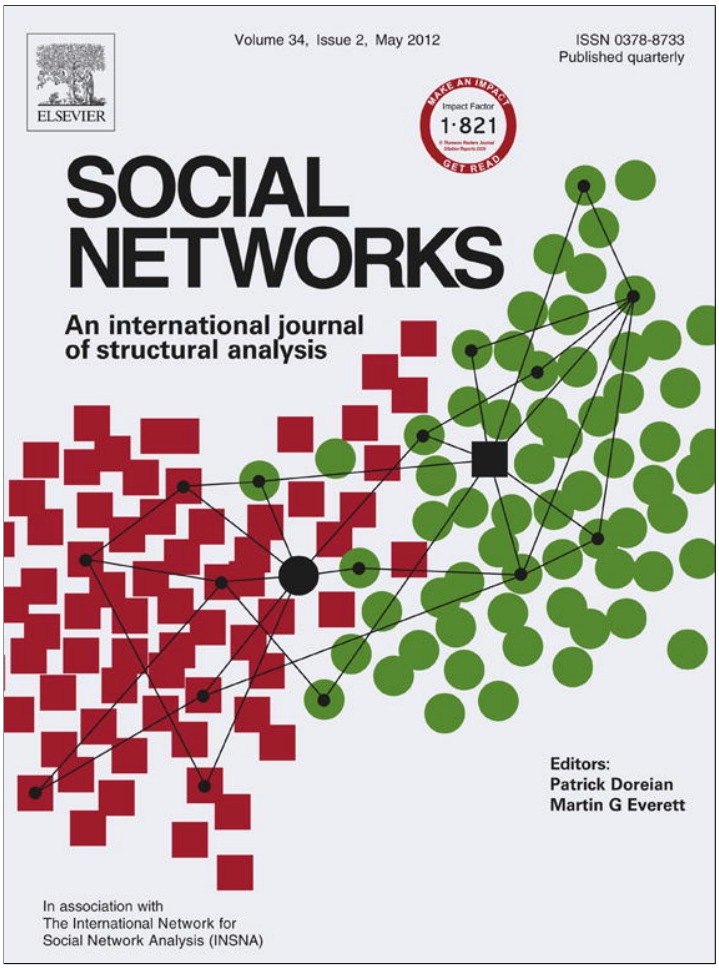
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A relationship between verbal aggression and personal network size

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ABSTRACT

Aggression has been associated with negative social consequences. Yet, more adaptive views of aggression hold that it can have beneficial correlates as well. In four studies, we examined the relationship between aggression and personal network size, a property associated with important social benefits. The results pointed to a consistent positive relationship between verbal aggression and social network size. This relationship remained after controlling for third variables like extraversion and when using different measures of network size. The fourth study sought to explain the relationships in terms of mutual relationships with status and power, but found no support for mediation.

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Aggression is an integral part of human nature. Due to its harmful consequences much research is devoted to its causes and control. Yet, the fact that aggression has persisted throughout human history suggests that it may have an adaptive side as well. In this paper, we examine the adaptive versus maladaptive nature of aggression by examining how it is associated with an important social asset, namely personal network size.

1. Aggression: adaptive or maladaptive?

A longstanding tradition in psychological research views aggression as socially maladaptive (Smith, 2007). For instance, Hawley (2003) provides a review of research that associates aggression with, among others, peer rejection (Coie and Dodge, 1998), low educational achievement (Brooks and Newcomb, 1995), and unemployment (Caspi et al., 1987). Consequently, several developmental theories focus on the maladaptive side of aggression and exclude the idea that aggression can be associated with social adaptation (Hawley, 2003).

On the other hand, it is not particularly difficult to find people who behave aggressively but are well adapted. We may think of instances of aggression in large company managers (e.g., Steve Jobs alleged aggressive management style, see e.g., Colvin, 2007), politics (e.g., politician Neil Farage who insults europresident Herman Van Rompuy on February 24, 2010), or sports (e.g., the Haka war dance in rugby). Most evolutionary theories endorse the idea that aggressive behaviour must be adaptive (Smith, 2007) otherwise it would not have been such a prominent feature of human evolutionary history (Buss, 2005). In line with an adaptive view on aggression, research by Tiedens and colleagues showed that the overt expression of aggression is associated with the perception of status and social power (Tiedens et al., 2000). Also other research has shown that aggression can yield important social benefits, such as positive friendship qualities and personal disclosure (Averill, 1983; Grotpeter and Crick, 1996) and social status (Tiedens, 2001). In this paper, we focus on the relationship between aggression and a particular social outcome, namely a person's personal network size (PNS).

