

Instrumental and Expressive Representations of Aggression: One Scale or Two?

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The Expagg questionnaire was developed to measure a subject's view of their own aggression as a relatively instrumental or relatively expressive act. Two issues have been raised pertaining to the dimensional structure of the questionnaire: the use of principal components analysis on dichotomous responses and the possibility that instrumental and expressive representations might be independent dimensions rather than opposite ends of a single continuum. In study 1, dichotomous Expagg data from 405 subjects were subjected to microfact, principal components, and factor analysis. Each produced a first general factor, and the correlations between the item loadings were in excess of $r = .99$. In study 2, a 40-item Likert scale version of Expagg was given to 295 subjects. Principal components analysis, paired item correlations, and subscale correlations suggested partial independence of instrumental and expressive items. Two new 8-item scales measuring instrumental and expressive representations were constructed that maximise their independence. Potential uses of these revised scales are discussed. *Aggr. Behav.* 25:435-444, 1999. © 1999 Wiley-Liss, Inc.

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INTRODUCTION

Campbell et al. [1992] reported the development of a psychometric instrument called Expagg, which was designed to measure people's social representations of aggression. Previous qualitative work [Campbell and Muncer, 1987] had suggested that men (more than women) represented their aggression as an instrumental act aimed at taking control over others, whereas women (more than men) represented aggression as the result of a temporary loss of control over themselves. Expagg was designed to assess an individual's view of aggression as relatively instrumental or relatively expressive.

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Expagg contains 20 items. Each item is prefaced by a cue line (e.g., I believe that my aggression comes from) followed by two end-parts to the statement (e.g., Losing my self control/Being pushed too far by obnoxious people) from which the subject is asked to select the one that best describes his or her feelings and experience. This instrument has now been used in a number of studies [Andreu et al., 1998; Archer and Haigh, 1997a, b; Archer and Parker, 1994; Baumgartner, 1995; Campbell and Muncer, 1994; Campbell et al., 1992, 1993, 1996; Campbell, Muncer, and Odber, 1997; Campbell, Sapochnik, and Muncer, 1997; Duckett et al., under review]. The effect size (weighted unbiased estimate) for the sex difference on 1,674 subjects in 12 samples is large ($d = .842$). The reliability of the questionnaire in various samples ranges from .70 to .91. (Though originally assessed by Cronbach's alpha, similar figures are found when reanalysed by Kuder Richardson-20 for dichotomous data.)

In the present article we respond to criticisms that have been made of the internal structure of the Expagg scale, offer further data, and derive two new independent scales that may be useful in future research.

THE FACTORIAL STRUCTURE OF EXPAGG

If a first general factor emerged on factor analysis of the 20-item Expagg, this would suggest that all items loaded on a common underlying construct and so provide some evidence that the structure of the questionnaire was unidimensional. Three studies have investigated the factorial structure of the 20-item Expagg [Archer and Parker, 1994; Baumgartner 1995; Campbell et al., 1992]. These investigations found that, using the Scree criterion, a one-factor solution was optimal but that this factor accounted for a modest proportion of the total variance (15–17%), which in some cases appeared to be a general factor and in others seemed more specific.

Archer and Parker [1994] and Eatough et al. [1997] expressed statistical reservations about performing factor analysis on dichotomous data. One possible consequence is that the results may overestimate the number of factors required to explain the variance in the correlation matrix [Carroll, 1945; Gorsuch, 1983; Maxwell, 1977]. In addition, principal components analyses (PCAs) were used in all the studies described. In this technique, all the variance in the measured items contributes to the solution. In factor analysis, only shared variance is taken into account. Hence, PCA produces factors that may account for less variance than in factor analysis (where error and unique variance are excluded). The first aim of the present study is to repeat the PCA using a technique specifically designed to deal with nominal data and to compare the results with those derived from PCA and factor analysis.

ARE INSTRUMENTAL AND EXPRESSIVE REPRESENTATIONS MUTUALLY EXCLUSIVE OR INDEPENDENT?

