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Parental psychological control and academic functioning in Chinese high school students: A short-term longitudinal study

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The present study aimed to examine the reciprocal relationship between parental psychological control and students' academic functioning in urban China. Participants were 731 Chinese high school students in grade 10 (356 boys; M_{age} = 15.64 years, SD = 0.68). Two waves of 1-year longitudinal data were collected using student reports of parental psychological control and academic-related beliefs, strategies, and behaviours. Results showed that parental psychological control at Time 1 significantly triggered an increase in students' maladaptive academic functioning at Time 2; and students' adaptive academic functioning at Time 1 significantly predicted parental psychological control at Time 2. Limitations of the present study and implications for practice are discussed.

Statement of contribution

What is already known on this subject?

- According to self-determination theory, parental psychological control has been found to be harmful on students' academic learning in Western societies.
- We know little about the relation between parental psychological control and academic functioning (adaptive vs. maladaptive) in Eastern societies such as China.

What does this study add?

- Parental psychological control increased maladaptive academic functioning, and adaptive academic functioning decreased parental psychological control, suggesting a more fluid, dynamic parenting–child interaction over time.
- The predicted relations between parental psychological control and academic functioning of high school students hold across gender.
- More urbanized adolescents had a high tendency to perceive their parents as psychological controlling, suggesting a change in culture regarding the importance of personal autonomy for more urbanized adolescents.

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Psychological control refers to the extensive use of intrusive tactics, including authority assertion, guilt induction, and love withdrawal, to induce children to comply with parentally approved behaviours (Soenens & Vansteenkiste, 2010). It is argued that *parental psychological control* (PPC), which is intrusive and manipulative on children's psychological and emotional world, frustrates children's needs, disrupts their autonomous process, and creates a vulnerability to maladjustment (Barber & Harmon, 2002). Psychological control is associated with negative outcomes in children and adolescents, including high depression and anxiety, low self-esteem, and increased externalizing behaviours and peer rejection (Barber & Harmon, 2002; Janssens *et al.*, 2017; Rogers, Padilla-Walker, McLean, & Hurst, 2020). With respect to academic learning, research has demonstrated that parental psychological control is negatively associated with academic competence (e.g., Soenens & Vansteenkiste, 2010; Soucy & Larose, 2000), attitudes towards school (e.g., Gonzalez, Holbein, & Quilter, 2002), and academic grades (e.g., Pinquart, 2016; Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012). Parents' use of withdrawal of affection could increase children's insecurity and frustration. For instance, recent research has found that the adolescents of psychological controlling parents experience high academic anxious and learned helplessness on school activities (Filippello, Harrington, Costa, Buzzai, & Sorrenti, 2018).

However, most research on the associations between parental psychological control and students' academic functioning has been conducted in Western societies. Differential effects of parental psychological control are proposed based on the argument that autonomy is less emphasized in Eastern societies (Chao & Tseng, 2002). Therefore, exploration of the relationship between parental psychological control and students' learning in non-Western societies is especially important for determining the generalizability of the relevant claims.

Parental psychological control and academic learning in the light of self-determination theory (SDT) and possible cultural differences

According to SDT, autonomy-supportive parenting may foster children's internalization of school-related regulation by satisfying their needs for autonomy, competence, and relatedness. Adolescents with well-internalized motivation are likely to become self-regulated learners, who autonomously engage in academic activities with their own attitudes and actions to achieve their own learning goals (Deci & Ryan, 2000; Grusec, Goodnow, & Kuczynski, 2000; Joussemet, Landry, & Koestner, 2008). In contrast, psychological controlling parenting may hinder this internalizing process due to its damage on need satisfaction (Soenens & Vansteenkiste, 2010). Under controlling conditions, children may obey their parents (i.e., external regulation) without actively internalizing parents' educational value and expectations (Chen & Ho, 2012), or, worse, make them more fearful of the negative consequences of not doing well, and more likely to suffer low self-esteem or employ maladaptive strategies such as avoidance (Kim & Dembo, 2000; Martin & Marsh, 2006; Mih & Mih, 2016).

However, it has been argued that parental psychological control may be less detrimental to academic learning in collectivist cultures, such as Chinese culture, that stress the importance of collective goals and strivings and deemphasize the value of self-determination (Chao & Tseng, 2002; Doan *et al.*, 2017; Soenens & Vansteenkiste, 2010), particularly when their children's academic achievement is concerned (e.g., Ng, Pomerantz, & Deng, 2014). Yet, the negative effects of such parenting practice can be mitigated when Chinese children and adolescents perceive and interpret parental control,

even intrusive one, as an expression of care and legitimate concern (Chao, 1994; Chen-Bouck & Patterson, 2017). For instance, in a 6-month longitudinal study, Wang, Pomerantz, and Chen (2007) found that parental psychological control did not significantly predict adolescent students' goal investment, learning strategies, and school grades (see also Lin, 2001; Lu, Walsh, White, & Shield, 2017).

