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A cross-cultural analysis of the relations of physical and relational aggression with peer victimization

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Abstract

To better address the many consequences of peer victimization, research must identify not only aspects of individuals that put them at risk for victimization, such as aggression, but also aspects of the context that influence the extent of that risk. To this end, this study examined the contextual influences of gender, same-sex peer group norms of physical and relational aggression, and nationality on the associations of physical and relational aggression with peer victimization in early adolescents from Canada, China, Brazil, and Colombia ($N = 865$; $M_{age} = 11.01$, $SD = 1.24$; 55% boys). Structural equation modeling was used to test for measurement invariance of the latent constructs. Multilevel modeling revealed that both forms of aggression were positive predictors of peer victimization, but physical aggression was a stronger predictor for girls than boys. Cross-national differences emerged in levels of peer victimization, such that levels were highest in Brazil and lowest in Colombia. Cross-national differences were also evidenced in the relationship between relational aggression and victimization: the relationship was positive in China, Brazil, and Canada (listed in descending order of magnitude), but negative in Colombia. Above and beyond the cross-national differences, physical aggression was a stronger predictor of victimization in peer groups low in physical aggression, and relational aggression was a stronger predictor in peer groups low in relational aggression. Ultimately, this research is intended to contribute to a better theoretical understanding of risk factors for peer victimization and the development of more effective and culturally-appropriate prevention and intervention efforts.

Keywords

culture, peer victimization, physical aggression, relational aggression, social norms

It is well accepted that peers have a substantial degree of impact on children's development (Hartup, 2009), particularly in adolescence when the salience and influence of peer relationships increases (Brown & Larson, 2009). Peer victimization, being the recipient of harmful behaviors of peers, can be a very traumatic experience with serious consequences for development (Rueger & Jenkins, 2014). To address the negative effects of peer victimization, it is critical that researchers develop a comprehensive understanding of risk factors, namely aggression (Ostrov & Godleski, 2013). In particular, this involves careful attention to the influence of contextual factors, specifically social and cultural norms, which influence the way aggressive behaviors are perceived and thus peers' responses to them. Therefore, this study provides a contextual framework, investigating the influence of gender and peer group norms of physical and relational aggression on the relationship between aggression and peer victimization across the diverse cultures of Brazil, Colombia, Canada, and China.

Types of aggression

The complex relationship between aggression and peer victimization may be better understood by differentiating between types of aggression. Although often concurrently expressed (Ostrov & Godleski, 2013), physical (physically harming another person) and relational aggression (harm targeting relationships, social status, and acceptance) are distinct. In addition to different behavioral expressions, they may also differ in motivating goals (Crick & Grotpeter, 1995). Based on extant literature and the unique behavioral expressions and underlying motivations, a goal of the current study was to assess whether these forms have unique relationships with peer victimization and contextual influences.

Research has consistently shown that adolescent boys engage in more direct, overt, and physical forms of aggression (Lansford et al., 2012). Conversely, there is

mixed evidence regarding gender differences in relational aggression, especially during adolescence. Although some studies have indicated that girls engage in more relational aggression (Crick & Grotpeter, 1995; Velasquez, Santo, Saldarriaga, Lopez, & Bukowski, 2010), other studies have found no evidence of gender differences (Lansford et al., 2012) or even the reverse (Tomada & Schneider, 1997). That gender differences have been observed suggests that the relationship between each type of aggression and peer victimization may also differ by gender, as supported by some previous research (Velasquez et al., 2010).

Contextual influences

Given that environmental contexts affect both individual behavior and peer-relationships, it was expected that the relationship between both forms of aggression and peer victimization would vary as a function of contextual factors. In particular, this study considered the role of social norms, based on evidence that group-level (Chang, 2004) and gender-based norms of aggression (Velasquez et al., 2010) are likely to account for variability in individual aggressive behavior and the relationship between aggression and peer victimization. Second, this study was designed to incorporate cross-national comparisons among nations which may be expected to differ in social values, including those relevant to aggression, (e.g. Hofstede et al., 2010) to provide preliminary evidence of the influence of cultural norms on the relationship between aggression and peer victimization.

Peer group norms

By providing a context-specific guideline for defining acceptable and expected behaviors, social norms provide a reference point for individuals' own behavior and their evaluations of and reactions to the behavior of others (Chang, 2004). As a metric of the acceptability of the behavior, norms influence peers' responses to behaviors; behaviors that deviate from norms tend to be elicited negative responses, a dynamic referred to as the misfit effect (Boivin, Dodge, & Coie, 1995). In support of the influence of group-level norms, this effect is demonstrated for aggression; in contexts in which aggression is non-normative (low prevalence), children who exhibit aggressive behavior

may be at risk for peer rejection (Xu, Farver, Schwartz, & Chang, 2003) or victimization (Velasquez et al., 2010), and have lower social status (Boivin et al., 1995).

Gender-based norms

Social norms also guide behaviors and evaluations of behavior within each same-sex peer group. These specific, gender-based norms stem from and contribute to the different cultures in which boys and girls grow up (Maccoby, 1998), producing different patterns of social expectations and interactions, including different evaluations of behaviors and standards for acceptance or rejection. Therefore, based on the existence of gender-based norms of aggression, it may be assumed that the misfit effect operates differently for boys and girls. Gender-based norms of aggression are assumed to be rooted in gender differences in the prevalence of different forms of aggression. Overwhelmingly, boys exhibit greater prevalence of physical aggression than girls (e.g. Lansford et al., 2012; Ostrov & Crick, 2007; Velasquez et al., 2010). Although inconsistencies must be acknowledged, relational aggression has generally been identified as more prevalent among girls (Crick & Grotpeter, 1995; Ostrov & Crick, 2007; Velasquez et al., 2010). Therefore, physical aggression is normative for boys and relational aggression is normative for girls. Consistent with the misfit effect, Velasquez et al. (2010) found that those who exhibit the form of aggression which is non-normative for their same-sex peer group are at risk for peer victimization, specifically, boys who exhibit relational aggression and girls who exhibit physical aggression.

Cultural influences

Researchers of peer relations have often overlooked variability across cultures, assuming that results from one sample of participants are universal. However, the samples in many of these studies are comprised entirely of Western, Educated, Industrialized, Rich, Democratic (WEIRD) societies, and results cannot be expected to generalize to all populations (Chen, French, & Schneider, 2006; Henrich, Heine, & Norenzayan, 2010). In fact, as Henrich and colleagues (2010) assert, due to these unique characteristics, such populations are likely to be among the least representative. The tendency to disregard cultural variability is particularly problematic when attempting

to understand phenomena like the misfit effect which are based on individuals' perceptions, evaluations, and reactions, all of which involve the influence of culture-specific norms of social behavior (Chen et al., 2006; Henrich et al., 2010). Thus, it was important in the current study to evaluate relationships among forms of aggression and peer victimization in diverse, non-WEIRD samples.

