent socialization into adulthood and is associated with better socio-emotional functioning and more positive self-evaluations (Tuominen-Soini, Salmela-Aro, & Niemivirta, 2012). Despite several years of intense research, there continues to be heterogeneity in how and what should be assessed when addressing students' student well-being. In this paper, we operationalized student wellbeing in terms of academic engagement (i.e., learning engagement), satisfaction with social relationships (i.e., satisfaction with peer relations), and commitment to school (i.e., school satisfaction) following the SEL goals proposed by Zins and Elias (2007). This conceptualization allowed us to obtain a more nuanced measure of student wellbeing encompassing both ‘subjective’ (i.e., satisfaction with peer relations and school conditions) and ‘objective’ (i.e., cognitive, affective and behavioral learning engagement) sources of school-related wellbeing.

Learning engagement is a psychological characteristic involving students' willingness to take part in learning activities to better acquire knowledge or skills (Hu & Hui, 2012), and is susceptible to contextual influences and predictive of academic performance. It underscores the importance of behavioral (e.g., participation), emotional (e.g., interest or satisfaction), and cognitive engagement in learning, which are connected to previously learned knowledge (Lam et al., 2012). Satisfaction with peer relations refers to a subjective sense of satisfaction with one's social relationships with peers. During early adolescence, the development and maintenance of satisfying peer relationships becomes a central task (Flynn, Felmlee, & Conger, 2017), and children's peer relations significantly contribute to their feelings of well-being at school (Oberle, Schonert-Reichl, & Thomson, 2010). School satisfaction is conceptualized as students' subjective, cognitive appraisals of their quality of school life (Baker, 1999). It affects psychological well-being, school engagement, dropout, and behavioral problems (Appleton, Christenson, & Furlong, 2008); thus, it is important to understand how children evaluate their school and which factors are related to school satisfaction.

Previous studies have shown that student wellbeing is influenced by a number of demographic variables. For example, boys have been found to exhibit less learning engagement and to hold more negative attitudes towards school than girls (King, 2016), and educational engagement is generally stronger for younger compared to older children (Fang, 2016). Also, children from higher SES family backgrounds tend to perceive more positive academic well-being than their peers from lower SES families (Guo, Marsh, Parker, Morin, & Yeung, 2015). We therefore considered gender, age, and SES as control variables in our study.

In traditional Chinese society, academic success has always been an extremely important means of personal advancement. Indeed, Chinese parents more highly value education and academic achievement compared to Western parents (Ng, Sze, Tamis-LeMonda, & Ruble, 2017). Also, Chinese beliefs about human malleability and self-improvement give rise to a strong emphasis on students' successful engagement in the school context (Lam et al., 2016), with learning engagement being one of the most important duties for children and adolescents. At the same time, social harmony, conformity, and interdependence are highly valued in Chinese collectivistic society, where connectedness with peers and respect for teacher authority are largely shared cultural values and norms. Given this cultural milieu, children's wellbeing at school is very well reflected in the extent to which students get along with their peers, are involved in educational activities and learning, and feel satisfied with their school environment.

Prior research in the Chinese context has shown that parental migration has a negative effect on the educational attainment of left-behind children living in rural areas (Wang, 2014). These children tend to exhibit more peer problems than their non-left-behind counterparts (Fan, Su, Gill, & Birmaher, 2010), whereas no differences have emerged in terms of school satisfaction (Su, Li, Lin, Xu, & Zhu, 2013). Yet, the degree to which these findings may apply to Chinese stay-behind children in urban settings, who generally live in socioeconomically more advantaged conditions and have better educational opportunities, remains unclear.

### 1.2. The teacher-student relationship in early adolescence

Early adolescence is often characterized by the beginning of a downward spiral in school-related behaviors and motivation that may lead to academic failure and school dropout (Quiroga, Janosz, Bisset, & Morin, 2013). Given the large amount of time children spend in the school context, there is a need to better understand the factors within schools that may enhance the positive adaptation of stay-behind children in urban China. Here, we focus on a relevant aspect potentially contributing to these children's wellbeing at school, namely teacher-student relationship quality.

The teacher–student relationship, conceptualized as the degree of closeness and conflict within this relationship, plays a crucial role in children's school adjustment, and numerous studies have underscored the influence of this relationship on individual adjustment (e.g., Davis, 2003; Lee, 2007; Ryan, Stiller, & Lynch, 1994; Zee, Koomen, & Van der Veen, 2013). In particular, based on compensatory and protective models of resilience (Zimmerman & Arunkumar, 1994), there is a growing body of research examining the teacher–student relationship as a source of support for individuals who are at risk. For instance, Liew, Chen, and Hughes (2010) reported that a positive teacher-student relationship is a buffer for achievement in academically at-risk children. The effects of a negative relationship seem to be stronger in primary than in secondary school, because students in secondary school usually have several teachers during the school day, whereas primary school