The effects of students' adjustment on psychologically controlling parenting

Much parenting research has been conducted with the assumption that parenting in general and parental psychological control in particularly un-directionally influence adolescents' functioning, not the other way around. To entangle the complex dynamics of parent–adolescent interaction and relationship, it is important to distinguish between parenting style and parenting practice. Parenting style (e.g., authoritative vs. authoritarian parenting) reflects a more pervasive, consistent pattern of interacting with children, whereas parenting practice can be more sensitive to situations, such as whether adolescent children live up to parents' expectations. In other words, levels and degrees of parental psychological control can be situational. From the relational developmental systems theory (Overton, 2014), parental psychological control is fundamentally a relational construct; it is likely to be dynamically shaped by parent–adolescent interaction, rather than a static or trait-like behaviour. This is why Soenens and Vansteenkiste (2010) stressed the importance of understanding the social–cultural context and interpersonal dynamics of parental psychological control.

Several studies have investigated sources of parental psychological control. Mills *et al.* (2007) found parents' proneness or disposition to shame to be associated with their more frequent use of psychological control. More broadly, Segrin, Woszidlo, Givertz, and Montgomery (2013) found that overparenting (i.e., excessive and inappropriate levels of involvement and control) to be related to parental anxiety. Taken together, they suggest that parental psychological control can be subjected to both dispositional and situational influences, similar to a diathesis-stress effect found in psychopathology (Meehl, 1962). One likely situational factor is children's behaviours, and it has long been claimed that children's behaviours may influence their parents' parenting behaviour (Bell, 1968; Dodge, 2001). For example, adolescents' externalizing problems predict parents' decreased support and increased harshness in parenting (e.g., Snyder, Cramer, Afrank, & Patterson, 2005). Moreover, adolescents' internalizing problems such as anxiety and depressive symptoms predict parental psychological control over time (e.g., Loukas, 2009). One way to understand this interaction effect is looking at gender effects on parenting (Grusec & Davidov, 2007). For instance, boys are more prone to view parents' behaviours as psychologically controlling than girls (Barber & Harmon, 2002; Soenens *et al.*, 2008; Werner, Van der Graaff, Meeus, & Branje, 2016). This 'bias' is coupled with the fact that boys usually display more non-conforming behaviours than girls (Duchesne & Larose, 2007), which, in turn, is likely to evoke parents' increased use of psychologically controlling behaviours. Most previous studies failed to examine this gender difference (see Scharf & Goldner, 2018, for a review), or otherwise masked the possible moderating role of gender on the interpersonal dynamics of parental psychological control.

There have been relatively few studies on the effects of students' academic functioning on parental psychological control. In a sample predominately composed of European American students, Pomerantz and Eaton (2001) found that elementary school children's poor academic achievement elicited their mothers' worry and then predicted increased maternal intrusive support. Similarly, Chang and Qin (2017) found that students' low

levels of self-efficacy in learning predicted parents' increased use of psychological control over time among European American and Chinese American students. Taken together, children's adjustment in academic contexts may be a factor that predicts the likelihood of parental psychological control.

In China, parents are especially concerned about their children's academic achievement and view it as a reflection of successful parenting (Ng *et al.*, 2014). Thus, Chinese parents can easily feel frustrated and stressed out if children do not fare well in school (Soenens & Vansteenkiste, 2010). Psychologically controlling practices can be a way to exert parental influence in China and other collectivist cultures compared with more individualist ones due to the lesser concern over personal autonomy. It is noticeable, however, over last three decades, China has changed dramatically, and such changes naturally affect parenting beliefs, expectations and practices in child-rearing, and child development (Yoshikawa, Way, & Chen, 2012). More developed regions of the country place more value on autonomy and competitiveness, and encourage a more favourable school environment that allows self-direction and exploration (Chen & Chen, 2010). In other words, parents in more developed regions are less likely to use controlling practices that interfere with child autonomy development. Thus, a complete understanding of PPC involves a recognition of possible reciprocal interaction of parents and their adolescents in specific social–cultural contexts, such as the norms, expectations, and values of academic achievement, and the salience and importance of preserving a sense of autonomy or self-determination for adolescents within a culture (Deci & Ryan, 1985).

The theoretical impetus of the present study

The preponderance of research on PPC in particular has been carried out under the assumption that its influence is unidirectional. However, according to the relational ontology of a developmental systems theory (Overton, 2014), manifest PPC reflects a dynamic interplay of parental expectations and concerns on the one hand, and adolescent perceptions of the positive or negative valence of parental controlling behaviours. Adolescents who strongly value autonomy will be more sensitive to even small doses of PPC compared with adolescents who do not feel as easily that their autonomy is threatened by parental controlling behaviours. It is also reasonable to assume that adolescents under high pressure of living up to parents' and teachers' expectations are more likely to perceive PPC than those who are well adjusted to academic environments, particularly in a highly competitive ethos present in China.

