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# FACTORIAL STRUCTURE OF THE BUSS-PERRY AGGRESSION QUESTIONNAIRE (BPQA) IN POLISH POPULATION[1]

**Abstract**

Aggression can be evaluated in a variety of ways. Among the self-reported measures, the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957) has been one of the most popular questionnaires. Based on this previous work, Buss and Perry proposed a psychometrically improved and updated measure of aggression: The Aggression Questionnaire (Buss & Perry, 1992). The Buss-Perry Aggression Questionnaire (BPQA) has quickly become the gold-standard for the measurement of aggression. The original version of the BPAQ contains 29 items and is designed to assess four dispositional components of aggression: Physical Aggression, Verbal Aggression, Anger, and Hostility. However, the BPAQ scale has been extensively validated, and the validation mainly focused on samples of college students. In this study, exploratory and confirmatory models were evaluated among a sample of 3990 Polish participants (aged from 10 to 79 years). A 5-factor structure resulted in the exploratory analysis and 5-factor structure showed acceptable fits in confirmatory analyses. Implications and limitations of these solutions are discussed.

**Keywords:** Buss-Perry Aggression Questionnaire (BPQA), aggression

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## 1. Arnold H. Buss and Mark Perry Aggression Questionnaire

Arnold H. Buss and Mark Perry Aggression Questionnaire (1992) has been a popular diagnostic tool used in the research on aggression for over twenty years. It is characterised by a clear theoretical model and excellent psychometric properties (cf. Eckhardt, Norlander, & Deffenbacher, 2004). It was created based on an earlier questionnaire designed by Arnold H. Buss and Ann Durkee (1957), which included seven scales constructed *a priori* by the authors: Assault, Indirect Aggression, Irritability, Negativism, Resentment, Suspicion and Verbal Aggression. The Polish version of the questionnaire entitled Nastroje i Humory (Moods and Humours), adapted by Choynowski, was published in 1971.

As Buss and Durkee (1957) indicate, the popularity of their instrument probably stems from the fact that it enables the diagnosis not only of overall aggressiveness but also of its manifestations. However, the questionnaire used a binary format of answers (true vs. false), the construction of its scales was not preceded by factor analysis, and some of the questionnaire items – which due to their content fit more than one scale – were arbitrarily assigned to individual scales. While retaining the basic advantage of the instrument, which is the ability to diagnose the components of aggression, the authors have begun to design a new version that meets modern psychometric standards.

The new version of the questionnaire (Buss & Perry, 1992) was developed based on an initial pool of 52 items, containing both the items of the previous questionnaire and the new items, which were evaluated on a five-point scale (from 1 – *extremely uncharacteristic* to 5 – *extremely characteristic*) by 1253 students (641 women and 612 men). Majority of the respondents was between 18 and 20 years old. The whole sample consisted of three samples with respective sizes of 406, 448, and 399 subjects. The correlation matrix of data received from the first sample was subjected to Exploratory Factor Analysis (EFA), which was conducted using the Principal Axis Factoring (PAF) method with Oblimin rotation because the several components of aggression were expected to be correlated. The authors have created items for six components of aggression (physical aggression, verbal aggression, anger, indirect aggression, trauma, and suspicion), planned *a priori*, however, four factors have been distinguished, defined as Physical Aggression and Verbal Aggression, representing the behavioural components of the aggression construct, Anger as an affective component and Hostility as a cognitive component of aggression. The results of exploratory factor analyses carried out for the other two samples confirmed the stability of the factor structure. The final version of the questionnaire – taking into account the factor loading matrices of all three analyses carried out – consistently included only those items in which the factor loadings were at least .35 on its own factor, but less than .35 on any other factor.

It was established that 29 items are satisfying that criterion: nine for the scale of Physical Aggression, five for the scale of Verbal Aggression, seven for the scale of Anger, and eight for the scale of Hostility.

Confirmatory factor analysis (CFA) was conducted on the from the second sample. The authors have formulated three models explaining the four-factor solution obtained in the exploratory analysis. According to the first model, all test items form one overall dimension of aggressiveness. The second model assumed the existence of four dimensions of aggressiveness correlated with each other, while the third – four dimensions

correlated with each other so strongly that they form one dimension of overall aggressiveness of higher order. The results of the analysis showed the worst fit of the first of the models (the goodness of fit index determined as the chi-squared test value divided by the number of degrees of freedom was equal to 2.27 and exceeded the value of 2, which means a poor fit), while the other two models adequately reflected the collected data (the goodness of fit index values for them were 1.94 and 1.95 respectively). The authors have chosen a model of four components of aggression linked by the factor of a higher level of overall aggressiveness.

