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Parenting styles and internet addiction in Chinese adolescents: Conscientiousness as a mediator and teacher support as a moderator☆

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ABSTRACT

This study examined whether conscientiousness mediated and teacher support moderated the relation of parenting styles to Internet addiction in Chinese adolescents. Data were drawn from a cross-sectional study involving 1783 students aged 11–18 years from Henan, China. Structural equation modeling (SEM) indicated that parenting styles were indirectly related to Internet addiction through conscientiousness. Further, teacher support moderated the relationship between parental refusal and Internet addiction. Specifically, the positive association of parental refusal with Internet addiction was significant for adolescents with high teacher support, but not for those with low teacher support. Prevention and intervention strategies for teachers, parents, and parent educators were provided.

1. Introduction

Internet use has become an essential skill of life for adolescents in the 21st century. Although the Internet has widely noted utilities and benefits, evidence indicates that uncontrolled and excessive Internet use has many potential risks and negative influences, for example predisposing individuals to Internet addiction, which in turn result in various psychosocial problems (e.g., Fumero, Marrero, Voltes, & Peñate, 2018; Liang, Zhou, Yuan, Shao, & Bian, 2016; Zhang et al., 2014; Zhang, Qin, & Ren, 2018).

Internet addiction, also known as "problematic Internet use", "Internet dependence" or "pathological Internet use", is characterized by excessive and uncontrollable use of the Internet, symptoms of withdrawal and tolerance, and adverse consequences (Kraut et al., 1998; Spada, 2014; Young, 1998). According to a survey conducted by the CNNIC (China Internet Network Information Center, 2014), Internet addiction was one of the most serious mental health problem in Chinese adolescents and over 17% of Chinese adolescents were becoming dependent on the Internet. Previous studies have indicated that Internet addiction can have a negative impact on academic performance, social relationships, and well-being for adolescents (Chou, Condron, &

Belland, 2005; Davis, 2001; Milani, Osualdella, & Di Blasio, 2009; Spada, 2014 Yao & Zhong, 2014), for example, result in academic dysfunction, anxiety, deteriorating family and peer relations, and substance use (Greydanus & Greydanus, 2012). Thus, it is very important to investigate Internet addiction in adolescents.

A number of studies have examined potential risk and protective factors involved in Internet addiction (Fumero et al., 2018), especially separately investigated the associations of personal/individual variables (e.g., personality traits, hostility, depression and anxiety) and social/contextual factors (e.g., parent-child relationships, family functioning, peer relations) with Internet addiction (Ko et al., 2014; Li, Dang, Zhang, & Guo, 2014; Lian, You, Huang, & Yang, 2016). However, only a few studies have been conducted to examine the combined effects of personality traits (very important individual characteristics) and social/contextual factors on Internet addiction (Li et al., 2014; Lian et al., 2016; Stavropoulos, Kuss, Griffiths, & Motti-Stefanidi, 2016). Relatively few studies have investigated the combined association of adolescent conscientiousness (an important personality factor) and parenting styles (an important contextual factor) with Internet addiction. In addition, little work has examined whether the effects of adolescent conscientiousness and parenting styles on Internet addiction

depend on another contextual factor such as teacher support. Based on the protective nature of social support, teacher support may protect children from the harm of unsupportive parent-child relationship. Therefore, we assumed that teacher support may moderate the relationship between parenting styles and Internet addiction. In this study, we investigated whether teacher support moderated the mediated effects of adolescent conscientiousness on the relation of parenting styles on Internet addiction.

1.1. Parenting styles and internet addiction

This study used Bronfenbrenner's ecological system model to understand parenting styles and the relation to child development. According to the model, family processes (such as parental behaviors) affected, or even determined a child's development (). Empirical studies have suggested that quality of the parent-child relationship was negatively (Liu & Kuo, 2007) and parent-adolescent conflict and low satisfaction with family functioning were positively (Ko, Yen, Yen, Lin, & Yang, 2007; Yen, Yen, Chen, Chen, & Ko, 2007) associated with adolescents' Internet addiction.

Parenting styles have been found to influence adolescent development (e.g., Carlo, White, Streit, Knight, & Zeiders, 2017; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). There is considerable evidence that parenting styles play an important factor in the development of Internet addiction (e.g., Huang et al., 2010; Lian et al., 2016). Low levels of parental monitoring or ineffective parenting styles were associated with Internet addiction in adolescents (e.g., Park, Kim, & Cho, 2008; Yen et al., 2007). Compared with parents of non-Internet addicted adolescents, parents of Internet addicted adolescents have higher over-involvement, higher rejection, and lower emotional warmth in rearing their children.

