Academic stereotype threat and engagement of higher vocational students: A moderated mediation model

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Abstract

Academic stereotype threat of Chinese adolescents in vocational education is under-examined. The present study aimed to gain an understanding of the effects of academic stereotype threat on academic engagement by examining the potential mediating role of academic self-efficacy and moderating role of perceived social support. A total of 1152 Chinese adolescents (448 boys; $mean_{age} = 18.26$, $SD = 1.20$) in higher vocational schools completed a survey questionnaire assessing academic stereotype threat, academic engagement (i.e., vigor, dedication and absorption), academic self-efficacy, and social support (i.e., family support, friend support and teacher support). Findings supported the mediating effect of academic self-efficacy, indicating that academic stereotype threat decreased academic engagement by undermining academic self-efficacy. Furthermore, the relationship between academic stereotype threat and academic self-efficacy was moderated by teacher support. Specifically, the negative effects of academic stereotype threat on self-efficacy was weaker for adolescents who perceived high levels of teacher support. This study contributes to the educational/psychological research on academic engagement by providing evidence for the adverse effects, potential mechanism and protective factor of academic stereotype threat in Chinese adolescents of higher vocational education. Implications for further investigations and intervention development are discussed.

Keywords Academic stereotype threat · Self-efficacy · Social support · Academic engagement · Adolescents

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1 Introduction

Engagement refers to a positive, fulfilling, working-related state of mind that is characterized by vigor, dedication and absorption (Schaufeli et al., 2002). Academic engagement, as the term suggests, refers to the state of engagement in learning. There are two characteristics of academic engagement in Chinese higher vocational students. One is universality, as some studies indicated that academic engagement problems have shown to be prevalent among adolescents in higher vocational schools (see Shen & Liu 2020; Xiao & Xu, 2012). Another is severity, as some researchers found that vocational school students with low level of academic engagement were less likely to get ready for class and review what they had learned, and could not finish the learning task within the prescribed time. This status may lead to a decrease in academic performance, and even academic failure in the long run (Wang et al., 2016). In addition, the fact that the number of vocational students continues to rise further highlights the importance of understanding their academic engagement (National Bureau of Statistics of China, 2021). In this sense, to improve academic engagements and therefore academic outcomes of students in higher vocational schools, examinations on influences and mechanisms of academic engagement are necessary. However, relevant research has been very limited so far. The present study examined the predictive relationship between academic stereotype threat and academic engagement in this population, and investigated the mediating role of academic self-efficacy and the moderating role of social support in this relationship.

1.1 Academic stereotype threat and academic engagement

Stereotype threat refers to the strictly situational threat of negative stereotypes, which is cued by the fact that most devaluing group stereotypes are widely known throughout a society and the mere recognition that a negative group stereotype could apply to oneself in a given situation (Spencer et al., 1999; Steele, 1997). As a situational threat or threat in the air, stereotype threat might affect the members of any group about whom a negative stereotype exists (Steele, 1997). A large body of research has found the effect of stereotype threat on academic engagement, which has been verified in different groups. For instance, the inverse link between negative stereotype endorsement and math cognitive engagement has been found in female college students (Spencer et al., 1999) and Black girls in the United States (Wang et al., 2022). In another study, Coutinho and Koinis-Mitchell (2014) found African immigrant students in the United States also reported lower levels of academic engagement when perceiving discrimination toward their ethnic group in school. These results were supported by evidence from more rigorous approaches. For example, Aronson et al. (2002) conducted an experimental study and found that African American college students who were encouraged to see intelligence—the object of the stereotype—as a malleable rather than fixed capacity were less vulnerable to stereotype threat and therefore showed greater academic engagement. Some researchers further explored the mechanism underlying the relationship between stereotype and academic engagement. For instance, Zhang et al. (2021) found one potential reason for the negative influences of stereotype threat on academic engagement in Chinese secondary school

students was that students with higher stereotype endorsement tended to set barriers to their success as a strategy to maintain positive image and protect self-esteem.