The analysis of the tool's validity was supplemented by determining its correlations with different personality scales and obtaining, among other things, positive correlations between all scales of the questionnaire and the measures of impulsivity (from .28 to .46), assertiveness (from .18 to .49) and competition (from .30 to .46), as well as the peer grades that were most strongly related to the Physical Aggression scale.

The reliability of the individual scales (Physical Aggression – .85, Verbal Aggression – .72, Anger – .83, Hostility – .77) and the entire questionnaire (.89) was determined as internal consistency by using Cronbach's alpha coefficient. The stability was estimated on a sample of 372 people, tested twice in the interval of nine weeks, obtaining satisfactory correlation coefficients, both for individual scales (Physical Aggression – .80, Verbal Aggression – .76, Anger – .72, Hostility – .72) and the whole questionnaire (.80).

Sex differences in aggression were also revealed. For the general level of aggressiveness, the effect of sex was moderate (.57). Men scored higher than woman on Physical and Verbal Aggression, and Hostility. The largest effect size was obtained for Physical Aggression (.89), for Verbal Aggression it was moderate (.44), and for Hostility – the smallest (.19). The difference was non-significant with respect to anger.

It is worth noting that the next version of the questionnaire (Buss & Warren, 2000) has been created with 34 items. However, it has not gained the same popularity as its predecessor. The Aggression Questionnaire, consisting of 29 items, remains the most widely used version of the instrument.

## 2. Research on the Factor Structure of the Aggression Questionnaire

The results of research on the psychometric properties of the Aggression Questionnaire conducted in various countries and cultures generally confirm the four-factor structure of the questionnaire. This structure was obtained in a study on the Italian adaptation of the tool, carried out on samples of high school and university students (Fossati, Maffei, Acquarini, & Di Ceglie, 2003), and in a study on the Greek (Tsorbatzoudis, 2006; Tsorbatzoudis, Travlos, & Rodafinos, 2012) and Arabic (Abd-El-Fattah, 2007) versions of the questionnaire, which covered secondary school students. However, the results of some research reveal that there are some discrepancies in the items included in individual scales and their factor loadings. Harris' (1995) confirmatory factor analysis of the scores obtained by Canadian students revealed that a better fit of the model can be achieved by removing two items from the Hostility scale that are more related to suspicion than hostility. Meesters, Muris, Bosma, Schouten, and Beuving (1996), using a sample of Dutch students, also achieved a better fit of the model after the removal of the two items indicated by Harris (1995) and, additionally,

one more item from the scale of Verbal Aggression. A study on the Spanish version of the questionnaire (Santisteban, Alvarado, & Recio, 2007) carried out on samples of young people aged 9–11 and 14–17 also identified three items with low factor loadings, including the one, already indicated, for both Canadian and Dutch tool adaptations. Japanese (Nakano, 2001), as well as Hungarian (Gerevich, Bácskai, & Czobor, 2007) version of the tool had better psychometric properties after the removal of two – the only two in the questionnaire – reversed items. In a study on the Turkish version, which was carried out on a sample of adult males addicted to psychoactive substances, one of the reversed items was removed (Evren, Çınar, Güleç, Çelik, & Evren, 2011).

In a study on the congruence of the factor structure of the questionnaire (Vigil-Colet, Lorenzo-Sewa, Codorniu-Raga, & Morales, 2005), in which the factor loading matrices from the original Buss and Perry studies and from studies carried out in Japan and Spain, were used, a high similarity of all compared loading matrices was obtained and correlation patterns between the factors similar to those of the construction test were obtained. However, to maintain the consistency of the structure in linguistically and culturally diverse populations, it was recommended to reduce the items of the questionnaire to twenty.

Bryant and Smith (2001), pointing out that the four frequently identified factors in the validation studies explain too little common variance, developed a shortened form of the Aggression Questionnaire, consisting of twelve items evaluated on a 6-point scale. In a study on a Chinese adaptation of the questionnaire (Maxwell, 2007), with a sample of 1219 students and graduates living in Hong Kong, in which both versions full and abbreviated were used, a more adequate fit of the four-factor model to the data was obtained for the abbreviated version of the questionnaire. Similar results were also obtained in the factor structure studies of the Greek version of the questionnaire, which included three samples: adults with an average age of about 50, recruits aged 19–24, and psychoactive substance addicts aged 24–55 (Vitoratou, Ntzoufras, Smyrnis, & Stefanis, 2009).

