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Preference-for-solitude and depressive symptoms in Chinese adolescents

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ABSTRACT

Social withdrawal has been associated with internalizing difficulties across development. Although much is known about shyness, little is known about preference-for-solitude; even less is known about how preference-for-solitude might relate to youth depression in non-Western countries. Using structural equation modeling, this study examined the links between preference-for-solitude and depressive symptoms in 201 young Chinese adolescents (86 boys; M age = 14.21 years). Consistent with past research demonstrating social withdrawal as a multidimensional construct, preference-for-solitude emerged as a related but distinct construct from shyness; youth who preferred to be alone were reliably differentiated from youth who were shy. Additionally, preference-for-solitude was positively associated with negative affect and negative self-esteem after accounting for shyness. These findings closely replicate past research conducted in North America and European settings, and suggest that interventions targeting preferred-solitary youth in early adolescence may prove particularly fruitful across cultures.

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1. Introduction

A significant number of adolescents across cultures struggle with affective disorders; these difficulties come with considerable personal and societal costs (Wolfe & Mash, 2008). Social withdrawal, the behavior of consistently withdrawing oneself from the peer group, has been linked to depressive symptoms in youth across cultures (see Rubin & Coplan, 2010). Despite these findings, the risks associated with withdrawal may depend on underlying motivations; different outcomes have been found for youth with differing combinations of social approach and social avoidance motivations (Bowker & Raja, 2011; Bowker, Markovic, Cogswell, & Raja, 2012; Thijs, Koomen, de Jong, van der Leij, & van Leeuwen, 2004). For example, *shyness* consists of high approach and high avoidance motivations (Asendorpf, 1990, 1993); shy youth are interested in interacting with others but withdraw because they are socially anxious. *Preference-for-solitude*, on the other hand, consists of low approach and low-to-high avoidance motivations; preferred-solitary youth withdraw due to a preference for solitary activities.

Although shyness has been associated with maladjustment across development (Rubin & Coplan, 2010), little is known about the implications of preference-for-solitude for adjustment, particularly during development. Indeed, although a preference to be alone has been examined in adulthood (e.g., Leary, Herbst, & McCrary, 2003), such inclination has rarely received empirical attention in childhood and adolescence. Of the limited research conducted, preference-for-solitude appears to be maladaptive in early adolescence. Marcoen and Goossens (1989) found that an affinity for solitude was associated with loneliness and fewer intimate friends in early adolescence. Coplan, Zheng, Weeks, and Chen (2012) found that low approach motivation was associated with socially withdrawn behaviors in young adolescents, which in turn predicted peer difficulties. Wang, Duong, Schwartz, Chang & Luo (2013) and Wang, Rubin, Laursen, Booth-LaForce & Rose-Krasnor (2013) found that preference-for-solitude was associated with internalizing difficulties like depression and low self-esteem in early adolescence. Although these studies suggest that preference-for-solitude is maladaptive during early adolescence, much additional research is needed to confirm these findings.

Compared to the limited adolescent research on preference-for-solitude, even less is known about preference-for-solitude in non-Western cultures. Indeed, the majority of the research on preference-for-solitude has been conducted in North American and European countries. Yet social withdrawal is a culture-bound phenomenon (Chen, 2010)—withdrawn behaviors are defined and regulated by the rules and value systems of a given culture (Chen, 2010; Hinde, 1997). Because cultural values provide guidance for evaluating and responding to withdrawn behaviors (Chen, Rubin, & Li, 1995), cross-cultural research on preference-for-solitude in particular is needed to understand the heterogeneity of withdrawn youth.

Despite the limited research, some evidence suggests preference-for-solitude is similarly maladaptive for youth beyond the regions of North America and Europe. Researchers have found that Chinese children who prefer to be alone experience significant psychological, school, and social difficulties throughout childhood (Chen, Wang, & Cao, 2011; Coplan et al., 2012; Nelson, Hart, Yang, Wu, & Jin, 2012).

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For instance, Bowker and Raja (2011) found that preference-for-solitude was associated with peer difficulties in young Indian adolescents. Similarly, Liu et al. (2014) found that preference-for-solitude was associated concurrently and predictively with negative self-perceptions, low academic achievement, and peer difficulties in young Chinese adolescents.

Although these studies help address the lack of cross-cultural research on preference-for-solitude, they are not without limitations. None of these studies, with the exception of Bowker and Raja (2011), assessed preference-for-solitude *directly*. Rather, preference-for-solitude was assessed indirectly through measures like peer nominations, parent reports, or behavioral observations (e.g., observed solitary-passive play; Nelson et al., 2012). Even though such measures provide important information about child behavior, they may not adequately capture youth's internal motivation to be alone, particularly in older children and adolescents. Indeed, parent–child and parent–parent concordance is generally low for internalizing behaviors like withdrawal (e.g., Birmaher et al., 1997). Research has also shown that self-reports are psychometrically stronger than other-reports in assessing internal motivation states in older children and adolescents (Coplan & Bowker, 2013; Coplan & Weeks, 2010; Ganellen, 2007).

Another limitation to these cross-cultural studies pertains to the analyses used. Aside from Liu et al. (2014), all of the studies used analyses that do not account for errors in measurement (e.g., regression analyses; Hancock & Mueller, 2006). Psychological constructs are not readily observable, and advanced statistical techniques are particularly needed to capture the complexity of multidimensional constructs like preference-for-solitude. Research that takes advantage of recent advances in statistical methodology (e.g., structural equation modeling) is especially warranted for gaining an accurate understanding of preference-for-solitude and its implications for adjustment across development.

Given the aforementioned gaps in research, the goal of this study was to examine the unique links between preference-for-solitude and depressive symptoms (negative affect; negative self-esteem) in young Chinese adolescents. Early adolescence is an especially relevant context for this study for several reasons. First, relationships with peers become increasingly important to youth as they enter early adolescence—cliques and crowds become prominent sources of influence (Veenstra & Dijkstra, 2011), and belonging to peer groups becomes a major concern (Rubin, Bukowski, & Laursen, 2009). Unsurprisingly, then, withdrawn behaviors are viewed as particularly aversive and non-normative during this period (Marcoen & Goossens, 1989; Rubin et al., 2009). Due to the increasing importance of peers and youth's negative views of withdrawal, early adolescence may be a notably difficult time for youth who prefer to be alone. Indeed, Wang, Duong, et al. (2013) and Wang, Rubin, et al. (2013) found that preference-for-solitude was more associated with internalizing difficulties like depression and low self-concepts in early adolescence compared with late adolescence.

Additionally, mental health problems, specifically depressive disorders, increase sharply in early adolescence (Hankin et al., 1998; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). Preadolescent onset of clinical depression also appears to be a serious risk factor for adult depression and other major affective disorders later in life (Harrington, Fudge, Rutter, Pickles, & Hill, 1990; Petersen et al., 1993). In fact, earlier onset of depression is predictive of more frequent and severe depressive episodes (Petersen et al., 1993). Thus, examining the correlates of depressive symptoms in early adolescence is critical for understanding the nature, course, and treatment of depressive disorders.

Although early adolescence may put all youth at risk for depression, Asian youth may be particularly at-risk for depressive symptoms. Research has shown that East Asians and Southeast Asians experience higher levels of internalizing difficulties than their non-Asian counterparts across development (e.g., Chen & Li, 2000; Young, Fang, & Zisook, 2010). In particular, evidence suggests that between 24% and 64% of Chinese adolescents exhibit significant depressive symptoms (Chan, 1995, 1997). Due to the low rates of treatment seeking in Asians across development (Abe-Kim et al., 2007), the prognosis of depression is also generally worse for members of this ethnic group than for those in other ethnic groups. Thus, in addition to addressing the sparse cross-cultural research on preference-for-solitude, findings from this study could provide much-needed insight into the development of effective interventions and preventions directed at improving the well-being of Asian individuals.

Based on previous research, it was hypothesized that: a) preference-for-solitude would emerge as a distinct construct from shyness, and b) preference-for-solitude would be associated with higher levels of negative affect and negative self-esteem in young Chinese adolescents. Given that preference-for-solitude remains an understudied phenomenon during development, and because little is known about its implications for youth adjustment beyond the North American and European contexts, results from this study could provide a more comprehensive understanding of the heterogeneity of withdrawal and depression across development.

2. Method

2.1. Participants

The sample included 201 ninth graders (86 boys; *M* age = 14.21 years, *SD* = .62 years) in Beijing, China. All participants identified as Han Chinese, the predominant ethnic group in China. The percentage of youth living with two parents was 85%. Available demographic data classified the participants as middle to upper-middle class.

2.2. Procedure

Participants were first contacted by telephone; if both parents and adolescents expressed interest, an informational letter, parental consent form, and adolescent assent form were mailed to the home (consent rate = 100%; return rate = 100%), along with packets of questionnaires (see below). All questionnaires have been shown to be reliable and valid across cultures (e.g., Achenbach, Howell, McConaughy, & Stranger, 1995). All Chinese translations were conducted by researchers fluent in both languages; translations were back-translated and cross-checked for reliability and validity.

2.3. Measures

Preference-for-solitude and *Shyness* were measured using the: 1) Social Withdrawal Scale (SWS; Terrell-Deutsch, 1999), and 2) Youth Self-Report (YSR; Achenbach & Rescorla, 2001). The SWS is a self-report of withdrawal that ranges on a scale from 0 (not at all true) to 5 (always true). The YSR is a self-report of youth adjustment on a scale that ranges from 0 (not true) to 2 (very often true). This assessment of different withdrawal dimensions has been shown to be reliable and valid (Wang, Rubin, et al., 2013).

The preference-for-solitude scale consists of 4 item indicators (three SWS items and one YSR item), which include: "I like spending time alone more than being with other kids;" "I would rather be with other kids than be alone" (reversed); "I spend time alone because I want to be alone more than I want to be with other kids;" and "I would rather be alone than with others" ($\alpha = .85$). The shyness scale consists of 3 item indicators (two SWS items and one YSR item), which include: "I am shy;" "I spend time alone because I want to be with other kids but I don't because I'm too shy or afraid;" and "I am too timid or shy" ($\alpha = .73$).

Depressive symptoms were measured using the Child Depression Inventory (CDI; Kovacs, 1992). The CDI comprises 27 groups of sentences, and sentences within each group correspond to a level of symptomology, ranging from 0 (symptom not present) to 2 (high level of symptom). Participants were asked to pick a sentence from a group of sentences that best described them during the past 2 weeks.

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Items assess five categories of depressive symptoms: 1) negative affect; 2) interpersonal problems; 3) ineffectiveness; 4) anhedonia; and 5) negative self-esteem. Because this study was focused on depressive symptoms rather than interpersonal or externalizing problems, the subscales of negative affect (e.g., 4 items; "Feel like crying everyday"; $\alpha = .71$) and negative-self-esteem (e.g., 4 items; "Nothing will ever work out for me"; $\alpha = .70$) were used (see Table 3).

2.4. Data analysis plan

On average, 0.0 to 0.9% of the data were missing across variables. Missing data were addressed using full information maximum likelihood (FIML); this procedure is a robust estimator of results (Hancock & Mueller, 2006).

Across all samples, analyses were conducted using structural equation modeling (SEM) within Mplus 7 (Muthen & Muthen, 1998–2014). SEM has been shown to be robust even in small samples (Hancock & Mueller, 2006). Satorra–Bentler adjusted chi-square (S–B $\chi 2$), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square (SRMR) were used to assess model-fit based on established by Hu and Bentler (1999), where CFI ≤ .95, RMSEA ≤ .06, and SRMR ≤ .08 indicate adequate fit. Differences in the Satorra–Bentler adjusted chi-square (ΔS–B $\chi 2$), adjusted Akaike Information Criteria (ΔAIC), adjusted Bayesian Information Criteria (ΔBIC), and adjusted Sample-Size Adjusted Bayesian (ΔAdjusted BIC) were used to compare different models.

To address the research questions in this study, a two-step process was followed (Anderson & Gerbing, 1988). Specifically, a measurement model of indicators to latent factors was first tested for preference-for-solitude, shyness, negative affect, and negative self-esteem. Following evidence of adequate fit in all measurement models, structural models of the relations of interest (with shyness as a control) were then tested. This two-phase approach helped diagnose model misspecification in the data (Anderson & Gerbing, 1988; Hancock & Mueller, 2006).

3. Results

3.1. Preliminary factor analyses

Table 1 presents the descriptives. Using multi-group structural equation modeling, results demonstrated no significant gender differences in any of the relations (all p's > .20). Accordingly, gender was included as a control variable.

3.1.1. Preference-for-solitude

To examine whether preference-for-solitude could be distinguished from shyness, a confirmatory factor analysis (CFA) model was constructed within Mplus 7 (Muthen & Muthen, 199–2014). Items describing preference-for-solitude ("Want to be alone more than with other kids," "Like spending time alone more than with other kids," "Would rather be with other kids than alone" (reverse), and "Would rather be alone than with others") loaded onto a preference-for-solitude factor, and items describing shyness ("Want to be with other kids but too shy," "I am very shy," and "I am too shy or timid") loaded onto a shyness factor. Results demonstrated excellent model-fit for this two-factor model (S–B $\chi^2 = 37.22$, $df = 13$, RMSEA = .06, SRMR = .05, CFI = .96). As Table 2 and Fig. 1 demonstrate, all items loaded adequately onto their respective factors (preference-for-solitude: .72 to .91; shyness: .59 to .83); correlation between the two factors was small to moderate in magnitude ($r = .26$, $p < .01$). Good latent construct reliability were also demonstrated for both preference-for-solitude ($H = .91$) and shyness ($H = .79$).

To further examine the validity of withdrawal as a multidimensional construct, a one-factor model, in which all withdrawal items loaded onto a single factor, was compared to the two-factor model. Results demonstrated poor model-fit for the one-factor model (S–B $\chi^2 = 152.77$, $df = 14$, RMSEA = .22, SRMR = .13, CFI = .78). In particular, the one-factor model exhibited significantly poorer fit compared with the two-factor model, $\Delta\chi^2_{SB}(1) = 115.55$, $p < .001$. These results provided further evidence of preference-for-solitude and shyness as unique dimensions of withdrawal in Chinese youth.

3.1.2. Negative affect and negative self-esteem

To examine the factor structure of negative affect and negative self-esteem, several confirmatory factor analysis (CFA) models were constructed within Mplus 7 (Muthen & Muthen, 1998–2014) based on previous research (e.g., García, Aluja, & del Barrio, 2008; Huang & Dong, 2013).

A measurement model was constructed in which four items loaded onto the negative affect factor ("Sad all the time," "Feel like crying every day," "Sure terrible things will happen," and "Things bother me all the time"), and four items loaded onto the negative self-esteem factor ("Nothing will ever work out for me," "All bad things are my fault," "Hate myself," and "Nobody really loves me"); the two factors were specified to correlate. Results demonstrated acceptable model-fit for this model (S–B $\chi^2 = 43.80$; $df = 17$; RMSEA = .07; SRMR = .04; CFI = .93). As demonstrated in Table 3 and Fig. 2, all items loaded highly (average = .51 to .80) onto their appropriate factors. Negative affect displayed adequate latent construct reliability ($H = .75$), as did negative self-esteem ($H = .72$). To further test the structural validity of the two-factor model, this model was compared with a one-factor model in which all items loaded onto a single factor. Compared with the two-factor model, results demonstrated a significant decrease in model-fit in the one-factor model ($\Delta\chi^2_{SB} = 65.24$, $df = 3$, $p < .001$), providing support for the distinctiveness of these depressive symptoms in Chinese youth.

3.2. Structural relations from preference-for-solitude to internalizing difficulties

To examine whether preference-for-solitude was associated with internalizing difficulties in Chinese youth, direct structural paths from preference-for-solitude to negative affect and negative self-esteem were modeled while controlling for shyness. This model exhibited adequate fit (robust RMSEA = .05; SRMR = .05; robust CFI = .95; S–B $\chi 2_{(201)} = 129.43$, $p < .01$). Controlling for preference-for-solitude, shyness was not significantly associated with negative affect ($b = .07$, $p = .31$, $z = .52$); it was also not significantly associated with negative self-esteem ($b = .02$, $p = .84$, $z = .18$).

The main aim of this study was to examine the relations between preference-for-solitude and internalizing difficulties. As seen in Fig. 3, results demonstrated that preference-for-solitude was significantly

Table 1
Estimated means, variance, and correlations ($N = 201$).

	M	Variance	Preference-for-solitude	Shyness	Negative affect
Preference-for-solitude	.10	.65			
Shyness	.18	.65	.26**		
Negative affect	.10	.05	.30*	.07	
Negative self-esteem	.11	.22	.45**	.02	.65**

* $p < .05$.
** $p < .01$.

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Table 2
Standardized factor loadings of preference-for-solitude and shyness ($N = 201$).*

Item indicators of latent factors	Loading
Preference-for-solitude	
Like spending time alone more than being with others	.91**
Spend time alone because want to be alone more than want to be with others	.88**
Would rather be alone than be with others	.72**
Would rather be with others than be alone (reversed)	.74**
Shyness	
Am very shy	.83**
Spend time alone because I want to be with others but I don't because I am too shy or afraid	.59**
I am shy	.65**

* $p < .05$.
** $p < .01$.

Table 3
Standardized factor loadings of negative affect and negative self-esteem ($N = 201$).*

Item indicators of latent factors	Loading
Negative affect	
Am sad all the time	.63**
Feel like crying every day	.78**
Sure terrible things will happen	.52**
Things bother me all the time	.51**
Negative self-esteem	
Nothing will ever work out for me	.73**
Hate myself	.50**
All bad things are my fault	.59**
Nobody really loves me	.58**

* $p < .05$.
** $p < .01$.

associated with negative affect ($b = .30$, $p < .05$, $z = 2.91$) and negative self-esteem ($b = 45$, $p < .001$, $z = 4.68$) after controlling for shyness. In other words, preference-for-solitude was significantly associated with negative affect and negative self-esteem beyond the effects of shyness in Chinese youth.

4. Discussion

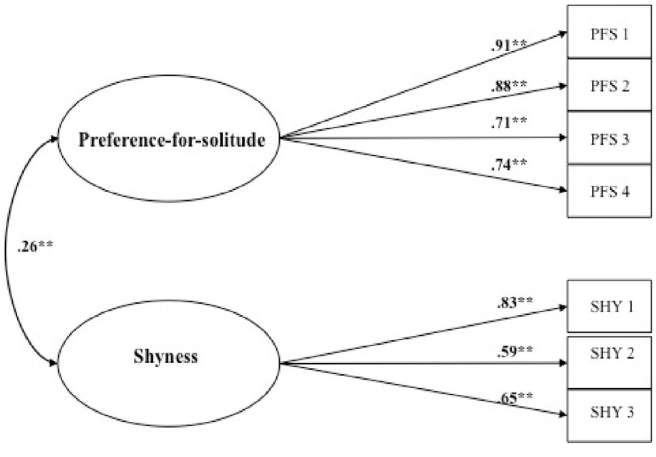
This study examined the relations between preference-for-solitude and depressive symptoms (negative affect; negative self-esteem) among young Chinese adolescents. Several findings stand out. First, as hypothesized, preference-for-solitude and shyness emerged as related but unique dimensions of withdrawal in Chinese youth. Consistent with previous research in North America and Europe (Nelson, 2012; Wang, Duong, et al., 2013; Wang, Rubin, et al., 2013), these results further demonstrate that there are several "faces" to withdrawal across development in different cultures (Rubin & Mills, 1988)—whereas some youth spend time alone because they are conflicted about approaching others, others spend time alone because they desire to be alone. Future research should consider withdrawal as a multidimensional construct across development and cultures.

Second, as hypothesized, preference-for-solitude was associated with higher negative affect and higher negative self-esteem beyond the effects of shyness in Chinese youth. These results remain consistent with past research linking withdrawal with depressive symptoms in North American and European youth (Wang, Duong, et al., 2013; Wang, Rubin, et al., 2013). Several explanations may account for these findings. Because withdrawal is viewed negatively in early adolescence (Marcoen & Goossens, 1989; Rubin et al., 2009), preferred-solitary young adolescents may internalize peers' negative views of withdrawal and come to feel negatively about themselves. Consistent with this view, Wang, Duong, et al. (2013) and Wang, Rubin, et al. (2013) found that preference-for-solitude was associated with lower perceived social competence in young American adolescents even after controlling for shyness. Similarly, Liu et al. (2014) found that preference-for-solitude was concurrently and predictively associated with low self-concepts in young Chinese adolescents.

Moreover, the need to belong increases in early adolescence. Given that withdrawn youth are often not members of peer groups (Rubin & Coplan, 2010), preferred-solitary youth may feel particularly alienated in early adolescence. Indeed, preference-for-solitude has been associated with loneliness in early adolescence across North American and European schools (e.g., Marcoen & Goossens, 1989) and Chinese schools (e.g., Liu et al., 2014).

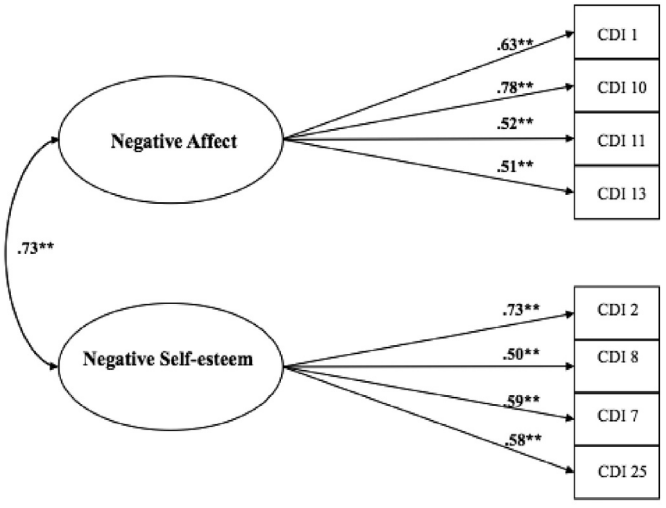
Additionally, by consistently withdrawing from social interactions, preferred-solitary adolescents may miss out on important opportunities to learn social skills. Indeed, scholars have long posited the significance of peer interaction for social skills development across cultures (Hartup & Laursen, 1999; Rubin et al., 2009). Future longitudinal research across multiple developmental periods is needed to better understand the relations between preference-for-solitude, social skills, and adjustment in different cultures.

The links between preference-for-solitude and depressive symptoms may be especially strong in collectivist societies like China, where interpersonal relationships and group harmony are heavily valued. In



Note. PFS = Preference-for-Solitude; Shy = Shyness. **$p < .01$.

Fig. 1. Standardized measurement model of preference-for-solitude and shyness.



Note. CDI= Child Depression Inventory items. **$p < .01$.

Fig. 2. Standardized measurement model of negative affect and negative self-esteem.