Implicit in the construction of the questionnaire was the assumption that instrumental and expressive social representations are unidimensional and bipolar. In terms of item response, this means that subjects are explicitly asked to select one or the other alternative but not both. In terms of item scoring, it means that Expagg is conceived of as composing a single scale ranging from instrumental to expressive. In effect, an ordinal scale is derived from nominal data [see Eatough et al., 1997]. This is not unusual,

and other questionnaires [such as Zuckerman's Sensation-Seeking Scale and Rotter's Internal-External Locus of Control Scale) operate in a similar way.

It is possible, however, that individuals may simultaneously hold different views without experiencing them as a logical contradiction. Indeed, it may be possible for people to subscribe to neither an expressive nor an instrumental view of aggression, and under a forced-choice format, this would not be detectable. Establishing whether these are real possibilities is of psychological importance for understanding the nature of social representations and of equal methodological importance in ensuring that the psychometric instrument accurately reflects the underlying schema held by individuals.

To address this issue Archer and Haigh [1997a] developed a revised version of Expagg. They "unpacked" the 20 dichotomous items into 40 statements with which the subjects were asked to rate their degree of agreement. Data were obtained in two separate studies. With the expressive items reverse keyed, both data sets of 40 items were factor analysed separately. In study 1 (with a sample size of 130), they report a three-factor solution in which the second factor, as expected, had positive loadings from expressive items and negative loadings from instrumental items, although their first and second factors showed an uninterpretable pattern of loadings. However, their second study (with a more adequate sample size of 200) produced a readily interpretable set of results consisting of two factors, corresponding to instrumental and expressive dimensions. Archer and Haigh's data therefore do not support a unidimensional view of the items. A second aim of the present study is to see if their results on the revised 40-item version of Expagg replicate with a larger sample.

To investigate the relationship between instrumental and expressive representations, Archer and Haigh [1997a] then summed subjects scores separately on the instrumental and expressive scales. The two scales had respective alpha coefficients of .85 and .72 (study 1) and .89 and .84 (study 2), reflecting a high degree of homogeneity in the two sets of items. (We also note, incidentally, that both studies found large sex differences on both of these reliable scales, with effect sizes for the expressive scale of $d = -.76$ and -1.26 and for the instrumental scale of $d = .71$ and $.72$.) Of particular interest, however, is the correlation between the two scales. A negative correlation approaching unity would suggest that the scales are effectively opposite ends of a single bipolar construct. A correlation close to zero would imply complete dissociation of the scales. The values obtained in studies 1 and 2, respectively, were $-.35$ and $-.36$, a significant negative relationship but a far from perfect one. In a recent study [Duckett et al., under review], a slightly stronger negative correlation of $-.39$ was found between the scales. However, in a study of 109 prison inmates, Archer and Haigh [1997b] reported a non-significant negative correlation of $-.12$, suggesting that the two scales may be orthogonal. A third aim of the present study is to examine the correlation between the two scales with a view to producing either (1) a reliable single bipolar scale or (2) two reliable orthogonal scales.

STUDY 1: THE FACTORIAL STRUCTURE OF THE 20-ITEM EXPAGG

Method

Participants. Our data were taken from four previous studies in which the 20-item Expagg was used [Campbell and Muncer, 1994; Campbell, Muncer, and Odber, 1997; Campbell, Sapochnik, and Muncer, 1997; Duckett et al., under review]. These pooled

data were composed of questionnaire responses obtained from 405 British subjects (281 men and 124 women). All participants completed the Expagg questionnaire voluntarily. On completion of the study, participants were debriefed.

Instrument. The Expagg questionnaire presents 20 incomplete sentences in which the participant selects one of two endings reflecting an expressive or instrumental view of aggression. The items are summed to form a unidimensional scale from 0 to 20, with a high score reflecting a more expressive view of aggression.