An attempt to replicate the four-factor model in the criminal population has failed (Williams, Boyd, Cascardi, & Poythress, 1996). The results of the confirmatory factor analysis showed a better fit of the model of two factors, the first of which included physical aggression and anger, while the second consisted of verbal aggression and hostility. For the Malaysian version of the questionnaire, validated on a sample of female prisoners, a four-factor structure was obtained, however, the item distribution for the created factors, inconsistent with the original one, made it impossible to identify three of them, except for the verbal aggression factor (Mazlan & Ahmad, 2012). Studies on the German adaptation (von Collani & Werner, 2005) also made it possible to separate four factors, however, for two of them it was difficult to obtain an unambiguous interpretation, and the assignment of items to scales only partially corresponded to the original. In the study on the Turkish version of the tool, conducted on adolescents, after removing seven items from the questionnaire, a three-factor solution was obtained, consisting of anger, hostility, and psychological aggression (Önen, 2009). Whereas, in the research conducted on Spanish adaptation of the questionnaire (Garcia-León, Reyes, Vila, Pérez, Robles, & Ramos, 2002), two subscales – linked to resentment and suspiciousness – for the scale of Anger were obtained. In the case of the Argentinean version of the tool (Reyna, Lello, Sanchez,

& Brussino, 2011), validated on an adolescent sample, the four-factor solution could not be replicated using exploratory factor analysis. A two-factor model proved to be a more adequate model: the first factor was formed from the items of the Physical Aggression, Verbal Aggression, and Anger scales, while the second one from the items of the scales of Hostility, Verbal Aggression, and Anger. The results of the confirmatory factor analysis carried out by the authors revealed that three of the models included in the analysis were satisfactory: the two-factor solution (for 27 items – two were removed due to low factor loadings), the original four-factor solution, and a shortened version of the Aggression Questionnaire.

Courtesy of the Amity Institute, which shared the scores of the Aggression Questionnaire conducted on a sample of 4116 people aged between 9 and 90 years with the authors, an effort was made to estimate the structure of aggressiveness in the Polish population. The data obtained constitute one of the largest databases collected using the Aggression Questionnaire, even though its representativeness for the general population has not been specified. It can be assumed that it is representative of Internet users who undertake self-diagnosis.

## 3. Method

After ruling out people whose results have led to the assumption of a schematic or random response (perhaps due to an incomplete understanding of the items), the validation sample consisted of 3990 people aged 10 to 79 years, with an average age of 26 years ($M = 26.03$, $SD = 11.66$). This sample can be treated as a representative sample for the population of Polish women by analysing the share of women's age fractions, similarly for men – taking into account men's age fractions. At the same time, the respondents represent all regions of Poland. In general, young people and women are predominant in the whole group of respondents. The study sample consisted of 2495 women (mean age of women 27.82, $SD = 11.74$) and 1495 men (mean age of men 23.05, $SD = 10.91$).

To estimate the structure of aggressiveness in the Polish population, an Exploratory Factor Analysis (EFA), using the Principal Axis Factoring (PAF) method with Oblimin rotation was conducted on the collected data. Then – based on the obtained solution and the content analysis of the items – the model of identified factors was developed, which was verified utilizing confirmatory factor analysis (CFA). Based on both solutions obtained, an attempt was made to create and verify a semi- the cause-and-effect model of the relationship between the identified dimensions of aggressiveness. The Structural Equation Modeling (SEM) method was used for this purpose.

### 3.1 Factor Structure of the Aggression Questionnaire: Results of Exploratory Factor Analysis

The authors of the test used exploratory factor analysis (PAF) with the Oblimin rotation (cf. Aranowska, 1996) due to strong subscale relationships with the overall test result (cf. the last column of Table 1). With such relationships, a solution in which the factors are allowed to be correlated, in line with the theoretical conclusions of Buss and Perry (1992), can be considered a sensible solution.

Table 1
*Correlation between the Aggression Questionnaire (AQ) scales (n = 3990)*

| Scale | Physical Aggression | Verb. Aggression | Anger | Hostility | AQ |
|---|---|---|---|---|---|
| **Physical Aggression** | (.76) | .491 | .515 | .428 | .820 |
| **Verb. Aggression** | | (.62) | .545 | .446 | .728 |
| **Anger** | | | (.60) | .527 | .808 |
| **Hostility** | | | | (.76) | .773 |
| **Gen. Result** | | | | | (.87) |

All correlations significant for $p < .001$ (one tailed).
Cronbach's alpha are reported along the diagonal (numbers in brackets).

Solutions were sought with the assumption of high correlation between factors, i.e., with the delta parameter value of – 40. At lower values of this parameter, both the standardised item coordinates values on the reproduced dimensions (in Pattern matrix) and the correlations of items and dimensions (in Structure matrix) were small and average numbers that differed significantly in both matrices, i.e. they did not reproduce the same order of strength of the relationship of items and factors (the same pattern of similarity), and therefore did not give the possibility of accepting the obtained solution.