Taking such relational complexity into account, we predict that (1) PPC as perceived by Chinese adolescents should be widely distributed from being non-existent to strongly present; (2) the relationship between PPC and Chinese adolescents' academic functioning (adaptive vs. maladaptive) and achievement is bidirectional, detectable by a set of cross-lagged longitudinal panel data; and (3) there should be some significant moderation regarding how this relationship holds across different groups of students, depending on how vulnerable they are to PPC. We focused on high school students, because of their increasingly keen need for autonomy as well as an increasing sense of societal pressure for school performance, often made acute by high-stakes testing (Lu, Walsh, White, & Shield, 2018; Pomerantz, Ng, & Wang, 2008). In the present study, PPC is defined as parents' attempts to manipulate their children's thinking, feeling, and behaviour by intrusive tactics, including authority assertion, guilt induction, and love withdrawal, and adolescent academic functioning is defined as an umbrella term inclusive of learners' attitudes, actions, and outcomes in their learning process. In the present study, we focused on a

certain range of cognitive and behavioural variables that have been found to play an important role in facilitating versus inhibiting academic achievement. The adaptive–maladaptive distinction was used to categorize these study variables. We included control of learning beliefs, self-efficacy in learning, time/study environmental management, and effort regulation, which are presumably crucial for academic success (Komarraju & Nadler, 2013; Martin & Marsh, 2006); we included self-handicapping strategies, avoiding novelty, and cheating and disruptive behaviours, which hinder students' engagement and progress in their studies (Martin, Marsh, Williamson, & Debus, 2003; Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014), as indicators of maladaptive academic functioning.

Method

Participants

Participants were 731 students in Grade 10 (356 boys; M_{age} = 15.64 years, SD = 0.68) from four public, regular high schools that located in urban regions (i.e., the cities of Beijing, Fuzhou, Guangzhou, and Xi'an) in China. According to urban size, economic development state, and political–cultural background, Beijing and Guangzhou are categorized into the first-tier cities, and Fuzhou and Xi'an are second-tier cities (Chen, 2017). Specific schools were chosen based on the corresponding author's professional networks in the education community. We randomly selected four classes in each school, with approximately 45 students in each class.

Of the sample, 99% were living in intact families; the rest were from single-parent families due to parental divorce, death, or other reasons. Regarding the educational level of the fathers and mothers, 1.8% and 2.6% had an elementary school, 4.9% and 4.9% had a junior middle school, 11.6% and 17.9% had a high middle school, 13.5% and 17.8% had a secondary specialized school, 40.8% and 38.6% had completed college, 16.7% and 11.2% had a graduate school education, 8.2% and 4.4% had a doctoral degree, and 2.5% and 2.6% had missing data on these items, respectively.

Participants were surveyed during their first semesters of 10th grade (Time 1) and 11th grade (Time 2). Of the original sample of 731 participants, 652 (89.19%) participated in the survey in both waves. Due to attrition, a comparison was made between those who completed all surveys and those who did not. These two groups showed no significant differences in relevant study variables through multivariate analysis of variance (MANOVA; $F(11, 648) = 1.01$, $p > .05$), alleviating concerns about systematic biases.

Procedure

At each wave, participants completed self-report measures of perceived PPC, and academic-related beliefs, strategies, and behaviours. Every participant had an account and password to log into online assessment system. A psychology teacher in each school had received standardized training to guide students to complete these measures online during students' leisure time. If students had difficulties while filling out the survey, the teachers would provide explanations to them. All procedures performed in the study were approved by the University's Research Ethics Committee. Consent was obtained from all participants and their parents through the schools. Participants did not receive any compensation for participation.

Measures

Parental psychological control

An 18-item measure was used to assess PPC. This measure has been demonstrated to be valid and appropriate for use in China (Ng *et al.*, 2014). Three items assess authority assertion, such as 'My parents emphasize that I should not argue with them'; ten items assess guilt induction, such as 'My parents tell me that I am not a good member of the family without meeting their expectations'; and five items assess love withdrawal, such as 'My parents are less friendly with me, if I do not see things their way'. Adolescents responded on a 5-point scale (1 = *not at all true*, 5 = *very true*). Participants' scores across the 18 items were averaged, with higher scores indicating the perception that their parents were more psychologically controlling. For use in structural equation modelling (SEM) analyses, we separately computed means for items pertaining to authority assertion, guilt induction, and love withdrawal as indicators of PPC. Internal reliability was high (Time 1, $\alpha = .94$, Time 2, $\alpha = .95$) in this study.