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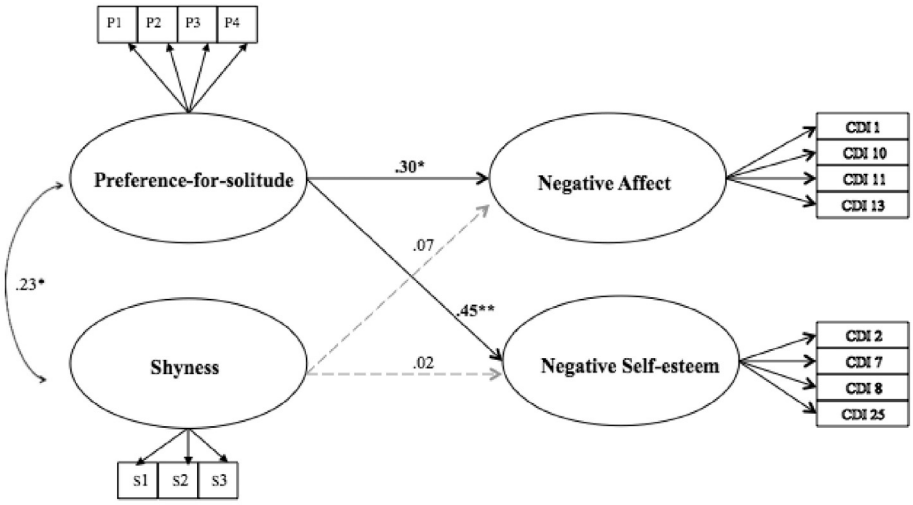

Note. *$p < 0.5$, **$p < .01$.

Fig. 3. Structural model of preference-for-solitude to negative affect and negative self-esteem.

particular, given the emphasis on social harmony and interdependence in Chinese culture (Chen, 2008; Triandis, 1995), preference-for-solitude may be viewed as anti-collectivist and thus notably maladaptive for Chinese youth. Indeed, compared with their more sociable peers, Chinese youth who prefer solitude suffer more psychological, school, and social difficulties (Chen et al., 2011; Liu et al., 2014). Future research comparing the relations of preference-for-solitude and youth adjustment between different cultures is needed to better understand these findings.

Although results of this study contribute to the extant withdrawal literature on an understudied topic in an under-explored cultural context, several limitations are worth noting. Due to the cross-sectional nature of our data, and because our analyses tested only for associative (e.g., predictive) relations among constructs, results should be viewed as temporally descriptive rather than causal. Individual trajectories of social withdrawal have been documented (Booth-LaForce & Oxford, 2008; Oh et al., 2008); it remains to be seen if similar patterns will emerge for preference-for-solitude across different cultures.

In addition, given that this study focused primarily on the broader construct of preference-for-solitude rather than the different motivations behind such preference (e.g., social avoidance motivations), results might have differed between differentially withdrawn youth. In particular, youth may prefer solitude for different reasons. Whereas some youth prefer to be alone because they enjoy solitary activities (e.g., reading, writing), others prefer to be alone because they find social interactions unpleasant (Coplan & Weeks, 2010, for a review). Research suggests that youth who actively avoid others may fare worse than their similarly preferred-solitary counterparts without such avoidance motivations (e.g., Coplan et al., 2012; Nelson, 2012). Further research is needed to determine whether different dimensions of preference-for-solitude can be reliably distinguished in youth.

Finally, all measures were derived from self-reports. Given the complexity of withdrawal, researchers examining different dimensions of withdrawal during development should utilize a multi-informant approach, such as including parent reports, peer reports, and behavioral observations, in addition to self-reports. Nevertheless, self-reports have been demonstrated to be the most reliable way to assess internal motivations like preference-for-solitude in older children and adolescents (Coplan & Weeks, 2010; Ganellen, 2007).

Limitations notwithstanding, this is the first study to directly examine preference-for-solitude among young Chinese adolescents. Results extend the extant withdrawal literature by addressing the lack of research on preference-for-solitude in non-Western contexts. Utilizing structural equation modeling, the study is also among the few to go beyond simple regression analyses in gaining a more accurate understanding of youth withdrawal. By demonstrating that preference-for-solitude puts Chinese young adolescents at risk for depressive symptoms, these findings add to the emerging evidence that preference-for-solitude is maladaptive for Chinese youth (e.g., Wang, Duong, et al., 2013). Results of this study provide further evidence that preferred-solitary Chinese youth may benefit from targeted intervention and prevention efforts. Such programs may be particularly warranted given withdrawal has long-term negative consequences for one's interpersonal relationships and adjustment across development (Rubin & Coplan, 2010). Further examinations on the implications of preference-for-solitude for adjustment across different developmental periods and cultural contexts are needed to better understand the heterogeneity of withdrawal and depression.

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Associations Between Personality and Physical Aggression in Chinese and U.S. Adolescents: The Mediating Role of Temper

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Abstract

Youth aggression is a serious global issue, but research identifying personality traits associated with aggression has focused on adults. Little is known about whether similar associations exist during adolescence; even less is known about these associations across cultures. This study examined links between personality and physical aggression in U.S. and Chinese adolescents, and tested whether temper mediates these associations. U.S. (N = 250) and Chinese (N = 199) young adolescents ($\overline{X}$ age = 13.43 years) completed self-reports describing personality, temper, and aggression. Path analyses demonstrated that temper significantly mediated associations from agreeableness and neuroticism to aggression in both samples. The mediating effect of temper was marginally stronger in the Chinese sample than in the U.S. sample, suggesting temper plays a more important role in youth

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aggression in China than in the United States. Findings highlight the universal role of affect in aggression and demonstrate the importance of cultural context in understanding links between personality and youth aggression.

Keywords
aggression, personality, temper, adolescence, culture

Youth aggression is a serious global issue (Rubin, Cheah, & Menzer, 2009). An extensive body of research has linked youth aggression to aspects of maladjustment, such as school dropout, criminal offenses, substance abuse, and mental health disorders (Rothon, Head, Klineberg, & Stansfeld, 2011). Substantial evidence from adult personality research shows that personality traits are particularly relevant for understanding individual differences in aggressive and violent behaviors (Miller & Lynam, 2001). Although much is known about what personality predicts (e.g., aggression), little is known about the mechanisms underlying these links. Cultural differences in these personality processes are poorly understood. The goal of the present study was to examine the associations between personality traits, temper, and aggressive behavior in young adolescents from the United States and China. Given that youth aggression peaks in early adolescence (Rubin et al., 2009), and because personality is highly malleable during adolescence (Shiner, 2009), such an examination is particularly relevant for identifying culturally specific and culturally consistent mechanisms of aggression.

Personality and Aggression

Substantial evidence from the adult personality literature suggests that the "Big Five" personality traits of extraversion, neuroticism, agreeableness, conscientiousness, and openness are associated with a wide range of aggressive and violent behaviors (John, Robins, & Pervin, 2008). *Agreeableness*, the tendency to be prosocial and cooperative (Graziano & Tobin, 2009), has been the strongest negative personality correlate of aggression across age groups and cultures (Miller & Lynam, 2001). Low agreeableness has been linked with bullying in youth (Bollmer, Harris, & Milich, 2006; Laursen, Hafen, Rubin, Booth-LaForce, & Rose-Krasnor, 2010; Pursell, Laursen, Rubin, Booth-LaForce, & Rose-Krasnor, 2008) and physical assaults, violent crimes, and criminal arrests in adults (Laursen, Pulkkinen, & Adams, 2002; Skeem, Miller, Mulvey, Tiemann, & Monahan, 2005). *Neuroticism*, the tendency to experience negative

emotions such as anxiety, anger, and depression (Widiger, 2009), has been tied to aggression (Miller & Lynam, 2001). High neuroticism predicts both proactive/instrumental aggression and reactive/defensive aggression (Meesters, Muris, & Van Rooijen, 2007; Widiger, 2009). *Conscientiousness*, the tendency to be responsible and dependable (John et al., 2008), has been found to be negatively associated with physical aggression in adults (Miller & Lynam, 2001) and, to a lesser extent, in adolescents (Gleason, Jensen-Campbell, & Richardson, 2004). *Openness*, the tendency to be independently minded and creative (John et al., 2008), is typically unrelated to aggressive behavior (Gleason et al., 2004). Finally, the associations between *extraversion*, the tendency to be active and sociable (John et al., 2008), and aggression are mixed (Miller & Lynam, 2001). High extraversion has been associated with both lower and higher levels of physical aggression in North American youth and adults (Sharpe & Desai, 2001), and higher levels of aggressive behavior and externalizing problems in East Asian youth (Chen, Rubin, & Li, 1995; Soga, Shimai, & Otake, 2002). Meta-analytic studies indicate that, of the five personality dimensions, agreeableness and neuroticism are the strongest predictors of aggressive and antisocial behavior (Miller & Lynam, 2001).

Personality, Aggressive Emotions, and Aggression

Although much is known about which personality traits predict aggression, much less is known about the processes underlying these links. Social-cognitive theories and models (Anderson & Bushman, 2002; Crick & Dodge, 1994) posit that personality traits are differentially related to aggressive behavior because they are related to aggressive emotions in different ways. Aggressive emotions are intense and explosive affective states that activate "hot" cognitions, such as hostility, frustration, and contempt; those displaying these emotions have been described as having a "temper" (Giesbrecht, Miller, & Müller, 2010). Social-cognitive theories suggest that personality may either enhance or inhibit the development and accessibility of aggressive emotions, thereby increasing or decreasing the likelihood of aggressive behavior. Indeed, hostility and frustration are some of the strongest predictors of aggressive and violent behaviors (Anderson & Bushman, 2002). Among adults, there is strong evidence that neuroticism and agreeableness differentially predict aggressive emotions, such that anger, contempt, and hostility are positively associated with neuroticism (Widiger, 2009) and negatively associated with agreeableness (Graziano & Tobin, 2009). Adolescents have been the focus of less personality research, but there is some evidence for similar associations (Gleason et al., 2004; Laursen et al., 2010).

It follows that aggressive emotions may mediate associations between personality and behavior. Specifically, neuroticism should increase the likelihood of aggressive behavior through its positive associations with aggressive emotions, whereas agreeableness should decrease the likelihood of aggressive behavior through its negative associations with aggressive emotions. Consistent with this claim, one study found that agreeableness was indirectly and negatively related to physical aggression through anger and hostility; neuroticism was indirectly and positively related to physical aggression through anger and hostility. (Barlett & Anderson, 2012). The participants were adults, so it remains to be seen whether similar relations exist during earlier periods of development.

Considering Culture in Personality, Aggressive Emotions (Temper), and Aggression

Culture may moderate the links between personality and aggression. Sociocultural theories (Chen & French, 2008; Rogoff, 2003) argue that social evaluations and responses are guided by cultural norms and values. Culture influences personality development and guides the evaluation and responses to these characteristics and behaviors; the same behavior or attribute may be viewed differently depending on the culture. A cultural bias toward individualism emphasizes the socialization of independence and assertiveness. Children in individualistic cultures such as the United States are taught to value the unique needs of each individual (Triandis, 1995). A cultural bias toward collectivism, by contrast, emphasizes the socialization of interdependence and social harmony (Chen & French, 2008). Children in collectivistic cultures such as China are taught to value conformity and to put the needs of others ahead of the self (Triandis, 1995).

We suspect that differences in cultural values may shape more than mean-level differences in personality traits. Differences in cultural values may also affect the links between personality and behavior. Agreeableness and neuroticism tend to be higher in China than in the United States (Ahadi, Rothbart, & Ye, 1993; Burton, Greenberger, & Hayword, 2005; McCrae, Yik, Trapnell, Bond, & Paulhus, 1998), consistent with the cultural emphasis on conformity and social harmony (Chen & French, 2008). Agreeableness enhances social harmony and relationships (McCrae & Terracciano, 2005), whereas neuroticism promotes vigilance and conformity (Fong & Yuen, 2011). There appears to be more room for interindividual variation in personality in North America than in China (Cervone & Shoda, 1999), suggesting that personality may be a stronger predictor

of aggressive behavior in the former than in the latter (Church, 2000). In other words, cultural expectations of conformity may limit individual expressions of personality in China relative to the United States, which in turn may give rise to cultural differences in associations between personality and aggression.

Culture may also moderate the mediated links between personality and aggression via aggressive, dysregulated emotions (e.g., temper). Compared with personality, temper may represent a more accurate reflection of innate temperament in Chinese cultures. Whereas societal values dictate personality (Chen & French, 2008), temper (氣) is considered a fundamental characteristic of humans to be embraced (Slingerland, 2014). Temper (or emotionally dysregulated anger) is therefore considered a "true" reflection of an internal disposition rather than a product of societal norms and expectations in China. Accordingly, the impact of personality on aggression may be entirely accounted for by temper in Chinese youth because emotionally dysregulated anger is less constricted by societal values than personality and is therefore a truer representation of internal dispositions. In contrast, temper may not account for the entire impact of personality on aggression in North American youth. Because personality development and individual uniqueness are emphasized in North American cultures, personality is likely to remain an important indicator of aggression, even after accounting for temper. Consistent with this view, Barlett and Anderson (2012) found that among North American adults, agreeableness and neuroticism remained significantly associated with aggression even after accounting for the mediating effects of aggressive emotions.

Present Study

The goal of this study was to examine the links between personality traits, temper, and physical aggression in young adolescents from the United States and China. Despite rapid urbanization, meta-analytic studies have consistently demonstrated that Chinese individuals score lower on individualism and higher on collectivism when compared with their European American counterparts (Oyserman, Coon, & Kemmelmeier, 2002). This contrast provides an ideal opportunity to examine culture-specific and universal correlates of aggressive behaviors.

In addition to specifying patterns of association in each sample, we examined the potential mediating role of temper and determined whether direct and indirect associations differed by country. Based on previous personality research (Barlett & Anderson, 2012; John et al., 2008; Miller & Lynam, 2001), we hypothesized that, across the United States and China,

(a) agreeableness and neuroticism would be associated with physical aggression; (b) temper would mediate the relation between each personality trait and physical aggression, such that agreeableness would be associated with less temper, neuroticism would be associated with greater temper, and in each case, temper would in turn be associated with greater physical aggression; and (c) culture would moderate the direct and indirect associations between personality and physical aggression, such that the mediated (indirect) effects would be stronger in the Chinese sample than in the U.S. sample.

Method

Participants

The Chinese participants were 199 eighth graders (91 boys; $\overline{X}$ age = 13.21 years) attending a single middle school in Beijing, China. All of these participants were ethnic Chinese. The percentage of youth from two-parent families was 85%. The participants were drawn from a school that served primarily middle and upper middle class neighborhoods.

The U.S. participants were 250 eighth graders (113 boys; $\overline{X}$ age = 13.43 years) attending three middle schools in the Washington, D.C., metropolitan area. The sample was diverse, with 53.9% of the adolescents self-identifying as Caucasian, 15.9% as African American, 13.3% as Asian, 11.4% as Latino/a, and 5.5% as bi- or multiracial. The percentage of youth from two-parent families was 70%. The participants were drawn from schools that served primarily middle- and upper-middle-class neighborhoods. Study characteristics did not differ significantly as a function of schools.

Procedure

Across both samples, data were collected during the spring (April-June). Participants were first contacted by telephone; if both parents and adolescents expressed interest, parental consent and adolescent assent forms were mailed to the home with preaddressed and stamped return envelopes, along with questionnaire measurements (see below).

The Western-based measures were examined and translated carefully by several members of the research team who were fluent in both English and Mandarin. The measures were then backtranslated to ensure comparability with the English versions. A variety of formal and informal strategies (e.g., repeated discussion in the research group, interviews with youth, psychometric analysis) were applied to maximize the validity of the items.

Measures

Participants completed the Big Five Inventory (BFI; John & Srivastava, 1999), a 44-item measure of five dimensions of personality: *Agreeableness* (9 items; for example, has a forgiving nature), *Conscientiousness* (9 items; for example, does things efficiently), *Extraversion* (8 items; for example, talkative), *Neuroticism* (8 items; for example, worries a lot), and *Openness* (10 items; for example, curious about many different things). Items are rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Participants completed the Youth Self Report (YSR; Achenbach, 1991), a 112-item measure on a scale of 0 (*not true*) to 2 (*very true*) that assesses behavior and adjustment. *Temper* was measured with a single item ("I have a hot temper"). Previous research has demonstrated the reliability and validity of single-item assessments of psychological constructs (Grice, Mignogna, & Badzinski, 2011; Youngblut & Casper, 1993). *Physical aggression* was measured with four items that directly assessed physically aggressive behaviors ("I destroy my own things," "I destroy things belonging to others," "I physically attack people," and "I get into many fights"; China: $\alpha = .73$; the United States: $\alpha = .72$). Temper did not load significantly on the narrowband Aggression scale in either sample, although it did load on the broadband Externalizing scale in both samples.

Plan of Analysis

Missing data were minimal. Across study variables, missingness ranged from 0.0% to 1.5% ($\overline{X} = 0.5\%$, $SD = 0.5\%$). Little's Missing Completely At Random (MCAR) test indicated that the data were missing completely at random, $\chi^2(12) = 14.74$, $p = .26$. Full information maximum likelihood (FIML) was used to handle missing data.

Multiple-group Confirmatory Factor Analyses (CFA) tested the measurement invariance of aggression and personality measures between the Chinese and U.S. samples using Mplus v7.3 (Muthén & Muthén, 1998-2014). Maximum likelihood estimation was used to derive all model parameters.

Factor loading differential item functioning (DIF) was tested for Agreeableness, Extraversion, Openness, Neuroticism, Conscientiousness, and Aggression to establish measurement invariance following the procedure described by Church and colleagues (2011). A more conservative alpha level of .01 was used in these analyses due to the number of statistical tests performed.

The latent variable in each CFA was Agreeableness, Extraversion, Openness, Neuroticism, Conscientiousness, and Aggression. The items for

the corresponding scale were the observed indicators. First, a CFA that allowed all item factor loadings to be freely estimated in both cultures was conducted. Next, a CFA that constrained all item factor loadings to be equal across cultures was conducted. A chi-square difference test was used to compare these two models. A nonsignificant chi-square difference indicates that DIF is absent. A significant chi-square difference ($p < .01$) indicates DIF is present, and thus each item should be individually tested for factor loading DIF. To do this, each item's factor loading is constrained to be equal across cultures, while the remaining items are freely estimated. A chi-square difference test comparing models with one item constrained to a model with all items freely estimated determines whether an item exhibits factor loading DIF. A nonsignificant chi-square difference indicates the item does not exhibit factor loading DIF. A significant chi-square difference indicates the item exhibits factor loading DIF, and thus the item loads differently on the factor between cultures. Item loading DIF can reflect a difference in an item's relevance to a scale between cultures. To ensure measurement invariance between cultures, items with factor loading DIF should be removed from the scale (Huang, Church, & Katigbak, 1997; Nye, Roberts, Saucier, & Zhou, 2008). Items are removed until a nonsignificant chi-square difference between a CFA with all items freely estimated and all items constrained to be equal across cultures is obtained.

Path analyses described the degree to which personality variables uniquely predicted concurrent aggression. Multiple-group mediation models were tested with Mplus v7.3 (Muthén & Muthén, 1998-2014). Statistically significant correlations between the potential mediator variable (temper) and both the predictor variable (personality) and the outcome variable (aggression) are a necessary precondition for mediation (Preacher & Hayes, 2008). Temper satisfied this precondition for Agreeableness, Neuroticism, and Conscientiousness in both samples but not for Openness or Extraversion. As a consequence, Openness and Extraversion were not tested as indirect predictors of Aggression.

Two sets of multiple-group path analyses were conducted. The first analyses identified unique associations between personality variables and Aggression, after accounting for variance attributed to Temper. Each personality variable was the predictor variable, Aggression was the outcome variable, and Temper was the mediator variable (e.g., Figure 1). Paths were included from the predictor variable (personality) to the mediator (temper) and the outcome (aggression) variables. A path was also included from the mediator variable (temper) to the outcome variable (aggression). To confirm the directionality of effects, a second set of analyses was conducted (Pursell et al., 2008). The second analyses examined an alternative model that identified unique associations between

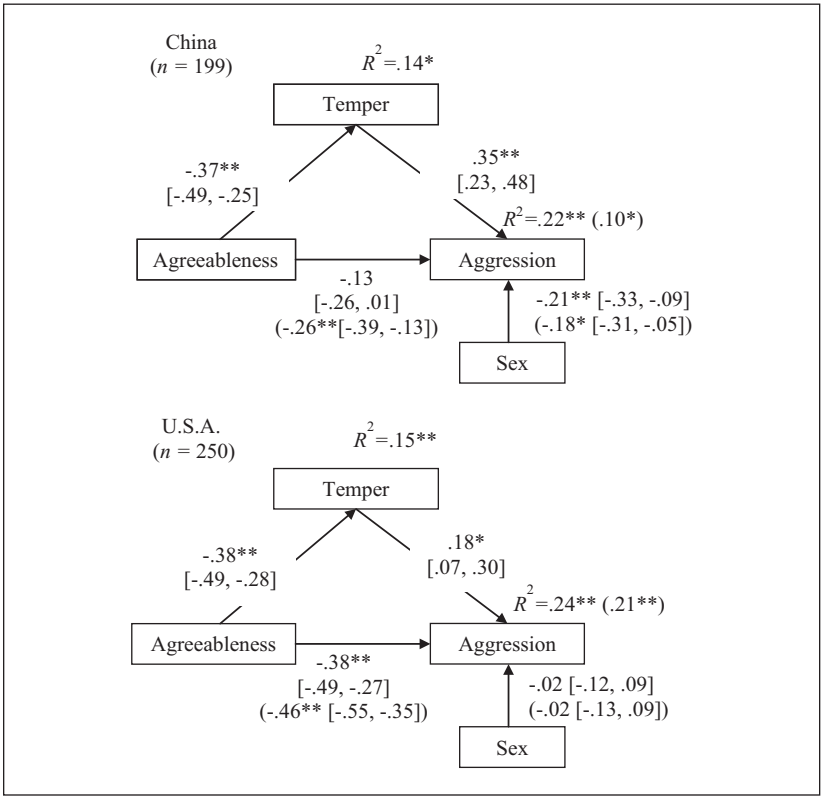

Figure 1. Direct and indirect associations from agreeableness to aggression in China and the United States.

Note. Final standardized regression weights and R^2 are reported, with initial standardized regression weights and R^2 in parentheses. The R^2 values indicate the percentage of variance accounted for in the outcome variable by the predictor variables. Brackets indicate 95% confidence intervals.

*$p < .05$. **$p < .001$, two-tailed.

Temper and Aggression, after isolating variance attributed to personality variables. Multiple-group analyses determined whether culture moderated associations. Full and partial mediation were considered. In full mediation, associations between predictor and outcome variables are rendered nonsignificant by the inclusion of a mediator variable (Preacher & Hayes, 2008). In partial mediation, the inclusion of a mediator variable reduces but does not eliminate associations between the predictor and outcome variable. Because boys tend to display greater physical aggression than girls (Card, Stucky, Sawalani, & Little,

2008), gender was included as a control on aggression in all analyses. Gender differences were also considered in separate multiple-group analyses, wherein gender was removed from the model as a control and instead treated as a multiple-group moderator.