Table 2 presents factor loadings, while the correlation between the generated factors are presented in Table 3. In interpreting the solution, the factor loadings of not less than the absolute value of .30 were taken into account, but for illustration, Table 2 shows the loadings higher or equal to .20.

Table 2
*The factor pattern matrix (n = 3990)*

| Item | Factor | | | | | |
|---|---|---|---|---|---|---|
| | 1 Anger | 2 Physical Aggression | 3 | 4 Verb. Ag. | 5 Hostility 1 | 6 Hostility 2 |
| **P.1** | .530 | | | | | |
| **P.2** | | –.446 | | .252 | | |
| **P.3** | | | | | | –.743 |
| **P.4** | | | | .514 | | |
| **P.5** | .307 | –.340 | | | | |
| **P.6** | .545 | | | | | |
| **P.7** | .408 | | | | | |
| **P.8** | .217 | –.553 | | –.204 | | |
| **P.9** | –.430 | | | | | |
| **P.10** | | | | | | –.703 |

Table 2 (continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| **P.11** | .273 | –.253 | | | .240 | –.313 |
| **P.12** | .439 | | | | | |
| **P.13** | | –.831 | | | | |
| **P.14** | .209 | –.255 | | .436 | | |
| **P.15** | | | | | –.367 | |
| **P.16** | | .463 | | | | |
| **P.17** | | | | | –.740 | |
| **P.18** | .510 | | | | –.238 | |
| **P.19** | .255 | | | | –.453 | |
| **P.20** | | | | | –.654 | |
| **P.21** | | | | .225 | –.308 | |
| **P.22** | –.200 | –.748 | | .231 | | |
| **P.23** | .373 | | | | –.384 | |
| **P.24** | | | | | –.736 | |
| **P.25** | | –.744 | –.219 | | | |
| **P.26** | | | –.335 | | –.399 | |
| **P.27** | .542 | | –.396 | | | |
| **P.28** | .545 | | | | –.269 | |
| **P.29** | | –.569 | –.324 | | | |

The first conclusion seems to be the different order of the reproduced dimensions of aggressiveness against many of the solutions cited above. The strongest dimension is Anger ($\lambda = 5.5$), the second is Physical Aggression ($\lambda = 5.3$), followed by Type 1 Hostility ($\lambda = 5.0$), Type 2 Hostility ($\lambda = 3.8$), and Verbal Aggression spread over the very weak two dimensions ($\lambda = 1.1$). The Anger Factor is strongly associated with six (items: 1, 9, 12, 18, 23, and 28) of the seven items constituting – according to the authors of the test – this scale, while one item (19) is related to the Type 1 Hostility Factor (cf. the correlations presented in Table 2 for the first factor). Physical aggression is strongly associated with eight out of nine items (items: 2, 5, 8, 13, 16, 22, 25, and 29), one position (11) correlates with the weaker dimension of Hostility 2. Type 2 Hostility – interpreted as resentment and jealousy – is strongly related to five items (15, 17, 20, 24, and 26) out of eight. In turn, type 2 Hostility – interpreted as the suspicion of kindness shown by others – strongly correlates with two items (3 and 10) out of eight. The remaining the seventh item of the Aggression Scale correlates on average with the first factor, namely, Anger. The fourth factor strongly correlates with only two (4 and 14) items from the five scales of Verbal Aggression. The third factor – uninterpretable: $\lambda < 1$ – would be related to one item (27) from the Verbal Aggression scale, however, this item is more strongly associated with the Anger factor.

All dimensions account for 40.1% of the variability of the items and this is a result comparable to the results of factor analyses for other populations, e.g., in German studies (von Collani & Werner, 2005), a similar percentage of variability was obtained (44.5%), and anger was reproduced as the first, strongest dimension.

Table 3
*Factor inter-correlations (n = 3990)*

| FACTOR | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **1** | 1.000 | –.631 | –.127 | | –.601 | –.456 |
| **2** | | 1.000 | .154 | | .448 | .462 |
| **3** | | | 1.000 | .111 | .231 | .313 |
| **4** | | | | 1.000 | | –.169 |
| **5** | | | | | 1.000 | .673 |
| **6** | | | | | | 1.000 |

The table shows correlation coefficient ≥ .10.

Observing the values of correlation coefficients in Table 3, one can see that relatively strong relationships are formed by factors: Anger (factor 1), Physical Aggression on (2), type 1 Hostility (6), and type 2 Hostility (5) with correlation values of 0.60 and above. Verbal Aggression (4) is essentially unrelated to other factors. Due to the weakness of the solution, this factor is not interpreted substantively. It is to be assumed that Verbal Aggression has not been satisfactorily reproduced. An important implication of the study seems to be the disclosure of a richer, more detailed than the original factor structure of the questionnaire for the Polish population. Two types of aspects have been reproduced for the Hostility construct: the hostility aspect interpreted as resentment and jealousy, and the aspect defined as suspicion of the kindness of others. In the case of verbal aggression, it is difficult to talk about the desired identification of the construct.