Adaptive academic functioning

Twenty-four items adopted from the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & Mckeachie, 1993) were used, covering a range of adaptive academic-related beliefs, strategies, and behaviours, and were used in the current research. Students rated themselves on a 7-point scale (1 = *not at all true of me*, 7 = *very true of me*). Four items address control of learning beliefs, such as 'If I try hard enough, then I will understand the course material'; eight items assess self-efficacy in learning, such as 'I'm certain I can master the skills being taught in this class'; eight items assess time/study environmental management, such as 'I make good use of my study time for this course'; and four items tap effort regulation, such as 'Even when course materials are dull and uninteresting, I manage to keep working until I finish'. Separate means were calculated for items pertaining to control of learning beliefs, self-efficacy in learning, time/study environmental management, and effort regulation for use as indicators of adaptive academic functioning in SEM analyses. Internal reliability was acceptable (Time 1, $\alpha = .89$; Time 2, $\alpha = .91$) in this study.

Maladaptive academic functioning

Students' maladaptive academic beliefs, strategies, and behaviours were assessed using 19 items adopted from the Patterns of Adaptive Learning Scales (Midgley *et al.*, 2000), which has been found to be valid and appropriate for use in China (Xu, Dai, Liu, & Deng, 2018). Students responded to each item to indicate how true (1 = *not at all*; 5 = *very true*) it was. Six items address academic self-handicapping strategies, such as 'Some students fool around the night before a test. Then if they don't do well, they can say that is the reason'; five items assess avoiding novelty, such as 'I prefer to do work as I have always done it, rather than trying something new'; three items assess students' cheating behaviours, such as 'I sometimes cheat on my class work'; and five items tap students' disruptive behaviours, such as 'I sometimes get into trouble with my teacher during class'. Separate means were calculated for items pertaining to self-handicapping strategies, avoiding novelty, cheating behaviours, and disruptive behaviours for use as indicators of maladaptive academic functioning in SEM analyses. Internal reliability was acceptable (Time 1, $\alpha = .88$; Time 2, $\alpha = .93$).

Data analysis strategy

First, we conducted a preliminary analysis calculating descriptive statistics and correlations for all study variables. Second, we examined the cross-lagged paths between PPC and students' adaptive/maladaptive academic functioning, and then went further to explore whether there were gender and regional differences in these reciprocal effects.

Models were tested by Mplus 7.4 (Muthén & Muthén, 1998–2012), using full information maximum-likelihood (FIML) estimation to deal with the missing data for students who had incomplete data on the variables (Graham, 2009). Three indices were used to evaluate SEM model fit: the Tucker–Lewis fit index (TLI), comparative fit index (CFI), and the root-mean-square error of approximation (RMSEA). If TLI and CFI ≥ 0.90 and 0.95, and RMSEA ≤ 0.08 and 0.06, model fitting is considered acceptable and excellent (Hu & Bentler, 1999). In model comparisons, evaluation of nested SEM models was based on the chi-square difference statistic ($\Delta\chi^2$) and its corresponding degrees of freedom (Δdf). A significant $\Delta\chi^2$ relative to Δdf indicated that the two nested models that were tested did not fit the data equally well.

Results

Descriptive data and correlations

We conducted repeated MANOVAs to test the effects of gender, region, and time on all study variables. A significant gender effect was found, *Wilk's* $\lambda = .88$, $F(11, 717) = 8.71$, $p < .001$, $\eta^2 = .12$. Boys perceived greater parental authority assertion, guilt induction, love withdrawal; had higher scores on self-efficacy in learning, self-handicapping strategies, and cheating and disruptive behaviours; and had lower scores on time/study environmental management than girls. Regional effect was found significant, *Wilk's* $\lambda = .96$, $F(11, 717) = 2.63$, $p < .01$, $\eta^2 = .04$. Students had higher scores on perceived love withdrawal, and avoiding novelty and disruptive behaviours for the first-tier cities. In addition, time effect was found significant, *Wilk's* $\lambda = .81$, $F(11, 717) = 15.46$, $p < .001$, $\eta^2 = .19$. Students' perceived parental guilt induction and love withdrawal, and their self-handicapping strategies, avoiding novelty, cheating behaviours, and disruptive behaviours increased between Time 1 (T1) and Time 2 (T2). Students' control of learning beliefs, time/study environmental management, and effort regulation decreased over time. Any interaction effects among gender, region, and time were not significant. The descriptive statistics are presented in Table 1. Correlations among the variables are presented in Table 2.

Measurement invariance

Two-group confirmatory factor analysis (CFA) models were conducted to examine whether measurement invariance was achieved across time for assessing PPC, and students' adaptive and maladaptive functioning in their academic pursuit. Three sets of CFA models were conducted, each of which included two nested models, a factorial-invariance model and an unconstrained one. These models were made up of constructs that were examined at two time points, and each of them was measured with its specific indicators. For model identification, one indicator's factor loading was fixed for each construct to unity (see Kline, 2016). Errors for the same indicator over time were correlated (McDonald & Ho, 2002). In the factorial-invariance model, the parameters were evaluated with the unstandardized estimates and standard errors of factor loadings from

Table 1. Means and standard deviations of variables for boys and girls at time 1 and time 2

