Factorial composition of the Aggression Questionnaire: A multi-sample study in Greek adults

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Abstract

The primary aim of the current article was the evaluation of the factorial composition of the Aggression Questionnaire (AQ29) in the Greek population. The translated questionnaire was administered to the following three heterogeneous adult samples: a general population sample from Athens, a sample of young male conscripts and a sample of individuals facing problems related to substance use. Factor analysis highlighted a structure similar to the one proposed by Buss and Perry [Buss, A.F., Perry, M., 1992. The Aggression Questionnaire. Journal of Personality and Social Psychology 63, 452–459]. However, the refined 12-item version of Bryant and Smith [Bryant, F.B., Smith, B.D., 2001. Refining the architecture of aggression: a measurement model for the Buss-Perry Aggression Questionnaire. Journal of Research in Personality 35, 138–167] provided a better fit to our data. Therefore, the refined model was implemented in further analysis. Multiple group confirmatory factor analysis was applied in order to assess the variability of the 12-item AQ across gender and samples. The percentage of factor loading invariance between males and females and across the three samples defined above was high (higher than 75%). The reliability (internal consistency) of the scale was satisfactory in all cases. Content validity of the 12-item AQ was confirmed by comparison with the Symptom Check-List 90 Revised.

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1. Introduction

Since the seminal conceptualization of aggression by Moyer (1968), subsequent efforts have strived to further refine, operationalise and quantify persistent aggressive behavior. This is not merely an academic endeavor, given rising public health concerns reflected in the international attention directed to prevention programs designed to address aggressive and violent behavior (Ahmad, 2004). Aggression is a potential predictive factor of later criminal activity during adolescence (Huesmann et al., 1984; Huesmann and Efron, 1992; Pulkkinen and Pitkanen, 1993). Furthermore, aggression is a multidimensional construct that develops within a complex interaction of biological, psychological, social, and cultural factors. While aggressive acts are state phenomena, the tendency...
to engage in aggressive behavior over the lifetime is relatively stable (Olweus, 1979; Huesmann et al., 1984; Coccaro et al., 1991).

Self-rated aggression measures remain a popular method to assess trait aggression. Amongst these, the Aggression Questionnaire (AQ29) was created by Buss and Perry (1992) and represents an updated and psychometrically improved version of the Buss-Durkee Hostility Inventory (Buss and Durkee, 1957) that has quickly become the gold-standard for the measurement of aggression.

The AQ29 has been cross-validated in several non-US samples including Dutch (Meesters et al., 1996), Japanese (Nakano, 2001), Spanish (Garcia-Leon et al., 2002), Italian (Fossati et al., 2001), Chinese (Maxwell, 2007), Greek (Tsorbatzoudis, 2006) and German populations (Collani and Werner, 2005). Further, Williams et al. (1996), Morren and Meesters (2002) and Diamond et al. (2005) assessed the properties of the AQ29 in offender samples.

As initially reported by Buss and Perry (1992) and further elaborated by other authors (Harris, 1995; Bernstein and Gesn, 1997; Garcia-Leon et al., 2002; Fossati et al., 2001), the AQ29 is a multidimensional instrument consisting of the following four subscales: Physical aggression, Verbal aggression, Anger and Hostility. Two further proposals for the latent structure of the AQ29 are proposed in the literature, namely: a) a one-factor model, which assumes that all items load on one first order factor, and b) a second order factor implicated in the initial four-factor model.

Further suggestions have been made about the questionnaire’s items. Specifically, Harris (1995) proposed to omit two items from the Hostility subscale (H6 and H8), thereby raising its reliability estimators (model c). Meesters et al. (1996) reported a closer fit after further omission of the first indicator of the Verbal aggression sub-scale, resulting in a modified 26-item AQ (model d). In addition, Bryant and Smith (2001) proposed a modified version of the AQ excluded a substantial number of items (model f). The selection of the excluded items was based upon i) factor complexity (omitting items that load on more than one factor) and ii) salience of loadings (omitting items with loadings lower than 0.40), while they also omitted the two items with reverse scoring.

