

A Cross-Cultural Study of the Psychometric Properties of the Reactive–Proactive Aggression Questionnaire Among Italian Nonclinical Adolescents

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Five independent studies were used to test the hypothesis that a reliable 2-factor structure underlies the Reactive–Proactive Aggression Questionnaire (RPQ) items and that the 2 scales show distinct patterns of association with personality and bullying behavior measures. Study 1 ($N = 1,447$) gave evidence of a clear 2-factor structure of RPQ items with factor loading matrices closely matching reactive (congruence coefficient = .90) and proactive (congruence coefficient = .91) models of item assignment. The RPQ 2-factor structure was consistently replicated in Study 2 ($N = 662$), as well as across the remaining 3 studies. In Study 3 ($N = 536$), Neuroticism differentiated reactive and proactive forms of aggression. In Study 4 ($N = 674$), self-reports of bullying behaviors were selectively correlated with proactive aggression. Findings confirm and extend the differential correlates of proactive–reactive aggression and also support the psychometric properties of the RPQ in a different cultural context. Finally, in Study 5 ($N = 347$), the RPQ scales showed adequate 2-month test–retest reliability.

Keywords: aggression, adolescence, personality, reliability, validity

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Understanding the causes of adolescent aggression is becoming an increasingly important research topic. However, one of the major difficulties that such research has to face is the heterogeneity of this construct. The distinction between proactive and reactive aggression represents one potentially important perspective that promises to shed light on different etiological pathways to aggression (Crick & Dodge, 1996; Dodge, 1991). An important gap in the literature is the lack of time-efficient, self-report measures of these constructs.

To address this gap, recently Raine et al. (2006) developed the Reactive–Proactive Aggression Questionnaire (RPQ); in the original validity study (Raine et al., 2006) all item–total correlations were greater than .40 and Cronbach's alpha values exceeded .80 for both Proactive and Reactive aggression scales. Although the proactive and reactive aggression scores were significantly corre-

lated, confirmatory factor analyses supported the two-factor structure of the RPQ items (Raine et al., 2006). Moreover, the RPQ scales showed differential correlations with external variables that were consistent with theoretical expectations concerning the reactive and proactive aggression constructs.

Up to now, the large majority of the studies on the differences between proactive and reactive aggression have been carried out in English-speaking countries; moreover, currently the RPQ has been validated only in the United States. On the basis of these considerations, this study aimed to assess the cross-cultural replicability of the basic psychometric properties of the RPQ. In order to avoid response bias and halo effects, we designed five studies based on independent, large samples of nonclinical participants to test separately each research hypothesis; the five samples included both male and female participants in order to increase the generalizability of our findings. The five samples were completely independent; that is, none of the participants was included in two or more of the studies. According to Archer's (2004) seminal article, we expected that male participants would score higher than female participants on both RPQ scales, because they measure different types of direct aggression. The stability of the results across the subsamples based on gender was formally tested. Study 1 involved the largest study group and addressed the issue of the internal consistency reliability and factor structure of the RPQ scales; the reliability of the Reactive and Proactive scales and the replicability of the RPQ two-factor structure were assessed also in all other

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samples. Study 2 was specifically designed to test the replicability of Study 1 findings. Construct validity issues were addressed in Study 3 and in Study 4. Study 3 tested the prediction that RPQ scores of proactive aggression are negatively correlated with self-report measures of Agreeableness and Conscientiousness (e.g., Gleason, Jensen-Campbell, & Richardson, 2004; Tremblay & Ewart, 2005) and that scores of reactive aggression correlate positively with self-reports of Neuroticism (Hubbard et al., 2002; Miller & Lynam, 2006), as well as negatively with self-reports of Agreeableness and Conscientiousness. In Study 4 we tested the hypothesis of a specific association between RPQ pure scores of proactive aggression and self-reports of bullying behaviors. Finally, Study 5 was specifically designed to assess the 2-month retest reliability of the RPQ scores and the 2-month consistency of the RPQ item factor structure.