More specifically, like other social norms, cultural norms also provide a frame of reference for establishing standards of acceptance or rejection within peer groups. That is, cultural norms reflect the context-specific meaning of behavior, such that the same behavior (i.e., aggression) may elicit different perceptions and thus different responses as a function of the culture (Chang, 2004; Chen et al., 2006). Therefore, specific cultural norms may affect the relationship between aggression and peer victimization due to cultural variation in the degree to which aggression is perceived as a norm violation and in the propensity for eliciting social consequences from peer group. For example, the prevalence of aggression has been found to vary as a function of cultural ideologies of individualism and collectivism, such that aggression is more normative in cultures ascribing to individualistic rather than collectivistic values. Norms of aggressive behavior thus reflect the culture-specific evaluations of aggressive behavior, specifically the degree to which interpersonal conflict is accepted within the value system. That is, there may be greater approval of competition and confrontation as a means to pursuing personal goals in individualistic cultures, whereas in collectivistic cultures, conflict may be viewed as a threat to the values of group harmony and cohesion and thus less tolerated (e.g. Bergmuller, 2013).

Although there are unique contexts in which aggression is normative and provides social benefits (e.g. social status; Wright et al., 1986), because a primary purpose of social norms is to benefit group members and the group as a whole by regulating behaviors that have the potential to do harm, norms deterring antisocial behaviors are fairly ubiquitous (Oliver, 1980). Thus, based on the misfit effect, it is reasonable to propose that aggression would be associated with social consequences across cultures. Indeed, some evidence has suggested that the misfit effect found in US samples may also exist in non-US cultures, including in China (Tom, Schwartz, Chang, Farver, & Xu, 2010; Tseng et al., 2013; Xu et al., 2003) and in Colombia (Velasquez et

al., 2010). However, uncertainty in the universality of the misfit effect of aggression remains. First, with the exception of Velasquez et al. (2010), few studies in non-Western cultures have simultaneously assessed the social consequences of both physical and relational aggression. Due to the different behavioral expressions and underlying motivations of each type of aggression, different cultural norms may exist for each type, particularly for relational aggression which may be used to either harm or to protect group cohesion (Cillessen & Rose, 2005), thus eliciting different evaluations and responses depending on cultural context. On the other hand, due to the evolutionary function of social norms as a mechanism for protecting the wellbeing of group members (e.g. Yamagishi, 1995), physical aggression may be a more universal norm violation. Therefore, the misfit effect may be expected to be salient across cultures concerning physical aggression, whereas more variability may be seen in regards to relational aggression.

Further, to date, no research could be located that has compared across diverse countries within a single study; importantly, even if the misfit effect has been evidenced in other cultures, whether there are differences in the relative strength cannot be appropriately evaluated. It is the express purpose of the current study to address both of these current gaps in the literature, among cultures known to be diverse in their social values and therefore, perhaps their evaluations of social behaviors like aggression (e.g. wide variation on individualism and collectivism; Hofstede et al., 2010).

The current study

The purpose of this study was to explore the relationship between aggression and peer victimization in early adolescence within a contextual framework. Importantly, this study differentiated between physical and relational aggression and considered the influence of multiple levels of contextual influences, specifically gender of the same-sex peer group and peer group norms of physical and relational aggression. This study also provides a unique cross-cultural perspective by assessing these relationships in Canada, Brazil, Colombia, and China. The following hypotheses were proposed:

1. Physical aggression will be more prevalent among boys; relational aggression will be more prevalent among girls (e.g. Crick & Grotpeter, 1995; Lansford et al.,

2012; Velasquez et al., 2010).

2. Physical and relational aggression will be expressed concurrently (Ostrov & Godleski, 2013).
3. Both physical and relational aggression will be positive predictors of peer victimization (e.g. Ostrov & Godleski, 2013; Velasquez et al., 2010).
4. Consistent with the function of social norms as a protection mechanism, the misfit effect of physical aggression is expected to be consistent across cultures. Cross-national comparisons of relationship between relational aggression and peer victimization are primarily considered exploratory, but is expected to be positive in Colombia (Velasquez et al., 2010).
5. Also, consistent with the misfit effect, the relationship between physical aggression and peer victimization will be stronger for girls, and the relationship between relational aggression and peer victimization will be stronger for boys (Velasquez et al., 2010).
6. Finally, consistent with the misfit effect, the relationship between physical aggression and peer victimization will be stronger in peer groups with a lower prevalence of physical aggression and the relationship between relational aggression and peer victimization will be stronger in peer groups with a lower prevalence of relational aggression (Boivin et al., 1995; Chang, 2004; Velasquez et al., 2010).

Method

Participants

Participants were recruited separately from four locations: Montreal, Canada; Curitiba, Brazil; Bogota, Colombia; and Shanghai, China. In the total sample, participants were 865 early adolescents ($M_{age} = 11.01$, $SD = 1.24$) in fifth ($n = 533$; 62%) or sixth ($n = 332$; 38%) grade. The gender distribution was nearly even (boys 55%; $n = 474$). See Appendix A for sample characteristics of each country. Socioeconomic status (SES) information was not collected. However, in Canada, Colombia, and China, an effort was made to recruit participants from schools in the middle SES range based on school administrators' reports.

Procedures

All measures were translated from English into a language appropriate for each sample by local collaborators: Spanish for the Colombian sample, Portuguese for the Brazilian sample, and Mandarin for the Chinese sample. The original English measures were administered to the Canadian sample. Informed consent was obtained prior to data collection. In Canada, parents provided written consent. In Colombia, parents provided either written or verbal consent. In Brazil and China, school principals provided consent. On the day of data collection, written assent was obtained from the participants. All data were collected at schools during regular class time (60–90 minutes).

Measures

Demographic information. Age and gender were self-reported. Grade level information was obtained from the school administrators.

Peer nominations. Peer victimization and both relational and physical aggression were measured by unlimited same-sex peer nominations using the Revised Class Play checklist (RCP; Masten, Morison, & Pellegrini, 1985; Velasquez et al., 2010). The questionnaire contained a set of items reflecting behaviors of early adolescents in their classes. Each participant was asked to indicate based on a list of all their participating classroom peers, which of whom fit each of the behaviors described. Two items measure peer victimization: “Others call him/her bad names” and “Others try to hurt them” (across samples, α 's = .71–.88). Two items measure physical aggression: “Someone who hits or pushes people” and “Someone who gets involved in physical fights” (α 's = .66–.95). Two items measure relational aggression: “Someone who talks bad about others behind their backs to hurt them” and “Someone who tries to keep others out of the group” (α 's = .60–.84). Scores on each subscale represent the mean number of nominations received by each participant for the two respective items; higher scores indicate more nominations.

Peer group norms of aggression. Same-sex peer group norms of aggression are represented by the mean level of each physical and relational aggression within each same-sex peer group, aggregated from the items used to measure individual-level

physical and relational aggression. Higher scores reflect a greater mean number of nominations of physical and relational aggressive behavior, respectively, in the same-sex peer group.

Statistical analyses

Prior to analysis, the data was corrected for the effects of class size, same-sex peer group size, and order of names on the class roster used in the peer nomination measures according to the procedures detailed by Velasquez, Bukowski, and Saldarriaga (2013). Data corrections revealed that class size, same-sex peer group size, and order on the class roster accounted for 6.9% and 8.8% of the variance in the two physical aggression items, 2.6% and 3.8% in the two relational aggression items, and 1.7% and 2.9% in the two peer victimization items, respectively.

Measurement invariance was tested by creating latent factors with the two indicators of each construct accounting for the censored nature of the peer nomination data and clustering the measures as a function of the same-sex peer group (to account for the non-independence inherent in the data).

Factorial ANOVAs were used to assess gender and cross-national differences in both types of aggression and peer victimization. Correlations were analyzed to assess the relations among physical aggression, relational aggression, and peer victimization at both the individual and group levels.