In China, it is well known that adolescents in higher vocational schools widely experienced stereotypes, which can be mainly attributed to two aspects. For one thing, the college entrance examination (i.e., Gaokao) is an important selection criterion in Chinese education system, which is regarded as the most impartial way to evaluate students' academic achievement and learning ability. Students with high scores get an opportunity to attend universities, while those with low scores would usually have to choose vocational colleges with few options. Therefore, vocational colleges are typically seen as educational institutions for students who are incompetent (Yang et al., 2013). In addition, as far as it is concerned, imperfect vocational education system is an important factor currently restricting the further development of China's vocational education (Yang, 2014), which limits the benefits vocational school students should receive in terms of career choice and development (Yang et al., 2013). This situation in China could be partly different compared to some western countries. For example, Backes-Gellner and Geel (2014) indicated that although vocational graduates in Switzerland had equal unemployment risk at career entry, it became lower at later career stages. For another, both dominated traditional educational ideologies and modern social values in China emphasize the importance of learning and educational achievement (Chen & Uttal, 1988; Woronov, 2011). For example, idioms such as 'learning is the greatest and noblest thing' (wan ban jie xia pin, wei you du shu gao) and 'education is the stepping stone' (xue li shi qiao men zhuan) reveal these dominated views. Moreover, the concept of hierarchy, of which the typical characteristic is to look up with inferiority and look down with contempt, is deeply rooted (Yang et al., 2013). Influenced by these factors, vocational education in China is usually seen as inferior on the Chinese educational ladder and rated as relatively poor academic achievement by the society. Higher vocational students can then experience stereotypes (Tao & Hong, 2014). For example, teachers may deliberately reduce the difficulty of the course and repeatedly imply the simplicity of the courses they teach. These behaviors may lead to perceived academic stereotype of the students toward themselves, such as being less capable of and dedicated to learning, and having insufficient knowledge (Shen & Liu, 2020; Yang et al., 2013). Steele (1997) indicated that the social-psychological threat arises when one is in a situation or doing something for which a negative stereotype about one's group applies; however, how threatening stereotype becomes depends on the person's identification with the stereotype-relevant domain.

Because the relationship between academic stereotype threat and academic engagement was supported by existing research as mentioned above, we also believed that stereotype threat is a potential factor influencing academic engagement of higher vocational school students based on empirical evidence and the educational system and social values in the Chinese context. In addition, little is known about the possible mechanisms or protective factors underpin such effects. Therefore, we sought to address this gap by exploring the mediating role of academic self-efficacy and the moderating role of social support.

1.2 Self-efficacy as a mediator of the association between academic stereotype threat and academic engagement

Perceived self-efficacy is concerned with judgments of their capabilities to execute courses of action required to deal with prospective situations (Bandura, 1982). Self-efficacy can change within relatively short periods of time as individuals constantly obtain information to reappraise their context-specific capabilities. Within an academic context, learners' self-efficacy can be influenced by their academic performances, vicarious experiences, the verbal persuasions they received from others, and their physiological states (Bandura, 1977). Other personal traits and environmental factors, such as optimism and authoritative parenting style (Chemers et al., 2001; Masud et al., 2016), may also exert effects on academic self-efficacy. A few studies have investigated the role of perceived stereotype threat in academic self-efficacy. For example, Steele and Aronson (1995) demonstrated that stereotype threat condition activated participants' self-doubts. Aronson and Inzlicht (2004) found that African American students who tended to perceive and be influenced by negative stereotypes exhibited more fluctuations in academic self-efficacy compared to their Blacks peers who were less vulnerable to stereotype as well as Whites students more generally. Combined with the educational context in China as discussed above, we argued that for vocational students, stereotype threat may have an adverse effect on their academic self-efficacy.

Based on the Social Cognitive Theory (Bandura, 2002), self-efficacy is one of the central internal self-influence factors which have significant impacts on individuals' motivation and performance. Emerging evidence has also shown the positive relationship between academic self-efficacy and engagement. Caraway et al. (2003) reported that adolescents who were more confident about their general level of competence showed to be more engaged in various aspects of school. Kuo et al. (2021) found that web-based learning self-efficacy played a critical role in online learning engagement. Existing research also supports the influence of self-efficacy on engagement at the specific dimension level. For example, Dagher et al. (2015) indicated that self-efficacy has a positive influence on vigor, dedication and absorption. Given the theoretical and empirical evidence reviewed above, we expected that self-efficacy may act as a mediator of the relationship between stereotype threat and academic engagement. Specifically, students who perceive higher stereotype threat would show lower academic self-efficacy, which would in turn make them less engaged in learning.