Method

Participants

The five studies involved adolescent high school students from both north and south Italy. In order to participate in the study, all participants had to sign a written informed consent form in which the study was described in detail; in the case of younger participants the informed consent form was signed also by the participant's parents. Study 1 involved 1,447 adolescent participants; 676 (46.7%) of the participants were boys and 771 (53.3%) were girls; the mean age was 16.5 years ($SD = 1.5$). Study 2 involved 662 adolescent participants; 498 (75.2%) participants were boys and 164 (24.8%) were girls; the mean age was 16.1 years ($SD = 1.6$). Study 3 was based on a sample of 536 high school students; 309 participants (57.6%) were boys and 227 participants (42.4%) were girls; the mean age was 15.8 years ($SD = 1.5$). Study 4 involved 674 adolescent high school students; 331 participants (49.1%) were boys and 343 participants (50.9%) were girls; the mean age was 15.5 years ($SD = 2.05$). Finally, Study 5 was based on 347 adolescent participants; 98 participants (28.2%) were boys and 249 participants (71.8%) were girls; the mean age was 16.1 years ($SD = 1.39$).

Measures

All participants were administered the Italian translation of the RPQ, a 23-item self-report questionnaire designed to yield both reactive (11 items) and proactive (12 items) aggression scores. Each RPQ item is rated on a 3-point scale (0 = *never*; 1 = *sometimes*; 2 = *often*). The generation and selection of the RPQ items are detailed elsewhere (Raine et al., 2006). Raw and residualized (i.e., "pure") scores may be computed for both RPQ Reactive Aggression and Proactive Aggression scales (Raine et al., 2006).

In addition to the RPQ, Study 3 participants were administered the Big Five Inventory (BFI; John & Srivastava, 1999), a 44-item, Likert-type, self-report questionnaire designed to measure the main dimensions of the Big Five model of personality. In Study 3, the BFI scales showed Cronbach's alpha values of .62, .70, .70, .71, and .75 for Agreeableness, Openness to Experience, Conscientiousness, Neuroticism, and Extraversion, respectively. In Study 4, participants were administered both the RPQ and the Peer

Relations Questionnaire (PRQ; Rigby & Slee, 1993), a 20-item, Likert-type, self-report questionnaire that yields separate score for the Bully scale, the Victim scale, and the Prosocial scale. In Study 4, the Cronbach's alpha values were .78, .83, and .67 for the PRQ Bully, Victim, and Prosocial scales, respectively.

In all studies the questionnaires were administered and scored anonymously during class time by psychology students when teachers were not present in the classrooms. In Study 3 and Study 4 the questionnaires were administered in random order. In Study 5 participants were readministered the RPQ after a 2-month interval, following the same procedure that was described above. All questionnaires were translated by one the authors (Andrea Fossati) and two additional psychologists. A native-English-speaking professional translator then back-translated the Italian versions to the respective original English versions to iteratively control for adequacy of translation.

Summary of Planned Analyses

Average interitem correlations and Cronbach's coefficient alphas were used to evaluate the internal consistency reliability of the two RPQ scales. Point-biserial r coefficients were used to analyze the associations between gender and Proactive and Reactive Aggression scale scores, respectively.

We assessed the correct number of factors to be extracted from the polychoric correlation matrices using three different methods, namely, the scree plot, parallel analysis, and the minimum average partial statistic (Zwick & Velicer, 1986). Principal component analysis was used to identify the latent structure of the RPQ item polychoric correlation matrix. Congruence coefficients (CC) were then computed in order to evaluate if the varimax rotated factors matched the binary target matrix of 1s and 0s representing the hypothesized factor loadings based on the RPQ model of item assignment; a CC value of .90 is typically considered necessary to define matching factors. We formally assessed the replicability of the RPQ two-factor structure across male and female subsamples by computing factor CCs.

Pearson r and partial correlations were used to evaluate the associations between the RPQ and other continuous measures. We tested the presence of significant differences in correlation coefficients between male and female participants using the appropriate z test. In the case of multiple comparisons, the nominal significance level was corrected according to the Bonferroni procedure.

Results and Discussion

Descriptive Statistics, Reliability Estimates, and Factor Structure Invariance of the RPQ Scales

The descriptive statistics of the RPQ scales are listed in Table 1. Although the Reactive and Proactive Aggression scale scores were significantly correlated in all five samples (min r [Study 1] = .51, max r [Study 3] = .63, all $ps < .001$), repeated measures analyses of variance showed that on average the participants scored significantly higher on the Reactive Aggression scale than on the Proactive Aggression scale, with eta-squared values ranging from .65 (Study 1) to .80 (Study 4), all $ps < .001$. These results were consistent with previous findings (Dodge & Coie, 1987; Raine et al., 2006) and suggested that in nonclinical adolescents reactive

