CURRENT RESEARCH IN SOCIAL PSYCHOLOGY

Volume 8, Number 8
Submitted: November 26, 2001
Revised: January 1, 2002
Accepted: March 22, 2002
Publication Date: December 18, 2002

ALTERNATIVE FACTOR MODELS OF THE EXPAGG SCALE: A RE-EVALUATION USING CONFIRMATORY FACTOR ANALYSIS

Sarah Forrest
Nottingham Trent University

Mark Shevlin
University of Ulster at Magee College

ABSTRACT

In order to measure expressive and instrumental social representations of aggression, Campbell, Muncer and Coyle (1992) devised the Expagg scale. Since its development the Expagg has been the subject of numerous research papers both by Campbell and colleagues, and Archer and Haigh (1997) who expanded this work by producing the Revised Expagg. Archer and Haigh (1999) modified the Revised Expagg by incorporating the mediating variables of "type of opponent" and "form of aggression" to form four new versions of the measure. This study uses confirmatory factor analysis to test three factor analytic models based upon the previous theoretical arguments. It was demonstrated that none of these models provide adequate explanations for the sample data presented in Archer and Haigh (1999). The results were discussed, along with consideration of how this evidence influences the recent debate in this area.

[119]
---
[120]

INTRODUCTION

Campbell and Muncer (1987) examined the way that men and women explain aggression within their lives. This was an important contribution to the expansion of the research on gender differences in aggression. They argued that men talked about and viewed aggression as instrumental, whereas women perceived and explained their aggression in expressive terms. They proposed that men therefore held instrumental "social representations of aggression," and women held expressive ones.

Moscovici (1984, 1987) developed the concept of social representations from Durkheim's ideas about "individual" and "collective" representations. Moscovici left the definition of social representations intentionally imprecise (Moscovici 1985). Social representations are "the shared images and concepts through which we organise our world" (Parker 1987: 448). Different social groups use different social representations, dependent on the situation at hand. Campbell, Muncer and Coyle (1992) developed the Expagg scale to measure instrumental-expressive social representations of aggression. These social representations are thought to be quite fixed and rigid, as members of the social group, in these case men and women, are "locked" into that particular form of understanding and cannot simultaneously hold two conflicting sets of social representations (Campbell 1995, 1996). It was therefore suggested that Expagg was a unidimensional measure, as social representations of aggression were bi-polar opposites on the same continuum. Support for the dimensionality of the Expagg scale has been based upon exploratory factor analytic solutions by Campbell and colleagues (Campbell, et al. 1992, 1999).

Campbell's work on instrumental and expressive aggression is very heavily dependent upon her application of social representations. Social representation theory has been subject to considerable debate and criticism (Potter and Linton 1985; McKinlay and Potter 1987; Parker 1987). More specifically, it is possible to question Campbell and Muncer's (1987) adoption of the term to explain their findings. They propose that being male or female is the most salient group membership to an individual when they are faced with an aggressive situation, without considering membership of other social groups (e.g. race, class, cultural groups). Additionally, men and women as groups may be far too heterogeneous to be the type of social group that Moscovici envisioned. As Potter and Linton (1985) considered "Satisfying one index of membership, however objective, does not entail that the individual will identify with, or act in terms of, the specified group" (p.83). Researchers have found Campbell's usage of social representation theory problematic (e.g. Archer, Monks and Connors 1997; Eatough, Gregson and Shevlin 1997).

Whilst it is not disputed that sex is a social category of importance when investigating individuals' perceptions of aggression, Campbell and Muncer (1987) provide no empirical evidence that this is the most salient category of group membership. Consistent with most of the traditional research in aggression, Campbell and Muncer (1987) assume that sex and gender are quintessential for understanding aggressive thinking. This preoccupation with gender and aggression is well recognised in the literature (e.g. White and Kowalski 1994). It has been argued that this serves to under-emphasise the similarities between men and women (Unger 1979), and ignores the fact that there is greater variation within the sexes than between them (Plomin and Foch 1981; White and Kowalski 1994).

Archer and Haigh (1996, 1997) proposed a revised version of this scale conceptualising the underlying psychological constructs as separate factors of instrumental and expressive "beliefs" about aggression. They demonstrated that instrumental and expressive item endings were not necessary alternatives, as implied in Campbell's work. Therefore, it was preferable to view Expagg items as measuring "beliefs" instead of more rigid social representations, allowing respondents to endorse both an instrumental and an expressive response to an item. They argued that Expagg misrepresented the underlying psychological construct as gendered social

representations, as people can and do use both sets. People were not "locked" into either an instrumental or an expressive understanding of aggression.