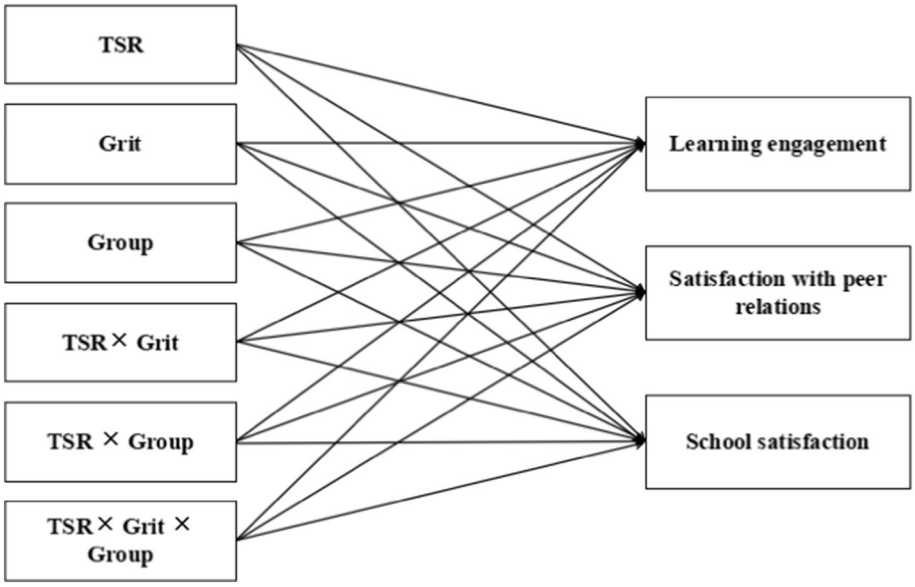


**Fig. 1.** Hypothesized model.
*Note*. TSR = teacher-student relationship. Age, gender, and socioeconomic status were considered as control variables.

students generally spend most of their time with the same teacher (Roorda, Koomen, Spilt, & Oort, 2011).

Students' relationships with teachers are fundamental to success in school. Forming strong and supportive relationships with teachers allows students to feel safer, more secure, and more competent in the school setting; in addition, it facilitates positive connections with peers and is linked to greater academic gains (Olivier & Archambault, 2017), also for Chinese adolescents (Zhen et al., 2017). In traditional Chinese society, parental socialization goals attach more importance to respecting teachers and elders ("*Zun jing shi zhang*") in comparison with Western cultures. Thus, it is reasonable to expect that a positive teacher-student relationship may play a particularly salient role within this cultural context - especially among stay-behind children, who often lack supportive attachment figures due to parental migration. Indeed, a study by Liu, Li, Chen, and Qu (2015) found that perceived positive teacher-student relationship quality was a protective factor for rural left-behind children's emotional and behavioral adjustment. However, the extent to which this positive effect also generalizes to Chinese stay-behind youth living in urban environments is still unknown (e.g., Guo et al., 2015). Furthermore, abundant studies have focused on exploring the relation between teacher support and psychosocial outcomes, while less research has investigated whether the teacher-student relationship may interact with students' personality characteristics to explain academic success, especially in non-Western cultures. Given the salience of perseverance and diligence ("*Qin fen*") in Chinese beliefs and customs, the current paper examines the role of grit in shaping urban stay-behind children's wellbeing at school.

### 1.3. The moderating role of grit

Grit is a lower-level personality trait involving perseverance and passion for long-term goals which contributes to educational attainment (Duckworth, Peterson, Matthews, & Kelly, 2007). Differently from conscientiousness or self-control, grit entails the capacity to sustain both effort and interest in achieving goals that may take months or even longer to complete (Duckworth & Quinn, 2009). As such, the construct of grit encompasses perseverance of effort and consistency of interests, and has been found to predict increased academic performance in school-aged adolescents from diverse cultural contexts, including China (e.g., Credé, Tynan, & Harms, 2017; Li, Zhao, Lin, Chen, & Wang, 2018).

While the positive role of grit in academic performance is well-established, emerging evidence also suggests that grit is a component of self-regulation and can therefore contribute to resilience. For instance, grit has been found to buffer against adverse circumstances in at-risk populations (see Blalock, Young, & Kleiman, 2015; White et al., 2017). Indeed, gritty individuals show consistent interest and work hard towards their goals with perseverance and show a high orientation towards the future; these characteristics may have a protective role in the context of negative environmental conditions, such as a conflicting relationship with one's teacher, especially among stay-behind children who are often more disadvantaged in terms of academic and/or socioemotional adjustment. This perspective is in line with social cognitive theory (Bandura, 1991), which posits that social factors affect the way our self-regulatory system works, implying that environmental variables in interaction with self-regulatory traits and abilities can influence behavioral outcomes.

Consistent with this view, and drawing upon a risk and resilience framework (Masten, 2013), the current study examines whether grit moderates the expected link between perceived teacher-student relationship quality and student well-being among urban Chinese stay-behind early adolescents and their non-stay-behind peers.

