A cross-regional study of the reactive and proactive aggression of youth in Spain, Uruguay, mainland China, and Hong Kong

Annis Lai Chu Fung | Xiang Li | Martín J. Ramírez | Bess Yin-Hung Lam | Luis Millana | Natalia E. Fares-Otero

1 City University of Hong Kong | 2 The Hong Kong Polytechnic University | 3 Complutense University of Madrid | 4 University Hospital Zurich

Correspondence
Annis Lai Chu Fung, Department of Applied Social Sciences, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong.
Email: annis.fung@cityu.edu.hk

Funding information
General Research Fund, Grant/Award Number: 141613

Abstract
This study is the first attempt to measure reactive and proactive aggression in 1,203 youths aged between 11 and 20 from Hong Kong, mainland China, Spain, and Uruguay using the reactive-proactive aggression questionnaire (RPQ). The two-factor RPQ construct was found to exhibit an excellent model fit for all subsamples, and the measurement and structural invariance across the four regions was also revealed. After controlling for age, the youth in Uruguay exhibited the highest levels of general, reactive, and proactive aggression, followed by Spain, Hong Kong, and mainland China. Reactive, proactive, and general aggression increased with age in the total sample, but the effects differed among regions. Boys were found to exhibit higher levels of general, reactive, and proactive aggression than girls only in the Uruguayan sample. These findings confirmed the cross-cultural generalizability of the two-factor RPQ model, and suggested culture, age, and gender to be significant determinants of youth aggression.

KEYWORDS
cross-cultural comparisons, four regions, proactive aggression, reactive aggression, youths

1 INTRODUCTION

Reactive and proactive aggression have been widely recognized as distinct subtypes of aggression for more than two decades (Cima, Raine, Meesters, Popma, 2013; Dodge & Coie, 1987; Fung, Gerstein, Chan, & Engebretson, 2015; Raine et al., 2006). Reactive aggression is defined as aggressive behavior in response to provocation or perceived threat, while proactive aggression is defined as goal-oriented and calculated aggression performed to obtain external rewards (Cima et al., 2013). The two subtypes demonstrated a differentiated relationship with youth’s behaviors. Vitaro, Gendreau, Tremblay, and Oligny (1998) found that only proactive aggression predicts delinquency, oppositional
defiant disorder, and conduct disorders, but not reactive aggression. Stevens and Hardy (2013) also found proactive aggression to be the only predictor of adolescents’ involvement and psychological investment in fights. In contrast, Fite, Rubens, Preddy, Raine, and Pardini (2014) found only reactive aggression in adolescent have association with internalizing problem (i.e., depression and anxiety). The distinction represented two underlying roots of aggressive behaviors and thus suggested meaningful implication in treating youth aggression (Coie & Koepp, 1990).

The identification of subtypes of aggression contributed to effective therapeutic outcome of aggression intervention (Fung, 2012). Most antibullying programs were criticized that little emphasis is put on the heterogeneous causes and functions of aggression (e.g., Raine et al., 2006). The distinction between proactive and reactive aggression sheds light on differential etiology of aggression (Crick & Dodge, 1996; Dodge, 1991) and has been proven to be superior to a one-factor general aggression model in many studies (Fung, Raine, & Gao, 2009; Raine et al., 2006; Xu & Zhang, 2008). The reactive-proactive aggression questionnaire (RPQ), first developed by Raine et al. (2006), was commonly used to differentiate and measure reactive and proactive aggression. RPQ has been validated in the United States and many other regions, such as mainland China (Li & Fung, 2015), Hong Kong (Fung et al., 2009), Singapore (Ang, Huan, Li, & Chan, 2016), Turkey (Baş & Yurdabakan, 2012), and Italy (Fossati et al., 2009).

Studies on developmental trajectory of reactive and proactive aggression have yielded inconsistent results. Barker, Tremblay, Nagin, Vitaro, and Lacourse (2006) found that the majority of Canadian boys with low to average socio-economic levels showed stable or desisting trajectory, while only a small proportion of boys showed increased proactive and reactive aggression from the age of 13 to the age of 15, followed by a decrease thereafter. However, Jia, Wang, and Shi (2014) found that levels of both reactive and proactive aggression among Chinese preschooler increased with age; Baş and Yurdabakan (2012) also found that the reactive aggression and proactive aggression of Turkish children generally increased from Grade 4 to Grade 7, with slight decrease in Grade 8. Fung et al. (2009) found that reactive aggression generally increased with age among Hong Kong students, but proactive aggression increased only in boys but not girls. In spite of the unclear results yielded from different regional-bound studies, no cross-regional studies have been conducted to date on effects of age on reactive and proactive aggression.