1.2. Conscientiousness and internet addiction

According to the diathesis-stress model of behavior, specific personality traits (e.g., poor self-control, high novelty seeking, low reward dependence, conscientiousness) may predispose individuals to become addicted to Internet (Kim, Namkoong, Ku, & Kim, 2008; Ko et al., 2010; Müller, Koch, Dichenhorst, Beutel, Duven, Wölfling, 2013). However, only a few studies have investigated the effects of personality traits on Internet addiction (Wang, Ho, Chan, & Tse, 2015). This study examined the relationship of adolescent conscientiousness with Internet addiction. In the framework of widely used Five Factor Model (FFM) of personality, conscientiousness entails order, dutiful, self-discipline, achievement striving, and deliberation (McCrae & Löckenhoff, 2010). Why do we assess conscientiousness as a personality trait in the context of Internet addiction? There are two main reasons. First, low conscientiousness is a disorder-specific risk factor for an individual's Internet addiction (Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013; Müller, Beutel, Egloff, & Wölfling, 2014; Stavropoulos et al., 2016; Wang et al., 2015; Wilson, Fornasier, & White, 2010). Second, although evidence indicated that low conscientiousness did predict addictive behaviors; little work has examined its link with Internet addiction when considering the effect of parenting styles.

For example, in a sample of 920 adolescents from secondary schools in China, Wang et al. (2015) found that adolescent conscientiousness was negatively associated with their Internet addiction and gaming addiction. In males of over 16 years of age, Müller et al. (2013) also reported that low conscientiousness was the strongest predictor for Internet gaming disorder. A more recent study by Stavropoulos et al. (2016) investigated the contribution of adolescent conscientiousness (as a personality trait) and classroom hostility (as a contextual factor) in the development of Internet addiction in a 2-year longitudinal study. They indicated the protective effect of conscientiousness on Internet addiction. Less conscientious adolescents may choose to use the Internet other than less pleasurable activities, such as doing their

homework, while high conscientious adolescents are more likely to have higher sense of orderliness, work effort, and self-discipline than those with low conscientiousness (Gnisci, Perugini, Pedone, & Conza, 2011; Kuss et al., 2013).

1.3. The mediating role of conscientiousness

The mediating mechanisms through which parenting styles are associated with adolescent Internet addiction are still unclear. However, this kind of study is essential to inform better understanding of how parenting styles are correlated with Internet addiction and design effective interventions to prevent or reduce Internet addiction. The present study examined whether adolescent conscientiousness could mediate the relationship between parenting styles and Internet addiction. To date, there seems no direct evidence to support the mediated effect of adolescent conscientiousness on the relation of parenting styles to Internet addiction. However, there are reasons to assume that adolescent conscientiousness may serve as a plausible mediator between parenting styles and Internet addiction.

According to Bronfenbrenner's ecological system model, parenting styles were an important family factor that contributed to personality development of adolescents (Huang et al., 2010). For example, in a three-year longitudinal study, Heaven and Ciarrochi (2008) found that parenting styles (i.e., authoritativeness) when students were in Grade 7 predicted an increase in adolescent conscientiousness when in Grade 8, which in turn affected Grade 9 grades. Their results indicated that the influence of authoritativeness on grades was not direct but rather was mediated by adolescents' conscientiousness.

Further, Lian et al. (2016) found in Chinese college students that virtues (i.e., relationship virtue, vitality virtue, and conscientiousness virtue), which were regarded as positive psychological resources, mediated the association between negative parenting styles and Smartphone addiction. However, their study considered virtues as a whole and did not investigate the effects of the specific aspects of virtues on the relationship between parenting styles and Smartphone addiction. Based on the theoretical work and previous studies, we hypothesized that adolescent conscientiousness may mediate the relation of parenting styles to Internet addiction.

1.4. Teacher support as a moderator

According to the cognitive-behavioral model of Internet addiction, a lack of social support or social isolation will lead to Internet addiction (Davis, 2001). In the context of schools, teachers are most likely to be an important source of social support for adolescents. Adolescents who had less social support from teachers were more likely to rely on the Internet (Casas, Del Rey, & Ortega-Ruiz, 2013). In addition, the quality of student-teacher relationship is a key factor that fosters or undermines students' school adjustment (Wang, 2009). If students perceive that their teachers support and care about them, they will have better academic performance and fewer problem behaviors (Wang, 2009), for example, they are less likely to develop Internet addiction (Casas et al., 2013). Thus, teacher support may play a protective role in adolescent development.