The primary aim of the present study was to evaluate the proposed models in the literature regarding the Aggression Questionnaire in three Greek adult samples. Moreover, the score and structure discrepancies among these samples were evaluated.

2. Methods

2.1. Participants

2.1.1. Sample 1
The translated AQ29 was administered to 307 individuals selected from the general population in the region of Rafina-Athens (randomly selected using the municipality registry). Among the individuals, 143 (46.6%) were male (mean age = 49.13, sd = 10.8, range: 22–73 years) and 164 (53.4%) were female (mean age = 49.14, sd = 11.0, range: 21–67 years). No significant age differences across genders were found (t = −0.012, df = 301, P = 0.979).

2.1.2. Sample 2
The AQ29 was also randomly administered to 1228 male conscripts (aged 19–24 years; mean = 20.83, sd = 1.87), who were recruited from the Greek Air Force during their first 2 weeks of admission in the National Basic Air Force training centre in the city of Tripoli. This sample can be considered representative of males in this age group, since military service is obligatory in Greece.

2.1.3. Sample 3
The third sample consists of 165 volunteers, members of the Greek methadone program of the Organisation Against Drugs (OKANA) in Athens. Among the individuals, 127 (77%) were males (mean age = 36.6, sd = 5.5, range: 24–55 years) and 33 (20%) were females (mean age = 36.4 years, sd = 5.2, range: 28–51 years); for five individuals, gender was not reported. Age did not differ significantly across gender (t = 0.176, df = 156, P = 0.861).

2.2. Measurements

The Symptom Check-List 90 Revised (SCL-90-R; Derogatis, 1993; Donias et al., 1991) was also administered, within the Athens Study of Psychosis Proneness and Incidence of Schizophrenia (ASPI; Stefanis et al., 2004). The SCL-90-R is a 90-item multidimensional self-report inventory consisting of nine subscales and three indices of psychological distress. The reliability coefficient of SCL-90-R was high for the total scale (alpha = 0.97) while the corresponding coefficients for each subscale were found to range from 0.66 to 0.87 (Stefanis et al., 2004).

The AQ29 (Buss and Perry, 1992) is a self-administered inventory that consists of 29 Likert type items (scored 1 to
5). Twelve of these items constitute the AQ12 (Bryant and Smith, 2001), which nonetheless retains the four-factor latent structure.

2.3. Translation procedure

The AQ29 adaptation for the Greek population followed the recommendations of Van de Vijver and Hampleton (1996). Specifically, the questionnaire was translated into Greek and back-translated into English by an independent official translator. Comparison of the original and the first English drafts produced a modified Greek version that received minor further changes when administered to a test sample of 15 young employees of the University Mental Health Research Institute of Athens (UMHRI).

2.4. Statistical analyses

Three criteria were used to evaluate the items’ intercorrelations: Measures of Sampling Adequacy for each item (MSA), the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) over all items and Bartlett’s test of Sphericity (Dziuban and Shirkey, 1974). For purposes of comparison with previously reported results, Exploratory Factor Analysis (EFA) was implemented in a random split-half of the second sample (selected due to its large size). However, the factorial structure of the Greek version of the questionnaire was essentially assessed utilizing CFA via a structural equation modelling approach (Bollen, 1989). The measures of fit that are reported are in concordance with the current AQ29 literature. In this way, comparison between studies can be easily obtained. Three absolute fit indices are reported, namely the Goodness of Fit Index (GFI; Jöreskog and Sörbom, 1984), the Root Mean Square Error of Approximation (RMSEA; Browne and Cudeck, 1993) and the relative chi-square ($\chi^2/df$; Hoelter, 1983). Furthermore, the fit of each model compared to the null (or independence) model was assessed by using two relative fit indices, namely the Non-Normed Fit Index (NNFI; Bentler and Bonett, 1980) and the Comparative Fit Index (CFI; Bentler, 1990).