Because participants are nested in same-sex peer groups and analyses include both within-group and between-group variables, the remaining analyses were conducted using multilevel modeling to account for the inherent non-independence of the data. The full model consisted of two levels of variables predicting peer victimization. Level 1 included the within-group variables, with relational aggression added first, followed by physical aggression (both entered as uncentered and random). Age and the interactions with each type of aggression were added next (entered as centered and fixed). Between-group variables were included in Level 2, beginning with contrast codes to compare the nation of the sample, followed by gender of the same-sex peer group, and finally the peer group norms of relational and physical aggression.

Results

Latent modeling of measurement invariance

Measurement invariance was tested using a model with the latent factors of victimization, physical and relational aggression measured using two indicators of each, accounting for non-independence by nesting by same-sex peer group. Robust maximum likelihood estimation was used with the censored option in Mplus (ver. 7.2; Muthen & Muthen, 2012) to account for the nature of the peer nomination data. First, we began with an unconstrained model using the entire sample, then split by nation with the models completely constrained so that we could remove constraints to the models one at a time as an assessment of measurement invariance of each component. Given that censored models do not provide traditional indices of model fit (nor standardized coefficients), we used the sample-size adjusted Bayesian Information Criterion (SSA-BIC), with increases of more than 6 between models reflecting “strong” evidence of 20:1 posterior odds ($p < .05$) that the model is significantly worse (Burnham & Anderson, 2002).

The first model used the full sample ($N = 865$) as a basis of comparison for subsequent models. Not surprisingly, each of the factor loadings were significant and positive. Moreover, both physical and relational aggression were positively associated with peer victimization. Next, we split the models by sample. The resulting model was a worse fit to the data (Δ SSA-BIC = 2187.80) likely reflecting the increased model complexity. In this model, the item intercepts, error variances, factor loadings, factor variances, factor covariances and regression estimates were constrained to be equal across groups. Table 1 contains the model estimates for the full sample and those from the final model (detailed in what follows). We began testing for measurement invariance using six separate models (one for each of the indicators) with one error variance freed across samples. Three of the models (one item for each of the factors) were significantly better when the error variances were freed (Δ SSA-BIC = 40.65–92.57). This suggests that there are some differences in the error variance (the variability remaining in the items after what’s accounted for by the latent construct) across the samples. However, considering that one item for each factor can be assumed to have the same error variance across samples, this suggests partial error

variance invariance. Based on these results, a revised model was created with three of the error variances allowed to vary and this model was markedly improved from the previously constrained model (Δ SSA-BIC = 239.34).

Table 1. Final model estimates for the full sample and measurement invariance across the samples.

	Full	Canada	Brazil	Colombia	China
Physical aggression					
PhyAgg1 Factor loading	1.000	1.000	1.000	1.000	1.000
PhyAgg1 Intercept	-.002	-1.544	-1.050	-1.120	-0.289
PhyAgg1 Error variance	1.310	0.452	2.451	0.066	3.215
PhyAgg2 Factor loading	.900	0.883	0.883	0.883	0.883
PhyAgg2 Intercept	-.002	-0.967	-0.967	-0.967	-0.967
PhyAgg2 Error variance	1.518	1.394	1.394	1.394	1.394
Factor variance	4.400	4.863	3.009	6.100	4.317
Factor mean	0.00	1.219	1.255	1.174	0.000
Relational aggression					
RelAgg1 Factor loading	1.000	1.000	1.000	1.000	1.000
RelAgg1 Intercept	-.001	-0.451	-0.451	-0.451	-0.451
RelAgg1 Error variance	1.260	1.238	1.238	1.238	1.238
RelAgg2 Factor loading	1.380	1.619	1.203	1.293	1.606
RelAgg2 Intercept	-.001	-0.616	-0.616	-0.616	-0.616
RelAgg2 Error variance	1.547	0.371	1.731	0.906	4.088
Factor variance	1.501	1.732	1.096	1.497	2.349
Factor mean	0.00	0.371	0.379	0.721	0.000
Peer victimization					
Vict1 Factor loading	1.000	1.000	1.000	1.000	1.000
<i>Vict1 Intercept</i>	-.001	-0.199	-0.176	0.482	-0.651
<i>Vict1 Error variance</i>	2.097	0.769	1.143	3.095	1.089
<i>Vict2 Factor loading</i>	1.392	1.068	0.614	0.649	0.167
Vict2 Intercept	-.001	-0.127	-0.127	-0.127	-0.127
Vict2 Error variance	.515	0.867	0.867	0.867	0.867
<i>Factor Variance</i>	.753	1.116	1.962	2.022	0.005
Factor mean	0.00	-0.266	-0.136	-0.972	0.000
Phys. and Rel. Agg. Covariance	1.654	1.625	1.625	1.625	1.625
Victimization regressed on Phy. Agg.	.181	0.309	0.309	0.309	0.309
Victimization regressed on Rel. Agg.	.318	0.358	1.515	0.034	5.101

Note. Total $N = 865$: Canada $n = 179$, Brazil $n = 322$, Colombia $n = 273$, China $n = 91$. Content of items is as follows: PhyAgg1 = someone who hits or pushes people; PhyAgg2 = someone who gets involved in physical fights; RelAgg1 = someone who talks bad about others behind their backs to hurt them; RelAgg2 = someone who tries to keep others out of the group; Vict1 = others call him/her bad names; Vict2 = others try to hurt them. Bold text reflects invariant components of the model while italics reflects variant components. All variables were measured by same-sex peer nominations; higher scores indicate greater number of nominations from same-sex classroom peers.

We then tested six additional models with each factor loading freed across samples. The model for one item for physical aggression (“Someone who gets involved

in physical fights”) failed to converge but for the remaining five items, three of the models were significantly better when the factor loading was freed (Δ SSA-BIC = 17.87–24.89). As a result, not all of the factor loadings can be assumed to be identical across the samples. In other words, the proportion of variability that the factors account for within the items varied somewhat between the nations. Again however, at least one factor loading for each latent factor (and both for physical aggression) can be assumed to be invariant across contexts making another case for partial measurement invariance. Based on this last set of findings, a revised model was created with all but three of the factor loadings allowed to vary and was again noticeably improved from the previously constrained model (Δ SSA-BIC = 55.15).

At this point, we were able to test yet six more models with each item intercept freed across samples. Two of the models were appreciably better when the intercepts were freed (Δ SSA-BIC = 10.02–12.99). Specifically, both of the intercepts for the relational aggression and one for physical aggression and peer victimization could be considered to be invariant again supporting partial measurement invariance. Based on these results, a revised model was created with these four item intercepts constrained to be the same across samples and this was an improvement from the previously constrained model (Δ SSA-BIC = 23.02).

After testing for error variance, factor loading and intercept invariance, we could then free the latent factor variances (for peer victimization, and relational and physical aggression) separately. Each of these three models was a better fit when the factor variances were freed (Δ SSA-BIC = 13.50–43.11). This suggests that we cannot assume that the factors have the same variability across nations, but this is not surprising. As such, a revised model was run with each of the factor variances allowed to vary and it was a better fit to the data (Δ SSA-BIC = 60.16).