In addition, perceived social support from teachers has been indicated to buffer the adverse effects of negative or stressful environmental conditions among adolescents (Wang & Dishion, 2012). For instance, in a longitudinal study, Wang and Dishion (2012) examined whether perceived teacher support moderated the effects of deviant peer affiliation (deviant peers as a negative environment) on adolescent problem behaviors and found high levels of teacher support appear to deter the influence of deviant peer groups on adolescents' problem behaviors. Also, according to Bronfenbrenner's (1977) ecological system model, the social systems (e.g., parents and teachers) might interact with each other. However, no research seems to have directly examined the possibility that teacher support moderates the relation

between parenting behaviors and Internet addiction in adolescents.

Based on the above theoretical foundation, in this study, we hypothesized that teacher support moderated the relation of parenting styles to Internet addiction. Specifically, high levels of teacher support would serve as a protective factor in the link between parenting styles and Internet addiction, whereas low levels of teacher support would serve as a risk factor for adolescents to use Internet excessively. Examining the role teacher support plays in the relationship between parenting styles and Internet addiction in adolescents has the merit. It may help us understand how the adverse impact of unsupportive parenting styles on Internet use can be mitigated within the school setting.

1.5. The present study

Although there is evidence for parenting styles and personality in the prediction of Internet addiction, limited work has examined the specific combination of parenting styles and conscientiousness in relation to Internet addiction. In the few studies examining parenting styles and Internet addiction, neither conscientiousness nor teacher support was investigated.

It remains unclear regarding whether conscientiousness mediates and teacher support moderates the relation of parenting styles to Internet addiction. This study aims to bridge the knowledge gap. Our hypothesized theoretical model can be seen in Fig. 1. In summary, we proposed the following hypotheses:

H1. Conscientiousness will mediate the association between parenting styles and Internet addiction.

H2. The relation of parenting styles to Internet addiction will be moderated by teacher support.

2. Materials and method

2.1. Participants and procedures

Our sample was recruited from middle schools in Henan province, China, using random cluster sampling. All students from grade 7 to grade 9 were invited to attend the survey. In total, 1783 students participated in this study (aged 11–18 years, $M = 13.6$, $SD = 0.90$). Most participants in the present study (97.0%) were the ethnic group of Han and all of them spoke mandarin Chinese. The sample consisted of 947 (53%) males and 836 (47%) females.

This research was approved by the local ethical committee of Zhengzhou University. The researchers first visited the schools, explained the purpose of this study to the principal of the target school, and obtained their approval for conducting the study. All participants participated in the study voluntarily and anonymously. Participants completed the questionnaire in 20 min in a quiet classroom under the supervision of a trained teacher. All questionnaires were written in Chinese. The data were collected from March 2018 to April 2018. This study was a part of a national project. In the project, we also collected data from parents and teachers, which were not used in this study.
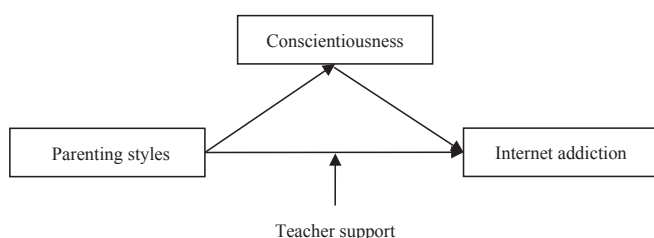

Fig. 1. The hypothesized model.

2.2. Measures

2.2.1. Parenting styles

Parenting styles were assessed by the short-Egna Minnen av Barndoms Uppfostran-Chinese questionnaire (s-EMBU-c) (Jiang, Lu, Jiang, & Xu, 2010). This Chinese version measured adolescents' own memories of perceived parental rearing behaviors (Lian et al., 2016). This scale comprises of 42 items in three dimensions: Parental refusal (12 items, "Even if it was a small mistake, my father/mother would punish me"), emotional warmth (14 items, "My father/mother praised me"), and overprotection (16 items, "I thought my father/mother interfered with everything I did"), which was developed from the original 81 items of EMBU (Jiang, Lu, & Jiang, 2010). Each Item was responded to a 4-point scale ranging from 1 (never) to 4 (almost always). All the 42 items were separately averaged into three dimension scores, with higher scores indicating higher levels of parental behaviors. The s-EMBU-c is an instrument with high internal consistency, validity, and test-retest reliability and has been widely used to measure parenting styles in Chinese samples (e.g., Jiang et al., 2010; Lian et al., 2016). In this study, the Cronbach's alpha coefficient was 0.79 for parental refusal, 0.80 for parental warmth, and 0.91 for parental protection.