Previous studies also generated inconsistent findings on the effects of gender on reactive and proactive aggression. Skripkauskaite et al. (2015) surveyed 482 Dutch adolescents, and found that boys exhibited higher levels of reactive and proactive aggression than girls. Li and Fung (2015) found that gender exerted influence on proactive but not reactive aggression in Chinese adolescents. In a survey of 200 Grade 9–12 Latino adolescents at risk of dropping out of school in the United States, researchers found males and females exhibit similar levels of reactive and proactive aggression (Evans, Fite, Hendrickson, Rubens, & Mages, 2015). These inconsistent findings may be due to differences between the sampled culture and regions. It remained unclear whether the effects of gender on reactive aggression and proactive aggression would vary across regions.

The cultural differences which led to inconsistent findings on aggression shall be defined as the interaction between individuals’ social environment and their ideas and beliefs (Harrison & Turner, 2011; López & Guarnaccia, 2000). In a cross-cultural study conducted in the United States (Baker, Raine, Liu, & Jacobson, 2008), African American children exhibited significantly higher levels of both reactive and proactive aggression than Hispanic American, Asian American, and Caucasian children. In another cross-regional study (Ang, Huan, & Florell, 2014), American adolescents displayed higher levels of reactive and proactive aggression than Singaporean adolescents. These findings implied that the manifestation of aggression varied across cultures.

Cultural differences might in part explain cross-regional disparities in levels of reactive and proactive aggression and unclear findings regarding the effects of age and gender. To the best of our knowledge, no previous studies have compared the reactive and proactive aggression level across Asian, European, and South American populations. The current study is the first attempt to compare the effects of age and gender on reactive and proactive aggression exhibited by young people in Asia, Europe, and South America.

The study sample is recruited from four regions for the current study and they are grouped into two pairs according to their geographic and culture region. Spain and Uruguay represented the Western culture. Because of the history of colonization by Spanish and Portuguese and European immigrants in 19th century, Uruguay was heavily influenced...
by the European culture (Kent & Kleinpenning, 1996). The most prominent influence is the language. Spanish is still
the official language of Uruguay. Furthermore, 87.7% of the population in Uruguay is European descendant (Cabella,
Nathan, & Tenenbaum, 2011). Both countries were influenced by the Catholic culture too (Gonzalez & Gonzalez,
2007). Although Uruguay shared great similarity with Spain, it also received culture influences from its other European
immigrants, as well as African and native American. For example, Uruguay is relatively more collectivistic in comparison
with Spain, especially with the emphasis of family relationship (Hofstede, 2010). However, as a recently developed
country, Uruguay suffers a growing crime threats, especially the robbery crime (Munyo, 2015), while Spain has a more
stable economy and well-developed social service system that maintain a lower crime rate (Bourguignon, 2001).

On the other hand, mainland China and Hong Kong represented the Eastern culture. They are both influenced by
the traditional Confucian values (Ralston, Gustafson, Elsass, Cheung, & Terpstra, 1992). Like Uruguay and Spain, Hong
Kong and mainland China shared the same ethnic and language background despite their different dialects. However,
Hong Kong is considered more westernized because of the colonization by British for over 150 years (Lam, Lau, Chiu,
Hong, & Peng, 1999). Previous study had found that Hong Kong Chinese are preferred personal-intrinsic value than
mainland Chinese (Lau, 1992). The two also have major differences in terms of the education policy (Chan & Mok,
2001) and political culture (Chu & Chang, 2001). Participants of mainland China were recruited from Fuzhou, which is
also a port city with rapid growing economy and allows meaningful comparison with Hong Kong.

To fill these gaps in existing literature, the following hypotheses were developed and tested:

1. The two-factor RPQ model is applicable to all four regions.
2. The measurement and structural invariance of the two-factor structure of the RPQ are established across the four
different regions.
3. Young people in Uruguay (South America) and Spain (Europe) have higher levels of reactive and proactive aggres-
sion than those in Hong Kong and mainland China (Asia).
4. Reactive aggression and proactive aggression increase with age in Asia, Europe, and South America.
5. Young males have higher levels of reactive and proactive aggression than young females in Asia, Europe, and
South America.