The variation of the factor loadings across samples and the gender effect were assessed via Multiple Groups CFA. Equality of loadings is necessary to make comparisons between groups (Anderson and Gerbing, 1988). By examining the critical ratios of the loading difference across samples for each item (i.e. the ratio of the difference’s estimate divided by the estimate of difference’s standard error), the equality constraints for significantly variant loadings were excluded. Data analysis was conducted in AMOS 5 (Arbuckle, 2003).

3. Results

3.1. Sampling adequacy and exploratory factor analysis

The assessment of the sampling adequacy diagnostics led to satisfactory MSA values (0.66 to 0.94). Values were lower than 0.73 for only two items. Furthermore, Bartlett’s test of sphericity ($\chi^2$=4796.7, df=406, $P<0.001$) indicated that the intercorrelations were satisfactory, while the KMO measure was high (0.89), indicating low partial intercorrelations among items. The above findings support the existence of possible latent factors. EFA using principal axis factoring (Oblimin rotation) was implemented. Seven eigenvalues above one were found (6.8, 2.6, 1.8, 1.5, 1.2, 1.1 and 1.1). Four factors existed explaining the 43.7% of the total variance, while the next three eigenvalues represented scree2. Further investigation of the questionnaire’s latent structure was implemented by CFA methodology, which follows.

3.2. Confirmatory factor analysis

CFA was applied in all three Greek samples separately. Seven distinct models that have been proposed in the literature were evaluated:

a) One-factor model (all items load on one first order factor),
b) Initial Buss and Perry’s (1992) four-factor model (four factors explain the items’ covariation),
c) and d) model b with reduced items as proposed correspondingly by Harris (1995) and Meesters et al. (1996),
e) Hierarchical model (one second order factor underlies the four factors of the initial model b),
f) Bryant and Smith’s (2001) refined model (the initial model b with the number of items reduced to 12) and
g) Hierarchical refined model (one second order factor underlies the four factors of the refined model f).

The one-factor model (a) inadequately fit the data in all samples (Table 1). The indices were improved in all cases after fitting Buss and Perry’s four-

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2 Full EFA results are available upon request.
factor model (b). The GFI increased substantially, while the RMSEA decreased reaching a reasonably close fit in the second and third samples but not in the first one (0.096). As can also seen by the relative chi-square, the fit of the model was adequate only in the third sample (Table 1). The fit of the hierarchical model (e) was slightly worse than the former one, in terms of both absolute and relative fit measures.

In order to evaluate the proposals formulated by Harris (1995) and Meesters et al. (1996), we compared models (c) and (d) with the corresponding one for AQ29 (b). cases, the 29-item model proposed by Buss and Perry (1992) provided the best fit to model in our data, since the Browne–Cudeck Criterion (Browne and Cudeck, 1989) was smaller in all samples than the corresponding value for: the other two models (Table 2). The 12-item AQ proposed by Bryant and Smith (2001) was further evaluated. The measures of fit of model (f) were satisfactory, indicating adequate fit in all samples. The values of GFI (0.94–0.96) indicate the high proportion of variance explained. The RMSEA was not significantly higher than 0.05 with the exception of the second sample, which nevertheless corresponds to a reasonably close fit according to Browne and Cudeck (1993). The relative fit indices (NNFI and CFI) reached their highest values, with CFI being higher than 0.9 in all three samples. The relative chi-square value was lower than the threshold value of 2 only in the first sample, while its values were 2.4 and 2.7 in the other two samples. Further, the corresponding hierarchical refined model (model g) provided similar indices with the latter one (Table 3).

### 3.3. Multiple group confirmatory factor analysis

#### 3.3.1. Gender invariance

The gender invariance of the best-fitting model (i.e. Bryant and Smith model f) was examined in the first and third samples (Tables 4 and 5). The chi-square statistic did not indicate a difference in the general population sample of Athens. Hence the AQ12 satisfies the requirement of loadings invariance and scores can, be meaningfully compared across genders.