We were then able to test whether the models improved when the covariance between both forms of aggression were freed. Allowing the covariances to vary worsened the model fit (Δ SSA-BIC = -9.29) and as a result we could assume that the correlations between each form of aggression is consistent across samples. At this point, the models also allowed us to compare the latent means across samples. The Shanghai sample was designated (automatically in the output) as the

referent group to which the other samples were compared. Only two significant differences were observed in that the latent mean for relational aggression was significantly higher in Bogota in comparison to Shanghai ($\text{mean}_{\text{diff}} = .74$, $\text{S.E.} = .24$, $z = 3.01$, $p < .05$) and the latent mean for physical aggression was significantly higher in Curitiba ($\text{mean}_{\text{diff}} = 1.25$, $\text{S.E.} = .61$, $z = 2.04$, $p < .05$), again in comparison to Shanghai.

Lastly, we tested the associations between each form of aggression and peer victimization. The effect of physical aggression on victimization was released first, worsening the fit of the model ($\Delta\text{SSA-BIC} = -24.17$) suggesting that the association between physical aggression and peer victimization is uniform across the samples. When the effect of relational aggression was released, the model fit improved ($\Delta\text{SSA-BIC} = 13.57$) indicating that for relational aggression on the other hand, the association with peer victimization did vary between the countries. Overall, the relationship between relational aggression and peer victimization was not significantly positive in Colombia, and the positive relationship evident in the other samples appears strongest in China. It is important to note though that these differences in the relationship between each type of aggression and peer victimization are not necessarily evidence of lack of measurement invariance, but rather may reflect meaningful differences between the nations.

Together, results of measurement invariance analyses indicate partial measurement invariance, which is considered adequate for preliminary evidence to be drawn from cross-national comparisons (Brown, 2015; Kline, 2016). Table 1 contains the final model estimates of the tests for measurement invariance while Figure 1 illustrates which parts of the structural equation model are invariant across samples.

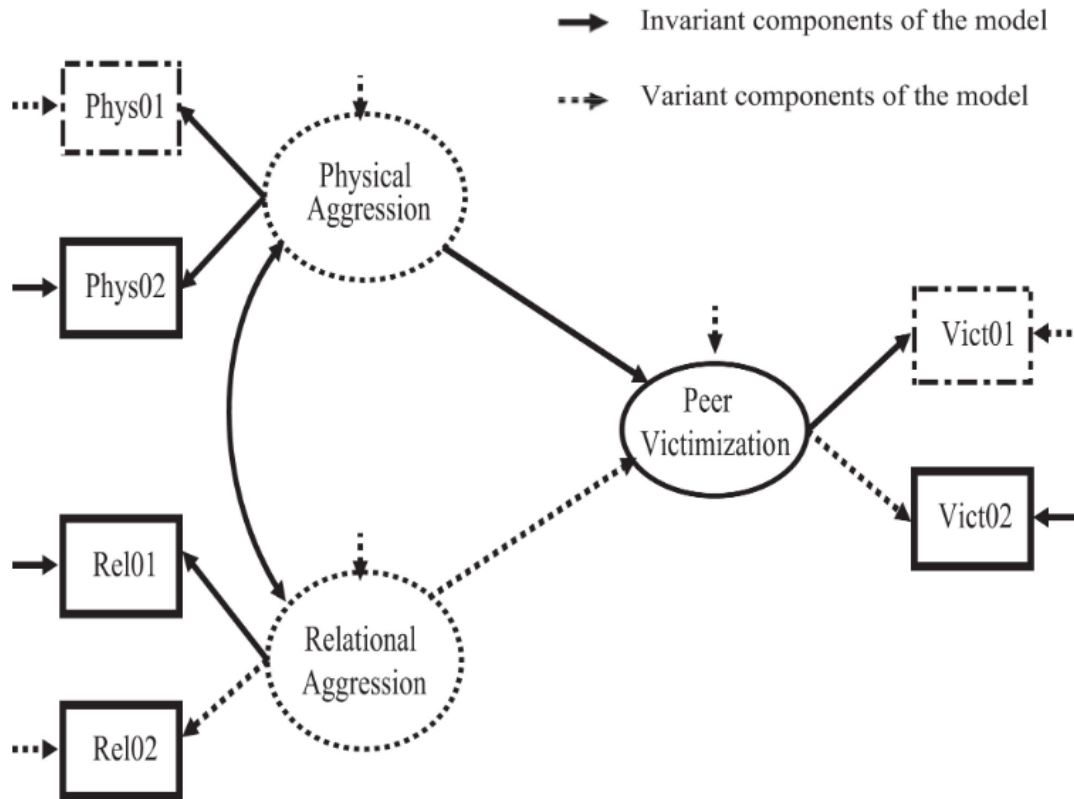


Figure 1. Conceptual illustration of the final measurement invariance model.

Note. Total $N = 865$: Canada $n = 179$, Brazil $n = 322$, Colombia $n = 273$, China $n = 91$. Content of items is as follows: Phys01 = someone who hits or pushes people; Phys02 = someone who gets involved in physical fights; Rel01 = someone who talks bad about others behind their backs to hurt them; Rel02 = someone who tries to keep others out of the group; Vict01 = others call him/her bad names; Vict02 = others try to hurt them.

Observed mean differences

See Appendix B for the descriptive statistics for the full sample and correlations for the full sample. Correlations for each country are presented, respectively, in Table 2. The hypothesized positive correlation between individual-level relational and physical aggression was supported in all samples. The correlations varied in magnitude between boys and girls for the full sample and for each country, but were consistently positive and significant.

Table 2. Zero-order correlations for each sample.

	Sample		Boys		Girls	
	Individual relational	Individual physical	Individual relational	Individual physical	Individual relational	Individual physical
CANADA						
Individual physical	.52***		.68***		.47***	
Peer victimization	.52***	.54***	.59***	.53***	.46***	.64***
Relational norm						
Physical norm		.25	.41			.79*
BRAZIL						
Individual physical	.64***		.68***		.49***	
Peer victimization	.63***	.59***	.63***	.60***	.60***	.53***
Relational norm						
Physical norm		.58**	.61*			.51
COLOMBIA						
Individual physical	.55***		.71***		.411***	
Peer victimization	.13*	.34***	.14	.29***	.13	.23*
Relational norm						
Physical norm		.43*	.73**			.65*
CHINA						
Individual physical	.32**		.41**		.75*	
Peer victimization	.72***	.37***	.74***	.29*	.85***	.64***
Relational norm						
Physical norm	.02					

Note. Total $N = 865$: Canada $n = 179$, Brazil $n = 322$, Colombia $n = 273$, China $n = 91$. Correlations between the physical and relational aggression norms could not be calculated for the Chinese sample due to the limited number of same-sex peer groups.

Factorial ANOVA analyses with least significant difference (LSD) post-hoc tests revealed gender and cross-national differences. As expected, boys engaged in more physical aggression than girls, $F(1, 857) = 106.55, p < .001$, partial $\eta^2 = .11$. In contrast, no main effect of gender emerged for relational aggression. There was a main effect of nation, $F(3, 857) = 3.99, p = .008$, partial $\eta^2 = .01$; relational aggression was significantly higher in Colombia than Brazil and significantly higher in Colombia than China, which matched the differences in the latent means. The interaction between nation and gender was also significant, $F(3, 857) = 5.71, p = .001$, partial $\eta^2 = .02$. One-way ANOVAs indicated that girls displayed higher levels of relational aggression than boys only in China, $F(1, 89) = 5.66, p = .019$. In Brazil, the reverse pattern was identified, $F(1,$

320) = 10.88, $p = .001$. No gender differences were identified in either Canada or Colombia (Figure 2). Analyses for peer victimization revealed significant gender differences, $F(1, 857) = 20.21, p < .001$, partial $\eta^2 = .02$, such that peer victimization was more prevalent for boys than girls, and by country, $F(3, 857) = 6.03, p < .001$, partial $\eta^2 = .02$, such that peer victimization was greater in Canada than Colombia and was greater in Brazil than Colombia.