2 | METHOD

2.1 | Participants

The participants comprised 1,203 young people aged between 11 and 20 (M<sub>age</sub> = 14.5, SD = 1.51, 8 did not report their age),
who were recruited as volunteers from high schools in four regions across the East and the West: Hong Kong (n = 329; 193
boys, 131 girls; M<sub>age</sub> = 14.0, Min<sub>age</sub> = 12, Max<sub>age</sub> = 20, SD = 1.30), mainland China (n = 394; 200 boys, 194 girls;
M<sub>age</sub> = 13.3, Min<sub>age</sub> = 11, Max<sub>age</sub> = 16, SD = 0.90), Spain (n = 153; 90 boys, 63 girls; M<sub>age</sub> = 15.0, Min<sub>age</sub> = 12, Max<sub>age</sub> = 17,
SD = 1.33), and Uruguay (n = 327; 147 boys, 180 girls; M<sub>age</sub> = 16.0, Min<sub>age</sub> = 13, Max<sub>age</sub> = 17, SD = 0.90). Six hundred and
thirty (52.6%) of the participants were male and 568 (47.4%) were female (5 did not report their gender). In Hong Kong, the
participants were recruited from high schools in the New Territories. In mainland China, the participants were recruited from
high schools in Fuzhou. The participants in Spain and Uruguay were recruited from high schools in Madrid and Montevideo,
respectively. None of the participants presented with pathological, neurological, or psychiatric symptoms. Written informed
consent was obtained from each participant, and parents also gave assent to allow their children to participate in the survey
in the four regions. The participants were asked to fill out the RPQ (Raine et al., 2006) in their respective classrooms.

2.2 | Measure

A 23-item, self-reported version of the RPQ (Raine et al., 2006) was used to assess the participants’ reactive aggression
and proactive aggression. The participants reported the frequency of their engagement in aggressive behavior on a 3-
point scale ranging from 0 (never) to 2 (often). The RPQ consisted of two subscales: reactive aggression (11 items) and proactive aggression (12 items). A score for general aggression was computed by summing the scores for all 23 items, and reactive-aggression and proactive-aggression scores were computed by summing the scores for their respective items. The construct validity, criterion validity, convergent validity, and discriminant validity of the RPQ were confirmed by Raine et al. (2006). In addition, Raine et al. (2006) obtained satisfying reliability: 0.90 (general aggression), 0.84 (reactive aggression), and 0.86 (proactive aggression). The RPQ has been adapted for use in Hong Kong (Fung et al., 2009), mainland China (Li & Fung, 2015), Spain (Peña Fernández, Andreu Rodríguez, Barriga, & Gibbs, 2013), and Uruguay (Fares, Cabrera, Lozano, Salas, & Ramírez, 2012) before, and in each case has been found to exhibit a high degree of internal consistency, with Cronbach’s α values of 0.83, 0.78, 0.84, and 0.77 for reactive aggression and 0.89, 0.85, 0.87, and 0.78 for proactive aggression, respectively. This study employed the Chinese version of RPQ validated in the cross-cultural study by Fung et al. (2009) in mainland China and Hong Kong, and demonstrated a good to excellent internal consistency 0.88, 0.83, and 0.80 for general aggression, reactive aggression, and proactive aggression, respectively. The Cronbach’s α values obtained for the subsamples ranged from 0.80 to 0.88 (general aggression), 0.73 to 0.82 (reactive aggression), and 0.71 to 0.84 (proactive aggression).

3 | RESULTS

3.1 | Confirmatory factor analysis

To determine the cross-cultural validity of the two-factor (reactive aggression and proactive aggression) model, its fitness for use with each subsample was first assessed using LISREL 8.7 (Jöreskog & Sörbom, 2004). Diagonally weighted least squares estimation was used because of its fit for ordinal data (Jöreskog, 2005). The comparative-fit index (CFI), incremental-fit index (IFI), non-normed fit index (NNFI), and root mean square error of approximation (RMSEA) were used to evaluate model fit. CFI, IFI, and NNFI values higher than 0.90 were considered to indicate an acceptable fit (Bentler, 1992), and values higher than 0.95 were taken to indicate a good fit. RMSEA values smaller than 0.06 indicated a good fit (Hu & Bentler, 1999). As shown in Tables 1 and 2, the two-factor RPQ model was found to be suitable for use with each of the four samples.

3.2 | Multigroup confirmatory factor analysis

Multigroup confirmatory factor analysis (MGCFA) was conducted to determine whether the two-factor RPQ model was similarly applicable to youths in Hong Kong, mainland China, Spain, and Uruguay. Seven models were assessed using MGCFA to examine the measurement (i.e., configural, metric, scalar, and error variance) and structural (i.e., factor variances, factor covariances, and factor means) invariance of the two-factor structure of the RPQ across the different four regions. In Model 1 (i.e., configural invariance), no equality constraints were imposed on factor loadings, item intercepts, error variances, factor variances and covariances, and factor means. A series of progressively restrictive invariance models across the four regions is following (Vandenberg & Lance, 2000). In a sequential manner, based on Model 1, Model 2 further constrained factor loadings equally across regions to test metric invariance; Model 3 further constrained item intercepts equally across regions to test scalar invariance; Model 4 further constrained error variances equally across regions to test error variance invariance; Model 5 further constrained factor variances equally across regions to test factor variance invariance; Model 6 further constrained factor covariances equally across regions to test factor covariance invariance; and last, Model 7 further constrained factor means equally across regions to test factor mean invariance. The CFI change (i.e., ΔCFI) smaller than or equal to 0.01 recommended by Cheung and Rensvold (2002) was employed as an indicator of factorial invariance due to the over-sensitivity of Δχ² to misfit. Results of the seven successively restrictive invariance models indicate the measurement and structural invariance across the four regions based on ΔCFI ≤ 0.01 (see Table 2).
Comparison of RPQ scores across regions