Even though the chi-square statistic indicated a significant gender effect for the third sample (namely items V2 and V4, which were higher in the females’ group), the sample size of the females’ group ($N=33$) was small (3:1 ratio of observations versus items) and may lead to unstable results.

#### 3.3.2. Sample invariance

The sample loading invariance was also assessed for the Bryant and Smith (2001) four-factor model (f). The chi-square statistic indicated significant sample effect; hence we proceeded with pair-wise comparisons among samples (Tables 4 and 5). Differences in the loadings were present only between the second and the third sample (items A1, H3 and V4; Table 5).

### 3.4. Descriptive indices and internal consistency

Descriptive indices and Cronbach’s (1951) alpha coefficients for each subscale and total scores for both AQ29 and AQ12 are presented in Table 1. Analysis of variance was used to compare the mean scores between the three samples. The highest scores appeared in the third sample (individuals facing problem related to substance abuse), followed by the second one (young male conscripts), while the lowest values appeared in the first sample (general population sample of Athens).

### Table 2

<table>
<thead>
<tr>
<th>Model</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) 29 items</td>
<td>861.98</td>
<td>1511.18</td>
<td>1495.98</td>
</tr>
<tr>
<td>(c) 27 items</td>
<td>905.58</td>
<td>1603.91</td>
<td>1594.62</td>
</tr>
<tr>
<td>(d) 26 items</td>
<td>910.92</td>
<td>1614.65</td>
<td>1597.60</td>
</tr>
</tbody>
</table>

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a $P \leq 0.001$.  
b $P > 0.05$.  
c Sample 1: $N=290$, Sample 2: $N=577$ and Sample 3: $N=160$.
The difference between the pairs of means was non-significant: $P > 0.05$.

Analysis of variance (using the Bonferroni post-hoc multiple comparisons test) revealed significant differences in all cases ($P < 0.05$) with the exception of the “Anger” scale between samples 1 and 2 (adjusted for age and gender).

Regarding reliability, Cronbach’s alpha coefficient was high (0.85–0.88) for the total AQ29 and moderate to high for the subscales (0.50–0.84). Two problematic items were identified (Verbal subscale items 1 and 3) with low item-total correlations (lower than 0.20) and no decrease of alpha at item deletion, in all samples. Unlike the other three statements included in the “Verbal aggression” subscale of the AQ29, the items V1 (“I tell my friends openly when I disagree with them”) and V3 (“When people annoy me, I may tell them what I think of them”) describe socially acceptable behaviours in the Greek culture. Possibly, they do not reflect aggressive behaviour; therefore the low consistency with the rest of the AQ29 items is justified.

With respect to the AQ12, the corresponding Cronbach’s alpha coefficients were lower (0.73–0.77 for the total scale and 0.48–0.76 for the subscales). This result was expected for the shortened AQ12 since Cronbach’s alpha depends on the number of items (Pedhazur and Schmelkin, 1991).

### 3.5. Age and gender effect

The age and gender effects on AQ12 subscale and total scores were evaluated implementing normal regression. No age effect, adjusted for gender, was present in samples 1 and 3. On the contrary, in the first sample the AQ12 scores were significantly different for

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Table 5

<table>
<thead>
<tr>
<th>Hypothesis for loadings</th>
<th>Sample excluded</th>
<th>Items excluded</th>
<th>% Invariance</th>
<th>Nested models comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender invariance</td>
<td>1</td>
<td>–</td>
<td>100.0</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>V2, V4</td>
<td>83.3</td>
<td>0.265</td>
</tr>
<tr>
<td>Sample invarance</td>
<td>1 and 2</td>
<td>–</td>
<td>100.0</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>2 and 3</td>
<td>A1, V4, H3</td>
<td>75.0</td>
<td>0.114</td>
</tr>
<tr>
<td></td>
<td>3 and 1</td>
<td>–</td>
<td>100.0</td>
<td>–</td>
</tr>
</tbody>
</table>

$^a$ Differences in chi-square ($\delta\chi^2$) between the unconstrained and the partially constrained models.