2. Personal network size

In humans, personal networks seem to be constituted out of a series of hierarchical levels (Zhou et al., 2005). This ranges from the support clique, from whom one would seek advice and emotional support in times of distress, over the sympathy group, which consists of persons with whom one had contact the last month, to the active network. This last level consists of all individuals with whom one has a personal relationship, and feels the need to keep in contact with (Dunbar and Spoors, 1995; Killworth et al., 1998).

The active network consists of not only persons you feel close with, but also more distant acquaintances. Yet, these weaker ties still have important benefits, because they are crucial in providing access to information, ideas and experiences. Weak ties are more numerous, more heterogeneous and are less likely to be connected with each other than strong ties (Granovetter, 1983). These weaker connections play an important role in the life of individuals

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(Christiakis and Fowler, 2009). For example, research points out that people with a large personal network have more quality of life than people with a small personal network (Stokes, 1983). In conclusion, having a large personal network is considered to be beneficial.

3. This study

The present study examines the adaptive versus maladaptive nature of aggression from a novel perspective by examining the relationship between individual differences in aggression and PNS. No previous research has directly examined this relationship, and we adopted a primarily explorative approach (see Rozin, 2009) in which we sought to examine whether aggression and PNS are interrelated and which direction this relationship takes. On the one hand, the maladaptive view of aggression would argue that high levels of aggression should be associated with negative social consequences leading to smaller PNS. On the other hand, if aggression serves an adaptive social function one could expect a positive association between aggression and PNS.

Several techniques have been developed to measure PNS. Throughout the four studies, we relied on two indirect network estimators, the scale-up method (Studies 1, 2 and 4; Killworth et al., 1998) and the name generator overlap technique (Study 3; Agresti, 1994).

4. Study 1

The aim of the first study was a simple exploration of the relationship between aggression and PNS.

4.1. Method

4.1.1. Participants

A sample of 178 first year psychology students (150 women; age $M = 19$; $SD = 2$; age range from 18 to 44) participated in return for course credits.

4.1.2. Materials and procedure

Aggression. The (Dutch translation of the) Buss–Perry Aggression Questionnaire (BPAQ; Buss and Perry, 1992) has been used extensively as a measure of aggression in previous research. It measures physical aggression, verbal aggression, anger, and hostility via 29 items. As our focus is on aggression, we only considered scores on the verbal and physical aggression subscales.

Personal network size. PNS or "degree" was estimated for every participant using the scale-up method (Killworth et al., 1998). A personal network is defined as the set of people that one knows (e.g., Bernard et al., 1989). In order to define and explain to the participants what is meant by knowing someone, we follow the definition of Bernard and colleagues: person A knows person B if A knows B by name or by face; A can contact B by mail or phone; and A and B had contact at least once the last two years.

The scale-up method uses questions of the form "How many people of [a certain subpopulation of people] do you know?" An example of such a question is: "How many people do you know who got married in the last 12 months?" If one knows the size of the subpopulation, this information can be used to estimate the PNS of a participant. For instance, when this survey was conducted, 89,700 Belgian people got married in the last 12 months while the size of the entire Belgian population was 10,666,866 inhabitants. If a participant knows five individuals that got married in the last twelve months, the PNS for an individual can be estimated as follows:

$$\frac{5}{89,700} \cdot 10,666,866 \approx 714$$

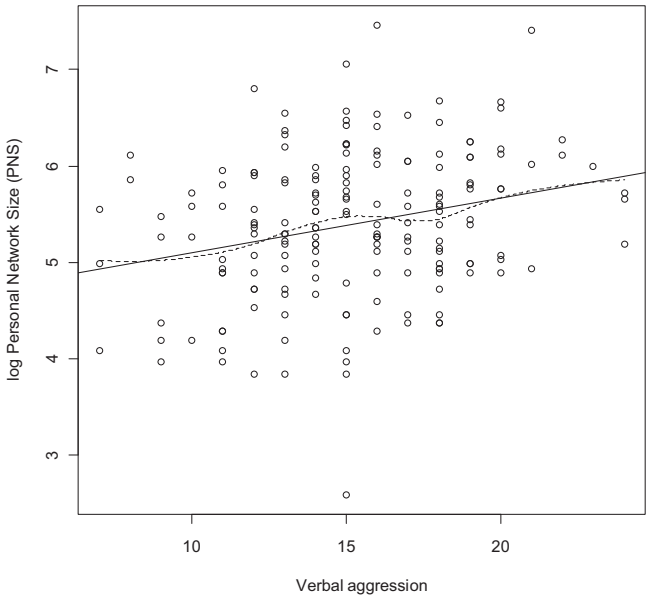


Fig. 1. Scatter plot displaying the relation between personal network size (on the abscissa) and verbal aggression (on the ordinate). The full line is a linear regression line; the dotted line is a lowess semi-parametric regression line (Study 1).