Three fit indices were used to assess how well the model fit the data: the chi-square value (χ^2), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The χ^2 should be small and nonsignificant, CFI should exceed .90 and preferably .95, and RMSEA should be less than .08.

Results

Determining Cross-Cultural Measurement Invariance

Final item factor loadings for each of the personality traits are described in Table 1. To evaluate the equivalence of the measures of Agreeableness, Extraversion, Openness, Neuroticism, Conscientiousness, and Aggression across the Chinese and U.S. samples, multiple-group CFAs were conducted. Freely estimated and constrained CFAs were compared using the chi-square difference criterion outlined by Church and colleagues (2011). The 9-item Agreeableness, $\Delta\chi^2(9) = 15.78$, $p > .01$; 8-item Extraversion, $\Delta\chi^2(8) = 11.35$, $p > .01$; 10-item Openness, $\Delta\chi^2(10) = 8.40$, $p > .01$; and 4-item Aggression, $\Delta\chi^2(3) = 3.62$, $p > .01$, factors were similar across cultures. The 8-item scale of Neuroticism was significantly different across cultures, $\Delta\chi^2(8) = 24.38$, $p < .01$. DIF was detected in a single item: "Can be tense," $\chi^2(1) = 11.75$, $p < .001$. After removing this item, the Neuroticism factor loaded similarly across cultures, $\Delta\chi^2(7) = 14.55$, $p > .01$. The 9-item scale of Conscientiousness was significantly different across cultures, $\Delta\chi^2(9) = 38.59$, $p < .01$. DIF was detected in two items: "Tends to be disorganized," $\chi^2(1) = 15.07$, $p < .001$, and "Tends to be lazy," $\chi^2(1) = 13.84$, $p < .001$. After removing these items, the Conscientiousness factor loaded similarly across cultures, $\Delta\chi^2(7) = 17.20$, $p > .01$.

Reliabilities for most traits were adequate after establishing measurement invariance. For the Chinese sample, Cronbach's $\alpha = .72, .71, .69, .63, .71$, and .73 for Agreeableness, Extraversion, Openness, Conscientiousness, Neuroticism, and Aggression, respectively. For the U.S. sample, Cronbach's $\alpha = .83, .82, .69, .73, .79$, and .72 for Agreeableness, Extraversion, Openness, Conscientiousness, Neuroticism, and Aggression, respectively. The reliability for Conscientiousness was unacceptably low in the Chinese sample ($\alpha = .63$). As a consequence, Conscientiousness was not tested as an indirect predictor of Aggression; only Agreeableness and Neuroticism were tested as indirect predictors of Aggression. Bivariate correlations, means, and standard deviations of variables are presented by country in Table 2.

Table 1. Final Factor Loadings From Multiple-Group CFA: U.S. and Chinese Samples.

	The United States	China
Personality variable/item	*B* (*SE*)	*B* (*SE*)
Agreeableness		
Tends to find fault with others	.42 (.06)	.52 (.07)
Is helpful and unselfish with others	.62 (.05)	.57 (.06)
Starts quarrels with others (reversed)	.49 (.05)	.41 (.07)
Has a forgiving nature	.70 (.04)	.63 (.06)
Is generally trusting	.67 (.04)	.51 (.07)
Is cold and distant (reversed)	.56 (.05)	.13 (.09)
Is considerate and kind to almost everyone	.68 (.04)	.72 (.05)
Is sometimes rude to others (reversed)	.49 (.05)	.33 (.08)
Likes to cooperate with others	.71 (.04)	.34 (.08)
Neuroticism		
Is depressed, blue	.64 (.05)	.74 (.05)
Is relaxed, handles stress well (reversed)	.48 (.07)	.48 (.07)
Worries a lot	.75 (.04)	.76 (.05)
Is emotionally stable and not easily upset (reversed)	.49 (.06)	.27 (.08)
Can be moody	.59 (.05)	.40 (.07)
Remains calm in tense situations (reversed)	.47 (.06)	.35 (.07)
Gets nervous easily	.61 (.05)	.46 (.07)
Extraversion		
Is talkative	.61 (.04)	.57 (.06)
Is reserved (reversed)	.38 (.06)	.35 (.08)
Is full of energy	.58 (.05)	.38 (.08)
Generates a lot of enthusiasm	.60 (.05)	.58 (.06)
Tends to be quite (reversed)	.72 (.04)	.55 (.07)
Has an assertive personality	.40 (.06)	.37 (.07)
Is sometimes shy and inhibited (reversed)	.66 (.04)	.35 (.08)
Is outgoing and sociable	.85 (.03)	.70 (.06)
Conscientiousness		
Does a thorough job	.66 (.04)	.54 (.07)
Can be somewhat careless (reversed)	.45 (.05)	.13 (.09)
Is a reliable worker	.55 (.06)	.33 (.08)
Perseveres until the task is finished	.36 (.06)	.57 (.07)
Does things efficiently	.69 (.04)	.65 (.07)
Makes plans and follows through with them	.69 (.04)	.56 (.07)
Is easily distracted (reversed)	.26 (.06)	.27 (.08)

(continued)

Table 1. (continued)

Personality variable/item	The United States *B* (*SE*)	China *B* (*SE*)
Openness		
Is original, comes up w/new ideas	.63 (.05)	.69 (.06)
Is curious about many different things	.46 (.06)	.37 (.07)
Is a creative problem solver and a deep thinker	.52 (.06)	.70 (.06)
Has an active imagination	.66 (.05)	.64 (.05)
Is inventive	.63 (.05)	.72 (.05)
Values artistic, aesthetic experiences	.54 (.06)	.41 (.08)
Prefers work that is routine (reversed)	−.17 (.07)	−.04 (.08)
Likes to reflect, play with ideas	.54 (.06)	.40 (.08)
Has few artistic interests (reversed)	.34 (.07)	.13 (.09)
Is sophisticated in art, music, or literature	.40 (.06)	.39 (.07)

Note. China $N = 199$, the United States $N = 250$. Estimates are standardized factor loadings. CFA = confirmatory factor analysis.

Associations Between Agreeableness and Aggression

Figure 1 summarizes the results for Agreeableness and Aggression. The moderated mediated model fit the data, $\chi^2(2) = 1.46$, $p = .48$, CFI = 1.00, RMSEA = .00. The initial model revealed direct links between Agreeableness and Aggression within each country. Subsequent analyses indicated that Temper mediated this association for both samples. In each case, greater Agreeableness was linked to less Temper, and less Temper was in turn associated with less Aggression. Including Temper eliminated the initial association between Agreeableness and Aggression in the Chinese sample, indicating full mediation (Sobel $z = 3.99$, $p < .001$). Including Temper attenuated the association between Agreeableness and Aggression in the U.S. sample, indicating partial mediation (Sobel $z = 2.83$, $p < .05$).

To determine cross-cultural differences in the mediated association between Agreeableness and Aggression, the path from Agreeableness to Aggression through Temper was constrained to be equal across samples. This mediated path was marginally stronger in the Chinese sample than the U.S. sample, $\chi^2(1) = 2.82$, $p = .09$. When including Temper as the mediator, the association between Agreeableness and Aggression remained significant and negative in the U.S. sample only.

Table 2. Intercorrelations, Means, and Standard Deviations.

	Intercorrelations																
	China/the United States							Total sample						China		The United States	
Variable	1	2	3	4	5	6	7	1	2	3	4	5	6	$\overline{X}$	*SD*	$\overline{X}$	*SD*
1. Openness	—	.33**	.23**	.29**	−.20**	.01	−0.06	—						3.81[b]	0.56	3.70[a]	0.55
2. Conscientiousness	.23**	—	.31**	.52**	−.45**	−.16*	−.21**	.24**	—					3.18[a]	0.63	3.59[b]	0.66
3. Extraversion	.33**	.14*	—	.32**	−.30**	.00	−.13*	.24**	.29**	—				3.39[a]	0.72	3.72[b]	0.72
4. Agreeableness	.27**	.30**	.21**	—	−.53**	−.38**	−.46**	.26**	.45**	.29**	—			3.71[a]	0.64	3.92[b]	0.65
5. Neuroticism	−.20**	−.42**	−.34**	−.56**	—	.31**	.25**	−.18**	−.46**	−.35**	−.55*	—		2.84[b]	0.79	2.55[a]	0.81
6. Temper	.06	−.18*	.17*	−.37**	.41**	—	.33**	.04	−.19**	.06	−.38**	.36**	—	0.58	0.70	0.46	0.69
7. Aggression	.05	−.03	.17*	−.26**	.21**	.39**	—	.00	−.14**	.00	−.37**	.24**	.36**	0.19	0.34	0.15	0.31

Note. China $N = 199$, the United States $N = 250$. Values below the diagonal reflect the Chinese sample; values above the diagonal reflect the U.S. sample. Superscripts indicate statistically significant differences between samples in *t* tests.

[a]Smaller mean.

[b]Larger mean.

*$p < .05$. **$p < .001$, two-tailed.

Associations Between Neuroticism and Aggression

Figure 2 summarizes the results for Neuroticism and Aggression. The moderated mediated model fit the data, $\chi^2(2) = 2.85$, $p = .24$, CFI = .99, RMSEA = .04. The initial model revealed direct links between Neuroticism and Aggression within each country. Subsequent analyses indicated that Temper significantly mediated this association for both samples. In each case, greater Neuroticism was linked to more Temper, which in turn was linked to more Aggression. Including Temper eliminated the initial positive association between Neuroticism and Aggression in the Chinese sample, indicating full mediation (Sobel $z = 4.26$, $p < .05$). Including Temper attenuated the initial positive association between Neuroticism and Aggression in the U.S. sample, indicating partial mediation (Sobel $z = 3.44$, $p < .001$).

To determine cross-cultural differences in the mediated association between Neuroticism and Aggression, the path from Neuroticism to Aggression through Temper was constrained to be equal across both samples. This mediated path was marginally stronger in the Chinese sample than the U.S. sample, $\chi^2(1) = 3.08$, $p = .08$. When including temper as the mediator, the association between Neuroticism and Aggression remained significant and positive in the U.S. sample only.

Supplemental Analyses

The same pattern of results emerged when YSR subscales of withdrawal, anxiety/depression, social problems, thought problems, and attention problems were separately added to the models as controls. The same pattern of results emerged when age, ethnicity, mother's level of education, and father's level of education were included in the model. The same pattern of results emerged when controlling for sex on all variables in the model. To test for gender differences, gender was removed from the model as a control and instead treated as a multiple-group moderator. The models were reanalyzed separately by gender for each country. The same pattern of results emerged across genders for both samples.

To confirm the direction of effects, Agreeableness and Neuroticism were tested as mediators of the association between Temper and Aggression. Model fit was adequate when Agreeableness was treated as the mediator, $\chi^2(2) = 1.72$, $p = .42$, CFI = 1.00, RMSEA = .00, but agreeableness failed to mediate associations between Temper and Aggression across cultures (Chinese: initial $\beta = .40$, final $\beta = .36$; the United States: initial $\beta = .33$, final $\beta = .18$). Model fit was inadequate when Neuroticism was treated as the mediator, $\chi^2(2) = 5.25$, $p = .07$, CFI = .98, RMSEA = .09, and Neuroticism

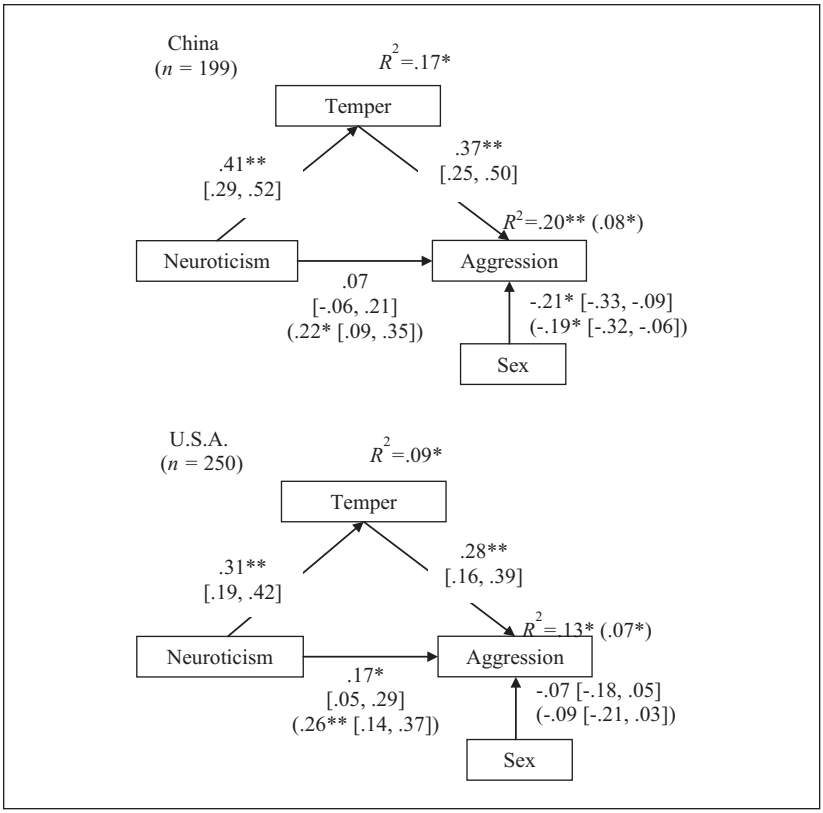

Figure 2. Direct and indirect associations from neuroticism to aggression in China and the United States.

Note. Final standardized regression weights and R^2 are reported, with initial standardized regression weights and R^2 in parentheses. The R^2 values indicate the percentage of variance accounted for in the outcome variable by the predictor variables. Brackets indicate 95% confidence intervals.

*$p < .05$. **$p < .001$, two-tailed.

also failed to mediate the associations between Temper and Aggression across cultures (Chinese: initial $\beta = .40$, final $\beta = .37$; the United States: initial $\beta = .33$, final $\beta = .28$).

Discussion

The overall goal of this study was to examine the relations between personality traits (agreeableness and neuroticism), temper, and physical aggression in

young adolescents in the United States and China. As hypothesized and consistent with previous research (Miller & Lynam, 2001), agreeableness and neuroticism were significantly associated with aggression. In each case, lower agreeableness and higher neuroticism were tied to higher aggression. Also as hypothesized, temper significantly mediated the effects of agreeableness and neuroticism on aggression. Greater agreeableness was associated with less temper, which in turn was associated with less aggression. As well, greater neuroticism was associated with more temper, which in turn was associated with more aggression. These results replicate previous findings with adults that aggressive emotions like anger and hostility significantly mediate the effects of agreeableness and neuroticism on physical aggression (Zalewski, Lengua, Wilson, Trancik, & Bazinet, 2011).

Unique to the present study is the examination of cultural differences in the associations between personality and physical aggression. Although agreeableness and neuroticism were significantly associated with aggression in both the United States and China, these relations were stronger in North American youth than in Chinese youth. These differences in associations may be due to differences in cultural values. Chinese cultures value interdependence and social harmony (Triandis, 1995). Because agreeableness and neuroticism enhance relationships and promote conformity, Chinese youth and adults tend to score high on agreeableness and neuroticism (Ahadi et al., 1993; Burton et al., 2005). It follows that agreeableness and neuroticism may thus be more reflective of societal expectations than of internal dispositions. By contrast, North American cultures value independence and self-expression—Personality is viewed as a unique and important representation of the self (Triandis, 1995). Accordingly, levels of agreeableness and neuroticism tend to vary widely across North Americans (Cervone & Shoda, 1999). In this view, personality may be a stronger predictor of aggression in North American youth compared with Chinese youth. These findings support previous research demonstrating that personality is more relevant to outcomes in North American cultures compared with East Asian cultures (Masuda et al., 2008).

Also unique to the present study are findings suggesting that culture moderates the mediating effects of temper on personality and aggression. Although temper significantly mediated the relations from agreeableness and neuroticism to aggression across both countries, the mediated effect was weaker in the United States and stronger in China; whereas both temper and personality traits were significant correlates of aggression in the United States, only temper was a unique correlate of aggression in China. Cultural differences in views of temper may help account for these differences. Temper is considered a fundamental part of humanity in East Asian cultures;

it is among the core characteristics of what it means to be human among Chinese individuals (Slingerland, 2014). Accordingly, temper is seen as a more relevant representation of individual disposition in Chinese cultures compared with personality traits, which are considered to reflect societal norms. By contrast, given the emphasis of individual uniqueness and self-expression in North American cultures (Triandis, 1995), temper is viewed as just one of the many other internal attributes that contribute to behavior—It is just as important as personality in explaining interindividual differences in North American cultures. From these perspectives, whereas temper may contribute uniquely to Chinese youth's aggression beyond the effects of personality, it may be less uniquely predictive of aggression among North American youth. In other words, the effects of agreeableness and neuroticism on aggression may be fully accounted for by temper in Chinese youth, whereas the impact of these traits likely remains significant even after accounting for temper in North American youth. Together, findings from this research replicate previous research on agreeableness, neuroticism, aggressive emotions, and aggression among adults (e.g., Barlett & Anderson, 2012), and highlight the importance of exploring the dynamic processes between personality, temper, and culture in understanding the heterogeneity of aggression across development.

Study Limitations and Research Implications

This study is not without limitations. First, the cross-sectional nature of this study precludes conclusions about the direction of influence. Although we hypothesized the direction of influence in both the United States and China to primarily follow the pattern of flow from broader, stable traits (agreeableness and neuroticism) to more specific affective processes (temper), bidirectional associations among broad affective traits and social-cognitive processes are possible. Although we did not find traits to better mediate associations between temper and youth aggression, this does not mean temper cannot precede traits to influence behavior. Future longitudinal research is needed to provide clarity on these relations.

Second, only physical aggression was examined in this study. Given that there are many subtypes of aggression (Barlett & Anderson, 2012), it would be interesting to see whether personality and temper would be similarly related to different types of aggression and whether these relations would differ as a function of culture. Nevertheless, given that physical aggression often has much more severe consequences for individuals and societies compared with other forms of aggression (Connor, 2012), the results of this study provide important insights for understanding the global issue of youth violence.

Relatedly, although we did not find significant gender differences in our research models across both samples, much research has demonstrated significant gender differences in different dimensions of aggression. For instance, whereas physical aggression is more typical in boys, relational aggression is more salient in girls (Card et al., 2008; Crick, 1997). Future research on gender differences across different aggression dimensions is needed to better understand the heterogeneity of aggression.

Furthermore, temper was measured with only one item. Although research has demonstrated the reliability and validity of using single-item measures (Grice et al., 2011; Youngblut & Casper, 1993), a broader range of items would have yielded a more comprehensive measure of temper. Future research is needed to replicate the findings of this study with a broader measure of temper.

Moreover, this study did not directly assess individualism and collectivism. Although research has shown that the Chinese culture remains higher on collectivism and lower on individualism relative to North American and European countries in spite of recent advances in industrialization (Oyserman et al., 2002), future research that incorporates direct measures of individualism and collectivism will better elucidate the role that culture plays in the links between individual characteristics and aggression.

Along similar lines, temper was the only mediator examined in this study. Given the complexity of aggression, other mediators are likely involved. Future research on potential mediators of the links between personality and aggression (e.g., relationship quality, relationship partner; Dishion & Piehler, 2009) will yield a more comprehensive understanding of the mechanisms underlying individual characteristics and aggressive behavior.

Finally, all measures were derived from self-reports. Given the complexity of youth aggression, researchers examining aggression during development should utilize a multi-informant approach, such as including parent reports, peer reports, and behavioral observations, in addition to self-reports. Nevertheless, self-reports have been demonstrated to be the most reliable form of measure for assessing individual characteristics such as personality and emotions in adolescents and adults (Kazdin, 1986).

Clinical and Policy Implications

The findings of this study provide several important clinical and policy implications. First, given that agreeableness and neuroticism were both associated with physical aggression in the U.S. and Chinese samples, special consideration should be paid to intraindividual traits for understanding the heterogeneity of aggression. Given that traits are relatively stable across development

and that temper significantly mediated the effects of agreeableness and neuroticism on youth aggression in both the United States and China, interventions aimed at increasing emotion regulation in youth may prove fruitful for decreasing the prevalence of physical aggression across cultures. Indeed, recent evidence has shown that emotion regulation can be trained and that changes in emotion regulation can lead to changes in subsequent behavior (John et al., 2008).

Importantly, findings suggest it may be fruitful to tailor interventions to specific cultures. In particular, given that both temper and the traits of agreeableness and neuroticism were unique correlates of physical aggression in the U.S. sample, combining interventions that modify personality and those that modify emotion regulation may prove especially effective for this population. In contrast, given that temper completely eliminated the effects of agreeableness and neuroticism on physical aggression in the Chinese sample, interventions that directly modify emotion regulation may prove more effective than interventions that attempt to modify personality, particularly given the culture's emphasis on self-control and self-regulation.

Declaration of Conflicting Interest

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Preference-for-Solitude and Adjustment Difficulties in Early and Late Adolescence

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Social withdrawal has been associated with adjustment difficulties across development. Although much is known about shyness, little is known about preference-for-solitude; even less is known about its relations with adjustment across different periods of adolescence. We examined whether preference-for-solitude might be differentially associated with adjustment difficulties in early and late adolescence. Self- and parent-reports of withdrawal motivations and adjustment were collected from 234 eighth graders (113 boys; *M* age = 13.43) and 204 twelfth graders (91 boys; *M* age = 17.25). Results from structural equation modeling demonstrated that above and beyond the effects of shyness, preference-for-solitude was more strongly associated with adjustment difficulties in 8th grade than in 12th grade. Preference-for-solitude was associated with greater anxiety/depression, emotion dysregulation, and lower self-esteem in 8th grade; these relations were not found in 12th grade. Although preference-for-solitude was associated with lower social competence in both 8th and 12th grades, this relation was significantly stronger in 8th grade than in 12th grade. Findings suggest preference-for-solitude has closer ties to maladjustment in early adolescence than in late adolescence. Interventions targeting preferred-solitary youth in early adolescence may be particularly fruitful.