Results from Pearson correlations suggested that participants’ age was significantly and positively correlated with general aggression, $r = .39$, $p < .001$, reactive aggression, $r = .40$, $p < .001$, and proactive aggression $r = .30$, $p < .001$. Reactive aggression ($r = .28$, $p < .001$) and general aggression ($r = .23$, $p < .01$) increased with age in Spain, but age was found to cast no significant effect on general, reactive, nor proactive aggression in Hong Kong, mainland China, and Uruguay samples. Details were presented in Table 3. The respondents in the four subsamples also differed significantly in age, $F(3, 1194) = 381.2$, $p < .001$. The Uruguayan respondents were the oldest ($M_{age} = 16.0$), followed by those from Spain ($M_{age} = 15.0$), Hong Kong ($M_{age} = 14.0$), and mainland China ($M_{age} = 13.3$). As age was associated with RPQ scores and country, age was treated as a covariate; the group means were adjusted for age differences between the subsamples.

After controlling for age, 2 (gender) × 4 (country) analysis of covariance was used to identify cross-regional differences in the subtypes of aggression. The means of aggression scores adjusted for age were presented in Table 4.

### 3.3.1 General aggression

The covariate of age was found to have a significant effect on general aggression, $F(1, 1186) = 5.16$, $p = .023$. Country was also found to have a significant main effect, $F(3, 1186) = 64.4$, $p < .001$. Bonferroni post hoc comparisons revealed that the young people in Uruguay displayed more general aggression than those in Spain, $p < .006$, who in turn reported significantly higher levels of general aggression than the respondents in Hong Kong and mainland China, $ps < .001$. The two Asian samples reported similar levels of general aggression, $p > .05$. Overall, gender was found to have a significant effect on general aggression: male respondents were more aggressive than female respondents, $F(1, 1186) = 6.27$, $p = .012$. In addition, gender and country were found to have a significant interaction effect, $F(3, 1186) = 5.86$, $p = .001$.

### Table 1: Factor loadings and internal consistency of two-factor RPQ by region

<table>
<thead>
<tr>
<th>Items</th>
<th>Reactive aggression</th>
<th>Proactive aggression</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yells when annoyed</td>
<td>0.51</td>
<td>0.45</td>
</tr>
<tr>
<td>3. Angry when provoked</td>
<td>0.60</td>
<td>0.31</td>
</tr>
<tr>
<td>5. Angry when frustrated</td>
<td>0.47</td>
<td>0.22</td>
</tr>
<tr>
<td>7. Has temper tantrums</td>
<td>0.55</td>
<td>0.31</td>
</tr>
<tr>
<td>8. Damages things when angry</td>
<td>0.63</td>
<td>0.47</td>
</tr>
<tr>
<td>11. Angry when unable to escape a situation</td>
<td>0.62</td>
<td>0.43</td>
</tr>
<tr>
<td>13. Angered by losing a game</td>
<td>0.47</td>
<td>0.45</td>
</tr>
<tr>
<td>14. Angry when threatened</td>
<td>0.55</td>
<td>0.48</td>
</tr>
<tr>
<td>16. Feels better after hitting others</td>
<td>0.58</td>
<td>0.42</td>
</tr>
<tr>
<td>19. Hit to defend self</td>
<td>0.41</td>
<td>0.30</td>
</tr>
<tr>
<td>22. Hits others when teased</td>
<td>0.55</td>
<td>0.54</td>
</tr>
</tbody>
</table>

**Factor loadings**

<table>
<thead>
<tr>
<th>Hong Kong</th>
<th>Mainland China</th>
<th>Spain</th>
<th>Uruguay</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>0.53</td>
<td>0.32</td>
<td>0.31</td>
</tr>
<tr>
<td>0.50</td>
<td>0.48</td>
<td>0.27</td>
<td>0.40</td>
</tr>
<tr>
<td>0.55</td>
<td>0.57</td>
<td>0.24</td>
<td>0.45</td>
</tr>
<tr>
<td>0.43</td>
<td>0.42</td>
<td>0.58</td>
<td>0.43</td>
</tr>
<tr>
<td>0.47</td>
<td>0.45</td>
<td>0.38</td>
<td>0.45</td>
</tr>
<tr>
<td>0.48</td>
<td>0.45</td>
<td>0.45</td>
<td>0.44</td>
</tr>
<tr>
<td>0.42</td>
<td>0.42</td>
<td>0.75</td>
<td>0.51</td>
</tr>
<tr>
<td>0.30</td>
<td>0.30</td>
<td>0.56</td>
<td>0.42</td>
</tr>
<tr>
<td>0.54</td>
<td>0.54</td>
<td>0.60</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Cronbach’s $\alpha$**