### 1.4. The present study

The current study has two main aims. First, we examined three facets of student wellbeing (i.e., learning engagement, satisfaction with peer relations, and school satisfaction) among stay-behind children in urban China in comparison with their non-stay-behind counterparts. Second, we assessed the direct and interactive contributions of perceived positive teacher-student relationship and grit to the three facets of student wellbeing in both groups.

Specifically, we tested the following hypotheses (H):

**H1.** Urban stay-behind students report lower levels of wellbeing at school compared to their non-stay-behind peers, and gender, age, and SES covariate student wellbeing. Specifically, boys, older children, and/or children from low SES families perceive poorer wellbeing.

**H2.** Students who report a positive student-teacher relationship show overall higher levels of school wellbeing; this association is stronger for those with high levels of grit (i.e., two-way interaction; H2a), and for children in the stay-behind group (two-way interaction; H2b).

**H3.** The moderating effect of grit in the association between teacher-student relationship and wellbeing at school is more pronounced among children in the stay-behind group (i.e., three-way interaction).

A graphical representation of our hypothesized model is depicted in Fig. 1.

## 2. Method

### 2.1. Participants

Participants in this study involved 143 stay-behind (43.4% girls; 81.8% living with one parent) and 297 non-stay-behind (52.9% girls) Chinese early adolescents aged 10–13 years ($M$ = 11.30; $SD$ = 1.12), who were attending 4th, 5th and 6th grades in eight public primary schools in Beijing, China. Based on national statistics, family SES was relatively moderate, with an average income equivalent to 800–1200 US dollars per month. Also, children's perceived living standard was moderate (66.6%) as rated on 5-point Likert scale. The majority of fathers (30.7%) had completed high school, whereas most mothers (33.2%) had received middle school education. The majority of participating families (59.1%) had an only child and belonged to the Han ethnic group (93.2%). The average length of time of parental migration for stay-behind children was 3 years and 4 months (range = 1–6 yrs, $SD$ = 1.77). One-hundred seventeen stay-behind children lived with one parent, and 26 cases were staying with their grandparents. The majority of migrant parents (96%) lived permanently outside the home, and returned home only for short periods of break (e.g., Chinese Spring Festival) due to work duties.

Preliminary analyses indicated that the two groups did not differ in SES ($t$ = 1.06, $df$ = 438, $p$ = .29), age ($t$ = 1.54, $df$ = 438, $p$ = .12) or gender distribution ($\chi^2$ = 3.49, $df$ = 1, $p$ = .06).

### 2.2. Measures

*Demographic information* collected from the participants included gender, age, place of birth, family composition, parental educational level and occupation, and monthly family income. Socioeconomic indicators were assessed via maternal and paternal education background and occupation. With regard to education, four categories were available: (1) middle school graduation or lower, (2) high school graduation, (3) bachelor's degree graduation, and (4) master's degree graduation or higher. As for parental occupation and monthly family income, students could choose among seven different response options based on occupational classification and residents' income criteria in China (adapted from Shi & Shen, 2007). The three scores were standardized and subsequently summed to yield an overall SES score (Seyfried, 1998).

*Student wellbeing*. Given the multifaceted nature of this construct, we used three separate measures of students' school well-being in this study, namely learning engagement, satisfaction with peer relations, and school satisfaction. Each of these measures was considered as an indicator of wellbeing at school and included as such in subsequent analyses. *Learning engagement* was measured by the 16-item Student Engagement Scale, which was validated for Chinese adolescents (Lam et al., 2012). The scale consists of three dimensions: behavioral engagement (five items; e.g., "I try hard to do well in school"), affective engagement (five items; e.g., "I like what I am learning in school"), and cognitive engagement (six items; e.g., "When I study, I try to connect what I am learning with my own experiences."). Participants were asked to rate each item on a Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The average score of 16 items was calculated, with a higher score indicating more learning engagement. Cronbach's Alpha for the total score was 0.94 in this study.

*Satisfaction with peer relations* were measured via the subscale of the Children's Loneliness and Social Dissatisfaction Scale adapted from Asher, Hymel, and Renshaw (1984). This questionnaire was adapted in China by Yu, Zhang, and Yan (2005), showing good internal consistency and validity. The satisfaction with peer relations subscale is composed of 5 items (e.g., "I do not have any friends"). Participants were asked to rate each item from 1 (*Not true at all*) to 5 (*Always true*) on the Likert scale. The average score of 5 items was calculated and reversed, so that higher scores indicated more satisfaction with peer relations. In the current study, Cronbach's Alpha was 0.82.

*School Satisfaction* was measured by a specific subscale of the Multidimensional Students' Life Satisfaction Scale (MSLSS; Huebner, 1994). The Chinese version validated by Tian and Liu showed good internal consistency (Tian & Liu, 2005). School satisfaction consists of five items (e.g., "I like being in school"). Participants were asked to rate each item on a response scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). The average score of 5 items was calculated, with a higher score indicating a higher level of school satisfaction. The subscale used in this study exhibited good internal consistency (Cronbach's Alpha = 0.87).