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Table 4

Tests of invariance of loadings among genders and samples (AQ12 — model f).

<table>
<thead>
<tr>
<th>Hypothesis for loadings</th>
<th>Sample excluded</th>
<th>Subscale</th>
<th>$\chi^2/df$</th>
<th>RMSEA$^a$</th>
<th>Nested models comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender invariance</td>
<td>1</td>
<td>Physical</td>
<td>1.762</td>
<td>0.051</td>
<td>15.5 (8) 0.050</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Verbal</td>
<td>1.644</td>
<td>0.065</td>
<td>27.0 (8) 0.001</td>
</tr>
<tr>
<td>Sample invarance</td>
<td>1 and 2</td>
<td>Anger</td>
<td>2.257</td>
<td>0.035</td>
<td>35.7 (16) 0.003</td>
</tr>
<tr>
<td></td>
<td>1 and 2</td>
<td>Hostility</td>
<td>2.480</td>
<td>0.041</td>
<td>15.0 (8) 0.058</td>
</tr>
<tr>
<td></td>
<td>2 and 3</td>
<td>Total</td>
<td>2.277</td>
<td>0.042</td>
<td>25.3 (8) 0.001</td>
</tr>
<tr>
<td></td>
<td>3 and 1</td>
<td>Total</td>
<td>1.987</td>
<td>0.047</td>
<td>10.2 (8) 0.249</td>
</tr>
</tbody>
</table>

$^a$ P < 0.001.

$^b$ Differences in $\chi^2$ between the unconstrained and the constrained models.

---

Table 3

Descriptive indices and internal consistency of the AQ29 (and AQ12 within parentheses) subscale and total scores in samples 1, 2 and 3.

<table>
<thead>
<tr>
<th>Sample</th>
<th>AQ Scale</th>
<th>Alpha (95% CI)</th>
<th>Mean (95% CI)</th>
<th>S.D. (95% CI)</th>
<th>Range (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1 (General population from Athens, n = 307)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>0.82 (0.77)</td>
<td>19.4 (5.6)</td>
<td>6.6 (2.6)</td>
<td>9–43 (2–15)</td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>0.55 (0.55)</td>
<td>14.2 (7.3)</td>
<td>3.1 (2.3)</td>
<td>5–25 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.75 (0.57)</td>
<td>20.1 (8.3)</td>
<td>5.0 (2.5)</td>
<td>7–34 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td>0.75 (0.66)</td>
<td>20.3 (7.3)</td>
<td>5.0 (2.4)</td>
<td>8–38 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.85 (0.74)</td>
<td>74.0 (28.6)</td>
<td>14.5 (6.6)</td>
<td>44–122 (14–51)</td>
<td></td>
</tr>
<tr>
<td>Sample 2 (Male conscripts, n = 1228)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>0.82 (0.70)</td>
<td>25.7 (7.9)</td>
<td>7.3 (3.0)</td>
<td>9–45 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>0.50 (0.56)</td>
<td>14.7 (7.0)</td>
<td>3.0 (2.3)</td>
<td>5–25 (2–15)</td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.79 (0.60)</td>
<td>19.7 (8.5)</td>
<td>5.6 (2.7)</td>
<td>7–35 (2–15)</td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td>0.70 (0.61)</td>
<td>21.5 (7.2)</td>
<td>5.4 (2.6)</td>
<td>7–40 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.88 (0.77)</td>
<td>81.5 (30.5)</td>
<td>16.3 (7.5)</td>
<td>35–135 (12–37)</td>
<td></td>
</tr>
<tr>
<td>Sample 3 (Drug dependent individuals, n = 165)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>0.84 (0.76)</td>
<td>27.0 (8.8)</td>
<td>7.9 (3.4)</td>
<td>9–45 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>0.51 (0.48)</td>
<td>15.5 (7.6)</td>
<td>3.0 (2.1)</td>
<td>8–24 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.74 (0.54)</td>
<td>21.0 (9.5)</td>
<td>5.2 (2.6)</td>
<td>10–35 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td>0.70 (0.63)</td>
<td>24.1 (8.9)</td>
<td>5.4 (2.6)</td>
<td>8–37 (3–15)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.87 (0.73)</td>
<td>88.6 (34.7)</td>
<td>16.1 (7.2)</td>
<td>53–123 (14–50)</td>
<td></td>
</tr>
</tbody>
</table>
males and females, with the exception of “Hostility” (Table 6). In both samples, males scored higher in “Physical aggression” than females. Males scored significantly higher than females in “Verbal aggression” and lower in “Anger” in the general population sample of Athens while the opposite effects emerged in the third sample.