2.2.2. Conscientiousness

Conscientiousness was assessed using 12 items from the Chinese version of the NEO-Five factor Inventory (NEO-FFI; Costa & McCrae, 1992; Nie, Lin, Zheng, Ding, & Peng, 2008). The NEO-FFI consists of 60 items of which 12 items measure conscientiousness. A sample item was "I have a clear set of goals and work toward them in an orderly fashion." Participants responded on a 5-point scale ranging from 0 (strongly disagree) to 4 (strongly agree). All the 12 items (with the negatively keyed items reverse coded) were averaged into a composite score, with higher scores indicating a higher level of conscientiousness. The NEO-FFI has been validated with Chinese children and college students, which showed convergent, discriminant and predictive validity for the five subscales (Nie et al., 2008; Zhang, 2016). In the present study, the Cronbach's alpha coefficient was 0.93.

2.2.3. Teacher support

Teacher support was measured with the perceived school climate scale (Jia et al., 2009). Perceived school climate scale consists of 25 items of which 7 items measure adolescents' perceived teacher support. The dimension of teacher support focuses on emotional support and academic support of teachers. A sample item was "Teachers believe I can do well". Children were asked to rate each items on a 4-point Likert-type scale from 1(never) to 4 (always). The 7 items were averaged to yield a single aggregated score. A higher score represented a higher level of teacher support. This measure has been successfully used among Chinese adolescents with great reliability and validity (Jia et al., 2009; Wen & Lin, 2012). The alpha coefficient was 0.86 for teacher support in this study.

2.2.4. Internet addiction

Internet addiction was measured by applying a Chinese version (e.g., Liang et al., 2016; Zhang et al., 2018) of Young's Internet Addiction Diagnostic Questionnaire (YDQ; Young, 1998). The YDQ is one of the most widely used unidimensional instruments of Internet addiction (Wartberg, Kriston, Kegel, & Thomasius, 2016). The Chinese version included eight YDQ questions (e.g., "Have you repeatedly made unsuccessful efforts to control, cut back or stop Internet use?") and two new questions ("Do you often spend a lot of money on the Internet?" and "Are you in a bad mood when you get off the Internet?"). Each item was scored from 0 (no) to 1 (yes). The average score was calculated as an indicator of Internet addiction, with higher scores representing higher Internet addiction severity. The Chinese version of YDQ has been indicated to have good psychometric properties in Chinese adolescents (e.g., Liang et al., 2016; Zhang et al., 2018). For example, Liang et al.

(2016) reported a Cronbach's α of 0.79, test-retest reliability of 0.64, and the internal consistency was 0.76–0.91. In the present study, the results of CFA showed that the one-factor model provided a good fit for the data, χ^2 (29) = 114.61, CFI = 0.98, TLI = 0.97, RMSEA = 0.041, SRMR = 0.022. The item loadings ranged from 0.46 to 0.67. The Cronbach's α was 0.82 in this study.

2.2.5. Control variables

Control variables included age and sex (girl vs boy). Children were asked to complete a questionnaire to provide information on their age and sex.

2.3. Analytic strategy

Descriptive statistics and correlation analyses were performed among the interested variables with 20.0 in this study. In the analyses, continuous variables were *z*-standardized. Moderated mediation analyses were performed using structural equation modeling (SEM) with Mplus version 7.0 for Windows (Muthén &Muthén, 2012). To assess model fit, we reported the following fit indices: The root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis fit index (TLI), and standardized root mean square residual (SRMR). RMSEA ≤ 0.06, CFI and TLI ≥ 0.95, and SRMR ≤ 0.06 were considered to be a good fit; RMSEA ≤ 0.08, CFI and TLI ≥ 0.90, and SRMR ≤ 0.08 were considered adequate (Hu & Bentler, 1999). More-over, the bias-corrected bootstrap estimation procedure was also used to obtain the bias-corrected 95% confidence intervals (BCIs) based on 5000 resample for the indirect effects. Specifically, we examined whether conscientiousness mediated the relationship of parenting styles with Internet addiction and whether teacher support moderated the strength of the conscientiousness' mediated effect.

3. Results

3.1. Descriptive statistics and correlation analyses

Descriptive statistics for the study variables are shown in Table 1. The skewness and kurtosis values were within an acceptable range (i.e., skewness < 2 and kurtosis < 4; Kline, 1998), indicating that the study sample distribution was nearly normal.