*Teacher-student relationship quality* was measured using the questionnaire originally developed by Pianta and Nimetz (1991) and revised by Wang and Wang (2002) for use in Chinese culture. This 15-item instrument assesses students' perceptions of three features of the relationship with their teacher: closeness, positive reactivity, and conflict. Participants rated items in terms of how applicable each statement was to their relationship with their current head teacher. Responses ranged from 1 (*definitely does not apply*) to 5 (*definitely applies*). Scores were computed by averaging items. The conflict subscale was reversed, so that high scores represented a positive relationship characterized by trust, warmth, and low conflict. The average score of 15 items was calculated, with a higher score indicating a positive teacher-student relationship. Cronbach's Alpha for this scale was 0.91 in the present study.

*Grit* was measured by the 8-item scale (Grit-S; Duckworth & Quinn, 2009), which was validated for Chinese adolescents (Li et al., 2018). The scale consists of two dimensions: perseverance of effort (four items; e.g., "Setbacks do not discourage me") and consistency of interests (four items; e.g., "New ideas and projects sometimes distract me from previous ones"). Participants were asked to rate each item from 1 (*Not like me at all*) to 5 (*Very much like me*) on the Likert scale. The average score of 8 items was calculated, with a higher score indicating a higher level of grit. In this study, Cronbach's Alpha for the scale was 0.78.

### 2.3. Procedure

Participants were recruited through public schools located in Beijing, China. After obtaining permission from school principals, informed consent forms were given to students who were asked to bring them home to their parents. Written consent was obtained from both parents, and verbal assent was obtained from each child. Overall, participation rate was 92%. During school hours, a trained experimenter provided standardized instructions, and students were asked to complete the questionnaires during a 30-minute period in the classroom. Upon completion of the survey, students received a small stationery gift to thank for their participation. Ethic approval for the study was granted by the relevant university committee prior to data collection.

## 3. Results

### 3.1. Descriptive statistics

Data analyses were performed using R software (R Core Team, 2017). Seventy-two cases were eliminated as they did not specify whether their parents were permanently working in another city. Another 20 cases were excluded due to high rates of missing data (> 20%) in at least one of the questionnaires in our battery. To investigate the impact of missing data, we performed a Little's missing completely at random (MCAR) test. Results supported the MCAR assumption,

**Table 1**
Descriptive statistics and bivariate correlations of study variables for urban Chinese stay-behind early adolescents and their non-stay-behind peers.

| | SB ($n$ = 143) | | | Non-SB ($n$ = 297) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | SD | Range | M | SD | Range | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. Teacher-student relationship | 3.83 | 0.79 | 1–5 | 3.85 | 0.87 | 1–5 | – | 0.41*** | 0.57*** | 0.40*** | 0.64*** | −0.25*** | 0.16*** | 0.04 |
| 2. Grit | 3.52 | 0.73 | 1–5 | 3.73 | 0.78 | 1–5 | 0.19* | – | 0.52*** | 0.25*** | 0.35*** | −0.11*** | 0.09 | 0.12* |
| 3. Learning engagement | 3.88 | 0.77 | 1–5 | 3.97 | 0.78 | 1–5 | 0.39*** | 0.43*** | – | 0.27*** | 0.62*** | −0.21*** | 0.10 | 0.17*** |
| 4. Peer relations | 3.59 | 1.14 | 1–5 | 4.02 | 0.95 | 1–5 | 0.10 | 0.11 | 0.11 | – | 0.38*** | −0.02*** | 0.04 | 0.09 |
| 5. School satisfaction | 3.39 | 0.62 | 1–5 | 3.47 | 0.62 | 1–5 | 0.39*** | 0.32*** | 0.57*** | 0.09 | – | −0.26*** | 0.08 | 0.06 |
| 6. Age | 11.19 | 1.07 | 10–13 | 11.36 | 1.13 | 10–13 | −0.23** | −0.09 | −0.09 | 0.07 | −0.21** | – | 0.03 | −0.25*** |
| 7. Gender | – | – | 1–2 | – | – | 1–2 | 0.09 | 0.03 | 0.08 | 0.01 | 0.14 | −0.08 | – | −0.02 |
| 8. SES | −0.32 | 4.00 | −7.72–8.78 | 0.15 | 4.08 | −6.96–8.78 | −0.10 | −0.05 | 0.22** | −0.02 | 0.12 | 0.02 | 0.18* | – |

*Note.* Correlation coefficients displayed above the diagonal are for non-stay-behind (Non-SB) adolescents, below for stay-behind (SB) adolescents.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

$\chi^2(102) = 96.28$, $p = .64$. The remaining missing values were imputed for each subject according to each subject's mean score on the considered measure.

Means and standard deviations for study variables and bivariate correlations are reported in Table 1, separately for stay-behind and non-stay-behind early adolescents.