Results

Cronbach's alpha was 0.796 and the Kuder Richardson-20 value was 0.797. In line with previous work, male participants' scores ($x = 11.55$, $sd = 4.27$) were significantly less expressive than those of females ($x = 14.5$, $sd = 3.36$; $t = 6.83$, $P < .0001$).

Factor analysis was performed using the Principal Factor program of SPSS. One major factor was identified on which all items had positive loadings (see Table I) and that accounted for 20% of the variance. When a two-factor solution was specified, the second factor had significant ($>.40$) loadings only from items 7 (0.687) and 10 (0.573), reflecting a preference for private rather than public aggression, as found by Campbell et al. [1992]. The PCA (SPSS) produced a similar picture with respect to both factors (see Table 1).

In response to reservations about the use of PCA on dichotomous data, we analysed the data using Microfact [Waller, 1995], which bases the eigenvalues on the tetrachoric correlations, which have been smoothed to remove negative eigenvalues. Once again, the results are very similar. Correlations between the factor loadings of the 20 items on the first factor of all three solutions approach unity. Specifically, the correlation be-

TABLE I. One-Factor Solutions of 20-Item Expagg: Item Loadings From Factor Analysis, Principal Components, and Microfact Analysis

Item*	Factor 1 loading		
	Principal factor	Principal components	Microfact
14 (15 & 37)	.671	.697	.836
18 (16 & 19)	.664	.693	.816
15 (18 & 22)	.599	.640	.743
11 (9 & 25)	.495	.548	.670
4 (2 & 4)	.493	.544	.613
5 (36 & 38)	.489	.543	.614
6 (12 & 23)	.439	.490	.565
19 (10 & 24)	.395	.449	.526
3 (20 & 40)	.379	.432	.481
7 (3 & 26)	.372	.426	.466
9 (27 & 33)	.371	.423	.469
20 (5 & 17)	.361	.414	.470
2 (7 & 28)	.347	.398	.450
13 (13 & 32)	.344	.397	.503
1 (8 & 39)	.295	.343	.383
12 (6 & 31)	.267	.314	.367
16 (1 & 11)	.243	.283	.348
8 (34 & 35)	.232	.271	.294
17 (21 & 30)	.187	.221	.239
10 (14 & 29)	.121	.147	.153

*The numbers in parentheses identify the pairs of items in Table II corresponding to the two-choice options on the original 20-item Expagg.

tween PCA and factor analysis is .998, between PCA and microfact is .994, and between factor analysis and microfact is .994. This strongly suggests that dichotomous data do not severely distort patterns of interrelationships between the items and that microfact, PCA, and factor analysis generate virtually identical solutions for the same data. Substantively, the results suggest that on the original 20-item dichotomous Expagg there is a single basic factor on which all the items load.

We can also evaluate the unidimensionality of the 20-item Expagg by a different route. We can split the scale in half (in the present case we selected the first 10 vs. the second 10 items). We then scored the first set of items in the direction of expressivity and the second set in the direction of instrumentality. If the scale is unidimensional then we would expect these two oppositely scored sets of items to show a negative relationship. The correlation was $r = -.66$. We selected three other questionnaires that also use a dichotomous format and are widely recognised to be single bipolar dimensions. We performed the same operation on them. The resulting correlations are $r = -.661$ ($N = 148, P < .0001$) for Eysenck Personality Inventory neuroticism [Heffernan et al., 1998], $r = -.721$ ($N = 148, P < .0001$) for Eysenck Personality Inventory extroversion [Muncer et al., 1997], and $r = -.577$ ($N = 249, P < .0001$) for Zuckerman's Sensation Seeking. Inasmuch as the 20-item Expagg behaves in a similar way to neuroticism, extroversion, and sensation seeking, we maintain that there is a strong argument for considering it to be a single dimension.