A significant number of adolescents struggle with psycho emotional difficulties; these difficulties come with considerable personal and societal costs (Wolfe & Mash, 2008). Social withdrawal, the behavior of consistently withdrawing oneself from the peer group (Rubin & Coplan, 2004), has been linked with such internalizing difficulties as anxiety and depression in childhood and adolescence (see Rubin & Coplan, 2010, for a review). Despite these findings, the risks associated with withdrawal may depend on the underlying motivations; different outcomes have been found for youth with differing combinations of social approach and social avoidance motivations (Bowker, Markovic, Cogswell, & Raja, 2012; Bowker & Raja, 2011; Thijs, Koomen, de Jong, van der Leij, & van Leeuwen, 2004). *Shyness* consists of high approach and high

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avoidance motivations (Asendorpf, 1990, 1993); shy youth are interested in interacting with others but withdraw because they are socially anxious. *Unsociability* consists of low approach and low-to-average avoidance motivations; though they do not actively avoid interacting with others, unsociable youth withdraw due to a preference for solitary activities. *Avoidance* consists of low approach and high avoidance motivations; in addition to a preference for solitary activities, avoidant youth also actively avoid others. Thus, in regards to approach motivation, both unsociability and avoidance are marked by low approach motivation or a preference for solitary activities. From this view, unsociability and avoidance fall under the broader construct of preference-for-solitude (see Figure 1).

Although shyness has been associated with maladjustment across development (Rubin & Coplan, 2010), little is known about the implications of preference-for-solitude for adjustment, particularly during adolescence. Of the limited research conducted, preference-for-solitude appears to be maladaptive in early adolescence. Marcoen and Goossens (1989) found that an affinity for aloneness was associated with loneliness and fewer intimate friends in early adolescence. Coplan et al. (2012) found that low approach motivation was associated with socially withdrawn behaviors in young adolescents, which in turn predicted peer difficulties. Bowker and colleagues (Bowker et al., 2011; Bowker & Raja, 2012) found that both unsociability and avoidance were associated with peer rejection in young adolescents. Because researchers have yet to examine preference-for-solitude beyond early adolescence, however, it is not known whether preference-for-solitude is maladaptive *across* adolescence. Given there are considerable developmental differences between early and late adolescence (Laursen & Collins, 2009), preference-for-solitude may be differentially associated with adjustment at these different time points.

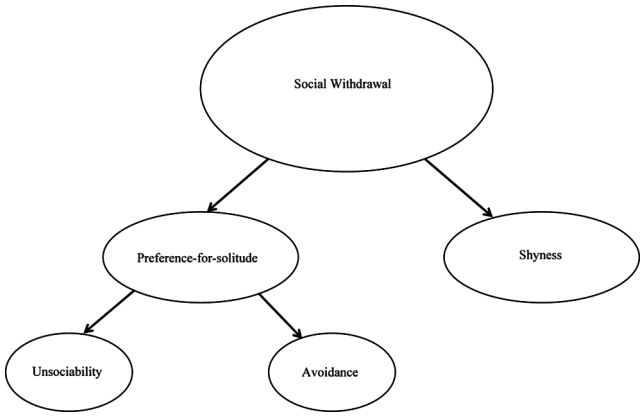

FIGURE 1 Conceptual model of preference-for-solitude.

Younger and older adolescents differ in the importance they place on solitude. In particular, solitude is viewed negatively in early adolescence— young adolescents find time alone aversive and hold negative views toward solitude and withdrawn behaviors (Larson, 1990; Rubin & Coplan, 2010). In contrast, solitude becomes more acceptable in late adolescence (Coplan & Weeks, 2010)—older adolescents not only spend more time alone compared with younger adolescents but also report such solitude as more positive and more important (Goossens & Marcoen, 1999; Larson, 1990).

These developmental differences may affect how preference-for-solitude relates to adjustment between early and late adolescence. Given the negative views of solitude in early adolescence, preferred-solitary youth may feel less self-assured when comparing themselves with their more sociable peers. Indeed, although little is known about the self-perceptions of preferred-solitary youth, shy youth have been found to report lower self-perceptions than non-shy youth during early adolescence (Rubin, Bowker, & Gazelle, 2010). As well, given the negative perceptions of solitude in early adolescence, young adolescents who prefer solitude may also be at risk for peer maltreatment and subsequent maladjustment (Rubin et al., 2009). Indeed, preference-for-solitude has been associated with peer difficulties in early adolescence (Bowker & Raja, 2011; Coplan et al., 2012).

In contrast, because solitude becomes more salient and normative in late adolescence (Coplan & Weeks, 2010), preference-for-solitude may be less associated with peer maltreatment and subsequent maladjustment during this period. Indeed, Freeman, Csikszentmihalyi, and Larson (1986) asked adolescents to rate changes in their affective states over the previous years. They found that older adolescents not only reported an increased need and desire to be alone but also reported solitude as less socially stigmatizing and less alienating than they had before. Similar results have been found in other studies (Goossens & Marcoen, 1999; Larson, 1990). Although these developmental possibilities provide important insights for understanding adolescent psychopathology, they remain to be empirically substantiated.

Given the aforementioned gaps in research, the overall goal of this study was to examine the unique relations between preference-for-solitude and psychoemotional adjustment in early and late adolescence. Specifically, because shyness has been strongly associated with internalizing difficulties across development (Rubin & Coplan, 2010), we examined the unique contribution of preference-for-solitude to internalizing difficulties (anxiety/depression, emotion dysregulation, social competence, and self-esteem) across adolescence. We hypothesized that (a) preference-for-solitude would

emerge as a distinct construct from shyness across adolescence and (b) preference-for-solitude would be more strongly associated with internalizing difficulties above and beyond the effects of shyness for younger adolescents (8th graders) than for older adolescents (12th graders). Given it is currently unknown whether all youth who prefer solitude across adolescence might benefit from or even require intervention, our results would provide much-needed knowledge on the heterogeneity of withdrawal.

METHOD

Participants

The sample consisted of 234 eighth graders (113 boys; *M* age = 13.43) and 204 twelfth graders (91 boys; *M* age = 17.25) from public middle and high schools in the greater Washington, DC, area. The sample was ethnically diverse, with 53.9% of the adolescents self-identifying as European American, 15.9% as African American, 13.3% as Asian, 11.4% as Latino/a, and 5.5% as bi- or multiracial.

Available demographic information classified the majority of the sample as middle to upper-middle class. Statistical comparisons (analysis of variance) did not reveal significant grade differences in socioeconomic status or gender.

Procedure

Across 8th and 12th grades, data were collected during the spring (April–June) of the school year. Participants were first contacted by telephone; if both parents and adolescents expressed interest, an informational letter, parental consent form, and adolescent assent form were mailed to the home (consent rate = 84%).

Depending on participant preference, packets of questionnaires were mailed home (87% of the sample) or a link to a secure website was sent via e-mail (13% of the sample). Statistical comparisons (analysis of variance) did not reveal significant demographic differences or differences in any of the study variables among participants who completed the questionnaires in these different contexts.

Measures

Preference-for-solitude and shyness. Preference-for-solitude and shyness were measured using items on the Social Withdrawal Scale (SWS; Terrell-Deutsch, 1999) and the Youth Self Report (YSR; Achenbach & Rescorla, 2001). The SWS is a self-report of withdrawal on a scale that ranges from 0 (*not at all true*) to 5 (*always true*). The YSR is a self-report of youth adjustment on a scale that ranges from 0 (*not true*) to 2 (*very often true*). Items were standardized and subjected to exploratory factor analyses separately in the 8th and 12th grades (see the Results section).

Preference-for-solitude consisted of 4 item indicators (three SWS items and one YSR item; "I like spending time alone more than being with other kids," "I would rather be with other kids than be alone" [reversed], "I spend time alone because I want to be alone more than I want to be with other kids," and "I would rather be alone than with others"). Internal reliability was acceptable ($\alpha = 0.72$, 8th grade; $\alpha = 0.79$, 12th grade).

Shyness consisted of a scale indicator (two SWS items and one YSR item; "I am shy," "I spend time alone because I want to be with other kids but I don't because I'm too shy or afraid," and "I am too timid or shy"). Internal reliability was acceptable ($\alpha = 0.76$, 8th grade; $\alpha = 0.75$, 12th grade).

Anxiety/depression. Anxiety/depression was measured using established subscales from the YSR (Achenbach & Rescorla, 2001) and the Child Behavioral Checklist (CBCL; Achenbach & Rescorla, 2001). The CBCL is a parent-report measure, similar to the YSR, that assesses youth adjustment on a scale that ranges from 0 (*not true*) to 2 (*very often true*).

The anxiety/depression consisted of a self-report scale indicator (12 YSR items: e.g., "I cry a lot," "I feel worthless or inferior," "I am nervous or tense," "I worry a lot") with good internal reliability ($\alpha = 0.82$, 8th grade; $\alpha = 0.84$, 12th grade) and a parent-report scale indicator (12 CBCL items: e.g., "My child cries a lot," "My child feels worthless or inferior," "My child is nervous, high strung, or tense," "My child worries") with good internal reliability ($\alpha = 0.80$, 8th grade; $\alpha = 0.78$, 12th grade).

Emotion dysregulation. Emotion dysregulation consisted of three CBCL item indicators ("My child tends to be emotional," "My child reacts intensely when upset," and "My child gets upset easily"). Internal reliability was acceptable ($\alpha = 0.72$, 8th grade; $\alpha = 0.86$, 12th grade).

Social competence and self-esteem. Social competence and self-esteem were measured using the Self-Perception Profile for Adolescents (SPPA; Harter, 1988) in 8th grade and the Self Perception Profile for College Students (SPPCS; Neemann & Harter, 1986) in 12th grade. The SPPA and the SPPCS assess youth' self-perceptions self-esteem; only similarly worded items

between SPPA and SPPC were used to ensure measurement invariance across grades.

Social competence consisted of two item indicators drawn from the Social Competence subscales of the SPPA and the SPPCS (''Able to make friends easily'' and ''Feel socially accepted by many''). Internal reliability was acceptable ($\alpha = 0.70$, 8th grade; $\alpha = 0.67$, 12th grade) for measures consisting of two items (Burisch, 1997).

Self-esteem consisted of five item indicators drawn from the Global Self-Worth subscales of the SPPA and the SPPCS (''Like the kind of person they are,'' ''Like the way they are leading their lives,'' ''Pleased with themselves,'' ''Happy being the way they are,'' and ''Usually satisfied with themselves''). Internal reliability was acceptable ($\alpha = 0.85$, 8th grade; $\alpha = 0.84$, 12th grade).

Plan of Analysis

To assess whether there were gender or ethnic group differences in the relations between preference-for-solitude and outcomes, several multigroup structural equation modeling analyses were conducted within Mplus 7 (Muthén & Muthén, 1998–2010). Results did not differ as a function of gender or ethnicity, so each was omitted from the final model. There were no statistically significant grade differences in variance across all latent constructs.

To address our research question of whether preference-for-solitude would be more strongly associated with outcomes in early than late adolescence, a measurement model of indicators to latent factors was first tested, followed by a structural model testing the relations of interest (with shyness as a control variable). This two-phase approach represents an optimal way to ensure data-model fit (Anderson & Gerbing, 1988; Hancock & Mueller, 2006). Comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square (SRMR) were used for model-fit assessments. Model-fit comparisons were conducted using a chi-square difference test.

On average, 0.0 to 7.1% of the data were missing across all variables; Little's MCAR test (Little & Rubin, 1987) revealed that these data were missing completely at random. Full information maximum likelihood was used to address missingness; this procedure is a robust and accurate estimator of results in small samples (Hancock & Mueller, 2006).

RESULTS

Preliminary Factor Analyses

Descriptives are presented in Table 1. To examine whether preference-for-solitude could be distinguished from shyness in early and late adolescence, scores on the SWS and YSR items were first standardized and subjected to exploratory factor analyses using principal-axis factoring with oblique rotation (due to the anticipation of factor intercorrelations; Preacher & MacCallum, 2003) separately in the 8th and 12th grades. Table 2 shows that a two-factor solution was the most appropriate in both grades, providing evidence that shyness and preference-for-solitude were related but unique constructs.

Next, to examine the structural validity of this two-factor model, we conducted separate confirmatory factor analyses comparing the two-factor model with the one-factor model within each grade. The one-factor model exhibited significantly poorer fit compared with the two-factor model in both the 8th grade, $\Delta\chi^2(1) = 74.32$, $p < .001$, and 12th grade, $\Delta\chi^2(1) = 90.53$, $p < .001$, providing further evidence of shyness and preference-for-solitude as unique dimensions of withdrawal.

TABLE 1
Estimated Means, Variance, and Correlations for All Latent Constructs

	M	*Variance*	*Preference-for-Solitude*	*Shyness*	*Anxiety/Depression*	*Emotion Dysregulation*	*Social Competence*
Preference-for-Solitude	.12 (8th)	.24 (8th)					
	.28 (12th)	.53 (12th)					
Shyness	.18 (8th)	.36 (8th)	.52 (8th)				
	.41 (12th)	.57 (12th)	.47 (12th)				
Anxiety/Depression	.85 (8th)	.35 (8th)	.76 (8th)	.59 (8th)			
	.88 (12th)	.41 (12th)	.14 (12th)	.37 (12th)			
Emotion Dysregulation	.03 (8th)	.14 (8th)	.35 (8th)	.21 (8th)	.61 (8th)		
	.27 (12th)	.30 (12th)	.14 (12th)	.11 (12th)	.56 (12th)		
Social Competence	−.46 (8th)	.32 (8th)	−.63 (8th)	−.62 (8th)	−.43 (8th)	−.34 (8th)	
	−.59 (12th)	.29 (12th)	−.46 (12th)	−.53 (12th)	−.21 (12th)	−.17 (12th)	
Self-Esteem	−.36 (8th)	.33 (8th)	−.43 (8th)	−.41 (8th)	−.46 (8th)	−.32 (8th)	.66 (8th)
	−.40 (12th)	.25 (12th)	−.24 (12th)	−.25 (12th)	−.16 (12th)	−.21 (12th)	.64 (12th)

Note: $N = 234$ 8th graders, 204 12th graders. All correlations were significant at $p < .05$.

TABLE 2
Results of Principal Axis Factor Analysis of the Preference-for-Solitude and Shyness Items in 8th grade ($N = 234$) and 12th grade ($N = 204$)

	Factor			
Items	*PFS (8th)*	*Shy (8th)*	*PFS (12th)*	*Shy (12th)*
Want to be alone more than with other kids	.67*	−.13	.79*	−.03
Like spending time alone more with other kids	.82*	−.09	.82*	−.11
Would rather be with other kids than alone (R)	.83*	.24	.77*	−.05
Would rather be alone than with others	.62*	−.20	.80*	−.04
Want to be with other kids but too shy/afraid	.20	−.72*	−.05	−.79*
I am very shy	−.08	−.89*	.01	−.89*
I am too shy or timid	.01	−.84*	.07	−.79*

Note: Factor analysis was calculated using principal axis factor analysis with promax/oblique rotation. PFS = preference-for-solitude; Shy = shyness; R = reverse scored.
*Primary loadings.

Finally, to examine the structural validity of the outcome model, we conducted separate confirmatory factor analyses comparing a one-factor model, in which items describing anxiety/depression, emotion dysregulation, self-esteem, and social competence all loaded onto one factor, with a four-factor model, in which items for each variable loaded onto separate factors. The one-factor model exhibited significantly poorer fit compared with the four-factor model in both the 8th grade, $\Delta\chi^2(8) = 160.61$, $p < .001$, and 12th grade, $\Delta\chi^2(8) = 495.31$, $p < .001$, providing support for the distinctiveness of these internalizing indices.

Measurement Models

To evaluate measurement equivalency between 8th and 12th grades, multiple-group confirmatory factor analyses were conducted. Freely estimated and constrained confirmatory factor analyses were compared using the chi-square difference criterion. The constrained measurement model exhibited adequate fit, $\chi^2(226) = 400.03$, RMSEA =.06, CFI =.95; all loadings were significant and exhibited the same pattern across both groups, demonstrating evidence of measurement equivalence across the two grades.

Construct reliability was assessed with Hancock's H (Hancock & Mueller, 2001), an index of latent construct reliability that is psychometrically stronger than traditional reliability indices (Hancock & Mueller, 2006). All latent constructs were reliable in both grades ($H > 0.75$).

Structural Equation Models of Preference-for-solitude to Psychoemotional Adjustment across Adolescence

Structural equation models tested whether preference-for-solitude would be more strongly associated with adjustment difficulties in 8th grade than in 12th grade. In all models, shyness was included as a control variable, with direct paths to preference-for-solitude and to all outcomes. In both grades, shyness was significantly associated with preference-for-solitude ($r = .52$, 8th grade; $r = .47$, 12th grade), anxiety/depression ($\beta = .59$, 8th grade; $\beta = .37$, 12th grade), emotion dysregulation ($\beta = .21$, 8th grade; $\beta = .11$, 12th grade), social competence ($\beta = -.62$, 8th grade; $\beta = -.53$, 12th grade), and self-esteem ($\beta = -.41$, 8th grade; $\beta = -.25$, 12th grade) at $p < .05$. There were no statistically significant grade differences in the magnitude of relations from shyness to any of the outcomes. Because the focus of this study was on the unique associations between preference-for-solitude and adjustment, over and above associations with shyness, shyness was included in all models as a control variable.

First, to examine the effects of preference-for-solitude, direct paths from preference-for-solitude to all outcomes were specified within each grade; this initial structural model exhibited adequate fit (Table 3).

Second, to test whether the relations between preference-for-solitude and outcomes differed between younger and older adolescents, all direct paths from preference-for-solitude to outcomes were constrained to be equal across grades. This constrained model exhibited significantly poorer fit compared with the initial unconstrained model, $\Delta\chi^2(5) = 17.21$, $p < .01$, suggesting preference-for-solitude was differentially associated with adjustment in 8th and 12th grades.

Third, to identify path differences between the two grades, path constraints from preference-for-solitude to outcomes were released sequentially based on information from the modification indices. First, the preference-for-solitude to self-esteem constraint was released; this resulted in a statistically significant model improvement $\Delta\chi^2(1) = 5.24$, $p < .05$, suggesting that preference-for-solitude was differentially associated with

TABLE 3
Summary of Data Model Fit Statistics

Model	χ^2	*df*	*CFI*	*RMSEA*	*SRMR*
Measurement Model	400.03	226	.95	.056	.073
Initial Structural Model	405.71	230	.95	.056	.073
First Structural Model (With All Paths Constrained)	422.92	234	.94	.058	.088
Second Structural Model (with PFS-Self-Esteem Constraint Released)	417.68	233	.94	.058	.085
Third Structural Model (with PFS-Social Competence Constraint Released)	413.54	232	.95	.057	.081
Fourth Structural Model (with PFS-Anxiety/Depression Constraint Released)	409.57	231	.95	.057	.078
Final Structural Model (With PFS- Emotion Dysregulation Constraint Released)	405.71	230	.95	.056	.073

Note: $N = 234$ 8th graders, 204 12th graders. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square; PFS = preference-for-solitude.

self-esteem for younger versus older adolescents. Second, the preference-for-solitude to social competence constraint was released; this resulted in a statistically significant model improvement, $\Delta\chi^2(1) = 4.14$, $p < .05$, suggesting that preference-for-solitude was differentially associated with social competence for younger versus older adolescents. Third, the preference-for-solitude to anxiety/depression constraint was released; this resulted in a significant model improvement, $\Delta\chi^2 = 3.97$, $p < .05$, suggesting that preference-for-solitude was differentially associated with anxiety/depression for younger versus older adolescents. Finally, the preference-for-solitude to emotion dysregulation constraint was released; this resulted in a significant model improvement, $\Delta\chi^2 = 3.86$, $p \leq .05$, suggesting preference-for-solitude was differentially associated with emotion dysregulation for younger versus older adolescents.

To explore the possibility of peer rejection as a confounder, we controlled for peer rejection (as measured via peer nominations; see Wojslawowicz, Rubin, Burgess, Rose-Krasnor, & Booth-LaForce, 2006) in the 8th-grade model. These additional analyses yielded results very similar to the original results for 8th graders: preference-for-solitude was still associated with all indices of maladjustment even after controlling for peer rejection. Given peer rejection was not the main research focus, and because we did not have peer rejection data in 12th grade, these analyses were not included.

Summary of Results

The final structural model exhibited adequate fit (Table 3). Figure 2 demonstrates that, above and beyond the effects of shyness, preference-for-solitude was more strongly associated with adjustment difficulties for younger adolescents than for older adolescents. Whereas preference-for-solitude was significantly associated with greater anxiety/depression and emotion dysregulation and lower self-esteem in 8th grade, it was not associated with these outcomes in 12th grade. In addition, although preference-for-solitude was significantly associated with lower social competence in both 8th and 12th grades, this relation was significantly stronger in 8th grade compared with 12th grade.

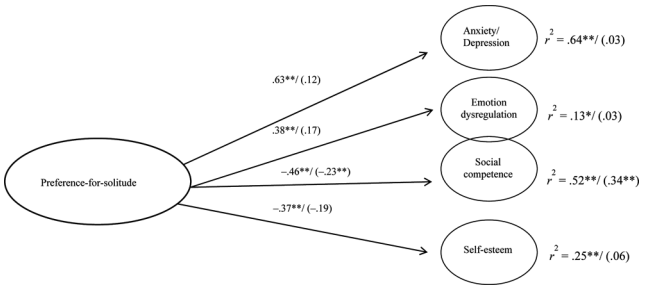

FIGURE 2 Unique associations between preference-for-solitude and adjustment in 8th grade ($N = 234$) and 12th grade ($N = 204$). *Note:* Paths between shyness and preference-for-solitude and from shyness to anxiety/depression, emotion dysregulation, social competence, and self-esteem were included in the model but were omitted from the figure to improve clarity. $^*p < .05$. $^{**}p < .01$.

DISCUSSION

Using a racially diverse sample, we examined whether preference-for-solitude would be differentially associated with psychoemotional adjustment above and beyond the effects of shyness in early and late adolescence. Several findings stand out. First, as hypothesized and consistent with previous research (Bowker & Raja, 2011; Coplan et al., 2012; Nelson, 2012), preference-for-solitude and shyness emerged as related but unique dimensions of withdrawal. These findings further demonstrate that there are several "faces" to withdrawal across development (Rubin & Mills, 1988)—whereas some youth spend time alone because they are conflicted

about approaching others, others spend time alone because they desire to be alone.

Second, as hypothesized, we found that preference-for-solitude was more strongly associated with maladjustment for younger adolescents than for older adolescents, even after controlling for shyness. Specifically, although preference-for-solitude was associated with greater anxiety/depression and emotion dysregulation as well as lower self-esteem in 8th grade, it was not associated with these difficulties in 12th grade. Preference-for-solitude was also more strongly associated with lower social competence in 8th grade than in 12th grade. Indeed, the magnitude of relations between preference-for-solitude and all adjustment outcomes were significantly stronger in 8th grade relative to 12th grade, suggesting preference-for-solitude may be particularly maladaptive in early adolescence.