1.3 Perceived social support as a moderator of the relation between academic stereotype threat and academic self-efficacy

In addition to the mediating role of self-efficacy in the link between academic stereotype threat and engagement, we further explored the moderating effect of perceived social support between academic stereotype threat and academic self-efficacy. Such investigations can provide more detailed knowledge informing intervention development. According to the person-situation interactive perspective (Furr & Funder, 2018), the effect of stereotype threat on individuals' academic performance might be

attenuated or strengthened by environmental factors. Steele (1997) also indicated that an important feature of stereotype threat, the type and degree of stereotype threat vary from group to group and, for any group, across settings. Specifically, in the current study, we investigated whether the first stage of this mediation (academic stereotype threat → academic self-efficacy) would vary as function of perceived social support.

Social support refers to the social resources that individuals perceive as available or that are actually provided to them by nonprofessionals in the context of both formal support groups and informal helping relationships (Gottlieb & Bergen, 2010). Generally speaking, social support is multidimensional and there are several potential sources of support, including family, teachers, and friends (Hopson et al., 2014; Jacobs & Dodd, 2003). Previous studies have found that social support has a positive effect on academic self-efficacy. For instance, Graziano et al. (2009) found that perceived parental support had a significant effect on academic self-efficacy of adolescents. Mercer et al. (2011) indicated that a moderate and positive correlation between perceived teacher support and academic self-efficacy in school children. Qualitative evidence also showed that students in higher education perceived emotional, instrumental, informational and appraisive support from friends and teachers, which could boost their confidence in academic work (Wilcox et al., 2005). Based on the theoretical and empirical evidence cited above, we proposed that different forms of support (either family, friends or teachers) may alleviate the effect of stereotype threat on academic work. However, individuals with high levels of support from their family, friends and teachers have more psychological resources to adaptively deal with stereotype threat and to retain a reasonable understanding toward themselves, which can eventually help them more effectively improve self-efficacy to overcome academic difficulties at school compared to individuals with low levels of support.

1.4 Aims of the present study

The aim of this study was to examine the mechanisms underlying the relationship between academic stereotype threat and academic engagement using a moderated mediation model. Specifically, we hypothesized that: (1) academic self-efficacy would mediate the association between academic stereotype threat and engagement (i.e., vigor, dedication, and absorption); and (2) social support (i.e., family support, friend support and teacher support) would moderate the first stage of this mediation (i.e., academic stereotype threat → academic self-efficacy); to be specific, people with high family support, friend support and teacher support would show a weaker negative relation between academic stereotype threat and academic self-efficacy, whereas people with low family support, friend support and teacher support would show a stronger negative relation between academic stereotype threat and academic self-efficacy (see Fig. 1).
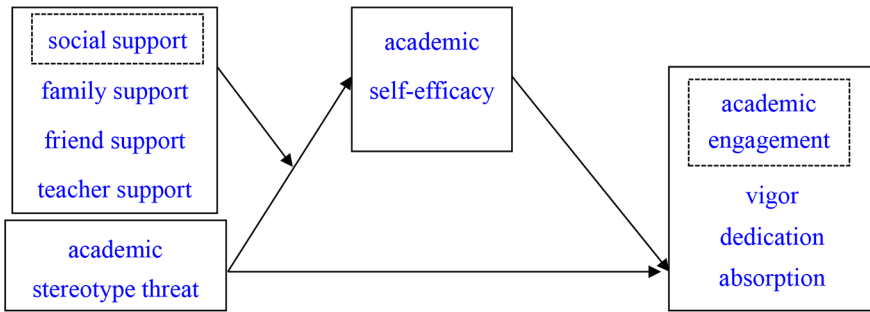
Fig. 1 Conceptual model of academic self-efficacy as a mediator and social support as a moderator of the relation between academic stereotype threat and engagement

2 Method

2.1 Participants and procedure

A total of 1300 students in higher vocational schools in four provinces (i.e., Guangdong, Yunnan, Tianjin and Ningxia) in mainland China were recruited and completed study questionnaires. One hundred and forty-eight (11.4%) questionnaires were excluded from further analysis due to poor response quality. The final sample included 1152 participants aging from 15 to 21 years ($M=18.26$, $SD=1.20$), with 448 (38.9%) boys; 549 (47.7%) in the first year, 138 (12.0%) in the second year, and 465 (40.4%) in the third year. Participants reported household incomes of less than 2,000 RMB per month ($n=238$, 20.7%), 2,000–4,000 RMB per month ($n=440$, 38.2%), 4,000–6,000 RMB per month ($n=204$, 17.7%), 6,000–8,000 RMB per month ($n=108$, 9.4%), 8,000–10,000 RMB per month ($n=83$, 7.2%), more than 10,000 RMB per month ($n=79$, 6.9%).