	Time 1				Time 2			
	First-tier cities		Second-tier cities		First-tier cities		Second-tier cities	
Variables	Boys (153)	Girls (170)	Boys (212)	Girls (196)	Boys (153)	Girls (170)	Boys (212)	Girls (196)
Psychological control								
Authority assertion	2.92 (1.08)	2.75 (1.01)	2.87 (0.95)	2.63 (1.04)	2.99 (1.04)	2.77 (0.98)	2.88 (0.99)	2.65 (0.97)
Guilt induction	2.89 (0.93)	2.57 (0.89)	2.83 (0.85)	2.50 (0.82)	3.02 (0.94)	2.67 (0.90)	2.89 (0.84)	2.63 (0.86)
Love withdrawal	2.51 (1.18)	2.11 (0.98)	2.39 (1.08)	2.01 (1.01)	2.78 (1.08)	2.39 (1.09)	2.57 (1.05)	2.25 (1.00)
Adaptive academic functioning								
Control of learning beliefs	5.60 (1.06)	5.65 (0.92)	5.53 (1.10)	5.67 (0.83)	5.30 (1.23)	5.48 (1.03)	5.49 (0.96)	5.47 (0.92)
Self-efficacy in learning	5.42 (1.08)	5.20 (1.04)	5.34 (1.22)	5.15 (1.08)	5.22 (1.27)	5.20 (1.06)	5.35 (1.06)	5.21 (1.03)
Time/environment management	4.80 (0.83)	4.84 (0.76)	4.72 (0.84)	4.84 (0.76)	4.52 (0.81)	4.72 (0.76)	4.73 (0.78)	4.78 (0.74)
Effort regulation	4.78 (1.04)	4.82 (0.89)	4.69 (0.96)	4.87 (0.85)	4.43 (0.95)	4.61 (0.80)	4.61 (1.01)	4.64 (0.85)
Maladaptive academic functioning								
Self-handicapping strategies	1.91 (0.90)	1.71 (0.64)	1.85 (0.68)	1.73 (0.62)	2.37 (0.90)	2.08 (0.81)	2.15 (0.85)	2.02 (0.74)
Avoiding novelty	2.40 (0.84)	2.35 (0.65)	2.27 (0.79)	2.36 (0.74)	2.71 (0.79)	2.51 (0.74)	2.47 (0.75)	2.46 (0.72)
Cheating behaviours	1.94 (0.99)	1.77 (0.71)	1.94 (0.84)	1.90 (0.73)	2.38 (1.03)	2.12 (0.83)	2.21 (0.90)	2.04 (0.77)
Disruptive behaviours	2.56 (0.92)	2.22 (0.64)	2.38 (0.76)	2.06 (0.65)	2.77 (0.80)	2.45 (0.77)	2.48 (0.72)	2.31 (0.70)

Table 2. Correlations among all study variables

	1	2	3	4	5	6	7	8	9	10	11
Time 1											
1. Authority assertion	1										
2. Guilt induction	.82**	1									
3. Love withdrawal	.71**	.77**	1								
4. Control of learning beliefs	.04	.06	−.08*	1							
5. Self-efficacy in learning	.03	.07	−.04	.67**	1						
6. Time/environmental management	−.14**	−.13**	−.25**	.28**	.45**	1					
7. Effort regulation	−.18**	−.15**	−.25**	.24**	.38**	.63**	1				
8. Self-handicapping strategies	.22**	.26**	.32**	−.12**	−.11**	−.33**	−.31**	1			
9. Avoiding novelty	.11**	.11**	.17**	−.24**	−.33**	−.30**	−.31**	.42**	1		
10. Cheating behaviours	.16**	.17**	.22**	−.15**	−.18**	−.33**	−.34**	.43**	.38**	1	
11. Disruptive behaviours	.23**	.27**	.32**	−.04	.01	−.27**	−.31**	.44**	.27**	.47**	1
Time 2											
1. Authority assertion	1										
2. Guilt induction	.86**	1									
3. Love withdrawal	.80**	.83**	1								
4. Control of learning beliefs	.11**	.14**	.01	1							
5. Self-efficacy in learning	.09*	.11**	.01	.79**	1						
6. Time/environmental management	−.12**	−.15**	−.25**	.48**	.53**	1					
7. Effort regulation	−.22**	−.25**	−.32**	.34**	.37**	.62**	1				
8. Self-handicapping strategies	.32**	.35**	.41**	−.19**	−.11**	−.37**	−.40**	1			
9. Avoiding novelty	.28**	.31**	.35**	−.09*	−.14**	−.34**	−.34**	.65**	1		
10. Cheating behaviours	.32**	.31**	.39**	−.14**	−.13**	−.36**	−.38**	.65**	.57**	1	
11. Disruptive behaviours	.32**	.36**	.37**	−.01	−.00	−.28**	−.34**	.59**	.50**	.58**	1

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

the constructs of interest to their indicators equally constrained across times. In the unconstrained model, the parameters were evaluated freely across time. If CFI decreased and RMSEA increased by < 0.01, the model with the factorial-invariance constraints was accepted (Chen, 2007). Estimates of factor loadings from factorial-invariance CFA models are presented in Table 3.