Several explanations exist for why the strength of associations between preference-for-solitude and adjustment difficulties might decrease with age. Because withdrawal is viewed negatively in early adolescence (Marcoen & Goossens, 1989; Rubin et al., 2009), preferred-solitary young adolescents may internalize peers' negative views of withdrawal and come to feel negatively about themselves, particularly if they are also victimized. Indeed, shy youth who are frequently victimized experience adjustment difficulties across development (Rubin & Coplan, 2010). In addition, as cliques and crowds become prominent sources of influence in early adolescence (Veenstra & Dijkstra, 2011), the need to belong begins to take increased importance during this period. Given withdrawn youth are often not members of peer groups (Rubin & Coplan, 2010), preferred-solitary youth may feel particularly alienated in early adolescence. Indeed, withdrawn young adolescents report greater loneliness and lower self-perceptions compared with their nonwithdrawn peers (Bowker & Raja, 2011; Marcoen & Goossens, 1989; Rubin & Coplan, 2010).

In contrast, given the need for solitude increases across adolescence (Larson, 1990), preference-for-solitude may be less associated with peer maltreatment and subsequent maladjustment in late adolescence. Indeed, youth view solitude as less socially stigmatizing and less aversive as they approach late adolescence (Freeman et al., 1986; Goossens & Marcoen, 1999). In addition, given that older adolescents are generally granted more independence and behavioral autonomy than younger adolescents (Laursen & Collins, 2009), preferred-solitary older adolescents may have more freedom to enjoy solitude (e.g., go to places alone without company), possibly contributing to greater well-being. Because this is the first study on preference-for-solitude in late adolescence, further studies are needed to explore these possibilities.

Despite these different age-related findings, preference-for-solitude was associated with lower perceived social competence in both 8th and 12th grades. This suggests that, regardless of age, preferred-solitary youth may feel negatively about their social competence across adolescence. By consistently withdrawing from social interactions, preferred-solitary adolescents may miss out on important opportunities to learn social skills. Indeed, scholars have long posited the significance of peer interaction for social skills development (Hartup & Laursen, 1999; Rubin et al., 2009). Future longitudinal research is needed to better understand the relations between preference-for-solitude, social skills, and adjustment across development. Although we found that preference-for-solitude was less maladaptive in late adolescence than early adolescence, the relation between preference-for-solitude and adjustment may be nonlinear over time. For instance, given the new social demands of adulthood (e.g., adjusting to college; establishing romantic relationships), preference-for-solitude may become increasingly maladaptive as adolescents enter adulthood. From this view, preference-for-solitude may be maladaptive in early adolescence, decreasingly maladaptive in late adolescence, and increasingly maladaptive once again in adulthood. These possibilities remain to be explored.

Several limitations are worth noting. Due to the cross-sectional nature of our data and because our analyses tested only for associative (e.g., predictive) relations among constructs, results should be viewed as temporally descriptive rather than causal. Individual trajectories of social withdrawal have been documented (Booth-LaForce & Oxford, 2008; Oh et al., 2008); it remains to be seen if similar patterns will emerge for preference-for-solitude. In addition, given the central focus of this study was on the broader construct of preference-for-solitude rather than the different motivations behind such preference (e.g., social avoidance motivations), unsociability and avoidance could not be differentiated. Indeed, some of our preference-for-solitude items overlap with some of the avoidance items in previous studies (Bowker & Raja, 2011). Future research is needed to distinguish between these different dimensions of preference-for-solitude across development. Unsociability has been shown to be less associated with maladjustment than has avoidance in early adolescence and adulthood (Bowker & Raja, 2011; Coplan et al., 2012; Nelson, 2012). Whether such relations also hold true in late adolescence and whether such relations differ between distinct development periods remain to be examined.

Moreover, given psychoemotional adjustment (e.g., internalizing difficulties) was the only type of adjustment examined in this study, it is not known how preference-for-solitude might have contributed to other types of adjustment across adolescence. Indeed, although we speculated preference-for-solitude may be differentially associated with peer difficulties in early

and late adolescence, future research is needed to confirm these speculations. It remains to be seen whether preference-for-solitude is indeed less associated with peer difficulties in late adolescence compared with early adolescence, and whether such differences might moderate or mediate the relations between preference-for-solitude and adjustment. As well, given peer difficulties contribute to withdrawal (Rubin & Coplan, 2010), it also remains to be seen whether prior negative peer experiences might lead to later preference-for-solitude. Indeed, peer rejection and victimization may cause youth to voluntarily choose solitude. Similarly, although additional exploratory analyses in this study demonstrated that preference-for-solitude was still associated with all indices of maladjustment above and beyond the effects of peer rejection for eighth graders, future research that controls for such negative peer experiences in a longitudinal framework would provide more clarity to the conceptualization of preference-for-solitude and its implications across development.

Limitations notwithstanding, this study provides several insights for youth intervention and prevention efforts. In light of our findings that preference-for-solitude was more maladaptive in early adolescence than in late adolescence, interpersonal and cognitive-behavioral interventions that focus on social skills and behavioral training (Kaslow, McClure, & Connell, 2002) may prove particularly helpful for preferred-solitary youth in early adolescence. Because decreased peer influence is thought to lessen the negative consequences of preference-for-solitude in late adolescence, techniques that address the level of regard youth place on peers may also prove fruitful. Indeed, Wang, McDonald, Rubin, and Laursen (2012) found that peer rejection was most associated with maladjustment for young adolescents who highly valued social acceptance. As well, because the increased salience of solitude is thought to lessen the negative consequences of preference-for-solitude in late adolescence, interventions that alter youths' attitudes about solitude and those that foster "solitude skills" (see Galanaki, 2005, for a review) may also prove fruitful for young adolescents who prefer solitude.

In light of our findings that preference-for-solitude was associated with lower social competence across adolescence, social skills interventions may prove fruitful for both younger and older adolescents who prefer solitude. Such interventions may be particularly warranted given social competence is significantly associated with a variety of adjustment outcomes across development (Rubin et al., 2009).

Taken together, our study suggests that a balance of solitude and social interactions might prove fruitful for adaptive development during adolescence. Caregivers and educators should encourage adolescents to balance both time alone and time spent with others so that youth do not place too much emphasis on one at the expense of the other. Given that the need for connectedness and the need for autonomy underlie what it means to be human, the sooner youth learn to balance such needs, the more likely they will be able to flourish across development.

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ORIGINAL ARTICLE

Psychometric Properties of the Network Relationship Inventory-Social Provision Version in Chinese Youth

Jennifer M. Wang

Abstract Given the lack of psychometric research on friendship measures in non-Western countries, this study examined the psychometric properties of the Chinese version of the network relationship inventory-social provision version (NRI-SPV-C) in a sample of 200 young adolescents living in China (91 boys; *M* age = 13.21 years). Results from confirmatory factor analysis demonstrated that a hierarchical structure model with two second-order factors (Social Support, Negative Interactions) and nine first-order factors (Companionship, Intimacy, Instrumental Aid, Nurturance, Affection, Admiration, Reliable Alliance, Conflict, and Antagonism) was the best-fitting model. High internal consistency and high construct reliability were found for all factors. Girls reported higher levels of Social Support compared with boys, though no gender differences emerged for Negative Interactions. Social Support was positively associated with youth's friendship satisfaction (Satisfaction), whereas Negative Interactions was negatively associated with Satisfaction. Findings suggest the NRI-SPV-C may be a fruitful measure for assessing youth's friendship quality in China.

Keywords Adolescents · Friendship quality · Chinese adolescents · Psychometric · Factor structure · Network relationship inventory

Introduction

The significance of friendship is well acknowledged in developmental literature [1]; friendship plays a significant role in the lives of youth across development. *Friendship quality*, the combination of positive and negative features in a friendship [2], is particularly relevant to youth's adjustment. Research has shown that high-quality friendship protects youth from the consequences of negative family and peer experiences [1, 2]. Perceptions of high-quality friendship are also associated with indices of well-being like higher self-esteem and lower anxiety and depression [1–3].

Whereas high-quality friendships are characterized by socially supportive features like validation and intimacy, low-quality friendships are characterized by relationship-straining features like conflict and antagonism [1, 2]. Consistent with these views, researchers typically measure friendship quality during development by asking youth about the prevalence of positive and negative features in their friendships [1, 4, 5].

The network relationships inventory-social provision version (NRI-SPV) [5]—one of the most utilized measures of relationship quality across development and cultures [6]—asks youth to rate the extent to which their relationships with different social network members (e.g., parents, best friends) are characterized by positive, socially supportive features (Affection, Reliable Alliance, Enhancement of Worth, Intimacy, Instrumental Help, Companionship, and Nurturance) and negative, relationship-straining features (Conflict and Antagonism). Evidence of reliability and validity for the NRI-SPV has been demonstrated in Western countries. Using a sample of North American youth, Furman and Buhrmester [5] found that all nine features of friendship (Affection, Reliable Alliance, Enhancement of Worth, Intimacy, Instrumental Help, Companionship, Nurturance, Conflict, and Antagonism) were internally consistent and reliable (average $\alpha = .80$), and that these factors further loaded onto two distinct higher-order or second-order

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factors: (a) Social Support, which comprises Affection, Reliable Alliance, Enhancement of Worth, Intimacy, Instrumental Help, Companionship, and Nurturance, and (b) Negative Interactions, which comprises Conflict and Antagonism. Other studies with North American youth have found similar support for this hierarchical structure model [6–8].

Although the NRI-SPV appears adequate for assessing friendship quality in North American youth, little is known about its psychometric properties in youth living in non-Western countries. Indeed, the only published psychometric research on the NRI-SPV to date was conducted with North American adolescents over a decade ago [6]. Accordingly, despite being used by over 900 developmental researchers from across the world [4, 9], little is known about whether the NRI-SPV is indeed suitable for assessing youth's friendship quality in non-Western countries. Given the majority of the world's youth do not live in Westernized countries and because friendship plays a significant role in youth's socioemotional and psychological adjustment across cultures [1–3], this lack of research remains to be addressed.

To address this gap in research, this study examined the psychometric properties of the NRI-SPV in young adolescents living in China. More specifically, this study examined: (a) the factor structure, (b) internal consistency and reliability, and (c) variable intercorrelations of the Chinese version of the NRI-SPV (NRI-SPV-C). Additionally, this study examined how the NRI-SPV-C factors of Social Support and Negative Interactions relate to Chinese youth's satisfaction with their friendships (Satisfaction).

Given that social relationships are conceptualized and regulated by the norms and values of culture [10], examining the NRI-SPV in China provides an ideal opportunity to examine how cultural differences in norms and values might influence the mechanisms of friendship in youth. In particular, whereas Western cultures like the U.S. are biased toward individualistic values like self-expression and independence, Eastern cultures like China are more characterized by collectivistic values like group-harmony and interdependence [10]. Indeed, China appears to be one of the most collectivistic and least individualistic countries [11]. These differences in cultural norms and values may affect the manifestation of friendships as well as how certain phenomena (e.g., intimacy) are expected and displayed within these relationships across different cultures. Understanding the mechanisms of friendship in China, then, may help elucidate critically important distinctions between culture-specific and culture-general forms of social relationships and help contribute to a more global understanding of friendship and its implications for youth's adjustment across development.

Method

Participants

200 Chinese young adolescents (91 boys; *M* age = 13.21 years; *SD* = .72) attending a public middle school in Beijing, China, participated in this study (consent rate = 100 %). 100 % of the participants were Han Chinese, the predominant ethnic group in China. All participants were developmentally normal and attended regular classrooms. The percentage of youth from two-parent families was 85 %. Available demographic information classified the majority of the participants as middle to upper-middle class.

Procedure

Data were collected during the Spring school semester (April–June). Participants were first contacted by telephone; if both parents and adolescents expressed interest, IRB-approved parental consent and adolescent assent forms were mailed to the home with pre-addressed and stamped return envelopes, along with NRI-SPV-C.

Chinese Version of the NRI-SPV (NRI-SPV-C)

The original NRI-SPV [5] assesses the quality of youth's relationship with their mothers, fathers, and friends. Youth's friendship quality was of interest in this study. Participants rated their relationships with their best friends based on 27 items, using a scale ranging from 1 ("none/not at all") to 5 ("very much/almost always"). The items form nine conceptually distinct first-order factors that further load onto two higher-order or second-order factors: (a) Social Support (Affection, Reliable Alliance, Enhancement of Worth, Intimacy, Instrumental Help, Companionship, and Nurturance) and (b) Negative Interactions (Conflict and Antagonism).

In addition to assessing youth's friendship quality, the NRI-SPV [5] also assesses youth's satisfaction with these relationships (Satisfaction). Participants rated their satisfaction with their best friends based on three items (e.g., "How satisfied are you with your relationship with this person?"), using a scale ranging from 1 ("none/not at all") to 5 ("very much/almost always").

Several members of the research team who were fluent in both English and Mandarin translated the original NRI-SPV using the standard forward and backward methods [12]. A variety of formal and informal strategies (e.g., interviews with youth, psychometric analysis) were also used to maximize the reliability and validity of the NRI-SPV-C.

Results

Preliminary Analyses and Descriptive Information

Table 1 contains the means and standard deviations of the NRI-SPV-C scale scores. Skewness and kurtosis values were within the acceptable range of univariate normality (e.g., skewness <2; kurtosis <7) for all scales [13]. Results from independent samples t tests demonstrated several gender differences between the scales. Compared to boys, girls scored significantly higher on Intimacy, Affection, Nurturance, and Social Support. No other gender differences were found. These results are consistent with past research with North American youth that demonstrated higher friendship quality among girls relative to boys [1–3, 6].

Internal Consistency and Reliability

To examine the internal consistency of the NRI-SPV-C, Cronbach's alpha coefficients were calculated for all factors. Table 2 demonstrates strong internal consistency for the two second-order factors (Social Support: $\alpha = .90$, Negative Interactions: $\alpha = .85$), and acceptable internal consistency for all nine first-order factors ($\alpha = .70$–$.85$). These results are similar to those obtained from past studies with North American youth [5, 6, 9].

To further examine the construct reliability of the NRI-SPV-C, coefficient H [14], a reliability index for latent factors, was calculated across all factors. Table 2 shows high H coefficients ($H = .73$–$.97$) across all factors.

Factor Structure

To examine the factor structure of the NRI-SPV-C, several confirmatory factor analysis (CFA) models were constructed within Mplus 7 [15] based on established guidelines [13].

First, a hierarchical structure model was examined with the entire sample (Fig. 1). In this hierarchical structure model, the NRI-SPV-C scale items loaded onto nine first-order factors (Affection, Admiration, Intimacy, Companionship, Reliable Alliance, Instrumental Aid, Nurturance, Conflict, and Antagonism), and these nine first-order factors further loaded onto two second-order factors (Social Support, Negative Interactions). Results demonstrated good model-fit for this model ($\chi^2 = 463.09$, $df = 314$; RMSEA = .05; SRMR = .06; CFI = .94). Table 3 demonstrates that all items loaded highly (average = .65–.77) onto their appropriate first-order factors, and that all first-order factors loaded highly (.80–.97) onto their appropriate second-order factors. Goodness of model-fit for this hierarchical structure model was also verified by the absence of large modification indices and standardized residuals, indicating no focal areas of ill fit in the solution [13].

Next, to further test the structural validity of the hierarchical structure model, this model was compared with several other competing models: (a) a model in which there were no first-order factors, and items loaded directly onto the two second-order factors (Second-order only model;

Table 1 Means and standard deviations for the NRI-SPV-C by sex

	Mean		SD	
	Boys	Girls	Boys	Girls
First-order factors				
Affection	3.47*	3.91*	.88	.78
Admiration	3.54	3.61	.86	.78
Intimacy	3.51*	3.83*	.93	.88
Companionship	3.80	4.03	.87	.70
Reliable alliance	4.00	4.20	.88	.79
Instrumental aid	3.57	3.61	.84	.70
Nurturance	3.47*	3.78*	.81	.67
Conflict	2.31	2.09	.86	.76
Antagonism	2.13	2.07	.86	.79
Second-order factors				
Social support	3.62*	3.85*	.72	.58
Negative interactions	2.22	2.08	.79	.73
Satisfaction	4.15	4.32	.77	.66

Note. $N = 91$ boys, 109 girls

NRI-SPV-C Chinese version of the network relationship inventory-social provision version

* Denotes significant gender differences at $p < .05$

Table 2 Internal consistency and reliability of the NRI-SPV-C

	Cronbach's α	*H*
First-order factors		
Affection	.81	.82
Admiration	.74	.75
Intimacy	.80	.81
Companionship	.73	.78
Reliable alliance	.80	.81
Instrumental aid	.71	.76
Nurturance	.70	.73
Conflict	.85	.96
Antagonism	.71	.74
Second-order factors		
Social support	.90	.97
Negative interactions	.85	.96
Satisfaction	.83	.86

Note: $N = 91$ boys, 109 girls

NRI-SPV-C Chinese version of the network relationship inventory-social provision version

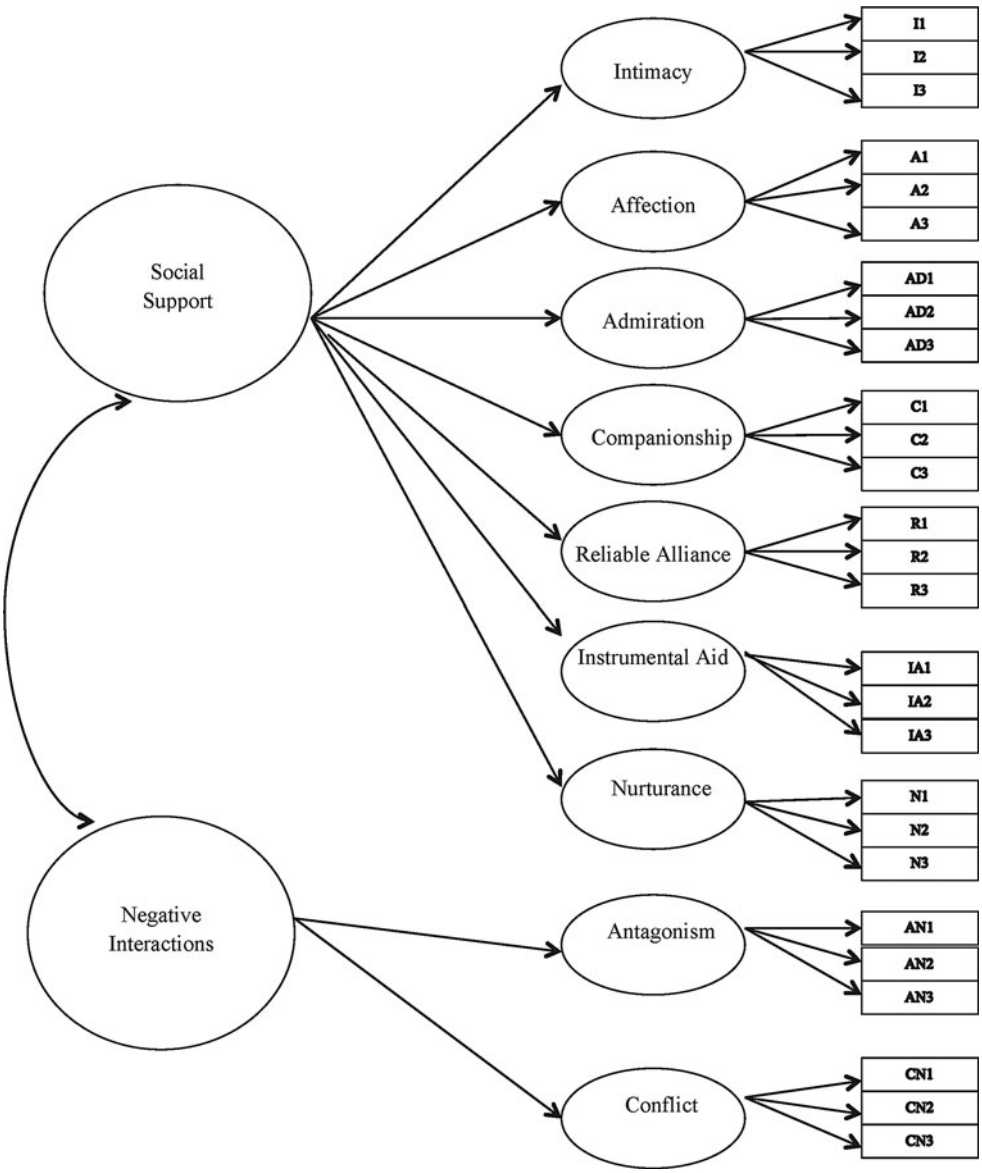

Fig. 1 Hierarchical structure model. $N = 91$ boys, 109 girls. Item indicators for first-order factors: Intimacy (I1–I3). Affection (A1–A3), Admiration (AD1–AD3); Companionship (C1–C3); Reliable Alliance (R1–R3); Instrumental aid (IA1–IA3); Nuturance (N1–N3); Antagonism (AN1–AN3); and Conflict (CN1–CN3)

Fig. 2), and (b) a model in which there were no second-order factors and items loaded directly onto the nine first-order factors (First-order only model; Fig. 3). Compared with the hierarchical structure model, results demonstrated a significant decrease in model-fit in both the Second-order only model ($\Delta\chi^2(9) = 156.76$, $p < .01$) and the First-order only model ($\Delta\chi^2(10) = 928.89$, $p < .0001$). These model comparisons (Table 4) provided further evidence that the hierarchical structure model was the best-fitting model for the NRI-SPV-C.

Finally, to test whether the hierarchical structure model was invariant across gender, several multiple-group CFA's were conducted following established guidelines on group comparisons [16]. First, the hierarchical structure model was tested separately within each gender. Results showed good model-fit in both girls (RMSEA = .05, SRMR = .05; CFI = .95) and boys (RMSEA = .06; SRMR = .07; CFI = .93), demonstrating evidence of configural invariance between the two genders. Next, a freely estimated model in which all paths were allowed to vary between girls and boys was compared to a model in which all paths were constrained to be equal between the two sexes. Results demonstrated no significant differences in model-fit between the free and the constrained models ($\Delta\chi^2(18) = 16.33$, $p > .05$); all loadings also exhibited the same pattern across both groups. These results provided evidence of metric invariance between the two genders. Then, a model in which all intercepts were allowed to vary between boys and girls was compared to a model in which all intercepts were constrained to be equal between the two sexes. Results showed no significant differences in model-fit between the free and the constrained models ($\Delta\chi^2(18) = 7.27$, $p > .05$), demonstrating evidence of scalar invariance between the two

Table 3 Factor loadings of the NRI-SPV-C

	Item loadings on scale		Factors	
	Mean	Range	Social support	Negative interactions
Affection	.77	.76–.78	.91	–
Admiration	.70	.66–.74	.87	–
Intimacy	.76	.68–.82	.82	–
Companionship	.70	.60–.81	.87	–
Reliable alliance	.76	.72–.81	.90	–
Instrumental aid	.69	.55–.81	.80	–
Nurturance	.65	.59–.78	.96	
Conflict	.76	.69–.81	–	.94
Antagonism	.68	.60–.77	–	.97

Note: $N = 91$ boys, 109 girls

NRI-SPV-C Chinese version of the network relationship inventory-social provision version

genders. Taken together, these findings provided evidence that the hierarchical structure model was invariant across gender.