Table 2 displays the correlations among the key variables. As it can be seen from Table 2, the main variables were correlated with each other in the expected directions. Specifically, adolescent conscientiousness was negatively related to parental refusal and over-protection, and positively related to parental warmth. Adolescents' Internet addiction was positively correlated with parental refusal and overprotection, and negatively correlated with parental warmth, teacher support and conscientiousness in adolescents. These results suggested that parental refusal and overprotection could be a risk factor, whereas a warm parenting style, adolescent conscientiousness, and perceived teacher support could be a protective factor for their Internet use. Except conscientiousness and teacher support, sex was correlated with other interested variables, and except parental refusal and

overprotection, age was related to other interested variables.

3.2. Mediation model

We examined the indirect effect of parenting styles on Internet addiction via conscientiousness. Age and gender were included as control variables. In this model, all the possible paths were estimated, resulting in a model with zero degrees of freedom, i.e., saturated model. Model fit cannot be assessed. Explained variance for conscientiousness and Internet addiction was 27.6%, and 23.3%, respectively.

Fig. 2 presents the only significant results of the mediation model. As Fig. 2 shows, Parental refusal and overprotection were negatively related to conscientiousness (β = −0.11, *p* < 0.01; β = −0.08, *p* < 0.01), while parental warmth was positively related to conscientiousness (β = 0.48, *p* < 0.01). Conscientiousness was negatively related to Internet addiction (β = −0.40, *p* < 0.01). The direct path from parental refusal to Internet addiction were significant (β = 0.08, *p* < 0.01), however, the direct paths from parental warmth and over-protection to Internet addiction were non-significant (β = −0.03, *p* > 0.05; β = 0.05, *p* > 0.05). Furthermore, parental refusal, warmth, and overprotection were significantly indirectly related to Internet addiction (standardized indirect effect = 0.04, 95% BCIs: 0.02, 0.07; standardized indirect effect = −0.19, 95% BCIs: -0.22, −0.16; standardized indirect effect = 0.03, 95% BCIs: 0.01, 0.05).

3.3. Moderated mediation model

We then tested whether teacher support moderated the indirect effect of parenting styles on Internet addiction through conscientiousness. Prior to the analyses, the continuous measures were mean-centered to reduce multicollinearity. To assess the potential moderating effect of teacher support, we investigated the same mediation model, but additionally included teacher support as well as the three two-way interaction terms between parenting styles (parental refusal, warmth, and overprotection) and teacher support. Age and sex were also in-cluded in this moderated mediated model. Explained variance for conscientiousness and Internet addiction was 37.9%, and 24.0%, re-spectively.

Table 3 shows the results of the moderated mediation analyses. As shown in Table 3, parental refusal and overprotection were negatively related to conscientiousness (β = −0.09, *p* < 0.01; β = −0.06, *p* < 0.05), while parental warmth and teacher support were positively related to conscientiousness (β = 0.25, *p* < 0.01; β = 0.40, *p* < 0.01). Teacher support and conscientiousness were negatively related to In-ternet addiction (β = −0.42, *p* < 0.05; β = −0.37, *p* < 0.01). How-ever, the direct paths from parental refusal, overprotection, and warmth to Internet addiction were non-significant (β = −0.27, *p* > 0.05; β = 0.16, *p* > 0.05; β = −0.24, *p* > 0.05). Furthermore, parental refusal, warmth, and overprotection were significantly in-directly related to Internet addiction (standardized indirect ef-fect = 0.03, 95% BCIs: 0.01, 0.05; standardized indirect ef-fect = −0.09, 95% BCIs: -0.12, −0.07; standardized indirect effect = 0.02, 95% BCIs: 0.01, 0.04).

We found non-significant interactions between parental warmth and teacher support (β = 0.41, *p* > 0.05) and between parental over-protection and teacher support (β = −0.15, *p* > 0.05). However, The interaction term between parental refusal and teacher support was significant, β = 0.39, *p* < 0.05, which showed that this effect did differ for adolescents with low teacher support and those with high teacher support. Specifically, the positive relationship between parental refusal and Internet addiction was significant for high teacher support (B = 0.18, *SE* = 0.036, *p* < 0.00), but not for low teacher support (B = 0.06, *SE* = 0.031, *p* > 0.05). This result indicated that teacher support moderated the relation between parental refusal and Internet addiction.