### 3.2 Factor Structure of the Aggression Questionnaire: Results of Confirmatory Factor Analysis

Further analyses were carried out for the model resulting from the solution obtained from the application of exploratory factor analysis (presented above). This solution differs from the four-factor aggressiveness structure. Figure 1 illustrates a graphical layout of relations for the introduced latent variables and the corresponding observable variables and the values of the related measures obtained after the application of confirmatory factor analysis (CFA) have been assigned to individual paths. Results of CFA were analysed using several indices. Altogether, five fit indices were used: chi-square ($\chi^2$), chi-square divided by degrees of freedom in the model ($\chi^2/df$), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Normed Fit Index (NFI). The fit indices showed that the proposed model was an acceptable explanation of the sample data. Thus, although $\chi^2$ (314) = 4668.4, $p < .0005$ and $\chi^2/df = 14.87$ are far too high to accept the model fit as sufficient, RMSEA = .059 (less than .07) is satisfactory, while CFI = .858 and NFI = .849 are slightly below the minimum "acceptable" threshold.

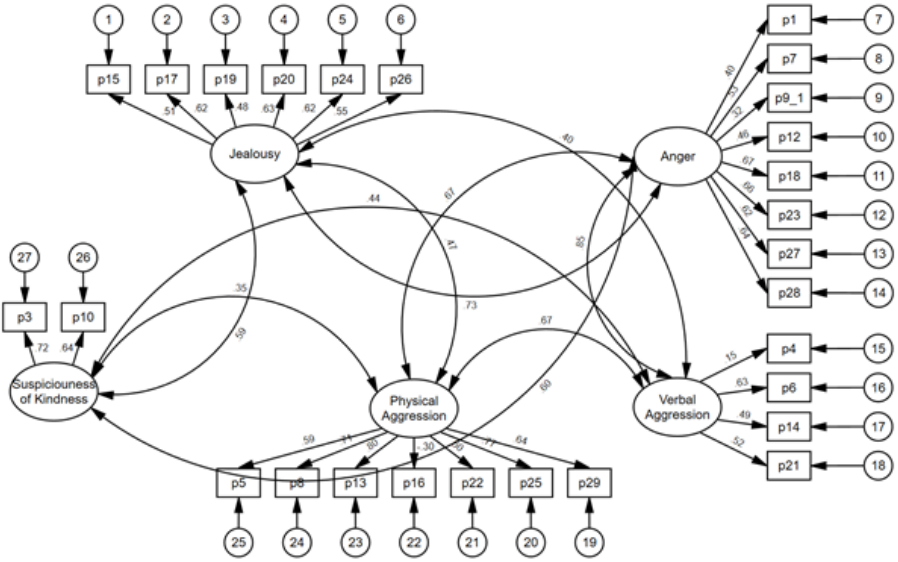


*Figure 1.* Confirmatory Factor Analysis (CFA) – A matrix of interrelationships of factors identified by Exploratory Factor Analysis (EFA) with 27 items (excluding items 2 and 11 eliminated due to their unsatisfactory relationship to the structures under analysis). Resentment and jealousy structure is marked in the figure as jealousy.

### 3.3 Factor Structure of the Aggression Questionnaire: Results of the Analysis of the Structural Equations System

Another model, verified by using the SEM created based on the content analysis of both solutions presented above (EFA and CFA), is the model illustrated in Figure 2. Exploratory Factor Analysis (EFA) was mainly used to check whether the items in the scales are correlated and what dimensions they form, as "the underlying purpose of EFA is to reveal hidden sources of covariance (correlation) between test items" (Konarski, 2009, p. 187). The aim of Confirmatory Factor Analysis (CFA) was to verify the validity of the *a priori* predicted relationships between the hidden dimensions of aggressiveness identified in the previous analysis. The results of Exploratory Factor Analysis (EFA) – showing the co-occurrence of observable reactions to items (co-occurrence of behaviour) – are used for purely descriptive purposes, revealing that the data are co-dependent. However, they do not show the substantive rules of this relationship, i.e., they do not describe the data at the content level. In the so-called measurement model (CFA), a latent construct involves items with a content related (on the basis of theory) with the concept that is its (construct) meaning.

A graph, illustrating a hypothetical network of latent variable relationships, represents a directional theoretical semi-cause-and-effect model. This model does not contain all possible relationships included in the so-called measurement model (CFA), and only those that are necessary to obtain the model optimally fitted to the data (see Figure 2).