| Reactive aggression | 0.82 | 0.76 | 0.76 | 0.73 |
| Proactive aggression | 0.80 | 0.79 | 0.84 | 0.71 |
| General aggression | 0.88 | 0.83 | 0.87 | 0.80 |
suggesting that the influence of gender varied across the four subsamples. Gender difference was not significant in Hong Kong, \( p = .90 \), mainland China, \( p = .38 \), or Spain, \( p = .97 \), but boys in Uruguay reported significantly higher scores for general aggression than girls in the same sample, \( p < .001 \). See Table 4.

### 3.3.2 Reactive aggression

The covariate of age was found to have a significant effect on reactive aggression, \( F(1, 1186) = 5.46, p = .020 \). In addition, country had a significant main effect, \( F(3, 1186) = 67.4, p < .001 \). Bonferroni post hoc comparisons revealed that respondents in Uruguay and Spain reported similar levels of reactive aggression (\( p > .05 \)), but both samples exhibited greater reactive aggression than the young people in Hong Kong and mainland China (\( ps < .001 \)). The two sets of Asian respondents reported similar levels of reactive aggression, \( p > .050 \). Gender had a nonsignificant effect on reactive aggression, \( F(1, 1186) = .025, p = .87 \). However, gender and country had a significant interaction effect, \( F(3, 1186) = 4.63, p = .003 \), suggesting that the effect of gender varied across the four subsamples. Gender difference was not significant in Hong Kong, \( p = .90 \), mainland China, \( p = .38 \), or Spain, \( p = .97 \), but boys in Uruguay reported significantly higher scores for general aggression than girls in the same sample, \( p < .001 \). See Table 4.

### Table 2 Two-factor RPQ model fit by region and region invariance

<table>
<thead>
<tr>
<th>Region</th>
<th>( SB_{\chi}^2 )</th>
<th>( df )</th>
<th>CFI</th>
<th>IFI</th>
<th>NNFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>351*</td>
<td>229</td>
<td>0.992</td>
<td>0.992</td>
<td>0.991</td>
<td>0.040</td>
</tr>
<tr>
<td>Mainland China</td>
<td>378*</td>
<td>229</td>
<td>0.989</td>
<td>0.989</td>
<td>0.988</td>
<td>0.041</td>
</tr>
<tr>
<td>Spain</td>
<td>310*</td>
<td>229</td>
<td>0.986</td>
<td>0.986</td>
<td>0.985</td>
<td>0.048</td>
</tr>
<tr>
<td>Uruguay</td>
<td>378*</td>
<td>229</td>
<td>0.978</td>
<td>0.978</td>
<td>0.976</td>
<td>0.045</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>( SB_{\chi}^2 )</th>
<th>( df )</th>
<th>CFI</th>
<th>IFI</th>
<th>NNFI</th>
<th>RMSEA</th>
<th>Compare</th>
<th>( \Delta )CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>1,427</td>
<td>916</td>
<td>0.991</td>
<td>0.991</td>
<td>0.990</td>
<td>0.043</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>1,523</td>
<td>979</td>
<td>0.990</td>
<td>0.990</td>
<td>0.990</td>
<td>0.043</td>
<td>2 vs. 1</td>
<td>0.001</td>
</tr>
<tr>
<td>Model 3</td>
<td>1,703</td>
<td>1,042</td>
<td>0.988</td>
<td>0.988</td>
<td>0.988</td>
<td>0.046</td>
<td>3 vs. 2</td>
<td>0.002</td>
</tr>
<tr>
<td>Model 4</td>
<td>1,815</td>
<td>1,111</td>
<td>0.987</td>
<td>0.987</td>
<td>0.988</td>
<td>0.046</td>
<td>4 vs. 3</td>
<td>0.001</td>
</tr>
<tr>
<td>Model 5</td>
<td>1,846</td>
<td>1,117</td>
<td>0.987</td>
<td>0.987</td>
<td>0.988</td>
<td>0.047</td>
<td>5 vs. 4</td>
<td>0.000</td>
</tr>
<tr>
<td>Model 6</td>
<td>1,810</td>
<td>1,120</td>
<td>0.988</td>
<td>0.988</td>
<td>0.989</td>
<td>0.045</td>
<td>6 vs. 5</td>
<td>0.001</td>
</tr>
<tr>
<td>Model 7</td>
<td>1,874</td>
<td>1,126</td>
<td>0.987</td>
<td>0.987</td>
<td>0.988</td>
<td>0.047</td>
<td>7 vs. 6</td>
<td>0.001</td>
</tr>
</tbody>
</table>

CFI = comparative fit index; IFI = incremental fit index; NNFI = non-normed fit index; RMSEA = root mean square error of approximation; \( SB_{\chi}^2 \) = Satorra-Bentler chi-square.