To help interpret the significant interaction, we graphed the

Table 1
Descriptive statistics of the study variables.

	Range	*M*	*SD*	Skewness	Kurtosis	α
1.Sex	0–1	0.53	0.50	–	–	–
2.Age	10–18	13.61	0.90	0.65	0.81	–
3.Parent refusal	1–4	1.47	0.49	1.19	0.98	0.79
4. Parent warmth	1–4	3.04	0.77	− 0.55	− 0.57	0.80
5.Parental overprotection	1–4	2.13	0.48	0.39	0.69	0.91
6.Conscientiousness	1–5	3.67	0.86	− 0.10	− 0.74	0.93
7.Teacher support	1–4	3.10	0.66	− 0.48	− 0.54	0.86
8.Internet addiction	0–1	0.20	0.24	1.32	1.07	0.82

Table 2
Correlation analysis among the study variables.

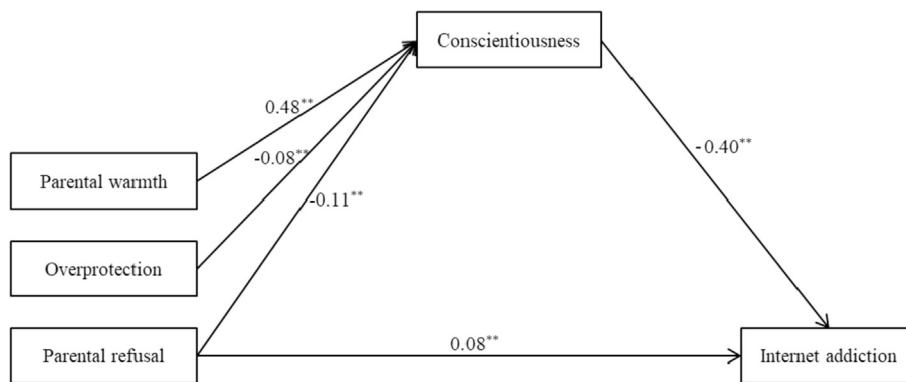|	1	2	3	4	5	6	7	8
1.Sex	1.00							
2.Age	0.05*	1.00						
3.Parent refusal	0.17**	0.02	1.00					
4. Parent warmth	−0.07**	−0.19**	−0.35**	1				
5.Parental overprotection	0.14**	−0.04	0.54**	0.01**	1.00			
6.Conscientiousness	−0.01	−0.12**	−0.31**	0.50**	−0.13**	1		
7.Teacher support	−0.03	−0.15**	−0.26**	0.58**	−0.05*	0.56**	1	
8.Internet addiction	0.13**	0.12**	0.26**	−0.27**	0.17**	−0.45**	−0.31**	1

Fig. 2. Results of mediation model (showing significant standardized estimates) of the relationship of parenting styles to Internet addiction through conscientiousness. Age and sex were included as controls (not shown), with significant paths from sex to conscientiousness (β = 0.05, $p < 0.05$) and from age and sex to Internet addiction (β = 0.07, $p < 0.01$; β = 0.10, $p < 0.01$).

interaction at high and low levels of teacher support and parental refusal (Fig. 3). As illustrated in Fig. 3, the association of parental refusal with Internet addiction severity differed depending on the level of teacher support. The moderating effect of teacher support on the association between parental refusal and Internet addiction was more pronounced at a low level of parental refusal, where Internet addiction associated with parental refusal was substantially lower for adolescents who had high levels of perceived teacher support. In other words, the effect of perceived teacher support of adolescents decreased when the level of parental refusal increased.

4. Discussion

This study indicated that parental refusal and overprotection were negatively associated with conscientiousness but positively associated with Internet addiction, while parental warmth and teacher support were positively associated with conscientiousness but negatively associated with Internet addiction. Furthermore, conscientiousness mediated the relationship between parenting styles and Internet addiction and teacher support moderated the mediated model, specifically,
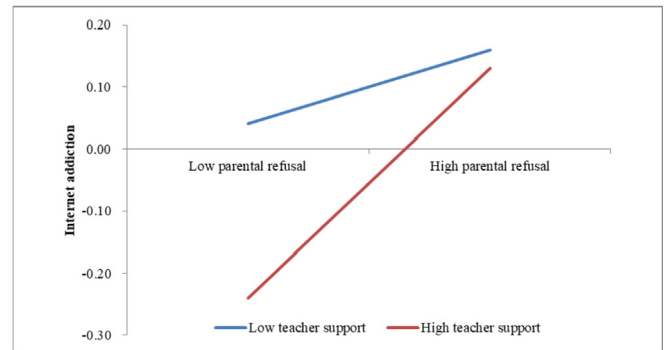

Fig. 3. Interaction effect of parental refusal with teacher support on Internet addiction. High = 1 standard deviations above the mean; Low = 1 standard deviations below the mean.

moderated the relation of parental refusal to Internet addiction. The current results contribute to the literature on Internet addiction in several ways.