Table 1

Descriptive and Internal Consistency Statistics and Factor Congruence Coefficients of the RPQ Item-Level Factor Structures Across the Five Studies

Scale	<i>M</i>	<i>SD</i>	α	\bar{r}_i	Factor congruence coefficient									
					RPQ model		Study 1		Study 2		Study 3		Study 4	
					RA	PA	RA	PA	RA	PA	RA	PA	RA	PA
Study 1 (<i>N</i> = 1,447)														
Reactive Aggression	9.45	4.05	.76	.22	.91									
Proactive Aggression	3.76	4.26	.85	.32		.92								
Study 2 (<i>N</i> = 662)														
Reactive Aggression	10.02	4.12	.78	.24	.90		.96							
Proactive Aggression	4.34	4.48	.86	.36		.91		.98						
Study 3 (<i>N</i> = 536)														
Reactive Aggression	9.51	4.23	.80	.27	.91		.97		.97					
Proactive Aggression	3.58	4.03	.85	.33		.90		.99		.99				
Study 4 (<i>N</i> = 674)														
Reactive Aggression	9.11	3.73	.75	.22	.90		.98		.98		.97			
Proactive Aggression	2.76	2.87	.75	.21		.91		.99		.98		.98		
Study 5 (<i>N</i> = 347)														
Reactive Aggression	8.61	3.74	.77	.24	.91		.98		.98		.98		.99	
Proactive Aggression	2.18	2.59	.76	.22		.90		.96		.97		.96		.96

Note. RPQ = Reactive–Proactive Aggression Questionnaire; RA = Reactive Aggression; PA = Proactive Aggression; RPQ model = RPQ theoretical model of item assignment; \bar{r}_i = average interitem correlation.

aggression especially at moderate levels may be more adaptive and quasinormative whereas proactive aggression may be more pathological (Raine et al., 2006).

Cronbach's alpha values were greater than .75 for both Reactive and Proactive Aggression scales in all five samples, thus suggesting adequate reliability of the RPQ subscales. Although male participants scored significantly higher than female participants both on Reactive (median r_{p-b} = .21, all ps < .001) and Proactive (median r_{p-b} = .37, all ps < .001) RPQ scales, male and female participants did not show substantial differences in the internal consistency reliabilities of the RPQ scales, with the partial exception of Study 3, in which only the internal consistency of the Proactive Aggression scale was appreciably smaller in the female participant subsample (Cronbach's α = .73) than in the male participant subsample (Cronbach's α = .85).

Results provide clear evidence for a two-factor structure of the RPQ items. The values of the Kaiser–Mayer–Olkin statistic ranged from .85 (Study 5) to .93 (Study 1), indicating that the RPQ item correlations matrix could be safely factor analyzed; the measures of sampling adequacy for the individual RPQ items were all satisfactory. In the derivation sample (e.g., the Study 1 sample), minimum average partial statistic (Zwick & Velicer, 1986) values for the first five principal components of the RPQ item correlation matrix were .0062, .0028, .0029, .0030, and .0032, respectively, thus indicating a two-factor solution. The two-factor structure of the RPQ items was supported also by the scree test and parallel analysis results (see Figure 1 in the online supplemental materials). In Study 1 the two-factor solution explained 35.99% of the item variance and adequately reproduced the observed RPQ item correlations (root-mean-square difference = .05). Since promax and varimax rotations yielded almost identical structures (factor score rs = .98 for both principal components, all ps < .001), we retained the varimax-rotated components for further analyses; the varimax-

rotated principal component loadings of the RPQ items are available in the online supplemental materials.

Although the two RPQ item components could be clearly discriminated in terms of their observable indicators, Items 8, 16, 19, 20, and 22 showed substantial cross-loadings. This finding is likely to reflect the amount of overlap between Proactive and Reactive Aggression scores that has been consistently shown across the five independent studies. Only Item 16 showed a pattern of loadings different from the theoretical model of item assignment. As shown in Table 1, despite these cross-loadings the two principal components that were extracted in Study 1 closely matched the RPQ theoretical model of item assignment; interestingly, the CC values were so large that there was no need to perform orthogonal Procrustes analyses. This finding was consistently replicated across all the five samples. Moreover, as can be observed in Table 1, CC values showed that the two-factor structure of the RPQ items was consistently replicated across all the studies. Within each sample the varimax-rotated two-factor structure of RPQ items was safely replicated across the subsamples based on participants' gender, with factor score correlations greater than .95 (all ps < .001) for both principal components.