By averaging the responses of a respondent for many subgroups the accuracy of the estimate can be increased. The multiple responses need to be combined:

$$\hat{d}_i = \frac{\sum_{k=1}^{K} y_{ik}}{\sum_{k=1}^{K} N_k} \cdot N \quad (1)$$

where y_{ik} is the number of people that person i knows in subpopulation k, N_k represents the size of the subpopulation k, and N is the size of the whole population.

In this study a questionnaire with 32 subpopulations was administered. The subpopulation consisted of 12 first names and 20 other subpopulations (see Appendix).

4.2. Results

The average size of the participant's PNS was 290 ($SD = 241$) degrees. The distribution of PNS was positively skewed so that the size of networks of two individuals can differ by an order of magnitude. As our statistical tools assume linearity and additivity and these assumptions are not fit for data on a multiplicative scale, PNS was log-transformed (hereafter named log PNS). There was a positive correlation between log PNS and verbal aggression ($r(178) = 0.26$, $p < 0.0002$). Fig. 1 graphically displays this relationship. The correlation between log PNS and physical aggression was non-significant ($r(178) = 0.09$, $p = 0.12$) (verbal and physical aggression correlated 0.47, $p < 0.0001$). In a regression analyses, verbal aggression remained a significant predictor of log PNS ($t(174) = 3.02$, $p = 0.003$, $\beta = 0.05$) when controlling for physical aggression ($t(174) = -0.79$, $p = 0.43$, $\beta = -0.008$) and gender ($t(174) = -1.69$, $p = 0.094$, $\beta = -0.27$).

4.3. Discussion

Study 1 provided first evidence that verbal aggression is positively associated with PNS. The findings further suggest that there is no association between physical aggression and PNS and that gender does not seem to play a role in the found relationship. However, a weakness of Study 1 is that it did not control for other variables

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Table 1
Correlations of all variables in Study 2.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. PNS	1.00**								
2. log PNS	0.93**	1.00**							
3. Verbal aggression	0.25**	0.26**	1.00**						
4. Physical aggression	0.10	0.07	0.24**	1.00**					
5. Neuroticsm	−0.01	0.00	−0.11	0.13*	1.00**				
6. Extraversion	0.16*	0.21**	0.20**	0.00	−0.47**	1.00**			
7. Openness	0.15*	0.11	0.10	−0.17*	−0.10	0.00	1.00**		
8. Agreeableness	−0.06	−0.07	−0.31**	−0.40**	−0.18*	0.27**	0.26**	1.00**	
9.Conscientiousness	0.02	0.01	0.00	−0.18**	−0.21**	0.14*	0.13*	0.31**	1.00**

* $p < 0.05$.
** $p < 0.01$.

that might possibly explain the relation between verbal aggression and PNS. This will be addressed in Study 2.

5. Study 2

Extraversion is positively related to aggression and the overt expression of anger (e.g., Bödekker and Stemmler, 2000), and has been associated with the propensity to connect with others (e.g., Totterdel et al., 2008).

The relationship between verbal aggression and PNS may therefore simply be due to their mutual association with extraversion. In Study 2 we examined the association between aggression and PNS in a different sample, while controlling for extraversion. We also controlled for the other Five Factor personality traits, some of which also demonstrate relationships with the variables under study (for instance agreeableness and aggression; Burton et al., 2007).

5.1. Method

5.1.1. Participants

A sample of 187 first year psychology students (157 women; age $M = 19$; $SD = 2$, age range from 17 to 36) participated in return for course credits.