Each Expagg item was split into a separate instrumental and expressive item to form the Revised Expagg scale in line with Archer and Haigh's research. This Revised Expagg was, in part, an attempt to improve the data quality, making the responses more amenable to factor analytic techniques. Haigh (1996) and Archer and Haigh (1997, 1999) claim that two factors consistently underlie the Revised Expagg, again using exploratory factor analytic techniques. Campbell et al. (1999) also examined the factor structure of the Revised Expagg using exploratory factor analysis. They concluded that the evidence for both a one- and a two-dimensional solution for this measure were equivocal.

[120]
---
[121]

Concerns about the lack of validity in the Expagg measures were raised by Forrest et al. (2002). By collecting large samples of data from both the original and Revised Expagg scales they tested the opposing ideas about the factor structure of them using confirmatory factor analysis. The Expagg measures were shown to lack validity, although it was demonstrated that viewing instrumental and expressive "representations" more loosely as two independent sets of beliefs was preferable to Campbell's contention of a bipolar continuum of instrumental-expressive social representations.

Archer and Haigh (1997) additionally identified important mediating variables accounting for significant differences in responses to the Revised Expagg. Instrumental and expressive beliefs about aggression were found to significantly differ depending upon the type of opponent the respondent considered when completing the scale. The form of aggression, either physical or verbal, was also identified as significantly affecting Revised Expagg responses. In an extension of these findings the Revised Expagg scale was modified by Archer and Haigh (1999). This recent paper by Archer and Haigh (1999) is a further contribution to the succession of papers expanding on the work of Campbell and colleagues (Campbell and Muncer 1987, 1994; Campbell, et al. 1992; Campbell, et al. 1996, 1997), which has become a popular topic of investigation within the aggression literature.

Archer and Haigh (1999) sought to examine how instrumental and expressive beliefs are affected by specifying the opponent as a partner or a same-sex non-partner, and the form of aggression as either physical or verbal. Each of these four scales was developed to comprise both instrumental and expressive items. Responses can be interpreted in terms of eight sub-scales. The expressive sub-scales relate to physical aggression towards a partner (PPE), same-sex physical aggression (SPE), verbal aggression towards a partner (PVE), and same-sex verbal aggression (SVE). The instrumental sub-scales relate to physical aggression towards a partner (PPI), same-sex physical aggression (SPI), verbal aggression towards a partner (PVI), and same-sex verbal aggression (SVI).

There are a number of testable predictions that can be made concerning the factor analytic structure of Archer and Haigh's (1999) new Revised Expagg. This allows a comparison of

alternative theoretical positions regarding the number and nature of the psychological variables relating to beliefs about aggression. Firstly, Archer and Haigh (1999) proposed that two dimensions underlie the eight sub-scales of the new Revised Expagg, meaning that the four expressive sub-scales measure an "expressive" factor and the four instrumental sub-scales measure an "instrumental" factor. Exploratory factor analysis of the Revised Expagg (Haigh 1996; Archer and Haigh 1997) suggest such a structure. Additionally correlations among the eight sub-scales of the Expagg (Haigh 1996) suggest two relatively discrete factors (Archer and Haigh 1999). The inference is that instrumental and expressive aggressive beliefs account for the covariation between the scales. They would therefore constitute second-order factors accounting for the covariation among the scales.

[121]
---
[122]

Figure 1. Covariation between the scales explained in terms of Expressiveness and Instrumentality (Model 1).

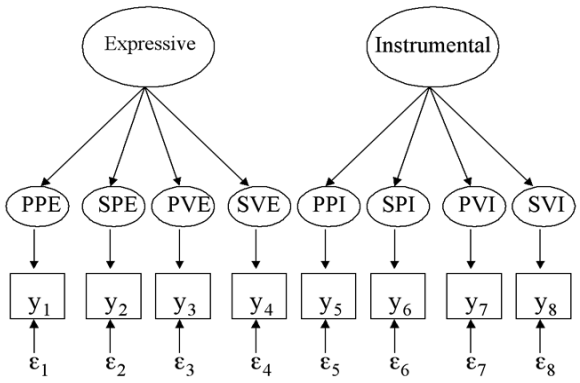


Figure 1 above depicts a path diagram (Model 1) for this set of proposed relationships. The eight sub-scales are assumed to be unidimensional, the circles representing the latent variables for each sub-scale. Higher-order instrumental and expressive belief factors are specified to explain the variation in responses between these sub-scale factors. For diagrammatic simplicity the residuals for the first order factors are not included in the figure. The summated sub-scales are represented by the observed *y*-variables displayed as squares in the path diagram. Each sub-scale then has a latent underlying variable representing "true" variation when error has been removed. With error removed they are displayed as their respective first-order variables (PPE, PVE, SPE, SVE, PPI, PVI, SPI, SVI) regressing onto the higher-order factors. The unique error variation for each sub-scale is denoted by Eta sub-1 to Eta sub-8. In specifying the model these variances were fixed to specified values to reflect the reliabilities of each sub-scale as reported by Archer and Haigh (1999).