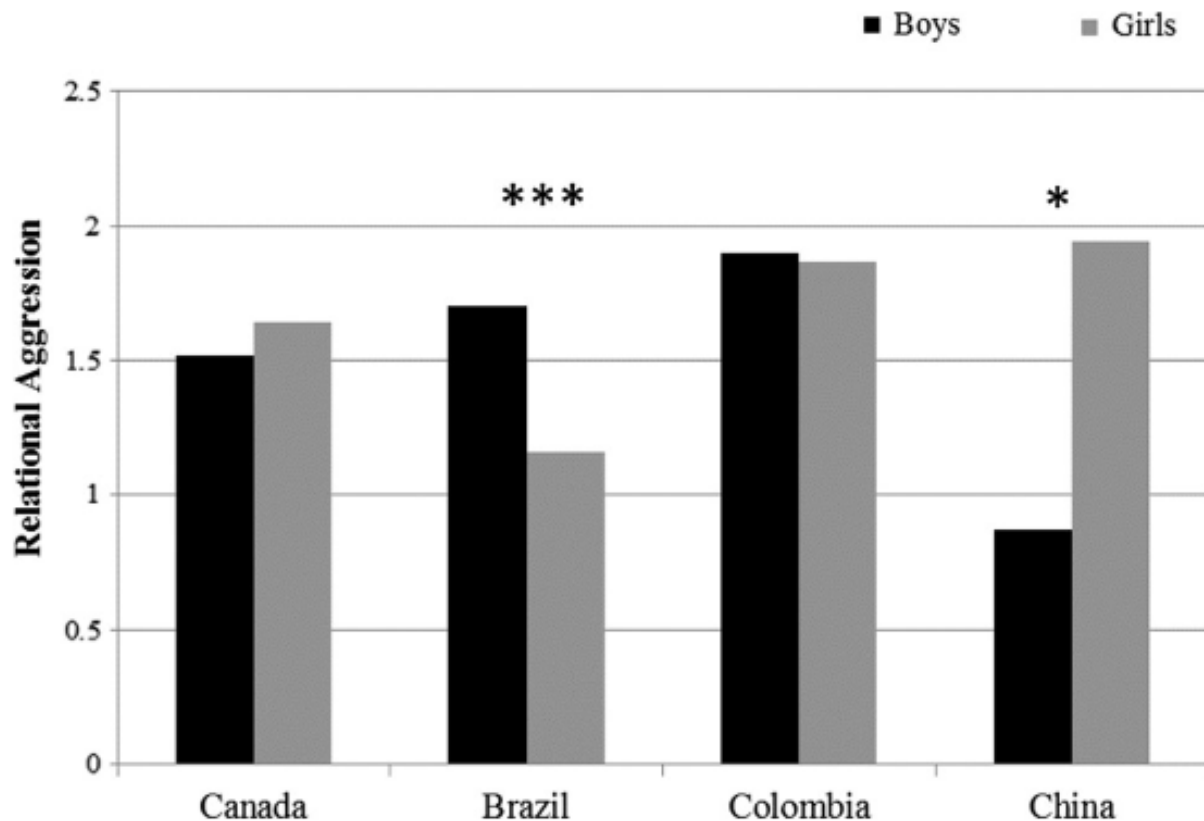


Figure 2. Gender differences in relational aggression in each sample *Note.* Total $N = 865$: Canada $n = 179$, Brazil $n = 322$, Colombia $n = 273$, China $n = 91$.
 $*p < .05$; $**p < .01$; $***p < .001$.

Multilevel modeling

The remaining analyses were conducted using multilevel modeling. The unconditional model included only the criterion, peer victimization. Intra-class correlations indicated that although most of the variability was at the within-group level (81.09%), there was also significant variability at the between-group level (18.91%; $\Delta\chi^2_{(67)} = 263.58, p < .001$).

Relational aggression was added first to the model. Relational aggression was a positive predictor of peer victimization, $b = 0.37$, $t(67) = 7.31$, $p < .001$; a proportional reduction in prediction error (PRPE = 24.43%) and significant improvement to the model resulted ($\Delta x^2_{(2)} = 194.67$, $p < .01$). Physical aggression was added next, and was also a positive predictor, $b = 0.26$, $t(67) = 6.75$, $p < .001$, leading to a PRPE of 11.25% and further improvement to the model ($\Delta x^2_{(3)} = 71.24$, $p < .01$). Relational aggression remained a significant predictor, $b = 0.19$, $t(67) = 3.41$, $p = .001$. To explain, consistent with the zero order correlations, higher relational and physical nominations are associated with more peer victimization nominations. It's also worth noting that there was significant variability across same-sex peer groups in peer victimization overall ($\chi^2_{(67)} = 137.18$, $p < .001$) and in the association with physical ($\Delta x^2_{(67)} = \chi^2_{(67)} = 94.33$, $p < .05$) and relational ($\Delta x^2_{(67)} = \chi^2_{(67)} = 127.70$, $p < .001$) aggression.

Age and the age interactions with physical and relational aggression were added next. Although there was no significant effect of age on victimization nominations, there was one significant interaction. The positive association between physical aggression and peer victimization was weaker among older children. The addition of age and the interactions with aggression led to a proportional reduction in prediction error (PRPE = 10.90%) and significant improvement to the model ($\Delta x^2_{(3)} = 331.63$, $p < .001$).

Next, cross-national differences were examined. Cross-national differences in peer victimization emerged, $b = 0.25$, $t(62) = 3.33$, $p < .001$; there were more nominations in Brazil than Colombia. The resulting PRPE was 10.08%, with significant improvement to model fit observed ($\Delta x^2_{(3)} = 12.26$, $p < .01$). Similar to the results from the tests for measurement invariance, there was no difference across samples in the association between physical aggression and peer victimization. Nevertheless, cross-national differences in the relationship between relational aggression and peer victimization emerged. The relationship was weaker in Brazil and Colombia than in China, $b = -0.09$, $t(62) = 1.99$, $p < .05$, and stronger in Brazil than in Colombia, $b = 0.26$, $t(62) = 3.94$, $p < .001$. Overall, the relationship between relational aggression and peer victimization was only negative in Colombia, and the positive relationship evident in the other samples appears strongest in China. These effects were associated

with a PRPE of 44.88% and significant improvement to modeling of the relational aggression slope ($\Delta\chi^2_{(3)} = 39.46, p < .001$; Figure 3). These cross-national differences match those from the analyses of measurement invariance.