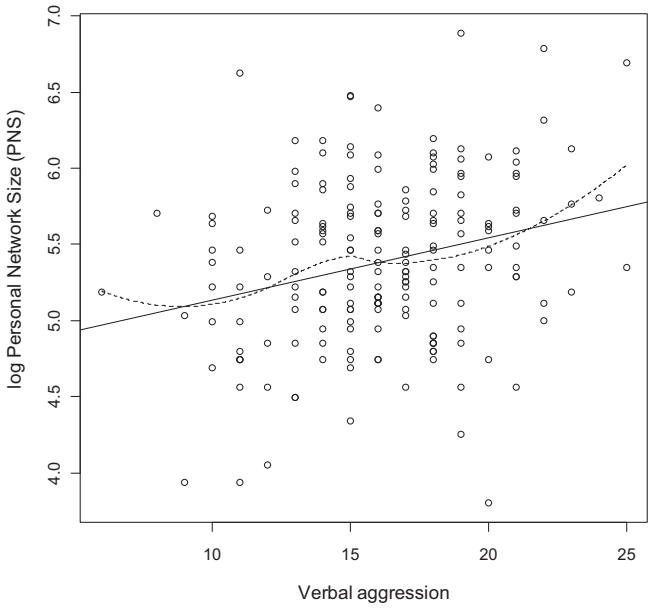


Fig. 2. Scatter plot displaying the relation between personal network size (on the abscissa) and verbal aggression (on the ordinate). The full line is a linear regression line; the dotted line is a lowess semi-parametric regression line (Study 2).

5.1.2. Materials and procedure

Personality. The Dutch version of the NEO-FFI (Hoekstra et al., 1996) was used to asses neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Each scale consists of 12 items.

Aggression. The BPAV was used similar to Study 1.

Personal network size. Like Study 1, Study 2 relied on the scale-up method to estimate personal network size. The survey again consisted of 32 items, however using different first names (see Appendix).

5.2. Results

The size of the participant's personal network was 253 ($SD = 149$) degrees on average, and was positively skewed. There was a positive correlation between log PNS and verbal aggression ($r(187) = 0.26$, $p = 0.0002$; see Fig. 2), while the correlation between log PNS and physical aggression was non-significant ($r(187) = 0.07$, $p = 0.46$). Only extraversion was a significant personality correlate of log PNS ($r(164) = 0.19$, $p < 0.005$) (see Table 1 for correlations between all variables).

In a regression model, we included verbal aggression and physical aggression as predictors of log PNS, while controlling for the five personality dimensions and gender. The findings showed that log PNS remained associated with verbal aggression ($t(133) = 2.40$, $p = 0.03$, $\beta = 0.03$), while there was again no significant relation with physical aggression ($t(133) = -0.49$, $p = 0.62$, $\beta = -0.003$). Extraversion ($t(133) = 3.86$, $p < 0.0001$, $\beta = 0.03$) and neuroticism ($t(133) = 2.11$, $p = 0.04$, $\beta = 0.01$) and gender ($t(133) = -2.82$, $p = 0.006$, $\beta = -0.35$), were the only other significant covariates in the model.

5.3. Discussion

The results of this second study replicated the findings of Study 1, even when controlling for extraversion (as well as the other Big Five personality factors). We conclude that when the scale-up method is used to estimate social network size, there is a stable association between verbal aggression and PNS.

We found a main effect of gender in this study, with males being more aggressive than females, although we would advise caution to over-interpret the reliability of this finding, due to the small number of male participants. Thus far, however, it cannot be ruled out that the found relationship is specific to the used method to estimate PNS in both studies.

6. Study 3

Study 3 used a different measure to estimate PNS, namely the "name generator overlap" technique (Killworth et al., 1984). We also aimed at replicating the finding that the relationship between

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PNS and verbal aggression was not due to shared variance with personality.

6.1. Method

6.1.1. Participants

A sample of 74 first year psychology students (62 women, age $M = 19$; $SD = 2$, range 17–36) participated in return for course credits.

6.1.2. Materials and procedure

Personality. Personality was measured with the NEO-FFI.

Aggression. Verbal and physical aggression were measured with the same instrument as in Studies 1 and 2.

Personal network size. Following the "name generator overlap" technique, an estimate can be made of the size of the (sub)population on the basis of counting individuals who are named in more than one sample. For this technique, the Petersen estimator (Agresti, 1994; Petersen, 1896) is the most straightforward estimator. Consider sample A and sample B, having sample sizes n_A and n_B each with a number of individuals that are acquaintances of an individual. The number of individuals that appear in both samples are enumerated, n_{AB}. Under independence, it holds that

$$\frac{n_{AB}}{N} = \frac{n_A}{N} \cdot \frac{n_B}{N}$$

Solving for the unknown N gives the Petersen estimator $\hat{N}$ of the total number of acquaintances:

$$\hat{N} = \frac{n_A \cdot n_B}{n_{AB}}$$

This method can be applied to the study of PNS as follows. To generate a first sample of acquaintances (called List A) we, for example, use the reversed small-world technique (Bernard et al., 1982) and ask "Which acquaintances can get you in contact with the prime minister of Belgium?" The participant for example responds with four names ($n_A = 4$; e.g., Mark B., Michelle O., George L. and Marie V.) in this first name generator moment. To generate a second sample of acquaintances (called List B) we, for example use the phone book technique (Pool and Kochen, 1978). The participant receives five random chosen surnames out of a phone book, and reports all acquaintances with these surnames. In this second name generator moment, the participant recalled for example seven names of acquaintances ($n_B = 7$; e.g., Karel B., Anne-Marie M., George L., Bart V., Marie V., Pieter B., Dries L. and Els L.). When we compare these two name generator moments, we see that two names appear in both lists ($n_{AB} = 2$). Based on this overlap in name generator moments we can make an estimate of the participant's PNS by using the above mentioned formula:

$$\hat{N} = \frac{n_A \cdot n_B}{n_{AB}} = \frac{4 \cdot 7}{2} = 14$$

The instrument for this study consisted of five naming moments: the phone book technique with 100 surnames, the phone book technique with 100 first names, the small world technique was used two times with different questions, and all participants had to list all of the persons they considered to be in their support group. With the overlap in names between these moments, we were able to estimate the PNS for every participant.

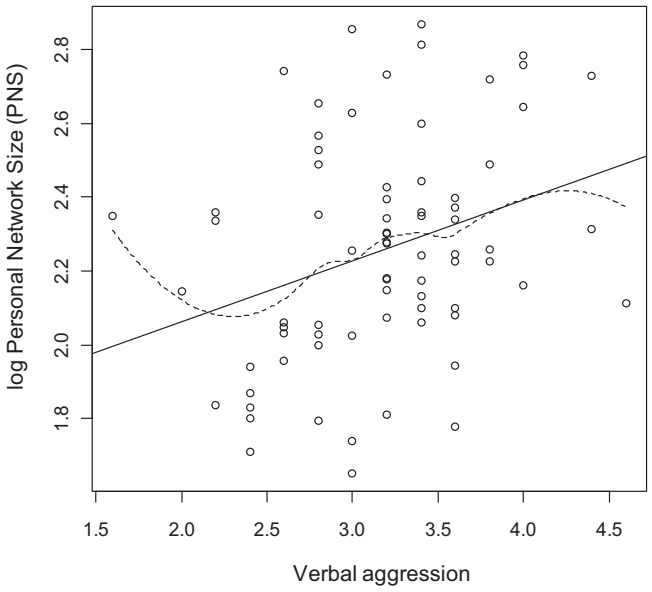


Fig. 3. Scatter plot displaying the relation between personal network size (on the abscissa) and verbal aggression (on the ordinate). The dotted line is a linear regression line; the full line is a lowess semi-parametric regression line (Study 3).

6.2. Results

The size of the participant's personal network was on average 229 ($SD = 170$) degrees, and was positively skewed. After log-transformation there was a positive correlation between log PNS and verbal aggression ($r(74) = 0.32$, $p = 0.003$; see Fig. 3). log PNS was not correlated with physical aggression ($r(74) = 0.08$, $p = 0.249$) but was positively related to extraversion ($r(74) = 0.34$, $p = 0.002$; see Table 2 for the correlations between all variables).

A regression analysis was performed that included verbal aggression and physical aggression as predictors of PNS, while controlling for the five personality dimensions and gender. Verbal aggression remained a significant predictor of log PNS ($t(65) = 2.62$,

Table 2
Correlations between measures of Study 3.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. PNS	1								
2. log PNS	0.94**	1							
3. Verbal aggression	0.27*	0.32**	1						
4. Physical aggression	0.09	0.08	0.33**	1					
5. Neuroticism	−0.01	0.00	−0.06	0.11	1				
6. Extraversion	0.26*	0.34**	−0.06	−0.23	−0.15	1			
7. Openness	0.01	−0.04	0.31**	0.10	0.18	−0.21	1		
8. Agreeableness	−0.19	−0.18	−0.26*	−0.55**	−0.09	0.34**	0.00	1	
9. Conscientiousness	−0.20	−0.19	−0.15	−0.27*	−0.26*	0.29*	−0.06	0.36**	1

* $p < 0.05$.
** $p < 0.01$.