In the young males’ sample (sample 2) the age effect was significant. Specifically, there was a negative age effect on “Physical Aggression” (regression coefficient = −0.31, se=0.05, P<0.001) and “Hostility” (r=−0.23, se=0.04, P<0.001) subscales. Further, a 1-year age increase corresponded to a decrease of about half a unit in the total AQ12 score (r=−0.51, se=0.12, P<0.001).

3.6. Correlations with SCL-90-R

All correlations at the subscale level between AQ12 and SCL-90-R were moderate (Table 7). The coefficients were compared and two interesting outcomes emerged. Firstly, all SCL-90-R subscales correlated substantially were compared and two interesting outcomes emerged. Secondly, the AQ12 subscales. Regarding the opposite comparison, the correlations of the AQ12 with the SCL-90-R “Hostility” (0.26 to 0.37) were significantly higher compared to the ones with the remaining eight SCL-90-R subscales (Olkin’s z for comparing dependent correlation coefficients, P<0.001 in all cases).

Interestingly, a “Hostility-cross” pattern (Table 7) emerged which does not include the two “Hostility” subscales. Regarding the AQ12, “Hostility” correlated higher with “Depression” (r=0.42, P<0.001). With respect to SCL-90-R, “Hostility” correlated lower with the homonymous AQ12 subscale than the other three AQ12 subscales.

4. Discussion

The initial Buss and Perry (1992) AQ29 and the counterpart hierarchical model provided an inadequate fit to our data in terms of both absolute and relative fit CFA measures. On the contrary, the Bryant and Smith (2001) revised model (model f) provided the best fit as well as its corresponding hierarchical model (g). The above results were replicated in three dissimilar samples of Greek adults. Despite the reduction in the number of the items, the internal consistency of the AQ12 remained satisfactory, providing evidence that the revised model by Bryant and Smith should be implemented in the Greek population.

Multiple groups CFA did not reveal substantial discrepancies in the loadings among samples or genders. On the assumption of metric invariance, comparisons were carried out between the scores. The AQ12 scores were substantially higher in the third sample. This fact indicates the existence of augmented aggressive personality traits in individuals facing problems related to substance abuse. The association between substance abuse and aggressiveness is undoubtedly complex, but a series of investigations with first graders revealed that boys who were identified by teachers/peers as more aggressive are more likely to use drugs in the future (Kellam et al., 1980, 1982, 1983, 1989). Early aggressive behaviour was found predictive of later substance abuse (Moffitt, 1993) and conduct disorder symptoms have been observed to begin some years before regular substance abuse (Moffitt, 1993) and conduct disorder symptoms have been observed to begin some years before regular substance abuse.