Intercorrelations Among First-order factors

Given its hierarchical structure, the degree of intercorrelation between the nine NRI-SPV-C first-order factors should be higher *within* than across their respective second-order factors. Results supported this assumption. As seen in Table 5, the seven first-order factors that make up Social Support (Affection, Admiration, Intimacy, Companionship, Reliable Alliance, Instrumental Aid, Nurturance; $r = .43$–$.78$) were highly correlated with each other, as were the two first-order factors that make up Negative Interactions (Conflict, Antagonism; $r = .74$). By contrast, the degree of intercorrelation between the nine first-order factors was much lower ($r = -.02$ to $-.15$) among different second-order factors (Table 5). These results demonstrated that the intercorrelations between the first-order factors were much higher *within* than across their second-order factors.

Associations with Friendship Satisfaction

Past research of North American youth has demonstrated significant associations between features of friendship quality and perceptions of friendship satisfaction [1–3, 6]. To test whether similar relations also exist for youth in China, path analyses were conducted to examine the associations between Social Support, Negative Interaction, and Satisfaction. Results demonstrated that, consistent with past research [1–3, 6], Social Support was positively associated with Satisfaction ($\beta = .72$, $p < .001$), whereas Negative Interaction was negatively associated with Satisfaction ($\beta = -.31$, $p < .001$); these results were comparable across gender. Thus, whereas higher Social Support was significantly associated with higher Satisfaction, higher Negative Interaction was significantly associated with lower Satisfaction.

Discussion

The goal of this study was to examine the psychometric properties of the network relationship inventory-social provision version (NRI-SPV) in Chinese youth. The original version of the NRI-SPV [5] for friendship was translated into Chinese (NRI-SPV-C) and administered to young adolescents in China. Findings from this study suggest the NRI-SPV-C may be suitable for assessing youth's friendship quality in China, and that the manifestations and functions of friendship quality may be similar to those found in Western cultures [1, 6].

Adequate coefficient alphas and *H* indices were found across all factors, including the nine first-order factors (Affection, Admiration, Intimacy, Companionship, Reliable Alliance, Instrumental Aid, Nurturance, Conflict, and Antagonism) as well as the two second-order factors (Social Support and Negative Interactions). As hypothesized, and similar to prior research in Western cultures [6, 9], a hierarchical structure model emerged as the most appropriate model in this study.

The intercorrelations between the nine first-order factors were much higher *within* than across their respective second-order factors: Affection, Admiration, Intimacy, Companionship, Reliable Alliance, Instrumental Aid, and Nurturance were more strongly correlated with one another than with Conflict or Antagonism, and Conflict and Antagonism were more strongly correlated with each other than with any of the other first-order factors of Social Support. These results provided evidence that the NRI-SPV-C is internally consistent and reliable among Chinese young adolescents.

Several gender differences as well as similarities were found. Compared with boys, girls reported higher scores on Intimacy, Affection, and Nurturance; they also scored higher on Social Support. By contrast, no gender differences in Negative Interactions were found—girls and boys reported similar levels of Negative Interactions in their friendships. In other words, whereas girls reported their friendships to be more socially supportive than boys, the two genders did not differ in their reports of negativity in these friendships. These results are consistent with past research with North American youth [1–3]. Indeed, although girls typically report higher levels of support in their friendships (e.g., greater affection, closeness, intimacy, and enhancement of self-worth), they do not tend to differ from boys in perceptions of negativity in these friendships. Results from this study further add to these

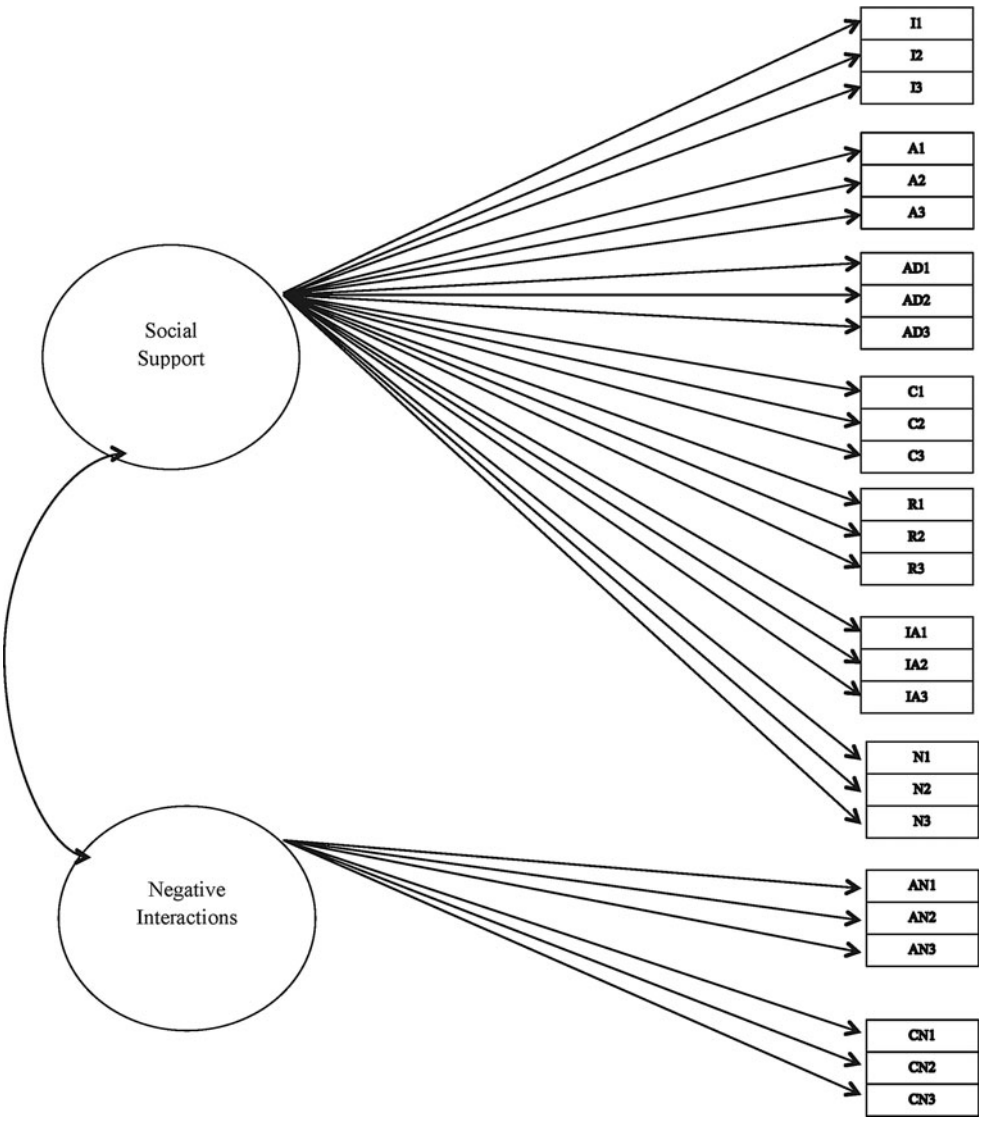

Fig. 2 Second-order only model. Note. $N = 91$ boys, 109 girls. Item indicators for second-order facotrs: Social Support (I1–I3, A1–A3, AD1–AD3, C1–C3, R1–R3, IA1–IA3, N1–N3) and Negatove interactions (AN1–AN3, CN1–CN3)

extant findings, suggesting that gender differences in friendship quality during early adolescence may be comparable across different cultures.

Also consistent with past research in Western cultures [1–3, 6], findings from this study demonstrated that whereas Social Support was associated with greater Satisfaction, Negative Interactions was associated with lower Satisfaction. Given the importance of friendship across development [1–4], these findings are not surprising. Whereas highly supportive friendships contribute to youth's sense of self-worth and emotional security, highly negative friendships put youth at risk for psychopathology and emotional distress [1, 2]. Because peers become particularly salient and influential during early adolescence [2], these implications may be particularly true for young adolescents. Regardless of cultural differences, youth's satisfaction with their friendships may be contingent on their perceptions of social support and negativity in these relationships.

Taken together, findings from this study highlight the universal importance of friendship in youth's development across different cultures. Although China has been found to be more collectivistic and less individualistic compared with Western cultures like the U.S. [10, 11], results from this study suggest that the underlying mechanisms of friendship quality may be comparable to those found in North American and European countries. Despite the potential differences in cultural norms and values, findings suggest youth in different cultures may ascribe similar meanings to the concept of friendship. Consistent with empirical findings that suggest peer relationships may contribute similarly to youth's adjustment across different cultures [17], findings from this study provide further evidence that friendship is a universal phenomenon during development.

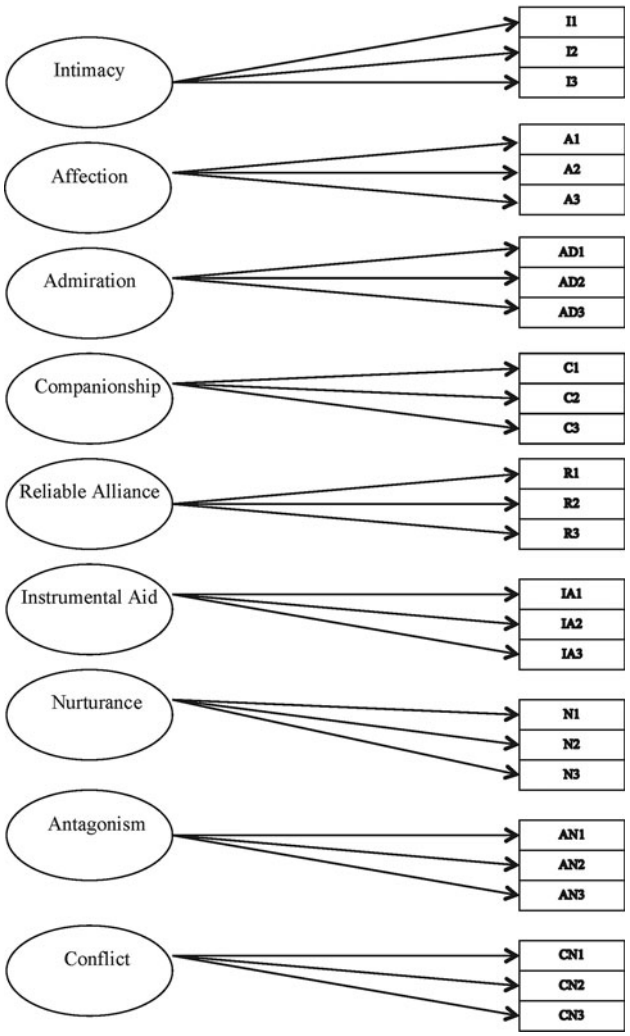

Fig. 3 First order only model. Note. N = 91 boys, 109 girls. Item indicators for first-order factors: Intimacy (I1–I3). Affection (A1–A3), Admiration (AD1–AD3); Companisionship (C1–C3); Reliable Alliance (R1–R3); Instrumental aid (IA1–IA3); Nuturance (N1–N3); Antagonism (AN1–AN3); and Conflict (CN1–CN3)

Table 4 Summary of model comparisons

Model	χ^2	*df*	CFI	RMSEA	SRMR
Hierarchical structure model	463.09	314	.95	.05	.06
Second-order only model	619.85	323	.88	.08	.07
First-order only model	1,391.98	324	.56	.13	.30

Note: $N = 91$ boys, 109 girls

CFI comparative fit index, *RMSEA* root-mean-square error of approximation, *SRMR* standardized-root-mean-square

Although this study helps address the lack of psychometric research on friendship measures and helps contribute to a more global understanding of youth's friendship quality, several limitations are worth noting. In particular, due to the cross-sectional nature of this study, future cross-cultural research on the NRI-SPV should employ longitudinal designs to examine its test–retest reliability. Additionally, because this study only examined the *friendship* dimension of the NRI-SPV, future research would do well to examine whether other dimensions, such as parent or romantic dimensions [8], also appear valid for assessing the quality of these relationships across different cultures. Furthermore, although the NRI-SPV-C was significantly associated with youth's friendship satisfaction in this study, future research on the NRI-SPV warrants the inclusion of other socioemotional outcomes (e.g., peer status, social competence), particularly from different informants (e.g., peers, teachers).

Table 5 Estimated intercorrelations among the NRI-SPV-C first-order factors

	1	2	3	4	5	6	7	8	9
1. Affection		.65	.64	.59	.64	.51	.64	−.10	−.08
2. Admiration			.48	.53	.59	.53	.61	−.25	−.20
3. Intimacy				.71	.54	.43	.58	−.10	−.07
4. Companionship					.78	.48	.60	−.02	−.03
5. Reliable Alliance						.72	.61	−.20	−.15
6. Instrumental Aid							.77	−.12	−.06
7. Nurturance								−.14	−.12
8. Conflict									.74
9. Antagonism									

Note: $N = 91$ boys, 109 girls

NRI-SPV-C Chinese version of the network relationship inventory-social provision version

Summary

As the first study to examine the psychometric properties of the NRI-SPV in a non-Western country, findings demonstrated that NRI-SPV-C was a reliable measure for assessing youth's friendship quality in China. Similar to past studies with North American youth [6–9], the best-fitting model was a hierarchical structure model with two second-order factors (Social Support, Negative Interactions) and nine first-order factors (Companionship, Intimacy, Instrumental Aid, Nurturance, Affection, Admiration, Reliable Alliance, Conflict, and Antagonism); all factors were reliable and internally consistent. Consistent with past findings of gender differences in friendships [1–3], girls reported higher levels of Social Support compared with boys, though no gender differences emerged for Negative Interactions. Also consistent with past research [1–3], Social Support was positively associated with Satisfaction, whereas Negative Interactions was negatively associated with Satisfaction.

Taken together, findings from this study suggest that the NRI-SPV-C may be a fruitful measure for assessing youth's friendship quality in China, and highlight friendship as a universal phenomenon during development. Given psychometric research is critical for the advancement of psychological research and theories, findings from this study help contribute to a more global understanding of friendship and its significance for youth's development across different cultures.

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EMPIRICAL RESEARCH

Interpersonal and Personal Antecedents and Consequences of Peer Victimization Across Middle Childhood in Hong Kong

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Abstract Although much is known about peer victimization, the majority of the longitudinal research in this area has been restricted to Western settings. The main objective of this study was to examine the interpersonal (rejection) and personal (withdrawal, aggression) antecedents and consequences of victimization for Chinese children living in Hong Kong. A sample of 1,058 children (501 boys; M age = 9.5 years) in Hong Kong was followed longitudinally from the 3rd and 4th grades to the 7th and 8th grades. Consistent with a transactional framework, rejection and withdrawal contributed to, as well as resulted from, victimization. Although victimization predicted later aggression, aggression was unrelated to later victimization. These findings closely replicate past research conducted in North America and European settings, and suggest considerable correspondence in the links between maladaptive child characteristics and victimization across Western and Hong Kong schools.

Keywords Peer victimization · Rejection · Withdrawal · Aggression · Hong Kong · Longitudinal · Path analysis

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Introduction

Research has sought to identify different characteristics that might increase children's risk for peer abuse (Cook et al. 2010; Espelage and De La Rue 2012). Rejection or peer dislike has emerged as a core interpersonal or group-level risk factor for peer maltreatment (Ladd and Troop-Gordon 2003). Aggression and withdrawal have been found to be as some of the strongest personal or individual correlates of victimization (Reijntjes et al. 2010; Salmivalli 2001). While such problematic characteristics may put children at risk for victimization, being victimized may also influence children's social status and behavior over time. Indeed, longitudinal research has demonstrated that peer victimization is both a consequence of and an antecedent of maladaptive child characteristics like rejection and withdrawal (e.g., Boivin et al. 2010). Most of these studies, however, have been restricted to North American and European contexts.

Because the pathways to positive social outcomes may be influenced by values and social conventions inherent in a particular culture (Chen and French 2008), it is not clear if findings from Western settings will replicate in other contexts. Moreover, as previous researchers have noted, an exclusive concern with Western contexts could obscure critically important distinctions between culture-specific and culture-general forms of child maladjustment (see López and Guarnaccia 2012). Research conducted in other cultural contexts could also help demonstrate the relevance of existing findings for cultural subgroups within North

America and Europe (Chen and French 2008). In line with these views, we examined the interpersonal (rejection) and personal (aggression, withdrawal) correlates of victimization across middle childhood in Hong Kong.

Hong Kong is a unique setting for peer relations research given its complex history. While under British jurisdiction, Hong Kong had extensive contact with other Asian cultures, as well as Western cultures (Cheung-Blunden and Juang 2008). Despite the population's exposure to outside cultures, traditional Chinese values continue to serve as a predominant socializing factor for many of Hong Kong's children. Hong Kong's value system emphasizes the maintenance of group well-being over individual interests (Yau and Smetana 2003), and children are expected to obey adult caregivers and cooperate with others (Berndt et al. 1993). Indeed, Hong Kong has appeared as one of the most collectivistic and least individualistic countries in meta-analytic reviews of individualism- collectivism (see Oyserman et al. 2002, for a comprehensive review). By replicating existing reciprocal models of maladaptive child characteristics and peer maltreatment in this under-investigated context, findings from this study will contribute to a richer understanding of the mechanisms underlying peer victimization.

Research on the antecedents and consequences of peer group victimization has highlighted a number of specific mechanisms. In terms of interpersonal risk, disliking by peer is one critical factor to consider. Due to factors such as negative reputations (Bierman 2004) and a lack of social resources (e.g., friends; Hodges and Perry 1999), rejected children are often frequent targets of peer abuse (Perry et al. 1988). In particular, peers perceive and describe rejected children more negatively than non-rejected children (Waas and Honer 1990). Not only do peers treat rejected children more aversively than they treat their non-rejected peers, they also justify the abuse and mistreatment of these rejected children (Berndt et al. 1993). Because rejection also prevents important opportunities to interact with others, rejected children often lack social skills and social support (Rubin et al. 2009). These factors combine to create the perfect invitation for peer abuse and victimization.

In addition to the broader risks associated with rejection by peers, more targeted behavioral deficits can increase children's vulnerability to peer victimization. Notably, aggression and withdrawal have emerged as salient personal factors. Aggressive and withdrawn behaviors deviate from social norms, and children often find these behaviors odd and irritating (Bierman 2004). Indeed, aggressive children's disruptive behaviors often provoke anger and abuse from peers (e.g., Salmivalli 2001), while withdrawn children's submissive behaviors likely invite attacks from those who view them as "odd" and "easy" targets (e.g., Olweus 1993).

Even though these problematic characteristics can put youth at risk for victimization, victimization can also impact children's status and behavior in peer groups. In particular, transactional models of development (Caspi et al. 1989) suggest that children actively shape their own environments, which in turn has an impact on their development. Consistent with this view, victimization predicts increases in rejection and friendlessness across childhood (Hodges and Perry 1999; Salmivalli and Isaacs 2005). Victimization also predicts increases in both aggression (Ladd and Troop-Gordon 2003) and withdrawal (Siegel et al. 2009) over time. From these perspectives, children and their social environments reciprocally influence one another across development.

In line with these views, longitudinal research has provided evidence of bidirectional relations between negative child attributes and peer maltreatment across development. For instance, Hodges and Perry (1999) found that initial victimization predicted later peer rejection, and that peer rejection also contributed to increased victimization across middle childhood. Boivin et al. (2010) found that withdrawn behaviors predicted later victimization, and that victimization also predicted later withdrawn behaviors in young adolescents. Because these studies were conducted only in North America and Europe, however, it remains to be investigated whether similar relations are also evident in non-Western settings.

Although longitudinal research on peer relationships has been mostly limited to Western contexts, a small number of relevant cross-sectional studies have been conducted with Chinese children in Mainland China and the Special Administrative Region of Hong Kong (Duong et al. 2009; Eslea et al. 2004; Xu et al. 2003). These findings suggest some degree of consistency in the concurrent correlates of peer victimization across Chinese and Western settings. For instance, as in Western settings, Chinese children who emerge as persistent victims of peer abuse are often rejected and disliked (Abouezzeddine et al. 2007; Xu et al. 2003). These children also tend to be highly aggressive and disruptive (Eslea et al. 2004). Though the links between withdrawal and negative peer experiences in Chinese children have been mixed, with some researchers finding positive relations (e.g., Hart et al. 2000; Schwartz et al. 2001) and others finding zero associations (Chen et al. 1999), increasing evidence suggests that withdrawal is a risk factor for negative peer experiences among Chinese children (Chang 2003; Chen et al. 1995). Although these studies provide important first-steps toward a cross-cultural understanding of peer maltreatment, they are limited to cross-sectional designs. Because development is a dynamic process between child and environment, research that incorporates longitudinal frameworks is needed to better understand the

developmental mechanisms underlying children's negative peer experiences.

Current Study

Due to the lack of longitudinal research on peer victimization in Chinese settings, this study examined the personal and interpersonal correlates of peer victimization across middle childhood in Hong Kong. Specifically, we used autoregressive cross-lagged panel analyses (Bollen and Curran 2006) to examine the potential reciprocal relations between victimization, rejection, aggression, and withdrawal over four time periods. In contrast to simple main effects models, autoregressive cross-lagged analyses help control for stability effects and concurrent links among study variables (Selig and Little 2012), allowing for a more reliable examination of developmental processes.

Based on the view of development as a dynamic process and because available findings suggest some degree of consistency in the correlates of victimization across Chinese and Western settings, we hypothesized a bidirectional relationship between victimization and problematic child characteristics over time. In particular, based on prior research with North American and European youth that demonstrate reciprocal relations between maladaptive child characteristics and peer victimization (e.g., Hodges and Perry 1999; Reijntjes et al. 2010), we posited that interpersonal (rejection) and behavior (withdrawal, aggression) would be reciprocally related to peer group victimization in the Hong Kong cultural context. That is, we expected that rejection, aggression, and social withdraw would each predict increases in peer victimization over time. In turn, we hypothesized that peer victimization would be predictive of later rejection, aggression, and withdrawal.

Method

Participants

Participants were drawn from a 4-year, four-wave longitudinal project that followed Hong Kong children from primary to secondary schools. The final sample consisted of 1,058 children (501 boys, 557 girls). The participating schools served families from Hong Kong's lower-middle socioeconomic class. Almost all of the mothers (97.7 %) had a lower secondary school education (the equivalent of a high school degree in the United States) or below. All families lived in government-subsidized housing, which required that each family's annual income and fixed assets were below set ceilings.

Procedures

At Time 1 (T1), all children in 3rd and 4th grade classrooms at four Hong-Kong schools were invited to participate in the project. Letters explaining the study were sent home along with consent forms. Parents were reminded that their children's participation was purely voluntary and that they could decline involvement in the study without penalty. Children were asked to return the forms to their classroom teachers regardless of whether their parents consented or denied their participation in the project. Of all the children who were invited to participate, 95 % returned positive parental permission, agreed to participate in the project, and were present in school during the period of data collection. On the days of data collection, research staff provided written and oral descriptions of the study procedures and children whose parents had provided consent were asked to give their assent.