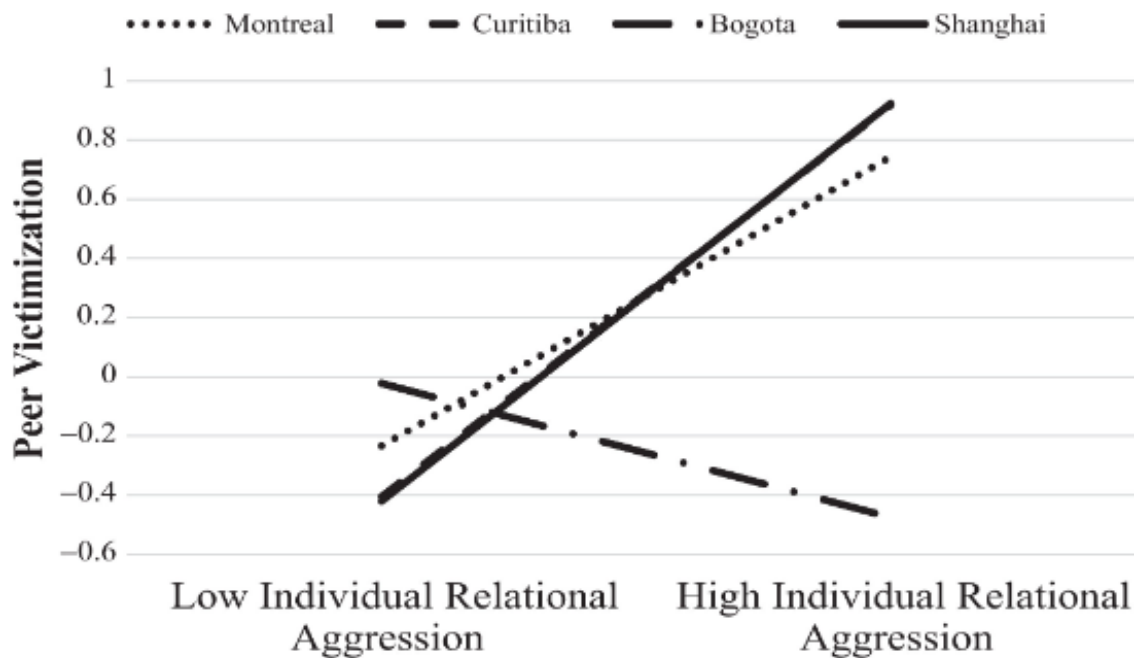


Figure 3. Cross-national differences in the relationship between relational aggression and peer victimization.

Note. $N = 865$.

Gender of the same-sex peer group was added next. There was no significant main effect, $b = -0.02, t(61) = .110, p > .05$, although the PRPE (2.29%) and improvement in the model ($\Delta\chi^2_{(1)} = 3.72, p = .05$) was significant; boys received more peer victimization nominations than girls. More interestingly, gender moderated the effect of physical aggression on peer victimization however, $b = 0.154, t(61) = 1.93, p < .05$; the relationship was stronger for girls than boys. This effect led to a PRPE of 7.03% and further improved modeling of the physical aggression slope ($\Delta\chi^2_{(1)} = 4.48, p < .05$). There was not a significant interaction between gender and relational aggression, $b = -0.04, t(64) = -0.40, p > .05$, and no significant PRPE (3.09%) or improvement to modeling of the relational aggression slope ($\Delta\chi^2_{(1)} = 1.07, p > .05$).

Next, same-sex peer group norms of physical aggression were added. A main effect was present with same-sex peer groups higher in physical aggression nominations having higher victimization nominations overall, $b = 0.28$, $t(60) = 2.93$, $p > .05$ (PRPE = 12.56%; $\Delta\chi^2_{(1)} = 6.28$, $p > .05$). Although the interaction between individual-level physical aggression and the peer group norms of physical aggression was just shy of statistical significance, $b = -0.07$, $t(60) = -1.94$, $p = .06$, the effect resulted in significant PRPE (10.44%) and improvement to modeling of the individual-level physical aggression slope ($\Delta\chi^2_{(1)} = 7.59$, $p < .01$); the relationship between individual-level physical aggression and peer victimization is stronger in peer groups in which physical aggression is less normative (Figure 4). victimization is stronger in peer groups in which physical aggression is less normative (Figure 4). There was no significant interaction between individual-level relational aggression and the physical aggression norms, $b = 0.03$, $t(60) = .56$, $p > .05$; a PRPE of 10.98% nor improved modeling of the individual-level relational aggression slope ($\Delta\chi^2_{(1)} = .28$, $p > .05$).

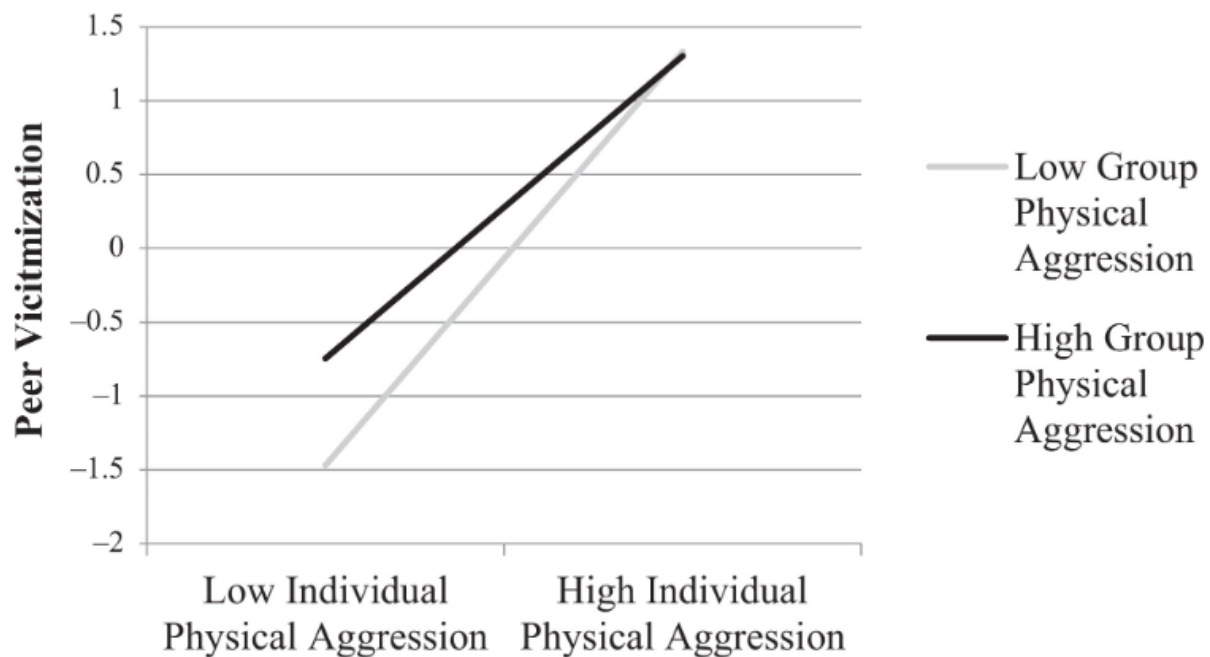


Figure 4. The moderating influence of same-sex peer group physical aggression on the relationship between physical aggression and peer victimization.

Note. $N = 865$.