Multivariate ANOVA and follow-up univariate ANOVAs indicated that there were no significant differences between the two groups in learning engagement ($F$ (1, 435) = 1.29, $p = .26$, $\eta_p^2 = 0.003$) or school satisfaction ($F$ (1, 435) = 2.08, $p = .15$, $\eta_p^2 = 0.005$). However, stay-behind children scored lower on satisfaction with peer relations ($F$ (1, 435) = 15.64, $p < .001$, $\eta_p^2 = 0.04$) compared to their non-stay-behind counterparts, although the effect size was low.

Correlational analyses indicated that among non-stay-behind children, teacher-student relationship and grit were each significantly and positively associated with learning engagement, satisfaction with peer relations, and school satisfaction. In the stay-behind group, teacher-student relationship was positively related with grit, learning engagement, and school satisfaction. Grit was positively related with learning engagement and school satisfaction, but not with satisfaction with peer relations.

### 3.2. Path analyses

In this study, we used path analysis to examine to evaluate the contributions of teacher-student relationship and grit to the three facets of student wellbeing in both groups. Although a latent variable modelling approach would have been valuable considering the nature of our data, the relatively small sample size prevented us from using this approach as it would have resulted in too many estimated parameters in relation to the number of study participants. Furthermore, all constructs/measures have been previously validated in the Chinese cultural context, thus ensuring reliable estimates. For these reasons, we chose to apply a more parsimonious SEM approach in which for each latent variable, we considered the aggregated score of the associated observed indicator. In this analysis, gender, age and SES were considered as control variables.

Our hypothesized model was tested using the R package lavaan (R Core Team, 2017; Rosseel, 2012). Path coefficients from teacher-student relationship and the three indicators of student well-being were estimated using the maximum likelihood method, with a single observed score (i.e., centered mean score) for each variable. To test for moderation, products between centered variables were computed and included in the model as interaction terms. We started from the baseline model which included the main effects of teacher-student relationship quality, grit, group membership (stay-behind vs. non- stay-behind youth), covariates (i.e., age, gender, SES) and two- and three-way interactions among these variables on each observed outcome variable (see Fig. 1). Inspection of path coefficients showed a number of non-significant links between interaction terms and outcome variables, which were removed on a step-by-step basis. This procedure was based on previous recommendations (see Perry, Nicholls, Clough, & Crust, 2015) and is particularly appropriate in the context of exploratory studies, as it allows to avoid irrelevant model misspecification caused by non-significant coefficients in the model, which may lead to the potential rejection of a good model. As described in prior research (e.g., Miconi, Moscardino, Ronconi, & Altoè, 2017; Scrimin, Osler, Pozzoli, & Moscardino, 2018), we first removed the higher nonsignificant $p$-value, and then re-ran the model to check until all the coefficients were significant at a 0.05 level. The final model, presented in Fig. 2, fit the data well, $\chi^2(7) = 5.36$, $p = .62$; Tucker Lewis Index (TLI) = 1.01; Comparative Fit Index (CFI) = 1.00, Standardized Root Mean Square Residual (SRMR) < 0.001. In this model, all estimated coefficients were statistically significant with a satisfactory effect size. The $R^2$ for the endogenous variables indicated that the model accounted for 40.8% of the variance in learning engagement, 14.7% in satisfaction with peer relations, and 37.0% in school satisfaction.

As shown in Fig. 2, teacher-student relationship quality and grit were each significantly and positively associated with learning engagement. Furthermore, the interaction effect of teacher-student relationship and grit on learning engagement was significant. Simple slope analysis revealed that in the context of a negative teacher-student relationship, students with high levels of grit reported more learning engagement ($B = 0.27$, $SE = 0.05$, $t = 5.08$, $p < .001$) than students with low levels of grit ($B = 0.44$, $SE = 0.05$, $t = 9.14$, $p < .001$) (see Fig. 3). No other two-or three-way interactions were significant.

Similarly, teacher-student relationship quality and grit were each significantly and positively linked to satisfaction with peer relations; group was also positively associated with this outcome variable, with non-stay-behind children being more satisfied about their relationships with peers.

Furthermore, teacher-student relationship interacted with group membership to explain satisfaction with peer relations. Simple slope analysis revealed that the positive association between teacher-student relationship quality and satisfaction with peer relations was significant for non-stay-behind children ($B = 0.42$, $SE = 0.07$, $t = 5.89$, $p < .001$), but not for their stay-behind counterparts ($B = 0.15$, $SE = 0.11$, $t = 1.41$, $p = .16$). No other two- or three-way interactions emerged.

Last, teacher-student relationship quality and grit were each significantly and positively related to school satisfaction.