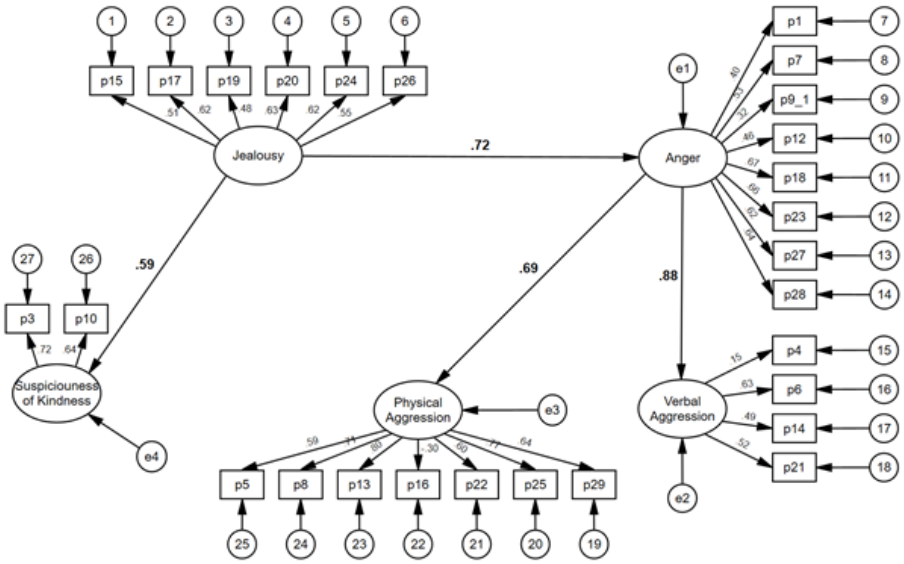


*Figure 2.* Aggressiveness model with estimates of the parameters after application of the SEM technique with 27 items. Resentment and jealousy structure was marked in the figure as jealousy.

As above, fit indices for the model: RMSEA, CFI, and NFI together have adopted acceptable values. The values of statistics $\chi^2$ (320) = 4752.8, $p < .0005$ and $\chi^2/df = 14.85$ are clearly too high. The RMSEA has taken a satisfactory value of .059, while CFI = –.855 and NFI = 0.846 are slightly too low but acceptable. Comparing the formal characteristics of both models, i.e., the values of fit indices, one can see that – according to the rules of behaviour of these measures – the value of $\chi^2$ statistics of the directional model has increased, but only slightly. However, the values of the other coefficients have practically remained unchanged. This means that the paths that have been reduced (cf. Figs. 1 and 2) did not contribute to the model, and therefore did not explain a significant part of the variability and covariance of variables. From the formal point of view, each bidirectional path (association) of latent features (shown in Figure 1) represents the composition of two unidirectional relationships (of a functional and not necessarily causal nature) between a pair of specific constructs, e.g.: the symmetrical relationship of resentment and jealousy with anger is .73 (cf. Figure 1), while an asymmetrical relationship of .72 expressing the directional relationship of resentment and jealousy with anger (cf. Figure 2) is almost the same. This means that the directional relationship between anger and resentment and jealousy is most likely very small and insignificant compared to the relationship in the opposite direction.

Recognising that the model fits the data sufficiently, one can see that resentment and jealousy, the initial cognitive component in the aggressiveness model, has a direct effect on the suspicion that is also a cognitive component, and on the anger that is the affective component of aggressiveness. At the same time, resentment and jealousy have an indirect effect (through anger) on physical aggression and verbal aggression, which are behavioural components of aggressiveness. These results are partly consistent with Tucholska's

suggestion (1998), which only based on the analysis of Pearson's correlation coefficients for scale pairs (anger and physical aggression: $r = .57$ and anger and verbal aggression: $r = .48$) assumes that anger is a "catalyst" of aggressive behaviour. The results are inconsistent in that one of the two important aspects of hostility (which – based on the results presented above – cannot be combined into a single concept in the Polish population), resentment and jealousy, seems to be the original premise of aggressiveness.

## 4. Discussion

In the Polish population, a slightly different factor structure of the Aggression Questionnaire was obtained. For the subjects (aged 10–79 years), the scales of Anger, Hostility, and Verbal Aggression did not reproduce satisfactorily, and the dominant factor was the of Anger (cf. EFA results). A similar result was obtained for a German adaptation of the questionnaire (von Collani & Werner, 2005), although a considerable part of the research sample consisted of participants under the age of 30 years. In most of the studies cited above, there is no mention of age control, and perhaps this is why similar effects were not found in other populations.