Table 3
Moderated mediation effects of parenting styles on Internet addiction through conscientiousness conditional on teacher support.

Predictor	Conscientiousness			Internet addiction		
	B (β)	SE	95% CI	B (β)	SE	95% CI
Age	−0.01 (−0.01)	0.03	−0.05 - 0.03	0.02** (0.06)	0.01	0.01 - 0.03
Sex	0.08* (0.04)	0.03	0.01 - 0.14	0.05** (0.10)	0.01	0.03 - 0.07
Parental refusal	−0.08** (−0.09)	0.02	−0.13–0.03	−0.07 (−0.27)	0.04	−0.14 - 0.01
Parental warmth	0.14** (0.25)	0.02	0.11 - 0.17	−0.04 (−0.24)	0.02	−0.08 - 0.01
Parental overprotection	−0.06* (−0.06)	0.02	−0.10–0.01	0.04 (0.16)	0.04	−0.04 - 0.12
Teacher support	0.52** (0.40)	0.03	0.45 - 0.59	−0.15* (−0.42)	0.06	−0.28–0.02
Conscientiousness				−0.10** (−0.37)	0.01	−0.12 - 0.09
Parental refusal × Teacher				0.03* (0.39)	0.01	0.01 - 0.05
Parental warmth × Teacher				0.01 (0.41)	0.01	−0.002 - 0.03
Overprotection × Teacher				−0.01 (−0.15)	0.01	−0.03 - 0.01
R^2	37.9%			24.0%		

Note. Teacher = Teacher support. Confidence intervals for effects are bias corrected based on 5000 bootstrap samples.

First, in line with previous reports (Huang et al., 2010), there was a positive association from parental refusal and overprotection to Internet addiction and a negative association from parental warmth to Internet addiction. This suggests that if adolescents tended to perceive their parents as more rejective, punitive, and overprotective, but less warm, they might be at the risk of developing Internet addiction. Specifically, when parents demonstrate more care and understanding toward adolescents and have a warm interaction with them, adolescents are less likely to depend on Internet. However, if adolescents experience rejection, punishment, or overprotection from their parents, they are more likely to become Internet addict. This might be helpful for parents to rethink about their parenting styles, for example, to improve or adjust their parenting behaviors, in order to reduce their adolescents' dependence on Internet.

Second, this study confirmed a significantly negative link between conscientiousness and Internet addiction. This result was consistent with previous findings that less conscientiousness was significantly associated with Internet addiction and social networking addiction (Müller et al., 2013; Wang et al., 2015). It appeared that certain personality factors (e.g., less conscientiousness) may predispose individuals to Internet addiction. The underlying mechanism might be that less conscientious adolescents were not dutiful and responsible in pursuing their personal goals (Ross et al., 2009) and might find the virtual environment attractive (Müller et al., 2014), thus spend more time on Internet. In contrast, adolescents high in conscientiousness are self-disciplined and success-achieved, and have sophisticated understanding of the consequence of problematic use of Internet, therefore may be less inclined to indulge in Internet world.

Third, this study further indicated the mediated effect of conscientiousness on the association of parenting styles with Internet addiction. This result was also consistent with previous work which implied that parenting styles might influence addictive behaviors indirectly through their associations with personality traits (Li et al., 2014; Lian et al., 2016). For example, Li et al. (2014) has reported the effect of parental behavior (i.e., positive support and negative control) on Internet addiction via the mediating role of self-control. Our results suggested that adolescents who perceived more warmth, less rejection, and less overprotection from their parents were prone to develop high levels of conscientiousness, which in turn, may prevent adolescents' excessive Internet use. On the contrary, rejective, hostility, and overprotective parental behaviors would impede adolescent conscientiousness and result in Internet addiction.