STUDY 2: THE STRUCTURE OF THE 40-ITEM EXPAGG

Method

Participants. The 295 participants were first-year Social Science students at a northern university, of which 112 were male and 183 were female. Complete data were obtained from 279 subjects (96 males and 183 females). The only personal information that was collected was the sex of the participant. They participated voluntarily and were debriefed after all the questionnaires had been completed and collected.

Instrument. The participants completed the revised 40-item version of Expagg [Archer and Haigh, 1997a]. This questionnaire consists of 40 items measuring instrumental (20 items) and expressive (20 items) beliefs about aggression. Each statement is followed by a 5-point Likert scale on which the subject indicates their degree of agreement with the statement.

Results

As in previous studies, males scored significantly lower ($x = 61.41, sd = 7.9$) than females ($x = 68.90, sd = 8.64; t = 7.28, P < .0001$) on the 20 items measuring the expressive representation. They also scored significantly higher ($x = 60.38, sd = 10.01$) than females ($x = 52.94, sd = 9.47; t = 6.01, P < .001$) on the 20 items measuring the instrumental representation.

Properties of the revised Expagg. As a single 40-item scale, with the expressive items reverse scored, the questionnaire had a Cronbach's alpha of 0.82, which is similar to that reported by Archer and Haigh [1997a].

Factor analysis (PCA, varimax rotation; SPSS for windows) revealed a two-factor structure, with the first factor accounting for 17.55% of the variance and the second for 8.69% of the variance (see Table II). All 20 of the instrumental items loaded positively

TABLE II. Principal Components Analysis of the 40-Item Expagg*

Item	Factor 1	Factor 2
1. After a physical fight I tend to tell no one except maybe a close friend (E)	-.291	.284
2. In an argument I would feel more annoyed with myself if I hit the other person than if I cried (E)	-.699	.120
3. I am more likely to hit out physically when I am alone with the person who is annoying me (E)	.212	.446
4. In an argument I would feel more annoyed with myself if I cried than if I hit the other person (I)	.587	.007
5. I believe that physical aggression is always wrong (E)	-.537	.157
6. I am most likely to get physically aggressive when I feel another person is trying to make me look like a jerk (I)	.625	.240
7. Someone who never behaves aggressively has admirable patience (E)	-.212	.327
8. I believe that my aggression comes from losing my self-control (E)	-.194	.515
9. When a verbal argument heats up I am most likely to cry (E)	-.500	.278
10. When I tell my friends about a fight I was in I tend to spend a lot of time justifying or excusing what I did (E)	-.052	.344
11. After a physical fight I tend to tell lots of my friends (I)	.396	-.234
12. When I get to the point of physical aggression the thing I am most aware of is how I'm going to teach the other person a lesson (I)	.462	-.037
13. The best thing about acting aggressively is that it gets my anger out of my system (E)	.358	.271
14. If no one is there to see an argument that I am involved in I am less likely to hit out physically (I)	.159	-.026
15. If I hit someone and hurt them I feel guilty (E)	-.246	.145
16. After a physical fight I feel drained and guilty (E)	-.401	.450
17. I believe that physical aggression is necessary to get through to some people (I)	.684	-.067
18. After I lash out physically at another person, I would like them to make sure they never annoy me again (I)	.557	.158
19. After a physical fight I feel happy or depressed depending on whether I won or lost (I)	.499	-.027
20. In a heated argument I am most afraid of saying something terrible that I can never take back (E)	-.346	.384
21. The day after a physical fight I can't remember exactly what happened (E)	-.061	.288
22. After I lash out physically at another person, I would like them to acknowledge how upset they made me and how unhappy I was (E)	.281	.538
23. When I get to the point of physical aggression, the thing I am most aware of is how upset and shaky I feel (E)	-.148	.453
24. When I tell my friends about a fight I was in I tend to make it sound more exciting than it probably was (I)	.320	-.071
25. When a verbal argument really heats up, I am most likely to lash out physically (I)	.450	.395
26. I am more likely to hit out physically when another person shows me up in public (I)	.598	.275
27. The worst thing about physical aggression is that before long the other person goes right back to behaving badly again (I)	.028	.308
28. Someone who never behaves aggressively gets trodden on by people (I)	.504	.076
29. If no one is there to see an argument that I am involved in, I'm more likely to hit out physically (E)	.258	.342
30. The day after a physical fight, I remember every move I made (I)	.049	-.114
31. I am most likely to get physically aggressive when I've been under a lot of stress and some little thing pushes me over the edge (E)	.365	.531
32. The best thing about physical aggression is that it makes the other person get in line (I)	.637	.098