For the measure of PPC, the results indicated that the factorial-invariance model and the unconstrained one both had good fitness with the data (CFIs > 0.99, TLIs > 0.98, RMSEAs < 0.07). The difference between the fit of the unconstrained model and that of the factorial-invariance model across times was not significant (ΔCFI < 0.01, ΔRMSEA = 0.006), reflecting equivalence in the factor loadings across time.

Similarly, for the measures of adaptive academic functioning and maladaptive academic functioning, the factorial-invariance model and the unconstrained one both had satisfactory fitness with the data (CFIs > 0.96, TLIs > 0.94, RMSEAs < 0.08). The fit of the factorial-invariance model across times was not significantly different from that of the unconstrained model for the measure of adaptive academic functioning (ΔCFI = 0.01, ΔRMSEA = 0.01), and maladaptive academic functioning (ΔCFI = 0.005, ΔRMSEA = 0.005), reflecting equivalence in the factor loadings across time.

Parental psychological control (PPC)'s predictive relationships with students' academic functioning

As suggested by previous research (e.g., Liu *et al*., 2014; Wang *et al*., 2007), we further tested cross-lagged models using latent variables to examine the reciprocal effects between PPC and students' adaptive and maladaptive academic functioning. Given that including all variables in one-panel model would make the model complex and require a large sample size to produce stable estimates (Kline, 2016), we estimated the reciprocal relations of psychological control with adaptive and maladaptive academic functioning in

Table 3. Estimates of factor loadings from factorial-invariance confirmatory factor analysis models

	Time 1		Time 2	
	Unstandardized (standard error)	Standardized	Unstandardized (standard error)	Standardized
Psychological control				
Authority assertion	1.00	0.87	1.00	0.91
Guilt induction	0.93 (0.02)	0.94	0.93 (0.02)	0.94
Love withdrawal	1.02 (0.02)	0.82	1.02 (0.02)	0.88
Adaptive academic functioning				
Control of learning beliefs	1.00	0.69	1.00	0.75
Self-efficacy in learning	1.10 (0.06)	0.87	1.10 (0.06)	0.98
Time/environmental management	0.67 (0.10)	0.42	0.67 (0.10)	0.46
Effort regulation	0.86 (0.14)	0.50	0.86 (0.14)	0.54
Maladaptive academic functioning				
Self-handicapping strategies	1.00	0.72	1.00	0.83
Avoiding novelty	0.84 (0.03)	0.57	0.84 (0.03)	0.76
Cheating behaviours	1.03 (0.04)	0.66	1.03 (0.04)	0.78
Disruptive behaviours	0.82 (0.04)	0.58	0.82 (0.04)	0.73

Note. Unstandardized and standard errors of the factor loadings for the same indicators were identical between two time points.

two separate models. In these models, each construct was indicated by its corresponding indicators. In addition, in order to examine gender differences in the reciprocal effects, a set of two-group structural models was tested, including a series of nested models. First, we examined the baseline model, in which structural parameters were freely estimated between genders. Thereafter, we employed constraints in two more parsimonious models: (1) a model the same with the baseline one, but 'parent effect' path (the path from T1 psychological control to T2 adaptive/maladaptive academic functioning) was set to be equal between boys and girls; (2) a model the same with the baseline one, but 'student effect' path (the path from T1 adaptive/maladaptive academic functioning to T2 psychological control) was set to be equal between genders. Comparing the parsimonious models with the baseline model, a significant $\Delta\chi^2$ would indicate gender differences in the mutual effects. Same steps were conducted to test the regional difference in the reciprocal effects.

For the relations between psychological control and adaptive academic functioning, results showed that the reciprocal effect model acceptably fitted the data (χ^2 = 738.80, df = 67, p < .001, CFI = 0.91, TLI = 0.88, RMSEA = 0.10). As displayed in Figure 1, students' adaptive academic functioning at T1 is a significant predictor of psychological control of parents at T2 (β = −.11, p < .01), whereas psychological control exerted by parents at T1 is not a significant predictor of students' adaptive academic functioning at T2 (β = .00, p > .05). In addition, results from two-group structural model comparisons showed that the association between PPC at T1 and adaptive academic functioning at T2 did not differ significantly by region ($\Delta\chi^2$ = 1.54, Δdf = 1, p > .05) and by gender ($\Delta\chi^2$ = 1.04, Δdf = 1, p > .05), and the association between adaptive academic functioning at T1 and PPC at T2 also did not differ significantly by region ($\Delta\chi^2$ = 0.42, Δdf = 1, p > .05) and by gender ($\Delta\chi^2$ = 0.001, Δdf = 1, p > .05).