Note. Model 1—configural invariance, Model 2—metric invariance, Model 3—scalar invariance, Model 4—error variance invariance, Model 5—factor variance invariance, Model 6—factor covariance invariance, and Model 7—factor mean invariance.

\( *p < .001 \).

### Table 3 Correlation of age with aggression scores by region

<table>
<thead>
<tr>
<th>Country</th>
<th>( n )</th>
<th>GA</th>
<th>RA</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1,195</td>
<td>0.39*</td>
<td>0.40*</td>
<td>0.30*</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>321</td>
<td>0.004</td>
<td>−0.013</td>
<td>0.028</td>
</tr>
<tr>
<td>Mainland China</td>
<td>394</td>
<td>0.033</td>
<td>0.026</td>
<td>0.033</td>
</tr>
<tr>
<td>Spain</td>
<td>153</td>
<td>0.23*</td>
<td>0.28*</td>
<td>0.14</td>
</tr>
<tr>
<td>Uruguay</td>
<td>327</td>
<td>0.046</td>
<td>0.077</td>
<td>−0.004</td>
</tr>
</tbody>
</table>

GA = general aggression; PA = proactive aggression; RA = reactive aggression.

\( *p < .05 \).
 signed in Hong Kong, $p = .28$, mainland China, $p = .87$, or Spain, $p = .23$, but the boys in Uruguay reported significantly higher scores for reactive aggression than the girls in the same sample, $p < .001$. See Table 4.

### 3.3.3 Proactive aggression

The covariate of age was found to have a nonsignificant effect on proactive aggression, $F(1, 1186) = 2.39, p = .12$. Country had a significant main effect, $F(3, 1186) = 31.4, p < .001$. Bonferroni post hoc comparisons suggested that young people in Uruguay reported a higher level of proactive aggression than their counterparts in Spain ($p < .01$), who in turn displayed significantly greater proactive aggression than the young people in Hong Kong and mainland China ($p < .001$). The respondents in Hong Kong and mainland China were found to have similar levels of proactive aggression, $p > .05$. Gender had a significant effect; boys exhibited significantly higher levels of proactive aggression than girls, $F(1, 1186) = 23.4, p < .001$. In addition, gender and country were found to have a significant interaction effect, $F(3, 1186) = 5.09, p = .002$, suggesting that the effect of gender varied across the four subsamples. Gender difference did not significantly affect the proactive aggression reported by the respondents in Hong Kong, $p = .19$, mainland China, $p = .10$, or Spain, $p = .20$, but the male respondents in Uruguay received significantly higher scores for proactive aggression than the female respondents in the same sample, $p < .001$. See Table 4.

### 4 DISCUSSION

This study investigated the influence of culture, age, and gender on the manifestation of reactive and proactive aggression. Overall, the findings supported the hypotheses. Consistent with both the hypotheses and the results in previous cross-cultural studies (e.g., Fossati et al., 2009; Fung et al., 2009), the two-factor (reactive and proactive) aggression construct was found to be applicable to East Asian, European, and South American samples. Meanwhile, the factorial invariance across the four regions was found.

As hypothesized, the young people in Uruguay and Spain exhibited higher levels of both reactive and proactive aggression than their counterparts in Hong Kong and mainland China, and Uruguay youths showed the highest level of both the subtypes of aggression. Reactive aggression and general aggression were found to increase with age in the Spanish subsample only; in the other three subsamples, age was found to exert nonsignificant effect on reactive, proactive, or general aggression. Male respondents exhibited significantly higher levels of general, reactive, and proactive aggression than female respondents in Uruguay only. The result has proved our hypothesis that young people in Uruguay (South America) and Spain (Europe) had higher levels of reactive and proactive aggression than those in Hong

### Table 4 Means and standard deviations of aggression scores by gender and region

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sex</th>
<th>Hong Kong</th>
<th>mainland China</th>
<th>Spain</th>
<th>Uruguay</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M_{Adj}$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>7.07</td>
<td>5.91</td>
<td>7.20</td>
<td>6.13</td>
<td>4.56</td>
</tr>
<tr>
<td>RA</td>
<td>All</td>
<td>5.25</td>
<td>3.67</td>
<td>5.40$^a$</td>
<td>5.03</td>
<td>3.16</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>5.11</td>
<td>3.43</td>
<td>5.17</td>
<td>5.06</td>
<td>3.13</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>5.56</td>
<td>4.01</td>
<td>5.63</td>
<td>5.01</td>
<td>3.20</td>
</tr>
<tr>
<td>PA</td>
<td>All</td>
<td>1.71</td>
<td>2.51</td>
<td>1.74$^a$</td>
<td>1.31</td>
<td>2.15</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.88</td>
<td>2.56</td>
<td>1.91</td>
<td>1.49</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.51</td>
<td>2.46</td>
<td>1.57</td>
<td>1.13</td>
<td>1.98</td>
</tr>
</tbody>
</table>

GA = general aggression; $M_{Adj}$ = means of aggression scores adjusted for age at 14.5; PA = proactive aggression; RA = reactive aggression.