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$p = 0.011$, $\beta = 0.30$), after controlling for physical aggression ($t(65) = -1.15$, $p = 0.255$, $\beta = -0.14$), gender ($t(65) = -1.85$, $p = 0.069$, $\beta = -0.22$), and the Big Five personality dimensions. Only extraversion was a significant personality covariate ($t(65) = 4.35$, $p < 0.0001$, $\beta = 0.47$).

6.3. Discussion

Study 3 again provided evidence that verbal aggression is positively associated with PNS, even when using a different estimator of PNS. This again held after controlling for the major personality dimensions including extraversion and gender. Throughout the previous studies, we have demonstrated a consistent positive relation between verbal aggression and PNS. An attempt to explain this relationship was made in Study 4.

7. Study 4

Tiedens et al. (2000) argue that high status is associated with emotions including anger and pride while low status is associated with sadness and guilt. The authors conclude that emotions are inferred from status and that status in turn can be inferred from the expression of the corresponding emotions. Also, research by Cillessen and Mayeux (2004) found that adolescent aggression can lead to higher peer status. In sum, the display of aggression is related to status. High status, in turn, may be associated with an increase in PNS (Belle, 1983). Not only might a position of status bring a person in touch with more people (Keltner et al., 2003), other people are also motivated to include a person in high status positions into their personal network, given the expected social advantages.

The above suggests that the notion of status could help to explain the relationship between PNS and verbal aggression. Specifically, perceived power or status may function as a mediator of the relationship between verbal aggression and PNS. We aimed to examine this possibility in a fourth study. We included two different measures reflecting status: one designed to measure the subjective sense of personal power and the other reflecting self-reported sociometric status.

7.1. Method

7.1.1. Participants

A sample of 52 undergraduate psychology students (32 women, age $M = 21$; $SD = 1$, range 19–24) participated in return for course credit. One participant was excluded from the analyses because the participant's PNS estimate was clearly an outlier (>3000).

7.1.2. Materials and procedure

Extraversion. The extraversion scale of the Dutch version of the NEO-FFI was used. Only extraversion was used because the other three studies pointed out that this was the only significant personality covariate.

Aggression. The BPAV was used to measure verbal and physical aggression.

Personal network size. PNS was estimated using the scale-up method, identical to Study 2 (see Appendix).

Subjective power. Subjective power was measured with a Dutch translation of the Subjective Sense of Power Questionnaire (Anderson and Galinsky, 2006). The questionnaire consists of eight questions all rated on a five point Likert scale (e.g., "I think I have a great deal of power").

Self-reported sociometric status. Sociometric status is usually measured using peer ratings in a so-called round robin design, which was practically unfeasible in our sample. For that reason the existing peer rating questionnaire was converted to a self-report questionnaire. The questionnaire consisted of nine items all rated on a five point Likert scale. The first five items were inspired by Anderson et al. (2006); the other four items were inspired by Cillessen and Mayeux (2004). We performed a Principal Component Analysis (PCA) with component 1 explaining 40% of the variance. Consequently, scores on the first principal component were used as a measure of self-reported sociometric status.

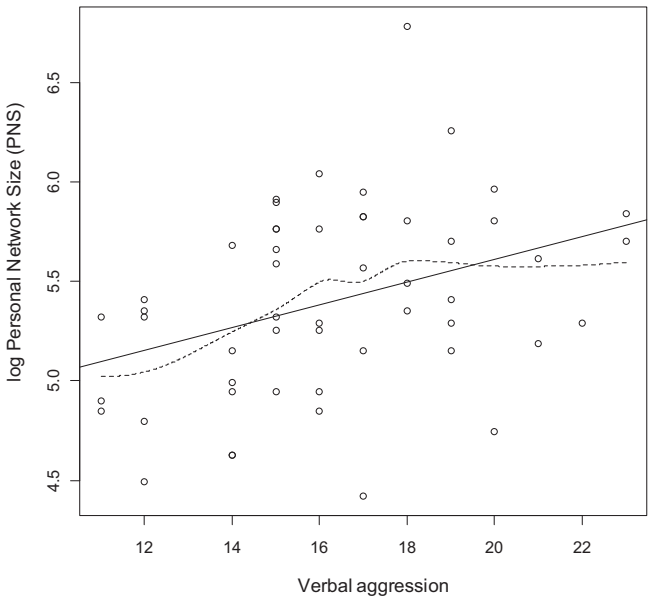


Fig. 4. Scatter plot k displaying the relation between personal network size (on the abscissa) and verbal aggression (on the ordinate). The full line is a linear regression line; the dotted line is a lowess semi-parametric regression line (Study 4).