Data were collected through Wenjuanxing (https://www.wjx.cn/; a popular online survey platform in China) between November 18 and December 7, 2021. Information sheet and the link to the survey were sent to potential participants via WeChat, a widely used instant messaging and social media application in China. Participants indicated their consent by completing the questionnaire. Participation was anonymous. It took up to 10 min to complete the survey.

2.2 Measures

2.2.1 Academic stereotype threat

Six items were developed to evaluate participants' perceived academic stereotype threat. In a pilot survey with a total of 50 students in higher vocational schools, participants answered a question: "As a student in higher vocational school, what negative stereotype do you think the outgroups may have about your academic status? Please try to describe it with some adjective phrases." Based on their answers, the six most frequently mentioned phrases, i.e., having poor academic performance,

less capable of learning, having insufficient knowledge, not interested in learning, not focused on learning tasks, and not committed to study, were used to form one index of stereotype threat in the formal survey. In the formal survey, participants rated to what extent they perceived each of stereotype threat on a 10-point Likert scale ranging from 1 (extremely weak) to 10 (extremely strong). The responses were averaged across the six items, with higher scores representing greater academic stereotype threat. Confirmatory factor analysis (CFA) showed that the scale fitted the data quite well (χ^2/df=3.67, RMSEA=0.05, NFI=1.00, TLI=0.99, SRMR=0.01). Cronbach's alpha coefficient in the present study was 0.95.

In addition, there were significant differences between male and female students, as well as between students from different academic grades on academic stereotype threat scores. To be specific, the scores of male students (M=3.74, SD=2.22) were significantly higher, $t(1150)$=3.61, $p<.001$) than that of female students (M=3.27, SD=2.08). The mean score and standard deviation of freshman, sophomore, junior were 3.72, 3.60, 3.09; 2.30, 2.24, 1.86, respectively. The grade difference was also significant, $F(2, 1149)$=11.60, $p<.001$: the scores of freshman ($p<.001$) and sophomore ($p<.05$) were significantly higher than those of junior.

2.2.2 Academic self-efficacy

Academic self-efficacy was measured using the 8-item self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & De Groot 1990). This scale has shown good psychometric properties in Chinese samples (e.g., Chen 2006). Sample items included "My study skills are excellent compared with others in this class" and "I'm certain I can understand the ideas taught in this course". Items were rated on a 7-point scale ranging from 1 (extremely disagree) to 7 (extremely agree), with higher average scores of the eight items indicating higher levels of academic self-efficacy. Confirmatory factor analysis (CFA) showed that the scale fitted the data well (χ^2/df=7.60, RMSEA=0.08, NFI=0.98, TLI=0.97, SRMR=0.02). Cronbach's alpha in the present study was 0.93.

2.2.3 Academic engagement

Academic engagement was assessed using the 17-item Engagement Scales for students developed by Schaufeli et al. (2002). This measure has been proven reliable and valid in Chinese samples (e.g., Fang et al., 2008). The engagement scales include three dimensions, i.e., vigor (e.g., "When I get up in the morning, I feel like going to class"), dedication (e.g., "My study inspires me") and absorption (e.g., "Time flies when I am studying"), which contains 6, 5, and 6 items, respectively. Items were rated on a 7-point scale ranging from 1 (extremely disagree) to 7 (extremely agree), with higher average scores on each subscale indicating higher levels of the dimension. Confirmatory factor analysis (CFA) showed that the scale fitted the data well (χ^2/df=6.49, RMSEA=0.07, NFI=0.96, TLI=0.96, SRMR=0.03). The Cronbach's alpha of three dimensions were 0.92, 0.92, and 0.93.