The second alternative is based upon the hypothesis of Campbell et al. (1992) that expressive and instrumental social representations of aggression are necessary alternatives; an individual could not endorse both representations on a given item. Archer and Haigh (1997) proposed that expressiveness-instrumentality is not a bipolar construct, that they are two separate, relatively orthogonal, dimensions, and that they can be more adequately described as sets of beliefs, rather

than as social representations. There is, however, still considerable dispute that expressiveness-instrumentality is a single continuum which would explain the variation in the recent formulation of the new Revised Expagg. Campbell et al. (1992, 1996, 1997) continue to theorise about instrumentality and expressiveness of aggression as a bipolar construct. There has been no definitive refutation of such a model. Campbell et al. (1999) and Muncer and Campbell (2000) still argue for the social representational interpretation of instrumental and expressive aggression.

[122]
---
[123]

Figure 2. Covariation between the scales explained in terms of Instrumentality-Expressiveness. (Model 2)

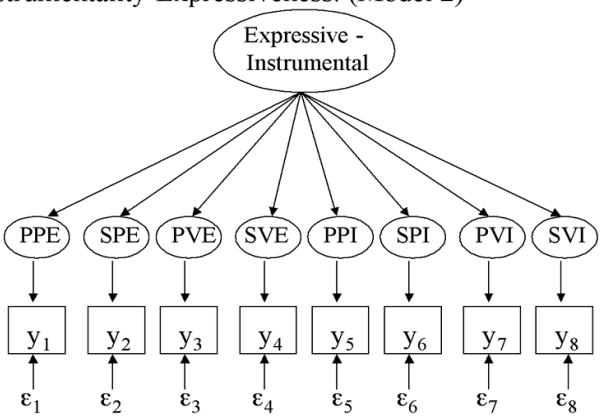
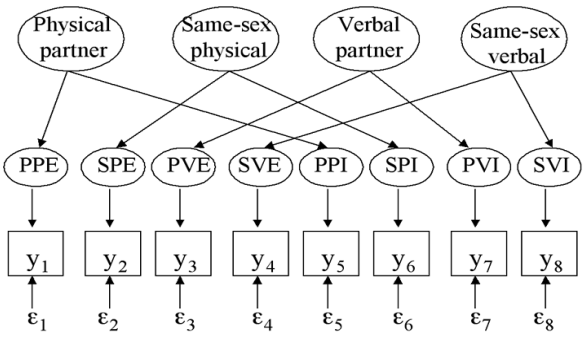


Figure 2 illustrates the model (Model 2) based on Campbell's original theoretical underpinning of Expagg. The single "expressive-instrumental" factor is specified to account for the association among the eight sub-scales and is depicted in a circle as a higher-order latent variable. The summated sub-scales are, again, shown as observed y-variables in the squares labelled y sub-1 to y sub-8 and are corrected for measurement error.

The third specification relates to the explicit prediction of Archer and Haigh (1999) that the differences in the variation between versions can be accounted for by the mediating variables they have incorporated. It is suggested that the type of opponent and the form of aggression rather than the type of "belief" (expressive or instrumental) can explain the first order factors. Figure 3 formulates this hypothesis into a model (Model 3) whereby the latent factors of the sub-scales reflect the higher-order factors of "Partner-Physical," "Same-sex-Physical," "Partner-Verbal" and "Same-sex-Verbal." These first-order latent variables regress onto the higher-order factors, when error has been removed from the observed summated scores from each sub-scale.

[123]
---
[124]

Figure 3. Covariation between the scales explained in terms of the mediating variables of 'type of opponent' and 'form of aggression' (Model 3).



Therefore, from the arguments formulated in Archer and Haigh (1999), there are three models of the predicted associations of the type of opponent, the form of aggression, and instrumental and expressive beliefs about aggression. Using the correlation matrix and standard deviations presented in Archer and Haigh (1999), these models can be tested using confirmatory factor analysis to examine the viability of the claims.

Structural equation modelling allows the comparison of different theoretically derived models, which cannot be tested within the more traditional factor analytic methods employed in the previous research. The problems of exploratory factor analysis and the superiority of confirmatory factor analysis (within a structural equation modelling framework) to address such issues are well-documented (Bollen 1989; Pedhazur and Schmelkin 1991). Each model can be specified and the parameters estimated. Importantly, goodness of fit statistics can be computed that describe how well the proposed model explains the sample data. Further, indices are available that allow a comparison between competing, or alternative, models.