Note. Adjusted means with differing letter superscripts within row were significantly different at the $p < .05$ level, based on Bonferroni post hoc comparisons.

*Significant difference at the $p < .05$ level.

significant in Hong Kong, $p = .28$, mainland China, $p = .87$, or Spain, $p = .23$, but the boys in Uruguay reported significantly higher scores for reactive aggression than the girls in the same sample, $p = .001$. See Table 4.
Kong and mainland China (Asia), but the other hypothesis which reactive and proactive aggression increase with age across four regions have not been wholly supported as age effect was not found in Hong Kong and mainland China (Asia) in the current study. The reason behind may be attributed to the fact that parenting and cultural values continue to exert influence on children as they age (e.g., Baumrind, 1991; Chen & Farruggia, 2002; Forehand, Miller, Dutra, & Chance, 1997; Georgiou, Fousiani, Michaelides, & Stavrinides, 2013). Therefore, the interplay between parenting style, cultural value, and aggression may be accountable for the mixed results on age and gender differences. Future cross-cultural studies should consider parenting style and cultural value when investigating aggression.

4.1 Reactive-proactive aggression construct

Overall, the two-factor RPQ construct (Raine et al., 2006) achieved excellent goodness of fit (e.g., $\text{CFI} > 0.95$, $\text{RMSEA} < 0.06$) and good reliability ($\alpha > 0.70$), indicating that the construct is suitable for use with populations in Hong Kong, mainland China, Spain, and Uruguay. This finding is consistent with the results of previous studies of the RPQ in East Asia (Ang et al., 2016), Europe (Fossati et al., 2009), and North America (Raine et al., 2006). The measurement and structural invariance across the four regions was supported via a MGCFA, suggesting that young people in different regions conceptualized reactive aggression and proactive aggression in a similar way. In short, region confirmatory factor analysis (CFA) confirmed that the two-factor reactive and proactive aggression structure was suitable for use in different cultural settings outside of the United States.

4.2 Differences in aggression across regions

After controlling for age, the young people in Uruguay and Spain received the highest scores for reactive aggression, followed by the respondents in Hong Kong and mainland China. In addition, significant differences in proactive aggression and general aggression were observed between the four regions: the respondents in Uruguay reported more proactive and general aggression than the respondents in Spain, and both samples exhibited significantly more proactive and general aggression than the respondents in mainland China and Hong Kong, even after controlling for age. These results are consistent with the observation made in previous studies (e.g., Forbes, Zhang, Doroszewicz, & Haas, 2009) that young people in the West are more aggressive than their Chinese counterparts. More importantly, our findings indicate that culture plays a significant role in the manifestation of reactive and proactive aggression.

Several cultural differences may explain the disparity in aggression between the Chinese and Western respondents. For instance, the open expression of positive or negative emotion is discouraged in Chinese cultural settings, while self-control and emotional restraint are valued. In contrast, autonomy and the open expression of emotions are encouraged in Western cultural contexts (Garrett-Peters & Fox, 2007). People living in individualistic societies tend to emphasize individual identity, needs, rights, and pleasure whereas people in collectivistic societies tend to emphasize group identity, obligations, and norms along with cooperation and harmony between in-group members (Duong, Schwartz, Chang, Kelly, & Tom, 2009; Gudykunst et al., 1996; Korostelina, 2007). In addition, the Chinese believe that controlling one’s emotions can help to maintain a healthy body and mind, on the grounds that excessive emotion causes physical and mental damage. Compared with people socialized in individualistic cultures, the Chinese are less open and more introverted (Huang, 2011). As they live interdependently, they tend to hide their thoughts and feelings, especially dissatisfaction and anger (Phillips & Xiong, 1995), to ensure that collective peace and harmony are maintained. In fact, emotional outburst or even the disclosure of one’s emotions is believed to reflect a weakness of character in Chinese culture (Arthur, 2002). These differences between collectivistic and individualistic cultures may be the underlying reasons for the disparate levels of aggression exhibited by young people in different regions.