2.2.4 Perceived social support

Social support was measured using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). This scale has shown good validity and reliability in Chinese samples (e.g., Pang et al., 2019). The MSPSS includes three dimensions: family support (e.g., "I can talk about my problems with my family"), friend support (e.g., "My friends really try to help me") and support from a significant other. In the present study, the dimension 'support from a significant other' was modified and replaced by teacher support (e.g., "My teacher is around when I am in need.") according to the purpose of the study. Each of the three dimensions contains 4 items. Items were rated on a 7-point scale ranging from 1 (extremely disagree) to 7 (extremely agree). The responses were averaged within the same dimension, with higher scores indicating higher family support, friend support and teacher support respectively. Confirmatory factor analysis (CFA) showed that the scale fitted the data well (χ^2/df = 5.84, RMSEA = 0.07, NFI = 0.97, TLI = 0.96, SRMR = 0.04). The Cronbach's alpha of three dimensions were 0.84, 0.88, and 0.88.

2.3 Data analytic approach

First, we used SPSS 21.0 to obtain descriptive statistics for the variables of interest, followed by Pearson's correlation among these variables. Second, we tested the hypothesized moderated mediation model with structural equation modeling (SEM) using Amos 24.0. The significance of the indirect and moderated mediation effects was tested by setting the bootstrap number to 5000 and the bias-corrected confidence interval to 95%. The 95% bias-corrected confidence interval do not contain zero, indicating the indirect and moderated mediation effects were significant (Preacher & Hayes, 2008). To get more specific and rich results, academic engagement and social support were tested at each dimension.

3 Results

3.1 Descriptive analysis and intercorrelations

Means, standard deviations and intercorrelations of studied variables are presented in Table 1. There were significant and negative associations between academic stereotype threat and academic self-efficacy, vigor, dedication, absorption, family support, friend support and teacher support (all $p < .01$). In addition, there were significant and positive associations between academic self-efficacy and vigor, dedication, absorption, family support, friend support and teacher support (all $p < .01$).
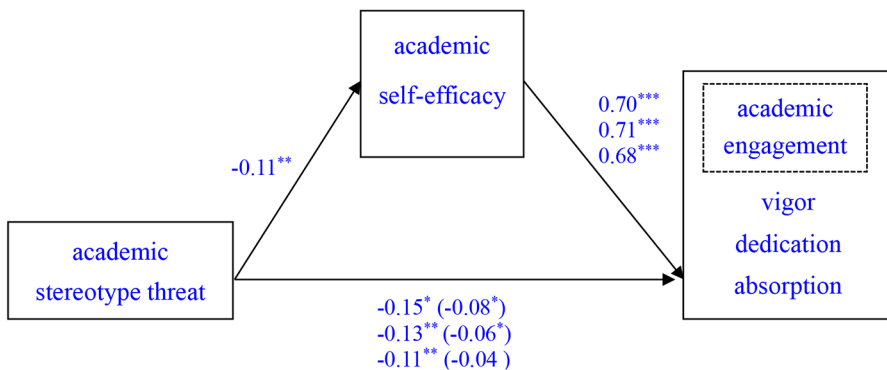
3.2 The mediating effect of academic self-efficacy on the relation between academic stereotype threat and academic engagement

The mediation model fitted the data well (χ^2/df = 5.80, CFI = 0.94, TLI = 0.93, RMSEA = 0.07, SRMR = 0.04). As presented in Fig. 2, the total effects of academic ste-

Table 1 Descriptive statistics and intercorrelations of variables of interest

	M	SD	1	2	3	4	5	6	7	8
1. AST	3.45	2.15	-							
2. AS	4.42	1.08	-.11**	-						
3. Vigor	4.03	1.13	-.15**	.67**	-					
4. Dedication	4.41	1.21	-.12**	.68**	.84**	-				
5. Absorption	4.22	1.20	-.11**	.65**	.80**	.85**	-			
6. FAS	5.00	1.30	-.10**	.31**	.29**	.33**	.33**	-		
7. FRS	5.00	1.27	-.17**	.32**	.27**	.30**	.30**	.61**	-	
8. TS	4.34	1.36	-.14**	.34**	.37**	.38**	.37**	.49**	.53**	-

Note: $^*p<.05$, $^{**}p<.01$, $^{***}p<.001$. AST=academic stereotype threat; AS=academic self-efficacy; FAS=family support; FRS=friend support; TS=teacher support