Same-sex peer group norms of relational aggression were added last. A main effect emerged, $b = 0.38$, $t(59) = 3.09$, $p < .05$; there was more peer victimization in peer groups with a higher prevalence of relational aggression. A significant PRPE (28.63%) and improvement in the model ($\Delta x^2_{(1)} = 21.70$, $p < .05$) was observed. The interaction between individual-level relational aggression and the peer group norm of relational aggression was not significant, $b = -0.03$, $t(59) = .45$, $p > .05$. However, the addition of the relational aggression norms to the slope of individual-level relational aggression was associated with a PRPE of 20.65% and significant improvement to modeling of the individual-relational aggression slope ($\Delta x^2_{(1)} = 4.14$, $p < .05$), providing some support that the effect of individual-level relational aggression on peer victimization is stronger in peer groups in which relational aggression is less normative (Figure 5). There was no significant interaction between individual-level physical aggression and the relational aggression norm, $b = -0.06$, $t(59) = -.01$, $p > .05$, nor a significant PRPE or improvement to modeling of the individual-level physical aggression slope ($\Delta x^2_{(1)} = .56$, $p > .05$). Final model estimates are provided in Table 3.

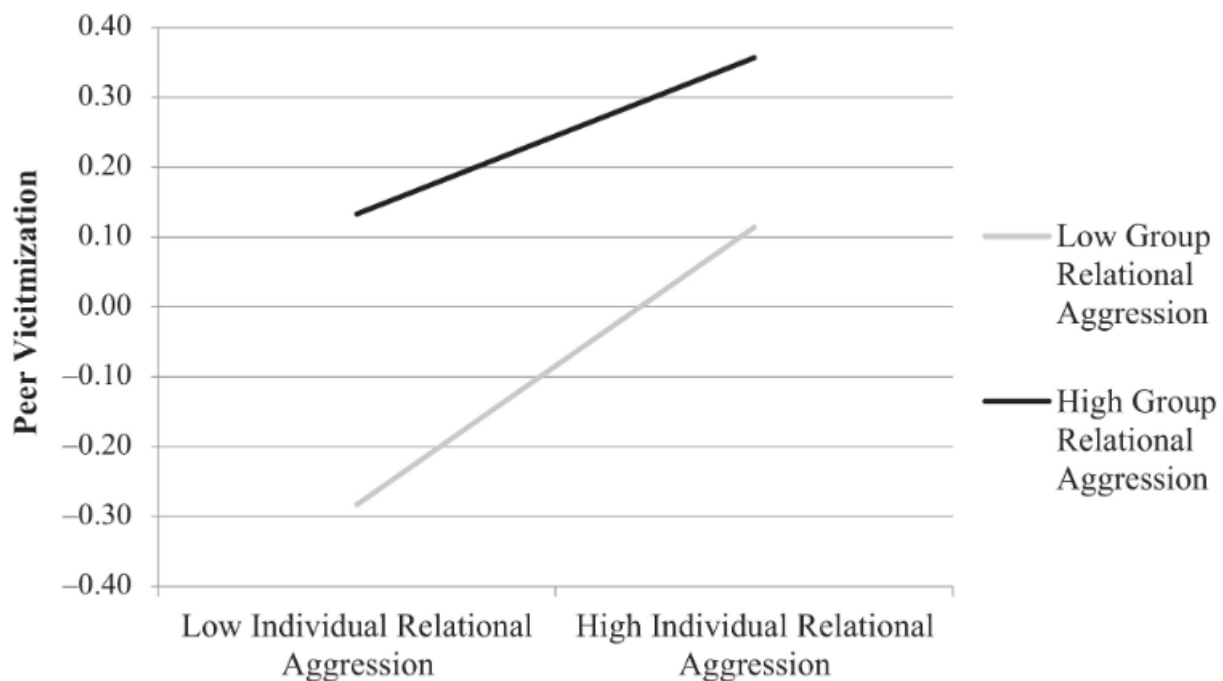


Figure 5. The moderating influence of same-sex peer group relational aggression on the relationship between relational aggression and peer victimization.

Note. $N = 865$.

Table 3. Final model results including individual level and group level effects

Predictors	<i>b</i>	<i>Lower CI₉₅</i>	<i>Upper CI₉₅</i>	<i>t(df)</i>
Intercept/Constant	.23	.03	.43	2.266 (59)
<i>Group physical norm</i>	.11	-.09	.31	1.131(59)
<i>Group relational norm</i>	.38	.14	.62	3.092 (59)**
<i>Group gender</i>	.14	-.17	.45	.845 (59)
<i>Contrast: Montreal compared other samples</i>	.05	-.05	.15	1.159 (59)
<i>Contrast: Shanghai compared to South America</i>	-.15	-.37	.07	-1.364 (59)
<i>Contrast: Curitiba compared to Bogota</i>	.28	.14	.42	3.818 (59)***
Individual physical aggression	.31	.21	.41	6.285 (59)***
<i>Group physical norm</i>	-.06	-.14	.02	-1.581 (59)
<i>Group relational norm</i>	-.01	-.09	.07	-.361 (59)
<i>Group gender</i>	.05	-.15	.25	.512 (59)
<i>Contrast: Montreal compared other samples</i>	.00	-.04	.04	.137 (59)
<i>Contrast: Shanghai compared to South America</i>	.01	-.09	.11	.168 (59)
<i>Contrast: Curitiba compared to Bogota</i>	-.01	-.11	.09	-.274 (59)
Individual relational aggression	.20	.10	.30	4.345 (59)***
<i>Group physical norm</i>	.03	-.07	.13	.573 (59)
<i>Group relational norm</i>	-.03	-.17	.11	-.447 (49)
<i>Group gender</i>	-.02	-.24	.20	-.199 (59)
<i>Contrast: Montreal compared other samples</i>	.02	-.02	.06	.833 (59)
<i>Contrast: Shanghai compared to South America</i>	-.10	-.20	.00	-1.808 (59)
<i>Contrast: Curitiba compared to Bogota</i>	.24	.20	.38	3.48 (59)***
Age	-.09	-.33	.15	-.728 (664)
Age by Physical aggression interaction	-.46	-.91	-.01	-1.973 (664)*
Age by Relational aggression interaction	.30	.05	.65	1.675 (664)

Note. *N* = 865. Italics indicate group-level predictors.

p* < .05; *p* < .01; ****p* < .001.

Discussion

Consistent with the contextual framework, results support that the relationship between aggression and peer victimization varies as a function of multiple contextual factors; nation of the sample, gender and peer group norms were implicated as relevant sources of this variation. As hypothesized, consistent with previous research (Ostrov & Godleski, 2013), both physical and relational aggression positively predicted peer victimization. As proposed, contextual influences on these associations differed by the type of aggression.

Mean-level differences in peer victimization were observed, with the greatest prevalence in Brazil and lowest in Colombia. Consistent with proposition that evaluations of relational aggression may be particularly vulnerable to cultural variation,

cross-national differences were also identified in the relationship between relational aggression and peer victimization; positive relationships were observed in all samples, with the exception of Colombia. The positive relationship, though differing in magnitude across cultures, is in line with the proposition that relational aggression is a risk factor for peer victimization. It may seem inconsistent that this relationship is negative in Colombia. However, aspects of the national context may explain this discrepancy. Most notably, exposure to violence may be greater in Colombia (Chaux, Molano, & Podlesky, 2009), which is associated with greater endorsement of aggression (Molano, Torrente, & Jones, 2015). Thus, there may be a normalization of aggression, eliminating the misfit effect. Normalization is further supported by the greater normativeness of relational aggression in Colombia.

The proposed misfit effect for gender norms was only supported for physical aggression. The presence of a consistent physical aggression norm for boys across all samples and lack of a consistent relational aggression norm for girls may account for this; the misfit effect would only be expected to occur when there is a gender disparity between the normativeness of each type of aggression. As expected, the misfit effect concerning the contextual influence of peer group norms was supported for both relational and physical aggression; for both types, the relationship between individual-level aggression and peer victimization was stronger in peer groups in which that form of aggression was less normative.