(continued)

TABLE II. Principal Components Analysis of the 40-Item Expagg (continued)

Item	Factor 1	Factor 2
33. The worst thing about physical aggression is that it hurts another person (E)	-.510	.262
34. During a physical fight, I feel out of control (E)	-.138	.448
35. During a physical fight, I feel as if I know exactly what I am doing (I)	.293	-.317
36. If someone challenged me to a fight in public, I'd be proud if I backed away (E)	-.495	.011
37. If I hit someone and hurt them, I feel as if they were asking for it (I)	.628	-.220
38. If someone challenged me to a fight in public, I'd feel cowardly if I backed away (I)	.563	.116
39. I believe my aggression comes from being pushed too far by obnoxious people (I)	.471	.337
40. In a heated argument, I am most afraid of being out-argued by the other person (I)	.086	.240

*Bold numbers indicate loadings $>.40$.

on the first factor (with 14 loading higher than .40) and 14 of the 20 expressive items had negative loadings (with six loading higher than .40). Recall that the expressive items were reverse keyed on scoring so that this pattern of results is consistent with a single instrumental-expressive factor. The second factor had 6 expressive-items (but no instrumental items) that loaded higher than .40, and all of them loaded positively. We therefore interpret factor 1 as a instrumental-expressive factor and factor 2 as a uniquely expressive factor.

We can compare these results with those of Archer and Haigh [1997a]. In their first study, the first factor had positive loadings from a mixture of instrumental and expressive items which, they argued, "made it difficult to reconcile with the assumption in the original Expagg that they are necessarily alternatives." It is important to emphasise, however, that their second study had a more adequate sample size of 200 and consequently a better subject-to-item ratio. Their first factor had high positive loadings from 17 of the 20 instrumental items and negative loadings from four of the 20 expressive items, bringing it more closely in line with the present results and suggesting a first bipolar dimension.

There are two further ways to evaluate whether a two-dimensional approach to the 40-item Expagg is superior to a unidimensional one. The first is to examine whether the instrumental and expressive responses are true opposites by matching up the pairs of items that were offered as alternatives on the original Expagg. If subjects treat them as mutually exclusive, then the correlations between them should be negative and significant. Archer and Haigh [1997a] found that 10 of the 20 pairs of items showed a negative correlation (of which eight were significant) and 10 pairs showed a positive correlation (of which two were significant). In the present study, 12 items showed a negative correlation (of which 10 were significant) and eight items showed a positive relationship (of which four were significant). However, if we restrict ourselves to only those "problematic" item pairs that show a significant positive correlation, it is still the case that when the instrumental score is subtracted from the expressive score each of these items shows a significant sex difference in the expected direction.

A second technique employed by Archer and Haigh [1997a] is to sum each subject's responses to the 20 expressive and 20 instrumental items separately. They found that the two subscales were significantly negatively correlated at $r = -0.37$ ($P < .001$). In the present study, the two subscales showed a negative correlation of $r = -0.34$ ($P < .001$).