Fig. 2 The mediating effect of academic self-efficacy in the association between academic stereotype threat and vigor, dedication and absorption
Note: $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$. The numbers in parentheses is the values of direct effect

reotype threat on vigor (β = -0.15, SE=0.04, p<.05), dedication (β = -0.13, SE=0.04, p<.01), absorption (β = -0.11, SE=0.04, p<.01) were significant; the direct effect of academic stereotype threat were significant on vigor (β = -0.08, SE=0.03, p<.05) and dedication (β = -0.06, SE=0.03, p<.05) but not absorption. In addition, academic stereotype threat significantly and negatively predicted academic self-efficacy (β = -0.11, SE=0.04, p<.01), and academic self-efficacy significantly and positively predicted vigor (β=0.70, SE=0.04, p<.001), dedication (β=0.71, SE=0.04, p<.001) and absorption(β=0.68, SE=0.04, p<.001). Mediation effects accounted for 51.33%, 60.08%, and 68.00% of the total effect, respectively. Moreover, the 95% confidence intervals for the indirect effect of academic stereotype threat on vigor [-0.13, -0.03], dedication [-0.13, -0.03] and absorption [-0.12, -0.03] through academic self-efficacy did not include zero, further indicating the presence of a significant mediating relationship. In sum, the mediation hypothesis was supported.

3.3 The moderating role of perceived social support in the relationship between academic stereotype threat and academic self-efficacy

After identifying the indirect (mediation) effect of academic self-efficacy on the association between academic stereotype threat and vigor, dedication and absorption, we investigated whether the first stage of the indirect effect was moderated by family support, friend support and teacher support. The moderated mediation model was presented in Fig. 3. The main effect of academic stereotype threat (β = -0.22, $SE = 0.01$, $p < .001$) and teacher support ($\beta = 0.14$, $SE = 0.04$, $p < .001$) on self-efficacy were significant, the interaction effect of academic stereotype threat and teacher support on self-efficacy was also significant ($\beta = 0.20$, $SE < 0.001$, $p < .001$). But the main effect of family support and friend support on self-efficacy were not significant, and their interaction effect with academic stereotype threat on self-efficacy were not significant. Taken together, the negative relation between academic stereotype threat and academic self-efficacy was moderated by teacher support but not family support or friend support, leaving our hypothesis 2 partially supported.

To gain a clearer understanding of the role of moderation on mediating effects, we operationalized low and high levels of teacher support as being one standard deviation below and above the mean. As shown in Table 2, the relation between academic stereotype threat and academic self-efficacy was weaker in adolescents who perceived high teacher support (β = -0.086, $SE = 0.05$, $p = .08$) than adolescents who perceived the low teacher support (β = -0.090, $SE = 0.06$, $p = .09$), they are marginally significant. However, the bias-corrected percentile bootstrap method further revealed a significant moderated mediation effect, because 95%CI are between [-0.16, -0.01] and [-0.19, -0.01], respectively, and do not include zero. To sum up, teacher support was a protective factor for the association between academic stereotype threat and self-efficacy. Moreover, the moderated effect of teacher support on the total indi-
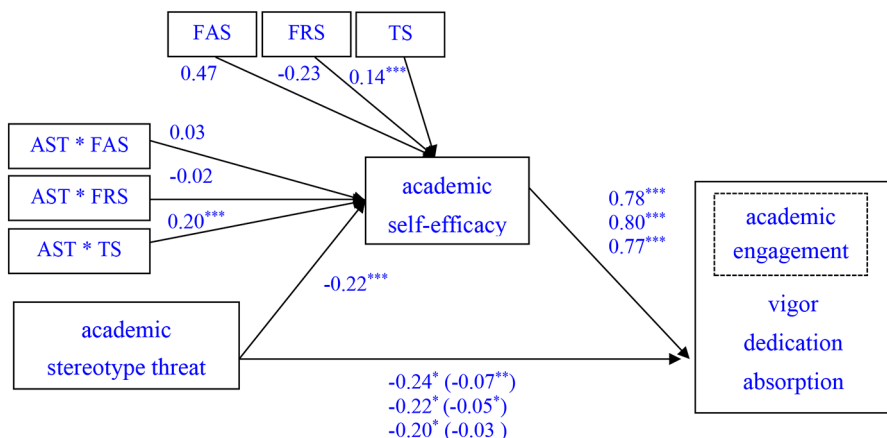

Fig. 3 The moderating effect of family support, friend support and teacher support on the first stage of the indirect association