For the relations between psychological control and maladaptive academic functioning, the reciprocal effect model also fit the data well (χ^2 = 223.30, df = 67, p < .001, CFI = 0.97, TLI = 0.96, RMSEA = 0.06). As displayed in Figure 2, PPC at T1 predicted increased students' maladaptive academic functioning at T2 (β = .13, p < .01), whereas

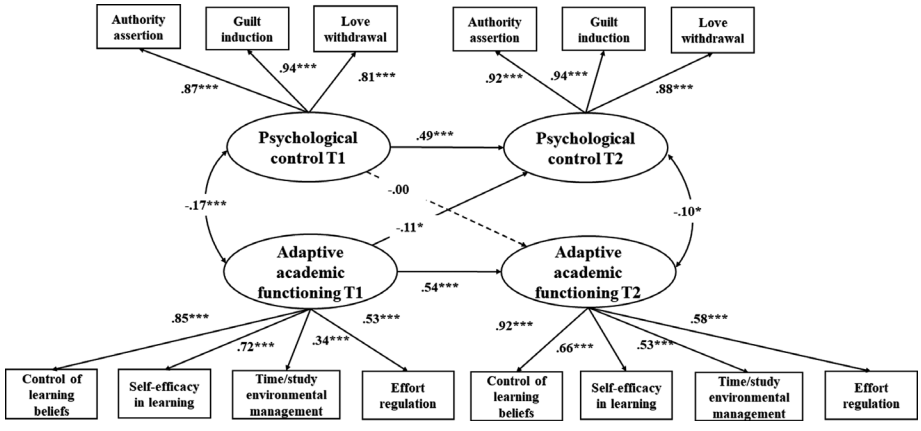

Figure 1. Cross-lagged model of the relations between psychological control and adaptive academic functioning at Time 1 and Time 2. *Note:* T1 = Time 1; T2 = Time 2. Coefficients are standardized regression weights. Correlations between error variances for the same indicators between two time points are omitted from the figure. *p < .05, ***p < .001.

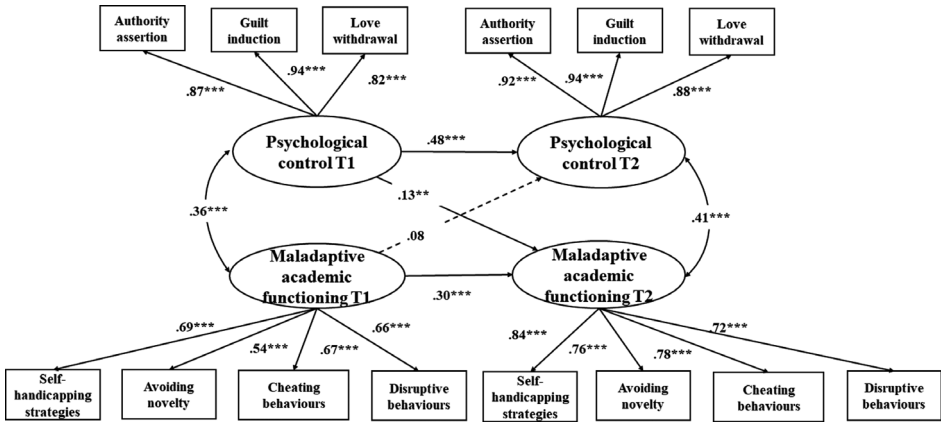

Figure 2. Cross-lagged model of the relations between psychological control and maladaptive academic functioning at Time 1 and Time 2. *Note:* T1 = Time 1; T2 = Time 2. Coefficients are standardized regression weights. Correlations between error variances for the same indicators between two time points are omitted from the figure. $^{**}p < .01$, $^{***}p < .001$.

maladaptive academic functioning at T1 did not significantly predict PPC at T2 ($\beta = .08$, $p > .05$). For this model, results indicated a significant regional difference in the effect of maladaptive academic functioning on PPC over time ($\Delta\chi^2 = 7.91$, $\Delta df = 1$, $p < .01$). Maladaptive academic functioning at T1 significantly predicted PPC at T2 for the tier 2 cities ($\beta = .21, p < .001$), but not for the tier 1 cities ($\beta = -.05, p > .05$). The association between PPC at T1 and maladaptive academic functioning at T2 did not differ significantly by region ($\Delta\chi^2 = 1.82$, $\Delta df = 1$, $p > .05$). In addition, no significant gender differences were found in the effect of PPC on students' maladaptive academic functioning ($\Delta\chi^2 = 2.02$, $\Delta df = 1, p > .05$), nor in the effect of maladaptive academic functioning on PPC over time ($\Delta\chi^2 = .02$, $\Delta df = 1, p > .05$).

Discussion

In this two-wave longitudinal study, we set out to examine the reciprocal relationships between PPC and students' adaptive and maladaptive academic functioning over time, under the assumption that the working of PPC is more interactive and dynamic than previously portrayed, involving 'reciprocal' interaction of adolescents and their parents within a specific cultural context that determines what expectations each party holds and how each party responds to the other's behaviour (including controlling ones) accordingly. Part of the study confirms previous findings that, indeed, manipulative and intrusive parenting practices meant to achieve psychological control over the child are detrimental to students' academic learning and achievement, as it predicts the adolescent students' maladaptive academic functioning. Although PPC did not significantly predict students' adaptive academic functioning, as suggested by Vansteenkiste and Ryan (2013), PPC, which frustrates children's need for autonomy, should be more strongly connected with maladaptive outcomes rather than adaptive ones.