To pursue the feasibility of constructing two independent measures of instrumentality and expressivity we examined the factor structure reported in Table II. From factor 1, we

examined the highest loading 10 items regardless of their sign. All but two of these (2,5) loaded positively and were originally written as instrumental items. We therefore retained these eight items (see Table III). From factor 2, we extracted the highest loading eight items. One of these was an instrumental item (25) and we therefore dropped it and replaced it with the next highest loading item (20). The revised eight-item instrumental scale has a Cronbach's alpha of 0.80, whereas the expressive scale has an alpha of 0.62. The correlation between the two scales is -0.02 , indicating near perfect independence. Factor analysis produces three factors, with the first factor accounting for 24% of the variance, the second accounting for 15%, and the third accounting for 7%. The first two factors correspond to the instrumental and expressive items, with all eight instrumental items loading over 0.5 on the first factor and all eight expressive items loading over 0.4 on the second factor. The third factor is uninterpretable, with only two expressive items loading at over 0.4, one positively and the other negatively. The instrumental scale shows a significant sex difference ($t = 7.37, P < .001$) with male scores ($x = 25.38, sd = 5.56$) being higher than female scores ($x = 20.60, sd = 5.32$). For the expressive scale, there is also a significant sex difference ($t = -3.94, P < .001$) with female scores ($x = 28.19, sd = 4.62$) being higher than male scores ($x = 26.11, sd = 4.02$).

DISCUSSION

The original 20-item forced-choice version of Expagg produced a first general factor on which all items had positive loadings when analysed by PCA, factor analysis, and

TABLE III. Revised Instrumental and Expressive Representation Scales*

Instrumental Representation Scale*

1. I believe that physical aggression is necessary to get through to some people
2. If I hit someone and hurt them, I feel as if they were asking for it
3. I am most likely to get physically aggressive when I feel another person is trying to make me look like a jerk
4. In an argument I would feel more annoyed with myself if I cried than if I hit the other person
5. The best thing about physical aggression is that it makes the other person get in line
6. If someone challenged me to a fight in public, I'd feel cowardly if I backed away
7. After I lash out physically at another person, I would like them to make sure they never annoy me again
8. I am more likely to hit out physically when another person shows me up in public

Expressive Representation Scale*

1. During a physical fight, I feel out of control
2. I am most likely to get physically aggressive when I've been under a lot of stress and some little thing pushes me over the edge
3. After a physical fight I feel drained and guilty
4. After I lash out physically at another person, I would like them to acknowledge how upset they made me and how unhappy I was
5. I believe that my aggression comes from losing my self-control
6. I am more likely to hit out physically when I am alone with the person who is annoying me
7. When I get to the point of physical aggression, the thing I am most aware of is how upset and shaky I feel
8. In a heated argument I am most afraid of saying something terrible that I can never take back

*When both sets of items are used together, we recommend that the items from the two scales be interspersed.

*Following each statement, the subject is asked to rate himself or herself on a 5-point scale ranging from "strongly agree" (score 1) to "strongly disagree" (score 5). The scores on each scale can therefore vary between 8 and 40.

microfact. The correlations between the loadings of the items across the three methods approach unity. When subjects are required to make a choice between alternative answers, the pattern of their responses is highly consistent over the 20 items. We feel confident of the unidimensional internal structure of this forced-choice questionnaire, which has been used in a number of studies.

Nonetheless, the use of a forced-choice format may violate the subjective experience of some subjects who find that they are precluded from endorsing both or neither response. When such a possibility is opened to them, via the use of the 40-item Likert format, the data are equivocal with regard to whether the structure of the questionnaire is best described as unidimensional or two-dimensional. It is a matter of whether the glass is half full or half empty. Do we read a correlation of approximately $-.35$ between the scales as approaching -1.00 and thereby suggesting unidimensionality or as approaching 0.00 and thereby suggesting two independent scales?