Note: $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. The numbers in parentheses is the values of direct effect. AST = academic stereotype threat; FAS = family support; FRS = friend support; TS = teacher support

Table 2 Moderated mediated results across levels of teacher support

	The first stage of indirect effect				Total indirect effect (vigor / dedication / absorption)			
	β	SE	p	95%CI	β	SE	p	95%CI
Low teacher support	-0.090	0.06	.09	-0.19, -0.01	-0.07	0.05	.07	-0.16, -0.01
					-0.07	0.05	.07	-0.15, -0.01
					-0.07	0.04	.07	-0.14, -0.01
High teacher support	-0.086	0.05	.08	-0.16, -0.01	-0.06	0.04	.06	-0.12, -0.02
					-0.06	0.04	.07	-0.13, -0.01
					-0.06	0.04	.06	-0.12, -0.01

rect effect in those who perceived high teacher support (vigor: β = -0.06, *SE*=0.04, *p*=.06, 95%CI = [-0.12, -0.02] ; dedication: β = -0.06, *SE*=0.04, *p*=.07, 95%CI = [-0.13, -0.01]; absorption: β = -0.06, *SE*=0.04, *p*=.06, 95%CI = [-0.12, -0.01]) were weaker than those who perceived low teacher support (vigor: β = -0.07, *SE*=0.05, *p*=.07, 95%CI = [-0.16, -0.01] ; dedication: β = -0.07, *SE*=0.05, *p*=.07, 95%CI = [-0.15, -0.01]; absorption: β = -0.07, *SE*=0.04, *p*=.07, 95%CI = [-0.14, -0.01]). Since the article assumed that the moderating effect only occured in the first half of the mediation pathway rather than the entire pathway, we simply showed the result of latter without going into deep discussion to ensure the comprehensiveness of the article.

4 Discussion

This study tested a moderated mediation model of academic engagement. The findings shed light on the psychological mechanisms underlying the association between academic stereotype threat and academic engagement by identifying academic self-efficacy as a mediator and perceived teacher support as a moderator. Main results and interpretations are discussed below in detail.

4.1 The mediating role of academic self-efficacy

In line with hypothesis 1, the results showed that academic self-efficacy mediated the relationship between academic stereotype threat and all three academic engagement dimensions, i.e., vigor, dedication, and absorption. Adding to the emerging evidence suggesting the adverse effects of academic stereotype threat on academic engagement (Coutinho & Koinis-Mitchell, 2014; Zhang et al., 2021), this finding highlights the role of academic self-efficacy as a mechanism, and broadens previous studies suggesting correlations between academic stereotype threat, academic self-efficacy and academic engagement (e.g., Lerdpornkulrat et al., 2012; Wu et al., 2020).

According to Bandura's theory of self-efficacy (1977), one's belief about his / her ability to accomplish a task can be influenced by social persuasion. Previous studies have shown that social persuasion played the most significant role in predicting academic self-efficacy of Chinese students (Zheng et al., 2017). Especially, Oettingen and Zosuls (2006) suggested that self-efficacy beliefs of adolescents from cultures that value collectivism, large power distance and high uncertainty avoidance, such as China, tend to rely largely on subjective evaluations and social norms. As a

negative type of social persuasion, feeling stereotyped constituted a potent threat to individuals' self-concept (Vorauer et al., 1998). More directly, stereotype threat is self-threatening, frustrating and evaluative threat, which means that one could be limited or diminished in a domain that is self-definitional (Steele, 1997; Steele & Aronson, 1995). Academic self-efficacy is involved with belief about one's ability to accomplish academic tasks, so we can understand that these adolescents in higher vocational schools who are confront with academic stereotype threat may experience negative self-evaluation and decreased academic self-efficacy. Moreover, self-efficacy functions as one set of proximal determinants of how people behave, their thought patterns, and the emotional reactions they experience in taxing situations, and the low level of perceived efficacy may hinder one from persisting in their efforts until they succeed (Bandura, 1982). It can be inferred from this perspective that the decreased academic self-efficacy might lower necessary academic efforts of adolescents in higher vocational schools when facing academic challenges (Schunk & Zimmerman, 2006) and to be actively engaged in learning (Bandura, 1982).