Study 5 was designed to test the 2-month stability of RPQ scale scores and factor structure. Test–retest correlations were .72 and .75 (all ps < .001) for the Reactive Aggression and Proactive Aggression scores, respectively, thus suggesting adequate 2-month retest reliability for both the RPQ scales. CC values for the RPQ item factor structure at the baseline and the RPQ item factor structure computed after the 2-month interval were .96 and .99 for the principal components that clustered Reactive Aggression and Proactive Aggression items, respectively. These results suggested invariance of the RPQ item factor structure, at least over a 2-month interval.

Convergent and Discriminant Validity Correlations

The correlations between the Reactive Aggression and Proactive Aggression scales and the BFI (Study 3) and RPQ scales (Study 4) are listed in Table 2. Study 3 results were highly consistent with our hypotheses on the relationships between the RPQ scales and measures of Big Five personality dimensions. In line with Saulsman and Page's (2004) meta-analysis of the five-factor model and personality disorders, low Agreeableness and, to a lesser extent, low Conscientiousness were personality features related to both proactive and reactive aspects of aggressive behaviors. As suggested by Miller and Lynam (2006), and as anticipated by Saulsman and Page's considerations of the relationships between borderline personality disorder and five-factor model personality traits, Neuroticism was the Big Five dimension that markedly discriminated proactive aggression from reactive aggression, particularly when the RPQ scale residual scores were taken into account. Because Proactive Aggression scores were significantly correlated with Reactive Aggression scores in both Study 3 and Study 4 (see Table 1), in addition to raw Proactive and Reactive Aggression scores, residualized measures of Proactive and Reactive aggression were created in order to assess the correlates of "pure" proactive aggression independent of reactive aggression and of "pure" reactive aggression independent of proactive aggression.

It is interesting that this pattern of correlations between BFI and RPQ scales was consistently replicated across the female and male participant subsamples, with the partial exception of Extraversion (Reactive Aggression: female participants, $r = .17, p < .025$; male participants, $r = -.00, p > .50$; $z = 1.99, p < .05$; Proactive Aggression: female participants, $r = -.07, p > .30$; male participants, $r = .17, p < .01$; $z = 2.40, p < .025$).

Table 2
Descriptive Statistics of the BFI Scales and Partial Correlations Between the BFI (Study 3), PRQ (Study 4), and RPQ Scales

Variable	<i>M</i>	<i>SD</i>	RA	PA	RA-R	PA-R
Study 3: BFI scales						
Extraversion	23.21	5.25	.12	.13	.06	.08
Agreeableness	31.64	5.39	-.37*	-.36*	-.16*	-.14*
Conscientiousness	29.78	6.25	-.20*	-.21*	-.07	-.10
Neuroticism	26.52	5.01	.32*	.03	.41*	-.15*
Openness to Experience	25.59	5.19	-.03	-.05	.02	.00
Study 4: RPQ scales						
Bully	7.90	2.53	.43*	.63*	.10	.45*
Victim	11.72	2.25	.05	.01	.06	-.03
Prosocial	8.08	2.70	-.08	-.16*	.00	-.10

Note. In Study 3 ($N = 536$), the correlations between the Big Five Inventory (BFI) scales and the Peer Relations Questionnaire (RPQ) scales were computed holding the effect of age constant. In Study 4 ($N = 674$), the Bully scale correlations were computed partialling out the Victim scale effect, whereas the Victim scale correlations were calculated holding constant the Bully scale effect. In the Study 4 female subsample, the correlations between the Bully scale and the Reactive-Proactive Aggression Questionnaire (RPQ) scales were .38 ($p < .0042$), .53 ($p < .0042$), .13, and .39 ($p < .0042$) for the reactive raw (RA), proactive raw (PA), reactive residual (RA-R), and proactive residual (PA-R) scores, respectively. In the Study 4 male subgroup, the Bully scale had correlations of .45 ($p < .0042$), .68 ($p < .0042$), .09, and .61 ($p < .0042$) with the RA, PA, RA-R, and PA-R scores, respectively.

* The nominal significance level ($p < .05$) was corrected according to the Bonferroni procedure and set to $p < .0025$ in Study 3 and to $p < .0042$ in Study 4.