We also found a significant interaction effect of teacher-student relationship and grit on school satisfaction. Simple slope analyses indicated that when experiencing a negative teacher-student relationship, students with high levels of grit ($B = 0.27$, $SE = 0.04$, $t = 6.25$, $p < .001$) were more satisfied with their school compared to students

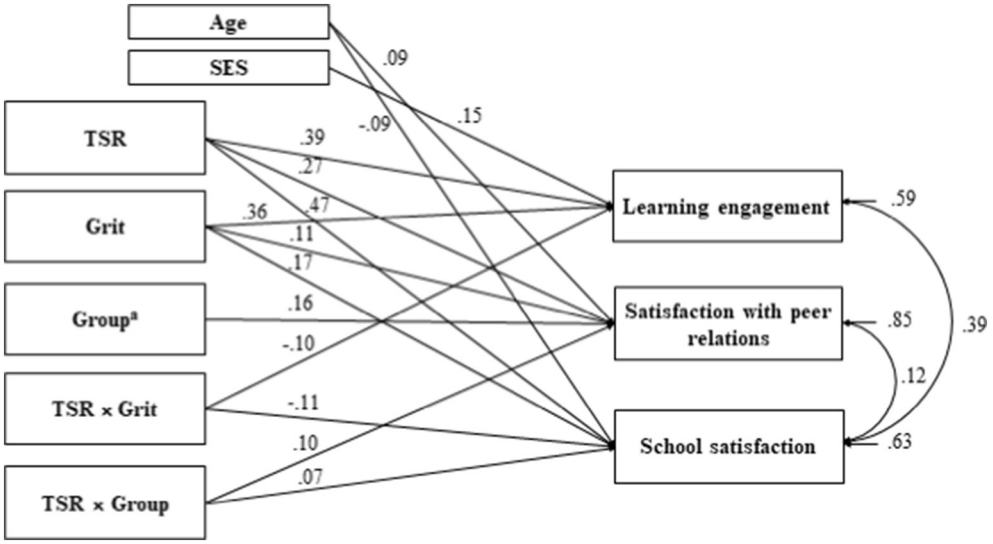


**Fig. 2.** Structural path diagram of the final model.
*Note*. [a]coded 1 = stay-behind youth and 2 = non-stay-behind youth. SES = socioeconomic status, TSR = teacher-student relationship. Only significant paths are shown with $p < .05$.

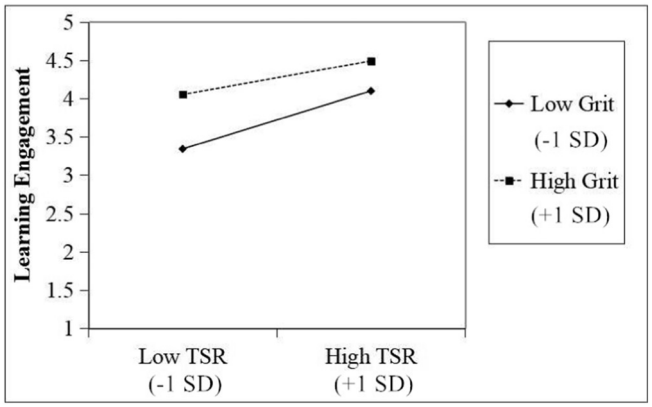


**Fig. 3.** Interaction effect of perceived teacher-student relationship and grit on learning engagement. Grit was divided into two levels based on mean: low = mean − 1 *SD*, high = mean + 1 *SD*.
*Note*. TSR = teacher-student relationship.

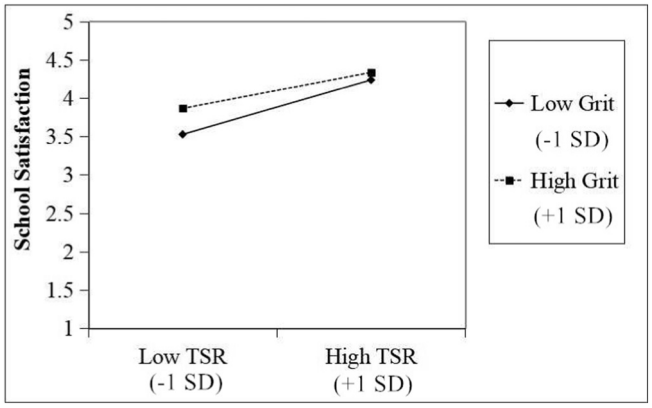


**Fig. 4.** Interaction effect of perceived teacher-student relationship and grit on school satisfaction. Grit was divided into two levels based on mean: low = mean − 1 *SD*, high = mean + 1 *SD*.
*Note*. TSR = teacher-student relationship.

with low levels of grit ($B = 0.43$, $SE = 0.04$, $t = 10.88$, $p < .001$) (see Fig. 4). Furthermore, teacher-student relationship quality interacted with group membership to explain school satisfaction. Specifically, when experiencing a positive teacher-student relationship, non-stay-behind children ($B = 0.40$, $SE = 0.04$, $t = 10.91$, $p < .001$) reported higher levels of school satisfaction than their stay-behind counterparts ($B = 0.24$, $SE = 0.05$, $t = 4.44$, $p < .001$). No other effects were statistically significant.