![Table 7](image)

**Table 7** Pearson correlation coefficients between AQ12 and SCL-90-R scores (sample 2).

<table>
<thead>
<tr>
<th></th>
<th>Physical</th>
<th>Verbal</th>
<th>Hostility</th>
<th>Anger</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>0.14</td>
<td>0.18</td>
<td>0.34 (b)</td>
<td>0.23</td>
<td>0.31</td>
</tr>
<tr>
<td>Depression</td>
<td>0.16</td>
<td>0.19</td>
<td>0.42 (b,c)</td>
<td>0.27</td>
<td>0.36</td>
</tr>
<tr>
<td>Hostility</td>
<td>0.38 (b,c)</td>
<td>0.28 (b)</td>
<td>0.26</td>
<td>0.36 (b)</td>
<td>0.45</td>
</tr>
<tr>
<td>Inter. Sensitivity</td>
<td>0.12</td>
<td>0.15</td>
<td>0.37 (c)</td>
<td>0.17</td>
<td>0.28</td>
</tr>
<tr>
<td>Obsessive–Compulsive</td>
<td>0.13</td>
<td>0.18</td>
<td>0.36 (c)</td>
<td>0.23</td>
<td>0.31</td>
</tr>
<tr>
<td>Paranoid ideation</td>
<td>0.14</td>
<td>0.14</td>
<td>0.32 (c)</td>
<td>0.16</td>
<td>0.27</td>
</tr>
<tr>
<td>Phobic anxiety</td>
<td>0.07</td>
<td>0.16</td>
<td>0.33 (c)</td>
<td>0.16</td>
<td>0.25</td>
</tr>
<tr>
<td>Psychoticism</td>
<td>0.12</td>
<td>0.15</td>
<td>0.32 (c)</td>
<td>0.19</td>
<td>0.28</td>
</tr>
<tr>
<td>Somatization</td>
<td>0.11</td>
<td>0.15</td>
<td>0.27 (c)</td>
<td>0.21</td>
<td>0.26</td>
</tr>
</tbody>
</table>

\(a\) All coefficients were statistically significant (P<0.05).

\(b\) The coefficient was significantly higher than the others in its row (P<0.05) according Olkin’s z (Olkin,1967).

\(c\) The coefficient was significantly higher than the others in its column (P<0.05) according Olkin’s z (Olkin,1967).

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**Note:** in that order.
drug use (Young et al., 1995). In conclusion, there is evidence suggesting that aggressive personality traits may predate addictive behaviour.

Regarding age, even though a negative relationship was found with aggression (in the conscripts’ sample), its magnitude was low and not replicated in the other samples, and hence a substantial age effect is not apparent. With respect to the gender effect, males scored higher than females in “Physical aggression” in samples 1 and 3. This is consistent with most studies that have utilized the AQ. In contrast, no clear pattern emerged when analyzing gender effects on the other three aggression subscales.

All nine SCL-90-R subscales were preferentially correlated with the AQ12 “Hostility” subscale rather than with the other three aggression subscales in accordance with Morren and Meesters (2002). Specifically, the highest correlations of the AQ12 “Hostility” subscale emerged with the SCL-90-R “Depression” and “Interpersonal sensitivity” subscales. This is intuitive since the AQ12 “Hostility” subscale includes items mostly reflecting depressive traits, suspiciousness and bitterness. On the other hand, the AQ12 subscales are more correlated with SCL-90-R “Hostility” rather than with the other eight SCL-90-R subscales. This finding is also makes intuitive sense, since the SCL-90-R “Hostility” items reflect mostly anger and physical aggression. This would explain additionally why the two homonymous subscales are not highly inter-correlated. Conclusively, these results provide evidence for content validity for both the AQ12 and SCL-90-R questionnaires.

With reference to the limitations of the present study, no test-retest analysis was performed to evaluate the stability of the AQ. Another limitation concerns the lack of further evaluation of convergence and discriminant validity. Finally, even though the Bryant and Smith (2001) revised model had a reasonably close fit to our data we acknowledge the need for a model with improved fit. The Greek version of the AQ12 had satisfactory properties and thus can be considered a valuable instrument in the assessment of aggressive behaviour.

References