Trained research assistants group-administered questionnaires students' classes in testing sessions lasting approximately 45 min. Two researchers were assigned to each classroom. One researcher read the instructions and questionnaire items aloud, while the other walked around to answer questions and ensure that students' answers were kept private.

The first wave of data collection was conducted in late fall 2005, and children were followed every year for 4 years. Data were collected after students had been in school for at least 2 months, so that participating students had time to know each other and could reliably report on their classmate's behavior. At T2, 4th and 5th graders from two additional schools were recruited. Of the 1,058 students in the final sample, 818 children (77.3 %) participated at T1, 1,018 children (96 %) participated at T2, and 713 children (67 %) participated at T3. Because the larger project included a transition from primary to secondary school, only a subset of children ($N = 459$; 43 % of the final sample) participated at T4. Children with incomplete data did not differ significantly from those with complete data on any demographic variable or study variable (all p's $>.10$). Study variables also did not differ as a function of classrooms or any other school characteristics across all time points (all p's $>.10$).

Measures

A sociometric (i.e., peer nomination) procedure was used to obtain measures of children's victimization, and personal and interpersonal characteristics. Peer nominations have been shown to produce estimates of children's peer status and social behaviors that are valid and highly reliable (Jiang and Cillssen 2005; also see Cillessen 2009, for a

review). Moreover, at least in Asian studies (e.g., Schwartz et al. 2001, 2002), overlap between peer nominations and estimates obtained via other informants (self-report and teachers) appears quite high. For instance, Schwartz et al. (2001) found high agreement between peer nominations, teacher-reports, and self-reports of victimization, aggression, and withdrawal in Chinese children.

Each participating child in the current study was given an alphabetized class roster and asked to nominate up to three peers who fit a series of behavioral descriptors. Students could nominate peers of either gender, and nominate the same peer for multiple items. They were told, however, that self-nominations were not allowed. A computer algorithm was used to remove any self-nominations before analysis. Because each item is completed by a large number of reporters (all participating students in the classroom), peer nomination procedures yield highly reliable and valid indices of peer reputations and social behavior even when a small number of assessment items are used (Coie and Dodge 1983). All items described below were derived from past research conducted in the Chinese cultural context (e.g., Schwartz et al. 2001). All measures were translated into Chinese.

Aggression

To assess aggression, students were given a class roster and asked to nominate three peers in their class who "fight with others," "push or hit others," "gossip or say mean things about other kids," and "try to leave other kids out of play to hurt their feelings." As in past research (e.g., Duong et al. 2009), we included items that tap both relational and overt aggression ($\alpha = .95$). The number of nominations a child received for each item was summed and standardized within class to account for varying numbers of nominators (as per Coie et al. 1982). The mean of these standardized scores constituted each child's aggression level, with higher scores reflecting more aggression.

Withdrawal

Withdrawal was also measured with four items on the peer nomination inventory. Students were asked to nominate the name of three peers who "are always alone," "are quiet," "are shy," and "like to be alone" ($\alpha = .85$). Similar to the procedure for calculating an aggression score, described above, we calculated a child's withdrawal score by summing the number of nominations he or she received for each item, standardizing this within class, and calculating a mean across the standardized scores. Research in Western settings has raised questions about the utility of peer nomination indices for identifying socially withdrawn youth. However, it should be noted that the evidence with regard to the validity of these assessment approaches in the Chinese cultural context has been stronger (Chang et al. 2005; Schwartz et al. 2001). For example, Schwartz et al. (2001) found that peer nominations for social withdrawal correlated with teacher reports and predicted rejection and peer group victimization.

Rejection

Children were asked to nominate three peers in their class whom they "like least." The number of nominations a child received for this item was standardized within class and constituted the child's rejection score.

Victimization

Five items on the peer nomination inventory assessed victimization by peers: "gets pushed around," "gets picked on or bullied," "gets bullied and can't protect themselves," "has mean things said about them by other kids," and "gets excluded from play when other kids are trying to hurt their feelings." As in past research (e.g., Duong et al. 2009), we included items that tap both relational and overt victimization ($\alpha = .90$). Again, the number of nominations a child received for each item was summed and standardized within class, and then a mean standardized score across all four items was used as the child's victimization score.

Plan of Analysis

We constructed several autoregressive cross-lagged path models (Bollen and Curran 2006) within Mplus 7 (Muthén and Muthén 1998–2012) to examine the longitudinal bivariate relations between victimization, rejection, withdrawal, and aggression from T1 to T4. In this framework, each study variable is regressed on all of the variables that precede it in time, allowing for the bivariate effects between different constructs to be examined while controlling for the temporal stability of these constructs over time. Comparative fit index (CFI), root-mean-square error of approximation (RMSEA), and standardized-root-mean-square (SRMR) were used for all model-fit assessments.

We conducted Little's MCAR test (Little and Rubin 1987) to assess whether data were missing completely at random (MCAR; Rubin and Coplan 2010). Results revealed that all data were missing completely at random ($\chi^2 = 95.72$, $df = 122$, $p = .96$). Full information maximum likelihood (FIML) was used to address data missingness, as this approach is effective at handling data that are missing at random (Little 2013). ML is superior to traditional techniques for addressing missing data because it maximizes statistical power by borrowing information from the observed data (Enders 2010). More specifically, ML integrates over all possible values of

missing data and gives more weight to values that are more likely (Allison 2002; Little and Rubin 1989). Because ML does not require complete data for each participant, it is ideal for addressing missingness in longitudinal data as participants can be measured at different time points. Indeed, research has shown that ML is a robust and accurate estimator of results even among data with large proportions of missingness (Enders 2010; Hancock and Mueller 2006; Little 2013; Schafer and Graham 2002).

Results

Descriptives

Descriptive statistics are presented in Table 1. Consistent with past research, peer victimization was significantly correlated with withdrawal, aggression, and rejection.

To assess whether there were potential gender differences in the relations between aggression, withdrawal, rejection, and victimization, we constructed several multi-group path analyses and compared freely estimated and constrained models with the Chi square difference criterion (see Hancock and Mueller 2006). Results did not differ as a function of gender. Thus, gender was omitted from the final model to keep the models parsimonious (Hancock and Mueller 2006). There were no statistically significant grade differences in variance among constructs across all time points.

Reciprocal Longitudinal Relations Between Rejection and Victimization

To assess the reciprocal relations between rejection and victimization, we constructed an autoregressive cross-lagged model with paths between all measures of rejection and victimization from T1 to T4. Results demonstrated excellent model-fit ($\chi^2 = 107.44$, $df = 12$, CFI = 0.98, RMSEA = .06 (90 CIs .06–.09), SRMR = .05).

Path coefficients indicated stability for both rejection and victimization over time (Fig. 1). As evident in Fig. 1, the relations between rejection and victimization were generally reciprocal over time. T1, T2, and T3 victimization predicted T2, T3, and T4 rejection after controlling for prior rejection, and T1 and T2 rejection predicted T2 and T3 victimization after accounting for prior victimization. These findings suggest reciprocal paths between rejection and victimization among children in Hong Kong.

Reciprocal Longitudinal Relations Between Withdrawal and Victimization

To assess the reciprocal relations between withdrawal and victimization, we constructed an autoregressive cross-lagged model with paths between all measures of withdrawal and victimization from T1 to T4. Results demonstrated excellent model-fit ($\chi^2 = 177.71$, $df = 12$, CFI = 0.96, RMSEA = .06 (90 CIs .06–.09), SRMR = .05).

Path coefficients indicated stability for both withdrawal and victimization over time (Fig. 2). As evident in Fig. 2, the relations between withdrawal and victimization were generally reciprocal over time. T1, T2, and T3 victimization predicted T2, T3, and T4 withdrawal after controlling for prior withdrawal, and T1 and T2 withdrawal predicted T2 and T3 victimization after accounting for prior victimization. These findings suggest reciprocal paths between withdrawal and victimization among children in Hong Kong.

Reciprocal Longitudinal Relations Between Aggression and Victimization

Finally, to examine the reciprocal relations between aggression and victimization, we constructed an autoregressive cross-lagged model with paths between all measures of aggression and victimization from T1 to T4. Results demonstrated excellent model-fit ($\chi^2 = 150.53$, $df = 12$, CFI = .97, RMSEA = .07 (90 CIs .06–.09), SRMR = .05).

Path coefficients indicated stability for both aggression and victimization over time (Fig. 3). As evident in Fig. 3, the relations between aggression and victimization were not reciprocal over time. Whereas T2 and T3 victimization predicted T3 and T4 aggression after accounting for prior aggression, aggression did not predict later victimization at any of the time periods after controlling for prior victimization. These findings suggest unidirectional paths from victimization to later aggression among children in Hong Kong.

Discussion

Research conducted in Western settings has shown that problematic child characteristics and peer maltreatment are reciprocally linked across development—rejection, withdrawal, and aggression predict later victimization, and victimization also predicts increases in these problematic characteristics over time (Boivin et al. 2010; Hodges and Perry 1999). By examining the interpersonal (rejection) and personal (withdrawal, aggression) antecedents and consequences of victimization across middle childhood in Hong Kong, findings from this study help extend the extant peer relationships research and contribute to a more comprehensive understanding of children's negative peer experiences in Eastern cultures.

Our results mostly replicate existing peer relationships research in Western contexts. As in previous research

Table 1 Correlations among the main study variables

	M	*SD*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. T1 Withdraw	−.00	.82	.70**	.71**	.67**	−.04	−.08*	−.01	−.01	.24**	.17**	.27**	.26**	.54**	.46**	.52**	.50**
2. T2 Withdraw	−.00	.84		.79**	.64**	−.07	−.06	−.06	−.04	.16**	.18**	.23**	.19**	.43**	.57**	.57**	.44**
3. T3 Withdraw	−.01	.85			.82**	−.02	−.07	−.02	.03	.19**	.19**	.31**	.34**	.50**	.55**	.68**	.63**
4. T4 Withdraw	−.00	.89				.06	−.04	.06	.13*	.25**	.24**	.39**	.44**	.51**	.55**	.74**	.74**
5. T1 Aggress	−.00	.88					.78**	.75**	.67**	.61**	.56**	.51**	.47**	.47**	.36**	.30**	.28**
6. T2 Aggress	−.00	.90						.84**	.73**	.55**	.71**	.57**	.44**	.36**	.47**	.34**	.23**
7. T3 Aggress	−.01	.88							.79**	.57**	.61**	.62**	.50**	.37**	.43**	.42**	.30**
8. T4 Aggress	−.00	.90								.53**	.62**	.63**	.68**	.38**	.41**	.39**	.48**
9. T1 Reject	−.00	1.00									.67**	.65**	.60**	.63**	.52**	.48**	.47**
10. T2 Reject	−.00	1.00										.76**	.67**	.52**	.62**	.52**	.52**
11. T3 Reject	−.01	1.00											.76**	.56**	.59**	.64**	.65**
12. T4 Reject	−.00	1.00												.56**	.54**	.60**	.73**
13. T1 Victim	−.00	.80													.76**	.74**	.69**
14. T2 Victim	−.00	.81														.84**	.75**
15. T3 Victim	−.01	.83															.87**
16. T4 Victim	−.00	.88															

$N = 501$ boys, 557 girls. *Withdraw* withdrawal, *Aggress* aggression, *Reject* rejection, *Victim* victimization. * $p < .05$; ** $p < .001$

conducted in North America and Europe (Boulton and Smith 1994; Boulton and Underwood 1992; Ladd and Troop-Gordon 2003; Salmivalli and Isaacs 2005; Siegel et al. 2009), victimization, rejection, withdrawal, and aggression were highly stable over time: prior victimization significantly predicted later victimization, and prior rejection significantly predicted later rejection. Being a target of peer abuse and dislike may rob children of important opportunities to learn social skills and develop supportive peer relationships, thereby increasing their risks of further victimization and rejection (Bierman 2004). Similarly, we found significant continuity in withdrawal and aggression over time: prior withdrawal significantly predicted later withdrawal, and prior aggression significantly predicted later aggression. Given that aggression and withdrawal are considered dispositional characteristics (Rubin et al. 2009), such findings are not surprising. Indeed, previous research with North American and European youth have demonstrated moderate to high stability in children's levels of aggression and withdrawal across development (Ladd and Troop-Gordon 2003; Siegel et al. 2009). Taken together, our findings provide further evidence that children's social status and reputations are highly stable across development. Because negative peer experiences and maladaptive behavioral characteristics put children at significant risks for later psychopathology (Bierman 2004; Rubin et al. 2009), early interventions may be crucial for children who are experiencing peer difficulties.

One of the main contributions of this study was the longitudinal examination of bidirectional influences between peer victimization and child characteristics (rejection, withdrawal, aggression). Replicating previous research in Western settings (Hodges and Perry 1999), we found that rejection and withdrawal are reciprocally associated with victimization over time: rejection predicted later victimization, and victimization predicted later rejection; withdrawal predicted later victimization, and victimization also predicted later withdrawal. These reciprocal relations, however, were not found for aggression and victimization: whereas victimization predicted later aggression, aggression was unrelated to later victimization.

Consistent with our hypotheses, we found reciprocal associations between rejection and victimization over time. In line with research in North America and Europe (Ladd and Troop-Gordon 2003; Hodges and Perry 1999), these findings highlight the particular relevance of rejection as both a contributor to and a consequence of victimization in Hong Kong schools. Several explanations may account for these reciprocal relations. First, the low social status and lack of social resources experienced by rejected children may serve as risk factors for subsequent victimization. In particular, peer victimization is embedded in a larger social

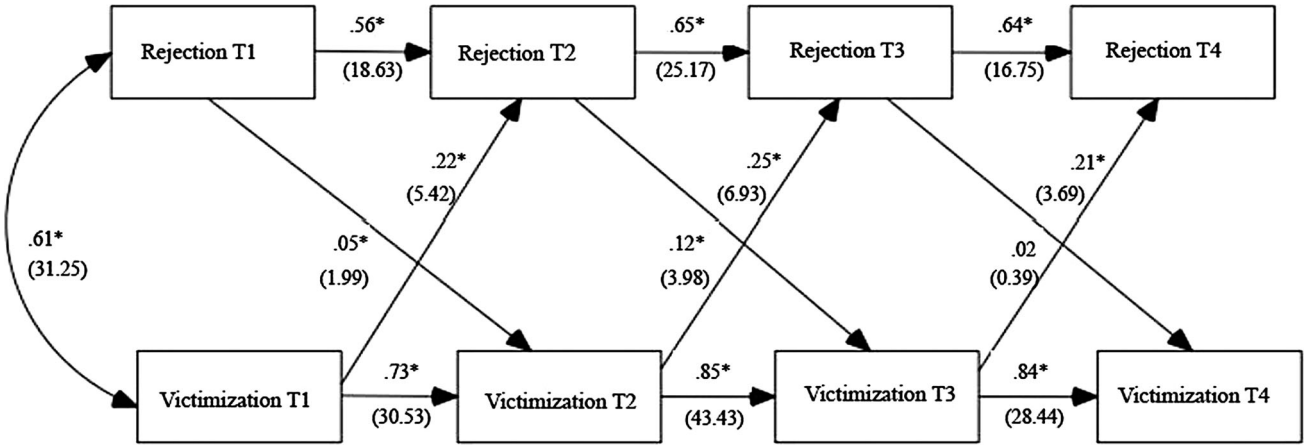

Fig. 1 Autoregressive cross-lagged model of rejection and victimization. *Note* Standardized coefficients and *z*-scores (in parentheses). $*p < .05$

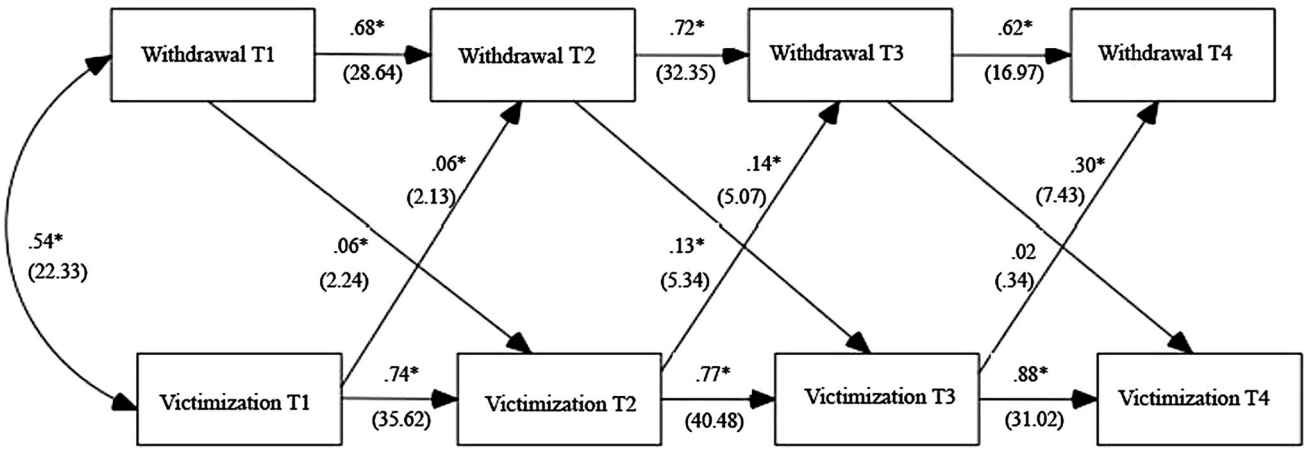

Fig. 2 Autoregressive cross-lagged model of withdrawal and victimization. *Note* Standardized coefficients and *z*-scores (in parentheses). $*p < .05$

system (Salmivalli 2001)—children who are not liked or defended by others may represent vulnerable targets for bullies (Hodges and Perry 1999). Indeed, research has shown that bullies often choose victims who are rejected by the larger peer group (Bukowski and Sippola 2001; Salmivalli and Peets 2009); even nonaggressive children are shown to view rejected children unfavorably (Dodge 1986). These unfavorable views may lead other children to dismiss or even encourage the peer abuse experienced by rejected children (Salmivalli and Peets 2009). Because peer rejection also robs children of important opportunities to develop appropriate social skills (Bierman 2004; Rubin et al. 2009), rejected children may become increasingly isolated over time; this isolation may further contribute to future victimization.

At the same time, peer victimization may also increase children's risks for later rejection. Because social acceptance and approval are partly based on one's status and position in the hierarchy, children are likely to dissociate themselves from those whom they view as frequent targets of ridicule and abuse. Indeed, children may distance themselves from their victimized classmates in order to appear more like the bully, as doing so may increase their own social standing (Juvonen and Galván 2008). Children may also be unwilling to side with victims due to fears of becoming the next victims themselves. Because peer acceptance becomes increasingly important to youth across middle childhood (Rubin et al. 2009), children at this stage of development may be particularly unwilling to associate with their victimized classmates. Accordingly, victimized children may become even more rejected as victimization continues, as evident in this study.

The reciprocal links between rejection and victimization may be particularly strong in collectivistic societies like Hong Kong, where interpersonal relationships and group harmony are heavily valued. Indeed, being disliked is strongly associated with peer victimization across development in Chinese cultures (Chen et al. 1999; Xu et al.

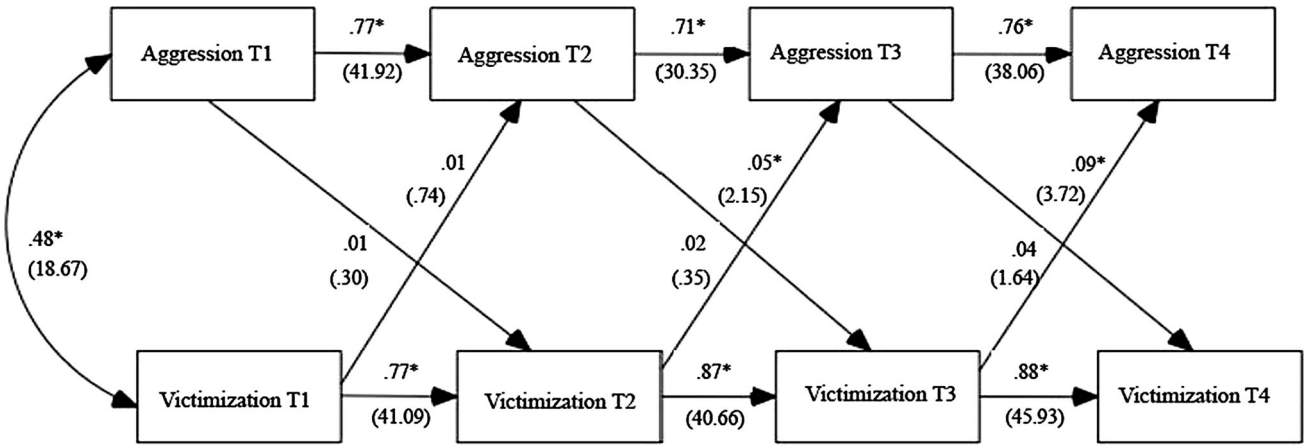

Fig. 3 Autoregressive cross-lagged model of aggression and victimization. *Note* Standardized coefficients and *z*-scores (in parentheses). $^{*}p < .05$

2003). As one of the first studies to examine the longitudinal relations between rejection and victimization beyond the North American and European contexts, our findings suggest there is considerable correspondence in the links between rejection and victimization across Western and Hong Kong schools.

Also consistent with our hypothesis, we found reciprocal associations between withdrawal and victimization over time. In particular, as in research in North America and Europe (Reijntjes et al. 2010; Siegel et al. 2009), withdrawal predicted later victimization, and victimization reciprocally influenced later withdrawal over time. These findings highlight the particular relevance of withdrawal as both a contributor and a consequence of victimization among children in Hong Kong.

Why might withdrawal and victimization reciprocally influence each other over time in Hong Kong schools? First, withdrawal may signal weakness and thus attract aggressors. Indeed, peers often view withdrawn children as easy targets for abuse (Gazelle and Ladd 2003; Olweus 1993). Although some researchers have argued that withdrawn behaviors are conducive to China's collectivistic values on group harmony (Chen et al. 1995), recent research increasingly suggests that withdrawal has negative implications for Chinese children's adjustment, particularly in urban settings (see Chen 2010, for a review). For instance, Schwartz et al. (2001) found that peer victimization was positively associated with withdrawal in 5th and 6th graders living in China. Chang et al. (2005) found that social withdrawal was negatively predictive of peer acceptance during adolescence in Hong Kong. Others have also found similar relations across development in different urban regions of China (e.g., Chen et al. 2005; Xu et al. 2003).

While withdrawal may increase children's risks for victimization, victimization may also increase children's risks for withdrawal. In particular, chronic maltreatment by peers may lead to increased fear of classmates and further withdrawal from peer interaction and school activities (Hoglund and Leadbeater 2007). Consistent with this view, research has shown that peer maltreatment exacerbates withdrawal across development (Gazelle and Ladd 2003; Gazelle and Rudolph 2004). As evident in this study, withdrawn children often become even more withdrawn as victimization continues. By examining the reciprocal relations between withdrawal and victimization beyond the North American and European settings, our findings suggest there is considerable correspondence in the links between withdrawal and victimization across Western and Hong Kong schools.