Most importantly, this study was the first, to our knowledge, to explore whether teacher support moderated the mediated effect of parenting styles on Internet addiction through conscientiousness. The current study indicated that teacher support moderated the effect of parental refusal on Internet addiction. Parental refusal may have a differential impact on adolescents' internet addiction, depending on their perceived level of teacher support. For adolescents who perceive the same level of parental refusal, those with low levels of perceived teacher support are more at risk for manifesting excessive Internet use than those who have high teacher support. This suggests that adolescents who experience high levels of parental refusal and low levels of teacher support have more severe Internet addiction symptoms, while those who experience low levels of parental refusal and high levels of teacher support are less likely to be addicted to Internet. This finding is important for prevention and intervention strategies of Internet addiction, as it suggests that the strategies could benefit from the increasing level of teacher support that adolescents perceive. If teachers care about adolescents, talk to them about their problems, help them with school problems, and believe that they can do well, the harm caused by parental refusal may become less influential.

Further, teacher support seemed to help adolescents with a low level of parental refusal. This adaptive quality didn't buffer those with high parental refusal that was related to increased severity of Internet addiction. The protective function of perceived teacher support seemed to break down at increasing levels of parental refusal. Why might this be? First, it is possible that adolescents usually perceive their teachers to be supportive, however, the teachers may not actually provide support or provide it poorly when children perceive their parents high refusal. Second, it is possible that parental refusal, especially high levels of parental rejection, punishment, and hostility, may play a more salient and detrimental role in adolescent development, while the negative effect is hard to be eliminated.

However, we did not find the moderated effect of perceived teacher support on the association of parental warmth and overprotection with Internet addiction. In other words, the relations of parental warmth and overprotection to Internet addiction through conscientiousness did not vary with the degree of teacher support. One possible explanation is that conscientiousness has such attributes as order, dutifulness, self-discipline, and planful deliberation (McCrae & Costa, 1999), which may play a pivotal role in developing Internet addiction predicted by parenting warmth and overprotection. Thus, adolescents are more likely to develop Internet addiction without higher degrees of conscientiousness, even if they perceive high levels of teacher support. A second explanation is that peer support rather than teacher support may moderate the relation of parental warmth and overprotection to Internet addiction. Peers play a central role in adolescents' development and behavior (Arnett, 2014). Low peer support combined with high parent support was also problematic (Young, Berenson, Cohen, & Garcia, 2005). Future studies could examine whether perceived peer support would moderate the effect of parental warmth and overprotection on Internet addiction.

The findings from the present study have implications for family education and parent educators, especially for adolescents in China. A Chinese proverb says, "Beating shows affection and scolding shows love" (Da shi qin, ma shi ai). However, parental behaviors such as harsh punishment and high levels of rejection and hostility are especially harmful for adolescents' development. A warm and acceptable family climate is helpful for adolescents to develop and promote their ability of conscientiousness and then decrease their problem behaviors. Specifically, parents should care about and support adolescents, develop positive interactions with them, praise their approved behaviors, and punish them fairly and justly, which are necessary for adolescents to obtain the capacity of conscientiousness. Although parents' care and protection can help adolescents deal with problems and difficulties, their overprotection and too much control may also lead adolescents turn to other things, such as dependent on Internet. For parent educators, effective intervention and prevention programs should be provided to help parents receive more parental rearing training to minimize the likelihood of adolescents' problem behaviors.

Several limitations of this study should be noted. First, the data were collected via self-reported questionnaire, which may constitute a common method bias. Second, this study investigated adolescents' perception of parenting styles, while maternal rearing and paternal rearing may have different effects on personality (Otani, Suzuki, Oshino, Ishii, & Marsumoto, 2009). Third, this study is cross-sectional, which cannot find the causality relationship among the variables. Does children's Internet use impact their conscientious level or cause parents to seek out other parenting behaviors? Previous studies have found that Internet addiction may result in increasing level of conflict with parents, and more time on Facebook and a higher frequency of checking Facebook predicted higher narcissism (e.g., Mehdizadeh, 2010; Ryan & Xenos, 2011). Future studies should design a longitudinal or experimental study to draw the causal relations among the variables.

Despite these limitations, this study is the first to examine the interplay between parenting styles, conscientiousness, teacher support and Internet addiction. This study adds to the evidence for the direct effects of parenting styles and conscientiousness on Internet addiction. Moreover, our results found that parenting styles were indirectly associated with Internet addiction through conscientiousness. It is also important to note that the mediated effect of conscientiousness for

parental refusal differed as a function of teacher support. The findings highlight the importance of considering individual (i.e., conscientiousness) and environmental factors (i.e., parenting style and teacher support) in preventing Internet addiction. This study will contribute to the foundation for future research on the proposed causality among the variables in longitudinal or experimental designs and for informing effective interventions for adolescents to reduce Internet addiction.

Acknowledgements

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