Importantly, the misfit effect of gender norms for physical aggression, and of peer group norms for both forms of aggression, emerged even when controlling for cross-national differences. Therefore, as an extension of previous research, this study provides clear evidence for these dynamics in a large multinational sample. Thus, in contrast to previous literature, the current study allowed for direct comparison of the relationships of physical and relational aggression with peer victimization within a multinational sample and demonstrating differences in the associations above and beyond any effects of place. Together, the results of this study provide evidence of both consistency (i.e., gender and peer group norm influences) and diversity (i.e., cross-national differences).

Limitations

Perhaps most importantly, the bidirectional nature of the relationship between aggression and peer victimization must be acknowledged; that is, aggression has been established as a predictor of peer victimization, but aggressive behavior is likely reinforced by peer victimization (e.g. Ostrov, 2010; Ostrov & Godleski, 2013; Schwartz et al., 1999). Unfortunately, the current cross-sectional study did not allow for such reciprocal relationships to be evaluated.

Although the current study differentiated between physical and relational aggression, further distinctions (e.g. proactive or reactive), which may have differential effects on peer relations (Xu & Zhang, 2008), would have allowed for more nuanced analyses. Similarly, the current data did not allow for distinguishing between physical and relational forms of peer victimization, which may have unique relationships with different forms of aggression (Ostrov & Godleski, 2013).

An important demographic variable that was not assessed in these analyses is SES. Because lower SES is associated with greater exposure to violence (Foster, Brooks-Gunn, & Martin, 2007), influencing attitudes towards aggression (Molano et al., 2015), SES likely influences normativeness or acceptableness of aggressive behaviors, which may affect the degree to which aggression is a risk factor for victimization.

The reliability of data may also present a limitation. The primary concern is that although partial measurement invariance was established, justifying cross-national comparisons (Brown, 2015; Kline, 2016), there were still some differences among the characteristics of the items and constructs across nations. Therefore, all results, particularly those concerning cross-national differences, must be interpreted with caution. In the current study, the limited number of items and considerably skewed distributions posed significant challenges to the attempt to establish measurement invariance. However, thorough analyses of measurement invariance of peer nomination items assessing physical and relational aggression and peer victimization should be pursued further. Finally, it must be considered that the size of the sample recruited from China ($n = 91$) is smaller than that of the remaining three samples, such that this sample is not as well represented in the aggregate data.

Future directions

In addition to addressing the limitations of this study, the results illuminate potentially fruitful future directions. In particular, this research calls for further examination of contextual influences on peer relations. This entails exploring different types of peer relations (e.g. cyberbullying), and different contexts, including different levels of context (e.g. the school or community) as well as different features of these contexts (e.g. exposure to aggression).

A future direction of high priority is clarifying the nature of cross-national differences. A great challenge will be establishing measurement invariance, a prerequisite for reliable effects. However, the lack of established measurement invariance does not necessarily nullify the meaningfulness of cross-cultural effects, and replication in additional countries with diverse values, norms, demographics, and sociohistorical characteristics is warranted.

Even more pressing is the need to identify factors that account for cross-national differences. Societies' ascriptions to individualism or collectivism may be a useful starting point due to both differences in the acceptance of conflict and evidence that levels of aggression covary with these orientations (higher in individualistic cultures; Bergmuller, 2013). The assessment of other national differences, such as socioeconomic and sociohistorical contexts, are also highly recommended because they influence cultural norms and values that may affect expressions and reactions to aggression.

Implications

Ultimately, this research is intended to inform efforts to better combat the serious consequences of peer victimization. Recognition of contributing and reinforcing factors is the first step in the development of more effective prevention and intervention programs.

The contextual approach of the current study may lend well to applications for group-level and culturally-appropriate programs. For example, the observed effects of peer group norms indicate that interventions may be more successful if they target social norms as well as individual behaviors. Based on previous studies of exposure to

contexts in which aggression is normative (Kuppens, Grietens, Omghena, Michiels, & Subramanian, 2008), it is possible that even when positive effects of interventions are seen in particular individuals, these effects may not persist if the behaviors are still normative in the social context.

Applications to the development of culturally-appropriate programs must consider the norms, values, and circumstances specific to different cultural contexts. Cross-national differences in the relationship between relational aggression and peer victimization suggests that culture-specific expressions and goals of relational aggression should be taken into account, within a contextual perspective which addresses the unique socioeconomic and sociohistorical environments.

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Appendix A

Participant characteristics for each sample

Sample	Sample size	Grade distribution	Gender distribution	Ages
Montreal, Canada	179	5th grade: $n = 73$ (41%)	Boys: $n = 94$ (53%)	$M = 10.67$
		6th grade: $n = 106$ (59%)	Girls: $n = 85$ (47%)	$SD = 0.55$
Bogota, Colombia	273	5th grade: $n = 138$ (50%)	Boys: $n = 151$ (55%)	$M = 11.37$
		6th grade: $n = 135$ (50%)	Girls: $n = 122$ (45%)	$SD = 0.83$
Curitiba, Brazil	322	5th grade: $n = 322$ (100%)	Boys: $n = 180$ (56%)	$M = 10.26$
			Girls: $n = 142$ (44%)	$SD = 0.97$
Shanghai, China	91	6th grade: $n = 91$ (100%)	Boys: $n = 49$ (54%)	$M = 13.45$
			Girls: $n = 42$ (46%)	$SD = 0.65$

Appendix B

Descriptive statistics and correlations for the full sample

	Both Gender				Boys				Girls			
	<i>M</i>	<i>SD</i>	Min	Max	<i>M</i>	<i>SD</i>	Min	Max	<i>M</i>	<i>SD</i>	Min	Max
Individual relational ^a	1.61	1.72	0.00	14.00	1.64	1.72	0.00	11.00	1.57	1.71	0.00	14.00
Individual physical ^a	1.71	2.22	0.00	15.00	2.48	2.62	0.00	15.00	0.78	1.00	0.00	6.50
Peer victimization ^a	1.29	1.58	0.00	10.50	1.56	1.75	0.00	10.50	0.97	1.27	0.00	8.50
Relational norm ^b	1.53	0.79	0.00	3.50	1.59	0.75	0.63	3.50	1.47	0.83	0.00	3.07
Physical norm ^b	1.54	1.11	0.00	4.82	2.38	0.89	0.70	4.82	0.70	0.53	0.00	1.87
	Individual relational		Individual physical		Individual relational		Individual physical		Individual relational		Individual physical	
Individual Physical ^a	.53***				.66***				.44***			
Peer victimization ^a	.43***		.46***		.44***		.43***		.46***		.52***	
	Relational norm				Relational norm				Relational norm			
Physical norm ^b	.37**				.56**				.42*			

Note. ^a $N = 865$; for boys, $n = 473$; for girls, $n = 392$; ^b $N = 68$; for boys, $n = 34$; for girls, $n = 34$. Min = minimum value, Max = maximum value. Individual Relational = individual-level relational aggression; Individual Physical = individual-level physical aggression; Relational Norm = classroom mean level of relational aggression; Physical Norm = classroom mean level of physical aggression. * $p < .05$, ** $p < .01$, *** $p < .001$.