## 4. Discussion

The main goal of this study was to investigate three facets of student wellbeing, namely learning engagement, satisfaction with peer relations, and school satisfaction among stay-behind early adolescents in urban China in comparison with their non-stay-behind peers. Also, the moderating role of grit was examined in both groups. Indeed, while extant research suggests that left-behind children in rural contexts are often disadvantaged in terms of behavioral adjustment and school performance, little is known about stay-behind children's adaptation in urban settings, especially in non-Western countries. Our results showed that stay-behind students reported similar levels of learning engagement and school satisfaction, but they were less satisfied with their peer relations than their non-left-behind counterparts. Of importance, grit and stay-behind status moderated the association between teacher-student relationship and student wellbeing.

Our first purpose was to investigate group differences in the three indicators of student wellbeing between stay-behind and non-stay-behind students. The lack of differences in terms of learning engagement is in contrast with previous research conducted with left-behind children in rural China. For instance, Wang (2014) found that parental migration had a negative influence on students' grades in mathematics and Chinese scores, and that this impact was stronger for children whose parents were both working in a different region. Interestingly, a recent meta-analysis found evidence for publication bias against studies showing less favorable development for migrant children and stay-behind children, suggesting that stay-behind children are not always disadvantaged (Wang & Mesman, 2015). It should be noted that in our sample, the vast majority of students belonged to families characterized by one-parent migration, and no differences in SES were found between the stay-behind and non-stay-behind groups. Moreover, compared to rural China, inner-city contexts (especially Beijing) provide families with diverse and available educational resources. Taken together, these

factors may explain why stay-behind children in our study reported similar levels of learning engagement in comparison with their non-stay-behind peers.

Levels of school satisfaction also did not differ between the two groups. This finding supports prior research on left-behind children in rural China, in which no differences were found between students living in households with one migrant parent and a matched group of students living in intact families (Su et al., 2013). As mentioned above, similar levels of school satisfaction may be attributed to the presence of at least one parent in the families of stay-behind children involved in our study, as well as the availability and accessibility of high-quality educational resources, which could contribute to feelings of satisfaction among students of both groups.

However, our findings revealed that stay-behind early adolescents held more negative evaluations about relationships with peers than their non-stay-behind counterparts. Although further research is needed to confirm this result, this pattern is congruent with previous studies reporting higher risk of social isolation among stay-behind children in urban China compared with local peers (Ge et al., 2015). Due to parental migration, stay-behind children may have less opportunities to participate in social activities accompanied by parents, and engage in more solitary activities instead (e.g., Internet surfing). Longtime deviation from the affiliation group network may negatively impact on the quality of social relationships with peers, thus resulting in lower levels of satisfaction. In this context, the quality of parental involvement and communication are two vital factors which may contribute to the development of positive relationships with peers also among urban stay-behind early adolescents.

In terms of covariates, we did not find any significant gender effect on the outcome variables in the current study, possibly because gender equality is increasingly embedded in Chinese cultural values (see Lee, 2012). Yet, age was positively linked to satisfaction with peer relations. This finding may be explained in terms of cognitive and socioemotional maturation, which results in more complex skills and an improved ability in managing peer relationships. In line with previous studies (e.g., Fang, 2016), age was also negatively related to school satisfaction. Indeed, older children start to direct their interests towards extra-school activities and may therefore derive a sense of satisfaction from other sources (e.g., peer group). Finally, and consistent with previous research, higher SES was positively associated with students' learning engagement, reflecting an increased emphasis on the academic domain on behalf of high SES parents (e.g., Guo, Marsh, et al., 2015).

Our second goal was to examine the association between teacher-student relationship quality and student wellbeing. As expected, teacher-student relationship quality showed a robust association with all three facets of student wellbeing, irrespective of parental migration. This pattern is in line with prior research highlighting the important role of teachers' emotional support for students' psychological socio-emotional well-being and academic functioning (Tennant et al., 2015), especially among left-behind Chinese children (Liu et al., 2015). This is particularly true in light of the low levels of involvement shown by migrant parents, who often do not have the resources to monitor and support their children's school activities.

With regard to moderation analysis, our study found that grit moderated the link between teacher-student relationship and learning engagement/school satisfaction irrespective of stay-behind status. Specifically, grit was found to buffer the association between a negative teacher-student relationship and decreased learning engagement and school satisfaction for Chinese early adolescents. A possible explanation is related to the large number of students composing classrooms in Chinese public schools (approx. 50), which may lead to difficulties in considering and providing support to any specific student in the classroom. Since gritty students exhibit an increased ability to overcome difficulties and consistently pursue their targeted goals, these individuals may be less affected by an unsatisfactory teacher-student relationship by focusing more on long-term goals, therefore resulting in higher levels of learning engagement and satisfaction with school. Thus, our study expands existing knowledge by documenting the protective role of a non-cognitive self-regulatory trait such as grit not only in relation to academic attainment, but also to more specific dimensions of student wellbeing (i.e., learning engagement and school satisfaction). Of interest, analyses revealed that grit did not moderate the link between teacher-student relationship and satisfaction with peer relations. Thus, the positive effect of perceived social-emotional support from teachers on students' satisfaction with peer relations was similar across high and low levels of grit. It is possible that other individual characteristics, such as emotion regulation, may be more relevant in shaping the extent to which children feel accepted by their peers (Kim & Cicchetti, 2010).