Finally, Study 4 results supported our research hypothesis of selective, substantial correlations between self-reports of aggressive behaviors and bullying behaviors. It is interesting that when the RPQ residualized scores were taken into account, the results clearly supported the hypothesis that proactive aggression (but not reactive aggression) is a distinctive personality feature of the adolescent bully. This finding was highly consistent with previous results showing that starting from age 14, bullying behaviors are significantly associated with proactive aggression, whereas proactive and reactive aggressive behaviors correlate poorly with victim status (Roland & Idsoe, 2001). A significant difference between female and male participants was observed only for the correlation between Bully scale scores and Proactive Aggression raw scores ($z = -3.07, p < .0025$).

Our results need to be considered in light of several limitations, including lack of behavioral data and reliance on data from the same source (self-report questionnaires). The failure to include independent ratings of overt aggression in these studies limits the conclusions that can be drawn. Indeed, self-reported explanations for behavior need to be more evidently related to distinguishable types of observed behaviors before it can be concluded that there are qualitatively distinct types of aggression being identified. Although our samples included a large number of participants, none of the five samples was randomly selected, making them convenience samples of nonclinical adolescents rather than representative samples. None of our studies had a long-term longitudinal design, thus no evidence for the temporal stability of the RPQ was possible beyond 2-month test-retest reliability. It was not possible to test whether the two-factor structure of the RPQ items reflected the actual existence of two dissociable latent variables or whether it reflected a distributional artifact clustering "rare" items on a separate factor. Finally, although we provided data on the generalizability of the RPQ in female and male adolescents, we focused our studies only on nonclinical participants; the replication of our findings in clinical samples is needed before considering the clinical utility of the RPQ.

Despite these limitations, we feel that our findings confirmed and extended the psychometric properties of the RPQ in a cross-cultural perspective and that they may have potential implications for clinical assessment. The RPQ is a reliable, brief, and easy-to-administer self-report instrument that could be used in nonclinical settings (e.g., schools) to identify individuals at risk for severe acts of violence of both reactive and proactive natures. It could also be a useful tool to evaluate the motivational features that lie behind the aggressive acts of adolescents, and thus it could help tailor different interventions to aid children who present with different forms of aggression. Finally, the adequate test-retest reliabilities of the RPQ scales suggest that the RPQ could be used, along with other measures, to evaluate the efficacy of treatments for both reactive and proactive aspects of aggression.

References

- Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology, 8*, 291-322.
- Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanism in reactive and proactive aggression. *Child Development, 67*, 993-1002.
- Dodge, K. A. (1991). The structure and function of reactive and proactive

- aggression. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 201–218). Hillsdale, NJ: Erlbaum.
- Dodge, K. A., & Coie, J. D. (1987). Social information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146–1158.
- Gleason, K. A., Jensen-Campbell, L. A., & Richardson, D. S. (2004). Agreeableness as a predictor of aggression in adolescence. *Aggressive Behavior, 30*, 43–61.
- Hubbard, J. A., Smithmyer, C. M., Ramsden, S. R., Parker, E. H., Flanagan, K. D., Dearing, K. F., et al. (2002). Observational, physiological, and self-report measures of children's anger: Relations to reactive versus proactive aggression. *Child Development, 73*, 1101–1118.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York: Guilford Press.
- Miller, J. D., & Lynam, D. R. (2006). Psychopathy and the five-factor model of personality: A replication and extension. *Journal of Personality Assessment, 81*, 168–178.
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., et al. (2006). The Reactive–Proactive Aggression Questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior, 32*, 159–171.
- Rigby, K., & Slee, P. T. (1993). Dimensions of interpersonal relation among Australian children and implications for psychological well-being. *Journal of Social Psychology, 133*, 33–42.
- Roland, E., & Idsoe, T. (2001). Aggression and bullying. *Aggressive Behavior, 27*, 446–462.
- Saulsman, L. M., & Page, A. C. (2004). The five-factor model and personality disorder empirical literature: A meta-analytic review. *Clinical Psychology Review, 23*, 1055–1085.
- Tremblay, P. F., & Ewart, L. A. (2005). The Buss and Perry Aggression Questionnaire and its relations to values, the Big Five, provoking hypothetical situations, alcohol consumption patterns, and alcohol expectancies. *Personality and Individual Differences, 38*, 337–346.
- Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99*, 432–442.

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