7.2. Results

As in Study 2, the size of the participant's personal network was 249 ($SD = 133$) and positively skewed. After log-transformation there was a positive correlation between estimated PNS and verbal aggression ($r(51) = 0.37$, $p = 0.004$; see Fig. 4). In this study the correlation between PNS and physical aggression was also significant ($r(51) = 0.35$, $p = 0.005$; see Table 3 for correlations between all variables).

The data were further analysed to test for the mediation model described above. In this mediation model, sociometric status and subjective power were treated as potential mediators for the relationship between PNS and verbal aggression. Similar to the other studies, extraversion was included as a covariate. The mediation analyses were conducted according to the method proposed by Baron and Kenny (1986). The first step showed that verbal aggression, $t(49) = 2.80$, $p = 0.007$, $\beta = 0.06$, is a significant predictor of log PNS, even when controlling for extraversion, $t(49) = 1.52$, $p = 0.14$, $\beta = 0.02$. Analyses in a second step showed that verbal aggression, $t(49) = 2.50$, $p = 0.016$, $\beta = 0.31$, is a significant predictor for subjective power after controlling for extraversion, $t(49) = 2.24$, $p = 0.03$, $\beta = 0.14$; and verbal aggression, $t(49) = 2.85$, $p < 0.01$, $\beta = 0.23$ is a significant predictor of sociometric status, after controlling for extraversion, $t(49) = 3.30$, $p = 0.002$, $\beta = 0.13$. The last step, however, showed that sociometric power, $t(47) = -0.722$, $p = 0.47$, $\beta = -0.02$ and status, $t(47) = 0.35$, $p = 0.35$, $\beta = 0.013$ are not significant predictors of log PNS after controlling for extraversion, $t(47) = 1.40$, $p = 0.17$, $\beta = 0.02$ and verbal aggression, $t(47) = 2.59$, $p = 0.013$, $\beta = 0.059$. In this last model, the relationship between verbal aggression and log PNS remained significant, even after controlling for status, power and extraversion. See Fig. 5 for a visual

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Table 3
Correlations between measures of Study 4.

	1.	2.	3.	4.	5.	6.	7.
1. PNS	1.00**						
2. log PNS	0.93**	1.00**					
3.Verbal aggression	0.32*	0.37**	1.00**				
4. Physical aggression	0.33**	0.31*	0.35**	1.00**			
5. Extraversion	0.26*	0.21	0.03	0.14	1.00		
6. Power	0.07	0.10	0.33**	0.25*	0.30*	1.00**	
7. Status	0.20	0.23	0.35**	0.11	0.41**	0.45**	1.00**

* $p < 0.05$.
** $p < 0.01$.

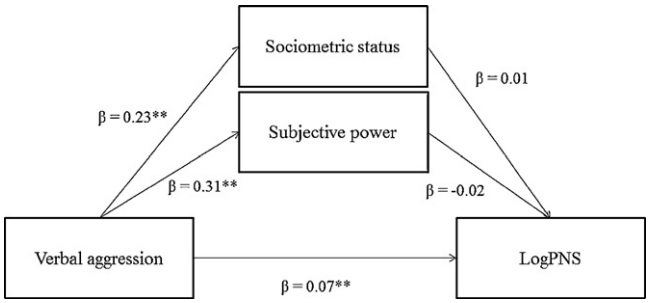


Fig. 5. The mediation model tested in Study 4 with corresponding regression weights. Extraversion was included as a covariate when testing the whole model (**$p < 0.01$).

overview of the mediation analyses with the corresponding standardised regression weights.

7.3. Discussion

Verbal aggression and PNS were again positively associated, also when controlling for extraversion. An attempt to explain the found link by including measures of power and status in a mediation model failed: power and status did not seem to be associated with PNS.

8. General discussion

Findings from four studies consistently provided support for a positive relationship between PNS and verbal aggression. This relationship was observed when using different methods to estimate PNS, and could not be explained through shared variance with personality factors like extraversion. Our findings indicated also that subjective power and status do not mediate the relationship. Indeed, a striking observation was that even after including power, status and extraversion in the association, a strong link between verbal aggression and PNS remains.

Three of the studies relied on the network scale-up method for estimating PNS. The similarities of the average network sizes (290, 253, 249) to the 290 from the original scale-up studies were striking, as was the similarity between these estimates and the estimate obtained through a different method, the "name generator overlap" (249).