The factor structure of aggressiveness in the Polish population proved to be more complex. This suggests a need to return to at least two of the previous indicators of hostility: resentment (or jealousy) and suspiciousness. It is worth remembering that the original intention of the authors was to operationalise the six components of aggressiveness. For diagnostic purposes, an instrument for differentiation between many different components of a complex construct, which is aggressiveness, seems to be more useful. An example of such a tool can be 13-scale questionnaire developed by Choynowski (2008) and validated on the Mexican population.

Considering the SEM results illustrated in Figure 2, the question arises to what extent the order and directions of relations in the model are supported by a type of substantive theory of aggressiveness (describing and explaining the existing mechanisms and connections of actual behaviour). Then the proposed model could be treated as a cause and effect model of aggressive behaviour. In its present form, it can be treated as an empirical descriptive model. Cognition → Affect → Behaviour scheme is one of the possible positions for cognitive evaluation when taking action (cf. Doliński, 2001) and was used as an assumption when developing the model. Once it was confirmed, competing models were tested, none of which have achieved acceptable values of the goodness of fit indices. Does this mean that the verified exploratory model can contribute to a more precise conceptualisation of the aggressiveness?

As an exploratory model, for now, it probably is not universal. This is further reinforced by the fact that, according to studies conducted in different populations (partially referred to above), even if SEM was used, the four main constructs proposed by Buss and Perry (1992) were considered, rather than the five, as in the case above. At the same time, there are more detailed reflections on the concept itself in other approaches to aggressiveness, e.g., Choynowski's concept (2008), which is based on a much higher number of dimensions (13). This issue is further linked to the number of questionnaire items. As can be seen in Figure 2, not all values of the measures determining the degree of explanation of the items by the construct are high enough. The question arises about the possibility of modifying the Aggression Questionnaire when adapting it (e.g., replacing some ques-

tions with others, increasing the number of questions, decreasing, etc.). Will the same theoretical model be appropriate for new results (from new research)?

The last question raises an important problem of stability of the construct introduced into the model, e.g., a higher level of male physical aggression is a result well confirmed in studies of various populations (cf. Rytel, 2011). Also in the studies in which the aggressiveness model was developed, the largest sex differences were found in Physical Aggression. Sex differences in Verbal Aggression were smaller. Verbal Aggression among men was greater than among women. Although the effect size for sex differences in Hostility (without any division into two dimensions) was small, women were more hostile (Aranowska & Rytel, 2011). The effect of increased hostility of Polish women in comparison to men requires of course further research. Perhaps analyses of the detailed components of this construct (at least two, jealousy and suspiciousness) will shed new light on this difference. In the Hungarian population (Gerevich et al., 2007), this effect did not occur (there is no statistically significant difference between the mean of men and women in the Hostility scale), but a similar – although statistically insignificant – trend was revealed in the German population (von Collani & Werner, 2005). Statistically significant – although completely unimportant from a practical point of view (cf. Thompson, 2002) – turned out to be the difference between the mean of men and women in the Anger scale. A similar result was obtained in a study conducted in Germany (von Collani & Werner, 2005), in which the women's average level of Anger was also higher than the men's.

Whether the above conclusions indicate the instability of the factor structure of aggressiveness, or the differential importance of its dimension during individual development requires further research. Especially in the light of the additionally observed dependence of the aggressiveness components with age, the analysis of the factor structure of aggressiveness in different age groups seems to be particularly important. Although statistically significant, Pearson's correlation coefficients between the Aggression Questionnaire scales and age of all subjects from the Polish population are negative and relatively weak, assuming values lower than |.29|. The relationship between the Aggression Questionnaire scales and age in the group of men and women is similar. Correlation coefficients obtained in both groups do not exceed |.25| (Aranowska & Rytel, 2011). It is therefore unreasonable to treat age as a variable related to dimensions of aggressiveness in a linear manner. This raises two important questions. Firstly, what is the nature of this relationship (if such a relationship exists at all), and secondly, if – as it seems necessary – the proposed analyses should be carried out for different age intervals, what those interval should be. At present, the only premises seem to be the theoretical ones resulting from a general theory of development, which is reflected in the comparison of aggressiveness of men and women of different ages carried out by Rytel (2011).

Regarding the research results presented, there is a particularly important problem related to the validation of the instrument. Is it reasonable to validate the Aggression Questionnaire on a sample representative of the population as a whole? Assuming that the structure and intensity of aggressiveness change dynamically over the course of an individual's life, and gender is a moderator of the intensity of at least one of its components, the answer is negative. As a result, it is necessary to identify other potential moderators of aggression levels and to conduct research on groups differentiated by age and gender. Thus the development of e.g., norms for the entire population, without taking into account gender and age, is methodologically incorrect.