The main thrust of the present study, however, is to demonstrate that the relationship between PPC and adolescent academic functioning is more interactive and dynamic than typically assumed under SDT. In support of the child effect on controlling parenting

practices (Bell, 1968; Dodge, 2001), the findings that PPC at Time 2 was significantly predicted by students' adaptive academic functioning suggest a bidirectional rather than unidirectional process; that is, positive characteristics of adolescent academic adaptation (self-efficacy, self-regulated learning) render it less likely that parents will use psychological control, whereas less desirable ones more likely evoke PPC. It can be extrapolated that this dyadic relationship may spin either positively or negatively over time.

A more nuanced, complex understanding can be achieved when we put this dynamic relationship in context. The findings that high school boys and those in more developed regions of China reported higher scores on all three indicators of PPC than girls on perceived love withdrawal suggests a more distinct value of personal autonomy, hence a more negative quality of the adolescent–parent relationship. In addition, this present finding showed that parents increased the use of guilt induction and love withdrawal and the use of authority assertion remained stable, suggesting that parents may tend to use subtle controlling parenting instead of direct physical or behavioural control in high school students due to their increased need for autonomy (Wray-Lake, Flanagan, & Osgood, 2010). Although such interpretation is speculative (post hoc) rather than based on theoretical prediction, it suggests that future research should look into intrapersonal changes in parental behaviour and how it affects this dynamic relationship.

It should be noted that reciprocal effects of PPC and students' adaptive and maladaptive academic functioning, while present, were not strong (see Figures 1 and 2). The small magnitude of the relationships, again, indicates a more subtle role of social and cultural regulation. For instance, the present study found that maladaptive academic functioning significantly predicted later PPC for the tier 2 cities, but not for the tier 1 cities, suggesting that psychological control appears to be of a reactive response to adolescents' maladaptive academic functioning in less urbanized contexts. Due to different social, economic, and cultural conditions, parents' expectations and practices vary across societies (Chen & Chen, 2010). Traditional Chinese child-rearing styles such as controlling and restrictive are increasingly incompatible with the requirement of a mostly urban and well-off society that emphasize autonomy and competitiveness. This finding contributes to the understanding of the relations between microsystem-level factors (e.g., PPC) and adolescent development (e.g., academic adjustment) in different social–cultural contexts.

Limitations and future directions

There are several limitations in the present study. First, all data on study variables were collected via self-report by the adolescent participants which may influence and even compromise the objectivity of the observations and bias the conclusions. In the future, studies should obtain measures from multiple sources (e.g., parent-reported parenting practices, teacher-reported, parent-reported, or observed data on adolescents' learning) to provide independent and corroborating evidence. Second, this study examined psychological control without differentiating between mothers and fathers. Future studies could examine and compare the associations of maternal psychological control and paternal psychological control with students' learning, as fathers have been found to be more responsible for children's adjustment to school (Chen, Liu, & Li, 2000). Third, the present study was conducted with a sample of schools located in urban areas and examined regional differences in the relations between psychological control and academic learning. Future studies should be conducted in more diverse areas such as smaller cities and rural areas where beliefs about and attitudes towards parenting are less westernized than urban areas. Comparisons of differences regarding how the adolescent–

parent dynamics, especially how psychological control is interpreted by adolescents growing up with differential emphasis on personal autonomy, will elucidate the nature of cultural influences under a common theoretical framework of parenting and adolescent growth and functioning. Much research is needed in order to clarify the dynamic, intricate psychosocial processes involved.

Implications

The present study has important practical implications for child-rearing and education. In general, the results concerning differences in PPC and their relations with academic adjustment among adolescents from different regions suggest that family-based programmes may be helpful in the minimization of the negative impacts of PPC on adolescents' academic development. It is important for psychologists and educators to pay particular attention to male and more urbanized adolescents whose need for autonomy is more prevalently thwarted by PPC, and to encourage their parents to grant them more autonomy. In addition, less urbanized adolescents with initial heightened maladaptive academic functioning are more likely to elicit subsequent high PPC, which tends to perpetuate adolescents' maladaptive academic functioning. It is also important for professionals to help parents avoid psychological controlling parenting and consider supportive practices in remediation programmes for less urban children who display maladaptive academic functioning.

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Author contributions

The execution of this paper was a combined effort on behalf of all authors. CD and DD conceptualized and designed the study. CD and ML collected the data. XX performed the statistical analyses and drafted the initial manuscript before DD, ML, and CD contributed to the writing of the manuscript. All authors read and approved the final manuscript.

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