The previously undocumented relationship between verbal aggression and PNS raises several interesting issues. First, it demonstrates that aggression has adaptive social correlates. Although we do not claim a causal direction underlying the association between VA and PNS (whereas we may have tacitly assumed in places that PNS is a social consequence of verbal aggression, of course, our data do not rule out the possibility that having a larger or smaller PNS makes people more or less verbally aggressive) we can only remark that if the display of aggression was only detrimental for one's social world, verbal aggression would not be positively related to the size of one's personal network. It is possible, however, that aggression has other detrimental consequences for one's network other than on its size. For instance, aggression could affect the quality of one's personal relationships. It would be interesting in future research to examine also the quality next to the quantity of one's social network in their relationship with aggression.

Second, it was only the milder, verbal form of aggression that yields an association with PNS. It may be that the adaptive correlates of aggression therefore only hold for this milder form and that physical aggression does not have the same social implications. Alternatively, it cannot be ruled out that a restricted range of physical aggression in our samples could affect the association with physical aggression.

We did not find a consistent effect of gender. The literature on gender differences in aggression is rather ambiguous (e.g., Crick and Grotpeter, 1995; David and Kistner, 2000). These ambiguities seem in part to be a function of the type of aggression that is being considered, particularly overt versus covert forms (Archer, 2004). To explore the gender effect in future research it could be interesting to include other, more covert forms of aggression.

9. Limitations and future research

The finding of the four studies is limited in a sense that they all rely on self-report measures. By using different methods for estimating PNS we were able to exclude the possibility that our PNS estimation is somehow biased by self-report or method effects. Yet, for verbal aggression, the current findings could be strongly corroborated by also looking at non self-report measures of verbal aggression such as peer reports or behavioural measures. A second limitation is that we only explored the relationship between PNS and verbal aggression cross-sectionally. Experimental or longitudinal studies may help to establish possible causal pathways between these two variables and as such provide important clues to the process or mechanism underlying the relationship and its direction. An example of an experimental study could be that (the expression of) verbal aggression is manipulated and that proximity seeking (both by and towards that person) is measured as a dependent variable. Longitudinal research could take the form of measuring both verbal aggression and PNS at different moments in time during a period where a personal network is expected to change dramatically (e.g., adolescents making the switch from high school to college). And examining the bidirectional links between both variables.

10. Conclusion

Verbally aggressive individuals know more people than their less verbally aggressive counterparts. This consistent finding clearly reveals an adaptive correlate of aggression, and identifies verbal aggression as an important factor in personal networks. In line with Wallbott and Scherer (1986), we conclude that verbal aggression is the expression of a social emotion in which personal relations with other persons play an important role.

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Appendix 1.

The questioned subpopulations of the scale-up questionnaire. Questionnaire 1 is used in Study 1; Questionnaire 2 in Studies 1 and 4.

Questionnaire 1	Questionnaire 2
Mailman	Mailman
Centenarians	Centenarians
Divorced individuals (the past year)	Divorced individuals (the past year)
Women who gave birth (the last year)	Women who gave birth (the last year)
Individuals who married the last year	Individuals who married the last year
Nurses	Nurses
Individuals with last name “Maes”	Individuals with last name “Maes”
Individuals who had a deadly accident last year	Individuals who had a deadly accident last year
Architects	Architects
Individuals with last name “De Smet”	Individuals with last name “De Smet”
Soldiers	Soldiers
Prisoners	Prisoners
Depressed individuals	Depressed individuals
Cooks	Cooks
Restaurant managers	Restaurant managers
Individuals with last name Goossens	Individuals with last name Goossens
Hair dressers	Hair dressers
Individuals with last name Peeters	Individuals with last name Peeters
Individuals with first name Julia	Individuals with first name Jan
Individuals with first name Katrien	Individuals with first name Eric/Erik
Individuals with first name Guido	Individuals with first name Isabelle/Isabel
Individuals with first name Christine	Individuals with first name An/Ann
Individuals with first name Alain	Individuals with first name Frederick/Frederik
Individuals with first name Christophe	Individuals with first name Geert
Individuals with first name Nicole	Individuals with first name Katrien/Catherine
Individuals with first name Simon	Individuals with first name Filip/Philippe
Individuals with first name Karel	Individuals with first name Kathleen/Katleen
Individuals with first name Rosa	Individuals with first name Claire
Individuals with first name Steven	Individuals with first name Jonas
Individuals with first name Linda	Individuals with first name Elke

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