4.3 Effects of age and gender across regions

General, reactive, and proactive aggression increased with age in the full sample, but the effect of age on aggression varied between regions. Specifically, reactive and general (but not proactive) aggression increased with age in Spain.
whereas age had no influence on general, reactive, or proactive aggression in the other three regions. This finding suggests that age is an unstable cross-regional predictor of aggression, and that further examination is required to determine its effects. Indeed, results concerning whether age is a significant predictor of aggression has been mixed. For example, Baş and Yurdabakan (2012) found that reactive and proactive aggression increased with age in Turkish children and adolescents. Yet, Murray-Close and Ostrov (2009) found no age differences on reactive and proactive aggression in children in the United States.

In the full sample, males were found to have higher levels of proactive aggression than females, which is consistent with previous findings (Baker et al., 2008; Fung et al., 2009). In addition, gender and country had a significant interaction effect on general, reactive, and proactive aggression, suggesting that the effect of gender on the subtypes of aggression varied between the four subsamples. Specifically, gender was not found to affect aggression in the samples from Hong Kong, mainland China, or Spain, which is consistent with the finding of the recent survey done in the United States (Evans et al., 2015); whereas boys in Uruguay received significantly higher scores for general, reactive, and proactive aggression than girls. This finding may be due to the significant gap in power and economic status between males and females in Uruguay. More specifically, men enjoy a higher employment rate and receive higher salaries than women in Uruguay (Amarante, Espino, & Amarante, 2004). As such disparities in power and economic status may increase the risk of violence against women (Dellsante & Tagliani, 2010), men in Uruguay may be more likely to engage in aggressive behavior. To conclude, the effect of gender depends on the region sampled, and further studies should investigate the underlying cultural root of the differences in aggression subtypes.

4.4 Limitations and implications

The study has three main limitations. First, as the subsamples were collected from single cities in single regions, the findings may not be generalizable to the whole regions, as there would be potential differences in aggression between individuals of different ethnicities living in the same regions (Fry, 1998). Therefore, more regionally representative samples should be used in future work. Second, a small sample was obtained for Spain (n = 153), which may lead to unstable CFA structure and reduce the stability of the results for this region. Therefore, the results concerning Spain should be interpreted with caution and sample sizes should be balanced across regions in the future work. Last but not least, shared-method variance cannot be avoided, as only self-reported data were analyzed. Although aggression is generally undesirable, attitudes toward aggression may vary between cultures. Therefore, future researchers should also ask third parties such as parents, teachers, and peers to evaluate the participants’ behavior.

Although the study had some limitations, its contributions are considerable. Given that reactive and proactive aggression have different predictive abilities, the model that differentiates between the two subtypes of aggression is very important in both theoretical and practical terms. Aggression does not fade away, in contrast, high levels of aggression persists over time (Krabbendam et al., 2014). It implies that adolescents with aggression are more likely to be involved in criminal behaviors in adulthood. Compared to reactive aggression, proactive aggression is more related to physical violence and serious crimes (Pechorro, Ray, Raine, Maroco, & Gonçalves, 2017). Proactive aggression is not only linked to disruptive behaviors, conduct problems, and violent crime (Cima et al., 2013; Vitaro et al., 1998), but it also predicts violent recidivism as it is the characteristic of violent offenders (Swogger, Walsh, Christie, Priddy, & Conner, 2015). Therefore, differentiating between subtypes of aggression exhibited by young people may facilitate the development of prevention and intervention programs. Antibullying programs that were developed based on a one-factor model often over-simplify the differential etiology of aggression. With the knowledge concerning the different natures and characteristics of the two subtypes of aggression, helping professionals such as social workers and school teachers would be able to develop specific intervention and therapeutic programs targeting different cognitive biases and distorted values existing between reactive and proactive aggression (see Fung, 2017). This study extends cross-cultural research and complements the existing knowledge by validating the RPQ in the four regions across Asia, Europe, and the South America. Understanding cross-regional differences in aggression may also aid the design and implementation of culture-specific measures to reduce youth aggression in various regions.
ACKNOWLEDGMENT

This study was funded by General Research Fund (grant number 141613).

CONFLICT OF INTEREST

Annis Lai Chu Fung, Xiang Li, Martin J. Ramírez, Bess Yin-Hung Lam, Luis Millana, and Natalia E. Fares-Otero declare that they have no conflict of interest.

ORCID

Xiang Li http://orcid.org/0000-0003-3978-2962

REFERENCES


**How to cite this article:** Fung ALC, Li X, Ramirez MJ, Lam BY-H, Millana L, Fares-Otero NE. A cross-regional study of the reactive and proactive aggression of youth in Spain, Uruguay, mainland China, and Hong Kong. *Social Development*. 2018;27:748–760. [https://doi.org/10.1111/sode.12305](https://doi.org/10.1111/sode.12305)