In contrast to our findings with rejection and withdrawal, we did not find reciprocal associations between aggression and victimization among children in Hong Kong. Rather, the relations between aggression and victimization appeared to be unidirectional. Whereas aggression did not predict later victimization at any of the time points, victimization generally predicted later aggression over time. Although these results are inconsistent with our hypothesis, they appear consistent with some previous research in Western contexts. For instance, Hodges and Perry (1999) found that children's aggressive and externalizing behaviors were unrelated to victimization 1 year later. Boivin et al. (2010) found that aggression became decreasingly associated with victimization from the 3rd grade through the 6th grade. Other studies have also found similar associations between aggression and peer maltreatment across development (see Little et al. 2013, for a review).

Several explanations may account for why aggression was not a significant predictor of later victimization in this study. First, although aggression is strongly sanctioned against in Chinese cultures (Chen and French 2008), children in these settings may be unwilling to directly confront aggressive

classmates. Indeed, Chinese cultures are generally low on direct confrontational behaviors (Oyserman et al. 2002). Moreover, unlike their withdrawn counterparts, who often appear weak and powerless (Coplan and Rubin 2010), aggressive children are known to retaliate when attacked by peers (Crick and Dodge 1994). Over time, these children also increasingly associate with one another, forming networks characterized by high levels of aggression and deviancy (Vitaro et al. 2007). From this view, because the costs of bullying aggressive children may be greater than the costs of bullying "weaker" children (i.e., withdrawn children), aggressive children may be more avoided or feared than confronted in Hong Kong schools.

Aggression has also been associated with *increased* popularity across development. Indeed, recent research in Western settings has demonstrated that aggression is increasingly associated with perceived popularity and social prominence from middle childhood to early adolescence (Cillessen and Mayeux 2004; Little et al. 2013). As peers play an increasingly more central role in children's lives across development (Rubin et al. 2009), aggression becomes an effective means for some children to gain high social status and prominence. Although the Western construct of popularity appears inconsistent with China's collectivistic values, it is likely that popularity does not require a child to engage in behaviors that are positively evaluated or consistent with the larger societal norms, or even that a child is liked. Rather, popular children are likely to be those who are controversial (liked by some while disliked by others) and who are highly skilled at balancing both prosocial and aggressive behaviors within their peer groups (Cillessen and Mayeux 2004; Little et al. 2013).

Despite limited research, there is some evidence to support these views. For instance, using the same sample as this study, Schwartz et al. (2009) found that popularity was associated with high levels of aggression among 3rd and 4th grade children in Hong Kong. These researchers suggest that popularity in Hong Kong peer groups might reflect a context characterized by vertical collectivism. In vertical collectivism (Triandis 1995), individuals see themselves as unique actors contributing to the functioning of the group. From this view, because popular children in Hong Kong may be those who serve a central organizing role in the peer group hierarchy, their aggression may be more accepted by their peers, even if they are not necessarily well-liked. Future research that examines the impact of societal and cultural changes on youth aggression may shed additional insights.

Whereas evidence is mixed on the predictive role of aggression for later victimization, theoretical and empirical evidence suggest victimization is a significant predictor of aggression (Eslea et al. 2004; Schwartz 2000). According to social-cognitive models (e.g., Anderson and Bushman 2002; Crick and Dodge 1994), negative social experiences can cause one to misinterpret social cues and become overly sensitive to rejection cues; this hypervigilance likely increases one's tendency for aggressive behaviors. Indeed, research has demonstrated that victimization alters youth's social schemas about relationships and, in turn, increases their tendency to defensively expect and overreact to rejection (Wang et al. 2012). Consistent with these perspectives, our finding further emphasizes the relevance of maladaptive peer experiences for youth aggression across development.

The results of this longitudinal study provide insight into the processes underlying peer victimization in an underexplored cultural context. Nonetheless, several limitations are worth noting. As is common in longitudinal research (Little 2013), our attrition rate was not low. Because this study followed children across a school transition, complete data across all four time points were not available for the full sample. Although we addressed data missingness with FIML, the small sample size may have decreased the power of our findings. Future longitudinal research with larger samples is therefore needed before firm conclusions can be made regarding our findings.

Although sociometric methods like peer nominations provide important information about children's peer experiences, they are not without limitations. In particular, biases in children's interpretation of social behavior may yield unreliable results (Bierman 2004). Children also differ in abilities to recall descriptions of various characteristics and behaviors (Cillessen 2009). Future longitudinal research would do well to incorporate different methodologies (e.g., self-reports, parent-reports) in addition to peer nominations in examining children's peer experiences.

Limitations notwithstanding, this study provides several insights for Chinese youth intervention and prevention programs. In light of our findings that victimization was both influenced by and contributed to rejection and withdrawal over time, interventions for rejected and withdrawn Chinese children may prove fruitful if they include programs that explicitly teach children how to deal with negative peer experiences. Indeed, although interventions for rejected children incorporate social competence training, they often do not directly address issues of peer victimization. As a consequence, a rejected child in China may know what to do to increase his or her acceptance in the general peer group, yet still struggle in coping with direct attacks from specific classmates. Similarly, although interventions for withdrawn children incorporate social skills and assertiveness training, they often do not directly address issues of peer abuse.

At the same time, interventions for victimized Chinese children might consider including components that deal specifically with increasing children's peer group acceptance, such as adaptive behavioral training (e.g., increasing

cooperative behaviors; Bierman 2004). Increasing victimized Chinese children's prosocial behaviors might help facilitate adaptive affiliations and thus decrease the likelihood of future victimization. Programs for victimized Chinese children might also benefit from incorporating specific components from withdrawal interventions. For instance, assertiveness training (e.g., Albano and DiBartolo 2007) may help victimized Chinese children behave in ways that help promote positive relationships with others.

In light of our finding that victimization contributed to later aggression, identifying and helping Chinese children who are victimized might be particularly relevant for interventions that aim to decrease aggression in Chinese schools. In particular, victimization may serve as a marker for aggression, and interventions that increase self-regulation skills may help reduce aggression in victimized Chinese children. Indeed, research has highlighted the importance of self-regulation for maladaptive social behaviors like aggression (Gross 2007). Such interventions may be important given that aggressive behaviors, particularly those in reaction to negative social interactions (i.e., reactive aggression), are significantly associated with a variety of adjustment difficulties (Rubin et al. 2009), especially in Chinese cultures (Chen and French 2008).

Conclusion

This study adds to the extant peer relationships literature by replicating existing reciprocal models of maladaptive child characteristics and victimization in Hong Kong schools. Consistent with research in Western settings, the findings suggest that rejection and withdrawal are both determinants and consequences of victimization, while victimization appears to be a risk factor for later aggression. Further replications of this study in different cultures will shed additional insights on the mechanisms underlying peer maltreatment across development.

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Author contributions J.M.W. participated in the conceptualization of the study, performed data analyses, interpreted the findings, and drafted the manuscript; M.D. participated in the conceptualization of the study, data analysis, interpretation of data, and drafting of the manuscript; D.S. participated in the conceptualization of the study, interpretation of the data, and drafting of the manuscript. L.C. participated in the design of the study and the collection of data. T.L. participated in the conceptualization of the study and drafting of the manuscript. All authors read and approved the final manuscript.

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Short Communication

Peer rejection as a social antecedent to rejection sensitivity in youth: The role of relational valuation

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ABSTRACT

Although much is known about the consequences of rejection sensitivity (RS), less is known about its social antecedents, particularly during development. Despite research demonstrating the role of peer rejection in the development and maintenance of problematic social schema like RS, little is known about why some youth are more susceptible to these negative consequences than others. We examined how relational valuation might moderate the effects of peer rejection on RS in a sample of 294 youth (138 boys) who made the transition from middle to high school. Results from path analysis revealed that 8th grade peer rejection was most highly associated with 9th grade RS for youth who held high regard for social relationships. Findings demonstrate the importance of examining cognitive moderators in the links between negative social experiences and problematic social schema, and highlight the need to move beyond simple main effects models for understanding the heterogeneity of rejection.

1. Introduction

Rejection sensitivity has been defined as the dispositional tendency to defensively expect, perceive, and overreact to rejection (*RS*; Downey & Feldman, 1996; Harb, Heimberg, Fresco, Schneier, & Leibowitz, 2002). Ironically, RS can lead to a self-fulfilling prophecy in which individuals' expectations of rejection lead them to engage in defensive actions (e.g., aggressing against or withdrawing from others; Downey, Lebolt, Rincon, & Freitas, 1998), which in turn increases the likelihood of actual rejection. Indeed, RS has been linked with psychosocial problems such as rejection, depression, and loneliness across development (e.g., Downey & Feldman, 1996; McDonald, Bowker, Rubin, Laursen, & Duchene, 2010; Sandstrom, Cillessen, & Eisenhower, 2003).

Although extensive research has examined the consequences of RS, much less is known about its antecedents. Whereas a genetic predisposition for RS has received empirical attention (Gillespie, Johnstone, Boyce, Heath, & Martin, 2001), little is known about its *social* predispositions during development. Because RS is theorized to originate from early rejection experiences (Feldman & Downey, 1994), peer rejection may play a role in its development and maintenance. Extant developmental research suggests chronic peer rejection may cause one to misinterpret social cues and become overly sensitive to rejection cues, contributing to interpersonal difficulties and leading to a vicious cycle of rejection (see Rubin, Bukowski, & Laursen, 2009). For instance, peer rejection alters youths' social schemas about relationships and, in turn, increases their tendency to defensively expect and overreact to rejection (London, Downey, Bonica, & Paltin, 2007). Understanding the links between peer rejection and RS, then, may provide important insights to breaking the cycle of rejection.

In the only developmental study to our knowledge that has been conducted, peer rejection in the beginning of 6th grade was associated with increases in RS by the end of 6th grade for boys (London et al., 2007). Research on adults using retrospective methods has also linked negative peer experiences during childhood with RS in adulthood (e.g., Butler, Doherty, & Potter, 2007).

Although these studies help address the paucity of research on the antecedents of RS, they are not without limitations. The ethnically homogeneous sample of London et al. (2007) study may have limited the generalizability of its findings, and the retrospective nature of Butler et al. (2007) study may have resulted in measurement biases like selection bias. Furthermore, none of these studies (or any research to our knowledge) has considered that the relations between peer rejection and RS may not hold across all individuals. In particular, because people vary considerably in how much they value social relationships (Leary, 2001), any explanation of people's reactions to rejection must consider the degree to

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which they value their relations with others. Indeed, cognitive dissonance (Festinger, 1957) and self-discrepancy (Higgins, 1987) theories suggest that failing in a domain deemed personally important would produce dissonance and lead to negative affect. In comparison, failing in a domain deemed personally insignificant would not. In this view, peer rejection may lead to RS particularly for youth who hold high regard for social relationships. Few researchers, however, have considered this possibility.

Despite limited research, there is some evidence for this moderation hypothesis. Research suggests people experience loneliness only when they perceive a discrepancy between their desired and existing social relationships (Heinrich & Gullone, 2006). Brown and Lohr (1987) found that adolescents who were unaffiliated with a peer crowd and who attributed little importance to crowd membership had higher self-esteem than unaffiliated adolescents who attributed high importance to crowd affiliation. Research also suggests that people who place a greater value on friendship and love are more likely to experience negative emotions when rejected than those who do not value social relationships as highly (Morrison, Wheeler, & Smeesters, 2007). Finally, Prinstein and Aikins (2004) found that peer rejection was predictive of increased depression only among adolescent girls who highly valued social acceptance.

Due to the paucity of developmental research on the social antecedents of RS and with the hypothesis that an individual's regard for relationships may impact their interpretations of social situations, we examined whether youths' relational valuation would moderate the link between peer rejection and RS. More specifically, we examined whether peer rejection would put youths at risk for RS, and whether certain youths—namely those who hold high (vs. low) regard for social relationships—would be more vulnerable to this negative outcome. Due to the importance of peers during early adolescence and because peer rejection becomes an increasingly prominent concern for youths during school transitions (Rubin et al., 2009), we felt that the 8th-to-9th grade school transition would provide an excellent opportunity to examine whether preexisting individual factors and environmental experiences contribute to problematic social schema.

We hypothesized that 8th grade relational valuation would moderate the link between 8th grade peer rejection and 9th grade RS. That is, we hypothesized that peer rejection would be most predictive of RS for youth who hold high regard for social relationships.

2. Method

2.1. Participants

Drawing from a larger longitudinal study, this study included 294 youths (138 boys) who made the transition from 8th (M_{age} = 13.61 years) to 9th grade (M_{age} = 14.05 years). The sample was ethnically diverse, with participants self-identifying as European–American (56.3%), Asian–American (18.9%), Latino/Hispanic (9.8%), African–American (8%), or bi-/multi-racial (6.9%).

2.2. Procedure

During 8th grade, participants completed the Peer Rejection and Relational Valuation measures (see below), either during lab visits (80.3%) or at home (19.7%). During the 9th grade, participants completed the RS measure (see below), either at home on paper (93.8%) or on the internet (6.2%). Statistical comparisons revealed no significant differences among participants who completed the questionnaires in these different contexts.

2.3. Measures

2.3.1. Peer rejection

8th Grade Peer Rejection was assessed using the *Extended Class Play* (*ECP*; Wojslawowicz, Rubin, Burgess, Rose-Krasnor, & Booth-LaForce, 2006). The ECP asks respondents to nominate up to three boys and three girls in their grade who best fit each description of Rejection ("Someone who has mean things said to them," "Someone who gets picked on", "Someone who gets hit or kicked by other persons", "Someone who has trouble making friends", "Someone who can't get others to listen", and "Someone who is often left out"). Only same-sex nominations for participants were considered to eliminate possible gender stereotyping. All item scores were standardized within sex and school to adjust for the number of nominations received and also the number of nominators. The standardized item scores for nominations were summed to create a Peer Rejection score for each participant (α = .90). A detailed description of the *ECP* has been reported elsewhere (Wojslawowicz et al., 2006).

2.3.2. Relational valuation

8th Grade Relational Valuation was assessed using *Harter's Self-Perception Profile for Adolescents* (SPPA; Harter, 1988). The SPPA asks respondents to report their perceptions of competence in several domains and the importance they attribute to each of these domains on a scale from 1 (low) to 4 (high). Only items assessing youths' regard for social relationships ("Think that having a lot of friends is important" and "Think it's important to be popular") were examined; these items were averaged to create a score of Relational Valuation (α = .65). This alpha reliability is acceptable for measures consisting of three or fewer items (see Burisch, 1997).

2.3.3. Rejection sensitivity (RS)

9th Grade RS was assessed using a modified version of the *Children's Rejection-Sensitivity Questionnaire* (*CRSQ*; Downey et al., 1998). The CRSQ asks respondents to read six separate hypothetical vignettes describing potential rejection situations involving *peers* (e.g., "...you hear some kids whispering... You wonder if they are talking about YOU"). After reading each vignette, respondents rate how nervous and how mad they would feel ("How NERVOUS would you feel?"; "How MAD would you feel?") in that situation on a scale from 1 (not nervous/mad) to 6 (very, very nervous/mad), and how much they would expect to be rejected in that situation (e.g., "Do you think they were saying bad things about you?") on a scale from 1 (no) to 6 (yes). The total RS score (α = .85) was created by multiplying the rating for each negative affect (anxiety, anger) by the rejection expectation for each vignette and then summing the products. Scores ranged from 16 to 262.

3. Results and discussion

On average, 7.14% (range = 0.0–10.0%) of each variable's data were missing across all variables. The full information maximum likelihood (FIML) method was used to address data missingness. Preliminary analyses demonstrated that missingness was unrelated to any of the variables.

Preliminary analyses with gender and ethnicity as moderators demonstrated that none of the interactions with gender or ethnicity were statistically significant. Because scores on 8th grade Peer Rejection were positively skewed, natural log transformations were applied. Analyses were performed with the untransformed and transformed data, and because the results were very similar, results with untransformed data are presented herein.

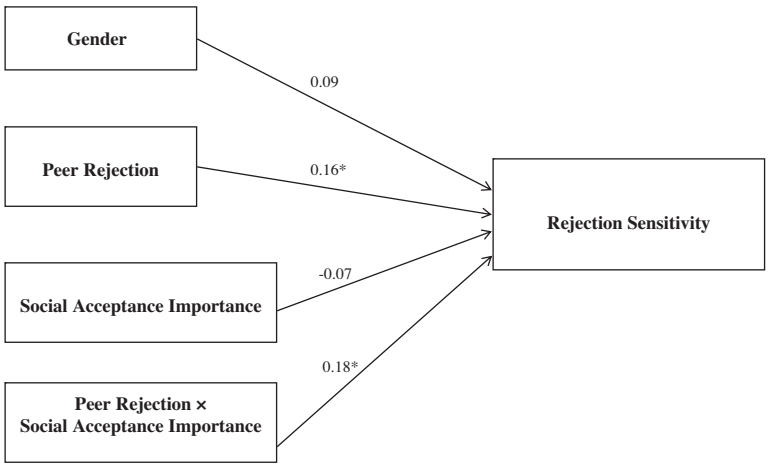

Fig. 1. Path diagram in standardized form $^{*}p < .05$.

3.1. Descriptives

8th Grade Peer Rejection ($M = .00$; $SD = .77$) was negatively correlated with 9th grade Relational Valuation ($M = 2.86$; $SD = .74$), $r(294) = -.09$, $p < .01$. Further, 9th grade RS ($M = 79.63$; $SD = 46.94$) was unrelated to 8th grade Peer Rejection, $r(294) = .11$, *ns*, and 8th grade Relational Valuation, $r(294) = -.05$, *ns*.

3.2. Does relational valuation moderate the effects of peer rejection on RS?

In order to test the moderating effect of Relational Valuation on the link between 8th grade Peer Rejection and 9th grade RS, a path analysis was conducted using FIML within LISREL (Jöreskog & Sörbom, 2005). This approach not only allows the testing of theory-driven models, it also allows the usage of all available data information (see Hancock & Mueller, 2006). With gender as a control variable, our final path model consisted of Peer Rejection, Relational Valuation, and the interaction between Peer Rejection and Relational Valuation.

The final model accounted for 9.5% of the total variance in RS. Fig. 1 shows that, consistent with previous research (Butler et al., 2007; London et al., 2007), Peer Rejection was significantly associated with RS ($Z = 1.99$, $SE = 5.47$, $p < 0.05$). In addition, consistent with our hypothesis, the interaction between Peer Rejection and Relational Valuation was significant ($Z = 2.19$, $SE = 5.35$, $p < 0.05$). In order to probe this interaction, we conducted simple slopes analyses (Aiken & West, 1991) using values for Relational Valuation that corresponded to 1 *SD* above (high) and 1 *SD* below the mean (low). Fig. 2 shows that whereas Peer Rejection was positively associated with RS for youth who scored high on Relational

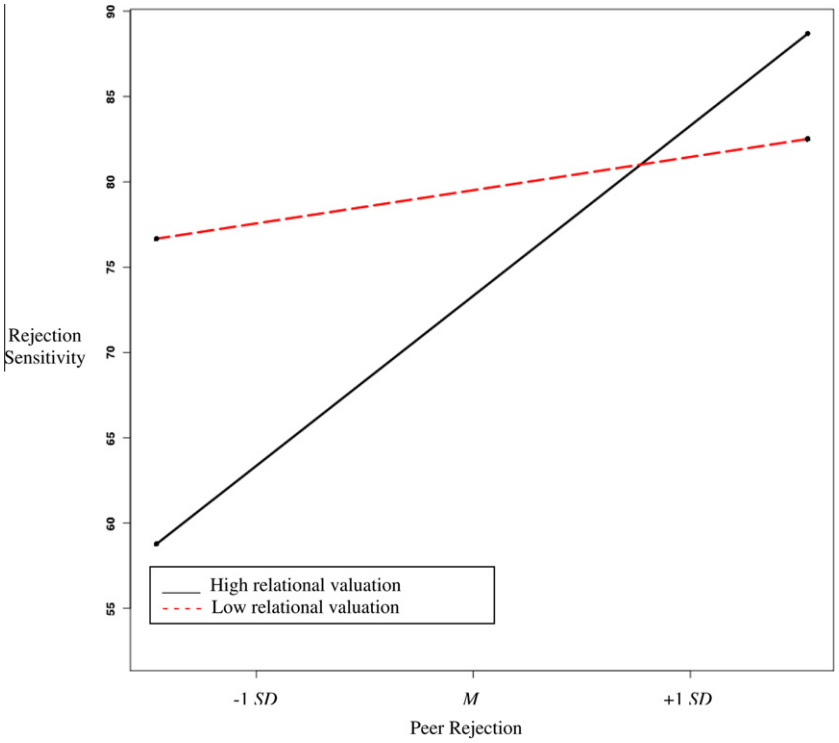

Fig. 2. Interaction between Peer Rejection and Relational Valuation in the prediction of RS.

Valuation (β = 19.94, t = 2.51, p < 0.01), this relation was not significant for those who scored low on Relational Valuation (β = 3.90, t = 0.74, *ns*). Thus, consistent with our hypothesis, peer rejection was most associated with RS for youth who held high regard for social relationships.

It is important to note that because RS was only measured in 9th grade, results should be viewed as temporally descriptive and not as causal, though RS does appear to be moderately stable (Downey & Feldman, 1996; London et al., 2007). Although we examined Peer Rejection as an antecedent to RS, it is possible that RS may also lead to Peer Rejection. This view would be consistent with the "cumulative deficit" hypothesis forwarded by peer relationship researchers (Bierman, 2004; Rubin et al., 2009), in which prior negative social experiences lead to maladaptive schema and behaviors, which in turn lead to further rejection. Future research using a longitudinal design may shed additional insights.

4. Conclusion

By addressing the gap in research on the social antecedents of RS, we demonstrated that peer rejection was most associated with RS for adolescents who held high regard for social relationships. Consistent with cognitive dissonance (Festinger, 1957) and self-discrepancy (Higgins, 1987) theories, findings suggest youths may be most susceptible to adjustment difficulties like RS when encountering a stressor that is personally important. In addition to contributing to the literature on RS, findings demonstrate the importance of considering cognitive moderators for understanding the links between negative experiences and adjustment, and highlight the need to move beyond simple main effects models for understanding the heterogeneity of rejection.

In addition to cognitive interventions addressing the attribution and interpretation of social encounters, therapeutic techniques addressing the level of regard youths place on social relationships may successfully help rejected youths cope with negative social experiences. Such techniques may be particularly important given the difficulty of changing youths' overall reputations among peers (Bierman, 2004). Future research is needed to further elucidate the individual cognitive and motivational processes (e.g., need for belongingness) through which social dynamics are linked with adjustment across development.

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