Research on the psychometric characteristics of the questionnaire has been conducted almost since its development. Although the psychometric properties of the Aggression Questionnaire were and still are of interest to researchers, validation concerns relatively narrowly defined populations and is primarily based on student samples. Exceptions include, for example, studies conducted on samples where the age of the subjects exceeds 55 years. The lack of research in groups of different genders and ages makes it impossible to compare the structure of the questionnaire.

What additionally limits the possibility of making such comparisons is the methodological inadequacy used in data analysis, mainly concerning the factor extraction method. Even though the authors of the Aggression Questionnaire assumed the relations between the components of aggressiveness, some researchers use methods leading to orthogonal dimensions and even resort to the use of methods that do not reveal any dimensions treated in science as common factors, but only as their earlier transient form, i.e., the principal components (cf. Fabrigar, Wegener, MacCallum, & Strahan, 1999).

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## Appendix

### Buss-Perry Aggression Questionnaire (Amity Version)

No permission is needed if the questionnaire is used for research purposes. Any other use requires the written consent of the Amity Institute. The penultimate column indicates which scale a given test item belongs to (PA – Physical Aggression, VA – Verbal Aggression, A – Anger, H – Hostility), while the numbers in the last column refer to the item numbers in the Buss-Perry Aggression Questionnaire according to Table 1. *Four Aggression Factors* (p. 454) in: Buss, A. H., Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, *63*(3), 452–459. In this Table 1, the items of the questionnaire are numbered separately for each scale, hence the number in the last column refers to a given item of the questionnaire within a given scale as shown in Buss and Perry (1992).

| | | | |
|---|---|---|---|
| 1. | Niektórzy z moich kolegów uważają, że jestem „w gorącej wodzie kąpany". | A | 5 |
| 2. | Gdybym musiał użyć przemocy, żeby chronić moje prawa – zrobię to. | PA | 5 |
| 3. | Kiedy ludzie są dla mnie szczególnie mili – zastanawiam się, czego ode mnie chcą. | H | 8 |
| 4. | Mówię otwarcie moim przyjaciołom, jeżeli nie zgadzam się z nimi. | VA | 1 |
| 5. | Czasem bywam tak rozdrażniony, że niszczę jakieś rzeczy. | PA | 9 |
| 6. | Kiedy inni nie zgadzają się ze mną, nie mogę się powstrzymać, aby się nie posprzeczać. | VA | 4 |
| 7. | Nie wiem, dlaczego czasem jestem tak bardzo zawzięty. | H | 4 |
| 8. | Bywają chwile, że nie potrafię zapanować nad chęcią, żeby kogoś nie uderzyć. | PA | 1 |
| 9. | Jestem osobą bardzo zrównoważoną. | A | 4 |
| 10. | Jestem podejrzliwy wobec obcych, którzy zachowują się bardzo przyjaźnie. | H | 6 |
| 11. | Wzbudzam lęk u ludzi, których znam. | PA | 8 |
| 12. | Łatwo się wściekam, ale równie szybko się uspokajam. | A | 1 |
| 13. | Kiedy ktoś mnie prowokuje, mogę go uderzyć. | PA | 2 |
| 14. | Kiedy ludzie mnie złoszczą, mówię im, co o nich myślę. | VA | 3 |
| 15. | Czasami pękam z zazdrości. | H | 1 |
| 16. | Nie jestem w stanie wyobrazić sobie, żeby kogokolwiek uderzyć. | PA | 7 |
| 17. | Czasami czuję, że wszystko jest przeciwko mnie. | H | 2 |
| 18. | Mam trudności, żeby zapanować nad swoją złością. | A | 7 |
| 19. | Kiedy jestem zawiedziony, denerwuję się. | A | 2 |
| 20. | Czasem czuję, że ludzie śmieją się ze mnie za moimi plecami. | H | 7 |
| 21. | Często nie zgadzam się z innymi ludźmi. | VA | 2 |
| 22. | Jeżeli ktoś mnie uderzy, oddaję mu. | PA | 3 |
| 23. | Czasem czuję się jak beczka prochu – gotowa żeby wybuchnąć. | A | 3 |
| 24. | Wydaje mi się, że inni ludzie mają na ogół więcej szczęścia ode mnie. | H | 3 |
| 25. | Są ludzie, którzy drażnią mnie do tego stopnia, że dochodzi do rękoczynów. | PA | 6 |
| 26. | Wiem, że „przyjaciele" obmawiają mnie za moimi plecami. | H | 5 |
| 27. | Moi znajomi mówią, że jestem trochę kłótliwy. | VA | 5 |
| 29. | Czasami unoszę się gniewem bez wyraźnego powodu. | A | 6 |
| 30. | Wdaję się w bójki trochę częściej, niż przeciętna osoba. | PA | 4 |