In addition, we found that stay-behind status moderated the link between teacher-student relationship and satisfaction with peer relations as well as school satisfaction. In both cases, the positive effect of a good relationship with one's teacher on the outcome variable was significant only for the non-stay-behind sample, suggesting that stay-behind status may be a risk factor because these children do not seem to benefit the same way from teachers' emotional support as their peers from the non-stay behind group. This pattern also suggests that stay-behind children might be more affected by other environmental factors. For example, less parent-child communication and guidance from co-parenting in families where only one parent is present may put children at disadvantage in terms of socio-emotional skills which, in turn, could affect the quality of their interactions with peers and their satisfaction with the school experience. Also, future studies may investigate whether exposure to discrimination, sense of insecurity due to parental migration, or less parental involvement in school may influence urban Chinese stay-behind children's satisfaction with peer relations and with their experience of school. Although these results deserve further investigation, stay-behind status seems to be a vulnerability factor to some extent for urban Chinese children, especially in the realm of social relationships.

Finally, our study failed to find three-way interaction effects among teacher-student relationship, grit, and stay-behind status. Although longitudinal studies are needed, the results suggest that the buffering effect of grit on the association between teacher-student relationship quality and student wellbeing is independent of parental migration. A possible explanation is that the two groups were relatively homogeneous in terms of family background (i.e., parental education, occupation, and income), suggesting that stay-behind students living in big cities are less disadvantaged in comparison to left-behind students residing in rural areas. Other possible reasons may include a better parent-child relationship and communication, as well as the availability of high-quality educational resources when facing at-risk situations.

## 5. Limitations and implications

While this study adds to the extant literature by documenting the protective role of grit in the association between teacher-student relationship quality and levels of student wellbeing among early adolescents in urban China, a number of limitations should be considered when interpreting the results. First, the cross-sectional and correlational design does not allow to establish causality. It may be, for example, that greater student wellbeing leads to a better teacher-student relationship which, in turn, enhances students' grit. Future studies may use a longitudinal design to assess the directionality of effects of relevant study variables. Second, the lack of a comparison group involving left-behind (and non-left-behind) students from rural areas does not allow to make inferences concerning possible differences between urban and rural contexts. Future investigations may expand the samples to include other geographical areas with high rates of stay-behind children in China. Third, potential differences between subgroups of stay-behind children in terms of family living arrangements, such as living without one or both parents, were not assessed in the current study due to the

insufficient number of participants representing each subgroup. Since children's wellbeing is substantially influenced by parenting styles and family socioemotional support (Moreira, Gouveia, & Canavarro, 2018), more research comparing stay-behind children living in households with diverse family arrangements is warranted. Fourth, the current study exclusively relied on self-report questionnaires with a relatively limited sample size, thus being subject to potential social desirability bias. Future studies might use a multi-informant (teacher- and parent-reports) and multi-method approach (e.g., behavior observations, qualitative interviews) with a larger sample size to reduce shared method variance and increase the validity of findings. Last, other contextual variables not considered in this study, such as parental involvement, family connectedness, and social support networks may have contributed to explain urban Chinese students' wellbeing. The role of these variables in both stay-behind and non-stay-behind urban samples may be a focus of future work in this area.

To conclude, the present study highlights the protective role of grit in the association between the quality of the student-teacher relationship and children's wellbeing in the school context, especially with regard to learning engagement and school satisfaction. From an applied perspective, the present study suggests that both stay-behind and non-stay-behind Chinese students living in urban contexts may benefit from targeted school activities or interventions aimed at boosting positive self-regulatory traits, such as perseverance and consistency. Within the school context, some activities facilitating grit may be organized to encourage students to set long-term goals based on their own interests. To achieve these goals, practice is needed especially with regard to the management of failure and setbacks, teaching students how to embrace failure as an opportunity to learn, improve, and get back up again. In particular, for students experiencing a negative teacher-student relationship, grit seems to foster not only academic achievement, but also learning engagement and school satisfaction. With regard to stay-behind children, educators and practitioners could emphasize satisfaction with peer relations in the process of school education by stimulating cooperative peer activities and facilitate group cooperative learning. Also, teacher support emerges as an important factor which may compensate – at least in part – the lower parental involvement frequently observed among this potentially vulnerable population. Devoting more attention, giving positive support, and providing inspiring comments may increase these children's feelings of acceptance, which, in turn, could boost their relationships with peers in the school context and ultimately promote their sense of wellbeing at school.

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