We believe that there are practical reasons for favouring a two-dimensional solution. First, it allows researchers who are interested in only one of the two representations to employ a scale specifically designed to tap that dimension. We would expect the expressivity and instrumentality scales to have different correlates. Expressivity might be investigated in the context of allied theoretical constructs such as internalisation, depression, self-harm, and passive-aggressive strategies of coping. Instrumentality might be investigated in the context of internal locus of control, belief in a just world, and "macho" values. Second, in many studies researchers may wish to simultaneously compare and contrast the two measures. For example, Archer and Haigh [1997b] found that whereas an instrumental representation is positively correlated with measures of aggression in prisoners, an expressive representation is negatively correlated. Third, when both scales are used in conjunction it allows subjects maximum freedom to endorse items from both scales if that reflects their own experience. In that sense, the two-scale modification is a more liberal and user-friendly format. Finally (and from our point of view most importantly), when the two scales are used together a single score can be derived simply by subtracting the sum of I (instrumental) responses from the sum of E (expressive) responses or by computing the I to E ratio. Researchers interested in relative degrees of instrumentality and expressivity can still obtain the measure that they need. A two-scale version thereby allows us to recover a single score (indicating the subject's relative preference for instrumentality vs. expressivity) and so maintains conceptual continuity with the original version of Expagg.

REFERENCES

- Andreu JM, Fujihara T, Ramirez JM. 1998. Cultural and sex differences in aggression: a comparison between Japanese and Spanish students. Read before the International Society of Research on Aggression, XIII World Meeting, July 12-17, 1998.
- Archer J, Haigh A. 1997a. Do beliefs about aggressive feelings and actions predict reported levels of aggression? *Br J Soc Psychol* 36:83-105.
- Archer J, Haigh A. 1997b. Beliefs about aggression among male and female prisoners. *Aggr Behav* 23:405-415.
- Archer J, Parker S. 1994. Social representations of aggression in children. *Aggr Behav* 20:101-114.
- Baumgartner F. 1995. Effects of instrumental versus expressive views of aggression on strategies of aggressive behaviour. *Stud Psychol* 37:197-198.
- Campbell A, Muncer S. 1987. Models of anger and aggression in the social talk of women and men. *J Theor Soc Behav* 17:489-512.
- Campbell A, Muncer S. 1994. Sex differences in aggression: social roles and social representations. *Br J Soc Psychol* 33:233-240.

- Campbell A, Muncer S, Coyle E. 1992. Social representations of aggression as an explanation of gender differences: a preliminary study. *Aggr Behav* 18:1-14.
- Campbell A, Muncer S, Gorman B. 1993. Sex and social representations of aggression: a communal-agentic analysis. *Aggr Behav* 19:125-136.
- Campbell A, Muncer S, Guy A, Banim M. 1996. Social representations of aggression: crossing the sex barrier. *Eur J Soc Psychol* 26:135-147.
- Campbell A, Muncer S, Odber J. 1997. Aggression and testosterone: testing a bio-social model. *Aggr Behav* 23:229-238.
- Campbell A, Sapochnik M, Muncer S. 1997. Sex differences in aggression: does social representation mediate form of aggression? *Br J Soc Psychol* 36:161-171.
- Carroll JB. 1945. The effect of difficulty and chance success on correlations between items or between tests. *Psychometrika* 10:1-19.
- Eatough V, Gregson M, Shevlin M. 1997. Comments on "Sex differences in aggression: does social representation mediate form of aggression?" by Campbell, Sapochnik, and Muncer. *Br J Soc Psychol* 36:383-384.
- Gorsuch RL. 1983. Factor analysis. Hillsdale, NJ: Lawrence Erlbaum.
- Heffernan T, Green D, McManus I, Muncer S. 1998. Comments on network analysis and lay interpretation: some issues of consensus and reliability. *Br J Soc Psychol* 37:253-254.
- Maxwell AE. 1977. Multivariate analysis in behavioral research. London: Chapman and Hall.
- Muncer S, Gillen K, Snape J. 1997. Sex, gender, relationship, risk or locus of control as factors determining attitudes towards the importance of health: a preliminary study. Read before the 5th European Congress of Psychology, July 1997, Dublin. p 417-418.
- Waller NG. 1995. MicroFact 1.0: a microcomputer factor analysis programme for dichotomous and ordered polytomous data and mainframe sized problems. St Paul, MN: Assessment Systems Corp.