4.2 The moderating role of social support

The negative relation between academic stereotype threat and academic self-efficacy was moderated by teacher support but not family or friend support. Specifically, this relationship became weaker for those who perceived higher level of teacher support. This finding is in line with previous studies highlighting the role of teacher support in students' academic life. For example, a recent study found that students who perceived higher levels of teacher support showed more intrinsic motivation and fewer feelings of shame related to studying (Karimi & Fallah, 2019). In addition, a meta-analysis of empirical evidence has revealed a negative correlation between teacher support and academic burnout in secondary and university students, which was stronger than that of family or peer support (Kim et al., 2017). We attribute this result to the following aspects. Firstly, teachers are the corresponding roles that accompany the students and they always get along with their students in the academic field, so they know most of the people and things in this field, including students' academic performance and academic difficulties. In addition, the concept of "a teacher for a day is a father for a lifetime" (yi ri wei shi, zhong shen wei fu) is deeply rooted in the hearts of Chinese people (Chai, 2004). Therefore, it can be found that teachers are the closest to students, and they are more likely to exert influences on students' studies based on the research showing that individuals are more inclined to trust people who are close to them (Zhu et al., 2021). Secondly, teachers often provide informational, appraisive support (Wilcox et al., 2005), the most direct and authoritative support when students encounter setbacks or experience difficulties in learning, which has proximal influence in shaping their coping strategies and competence beliefs (Ahmed et al., 2010; Chong et al., 2018). To sum up, for adolescents in higher vocational schools, support from teachers may help them better cope with the emotional reactions (e.g., shameful) to academic stereotype threat and enhance their perception of personal strength, which will weaken the influence of academic stereotype threat on self-efficacy.

4.3 Practical implications and limitations

The results of the current study have some important practical implications. The investigation of the mediating effects suggest that academic self-efficacy is an important variable between stereotype threat and academic engagement. Therefore, practitioners working with higher vocational school students can try different methods that aim to enhance academic self-efficacy. For example, government should change the admission rules that solely emphasizing examination scores for vocational schools and make choosing these schools become more of an individual's decision based on interests and career plans. These measures will help to create a good learning atmosphere in vocational colleges, which can ultimately encourage these students to establish a positive attitude towards learning, and finally improve their academic self-efficacy. Furthermore, our findings provide insights into the role of teacher support. To be specific, teacher support could play a critical role in academic interventions. If appropriate, teachers might discuss with these students whether they perceive sufficient support from their teachers, any possible barriers that prevent them from receiving the support, and potential measures to improve it. More fundamentally, teachers should be more aware and sensitive to the subtle stereotype threat cues that may be hidden in their words and deeds. Considering the practical cost of delivering such teacher support for the organization, the government can set up expert teams who are specialized in such issues nationwide, so that they could enhance students' self-efficacy through by many means. For example, they could provide effective learning methods (e.g., project-based learning) and improve positive self-evaluation after finding problems in the learning process, which will help to improve their belief toward ability (Yang & Chen, 2012; Krsmanovic, 2021). Further, more attention should be paid to male and lower grade students in the course of implementing these measures based on the distribution of academic stereotype threat scores in the study.

Findings should be considered alongside the following limitations. First, the cross-sectional nature of data does not allow inferences with regard to causal relations. Longitudinal studies are needed to further examine the relationship among these variables. Second, the self-report measures used in this study are subject to social desirability and other response bias. Particularly, the measure we developed to access academic stereotype threat may need further validation, and future research could comprehensively use mixed methods or multiple sources of information. For example, to better capture adolescents' stereotype threat, researchers can invite representative adolescents for interview and compare the results with those obtained using the self-report measures. Third, the moderating effect of teacher support on the relationship between academic stereotype threat and academic self-efficacy was low, and the moderating effect coefficient for high teacher support on the relationship between academic stereotype threat and academic self-efficacy was only slightly lower than the moderating effect coefficient for low teacher support. Therefore, caution is needed when interpreting the results. Future studies should verify the robustness of the moderating effect by increasing the sample size.

4.4 Conclusion

Although the study has its limitations, it sought to expand to the growing literature by exploring new complex moderated mediated propositions involving stereotype threat, academic self-efficacy, academic engagement and social support with Chinese vocational students, a group that has been neglected in previous related studies. In particular, this study reveals the important role of teacher support that differs from that of family and friend support. Meanwhile, the findings also provide practical implications for relevant departments and individuals to create a positive social atmosphere and build positive support systems for vocational students.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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