In light of the validation problems identified in Forrest et al. (2002) and the identification by Archer and Haigh (1999) of mediating variables, this study aimed to re-evaluate the validation of the measures taking the mediating variables into account. If these mediating variables are so pivotal to understanding instrumental and expressive beliefs, then by incorporating them into models about the dimensionality of the measures may improve validation evidence. If the theoretical models are also demonstrated to be invalid, this raises serious issues for research that uses these measures. Although developed in the UK, the Expagg measures are extensively used in social psychological research on aggression all over the world. For example, in France (Paty 1998; Richardson, Huguet and Schwartz 2000), Spain (Andreu, Fujihara and Ramirez 1998), the Czech Republic (Baumgartner 1995), the Middle East (Puyat 2000), Japan (Andreu et al. 1998) and the USA (Richardson and Latane 2000; Richardson et al. 2000). Therefore it is very important that the measures are validated and the findings of Archer and Haigh (1999) replicated.

METHOD

The three models described above were specified and estimated using LISREL8 (Joreskog and Sorbom 1993). Using the correlation matrix and standard deviations reported in Archer and Haigh (1999), based on a sample of 200 university undergraduate students, a covariance matrix was computed and the models estimated using maximum likelihood. Archer and Haigh's (1999) data set is re-analysed here as this is currently the only published data set available where researchers have specified the type of opponent and the form of aggression using different formats of the Revised Expagg scale. The reliabilities of the eight sub-scales, as reported by in Archer and Haigh (1999), were incorporated into the model to account for measurement error in each of the sub-scales. This was achieved by constraining the first-order factor loadings to reflect the reported estimates of Cronbach's alpha.

RESULTS

Table 1 shows the chi-square and RMSEA fit statistics for each of the three models. The chi-square statistic and the Root Mean Square Error of Approximation (RMSEA; Steiger 1989, 1990) provide an indication of the global fit of the model. A non-significant probability value for the chi-square and an RMSEA value of 0.05 or below indicates satisfactory fit between the specified model and the sample data. Current consensus in the structural equation modelling literature advocates the desirable properties of the RMSEA (Raykov 1998), and stipulate that the chi-square test statistic should always be cited (Pedhazur and Schmelkin 1991; Hoyle and Panter 1995). The Akaike Information Crtierion (AIC), Consistent Information Criterion (CAIC) and Expected Cross Validation Index (ECVI) are indices used for the purposes of model comparison, with the smallest values being indicative of the best fitting model.

Table 1. Fit indices results of the three models (N=200).

	Chi-Square	df	p	RMSEA	AIC	CAIC	ECVI
Model 1	103.58	19	0.00	0.15	137.58	210.65	0.69
Model 2	352.78	20	0.00	0.29	384.78	453.55	1.93
Model 3	332.93	24	0.00	0.34	376.93	471.49	1.89

Table 1 shows that none of the proposed models adequately explain the variation in the data in terms of the chi-square or the RMSEA. In addition, all other fit indices provided in the LISREL output also strongly suggested that all three models are not good descriptions of the sample data. As the models do not explain the data the parameter estimates are unreliable and therefore are not reported.

Despite the fact that none of the models, according to overall fit indices, adequately fit the data, the analysis does provide the evidence of which is the best approximation. Comparison of the possible theoretical models suggests that Model 1 is the "best." Chi-square difference tests indicated that Model 1 represents a significant improvement on Model 2 (Chi-square difference=249.2; df difference=1; $p<.05$) and Model 3 (Chi-square difference=229.35; df diff =5; $p<.05$).

[125]
---
[126]

DISCUSSION

Comparison of the possible theoretical models suggests that the model that shows least discrepancy with the observed data is Model 1. Chi-square difference tests reveal that Model 1 is significantly better than the two alternative models. This is the model based on Archer and Haigh's claim that instrumental and expressive beliefs represent two distinct factors, and these two constructs underlie the covariation between the sub-scales of the Modified Revised Expagg. Consistent with Forrest et al. (2002) it appears that it is preferable to view instrumental and expressive "representations" as more flexible beliefs. People can and do use both sets of beliefs, and do not appear to be "locked" into either an instrumental or an expressive understanding of aggression.

Although, Model 1 is significantly better than the other two models using model evaluation indices, it should not be overlooked that, according to the overall fit indices, even this model does not meet psychometric standards of construct validity. Model 1 is the preferable representation of the underlying nature and properties of instrumental and expressive beliefs about aggression, but the evidence suggests that, nonetheless, there is substantial observed variance not explained by this implied model. In terms of our theoretical understanding of the constructs this represents the best model so far, but evidence suggests that in terms of the psychometric standing of the Revised Expagg there are still problems. This invalidity of measures was also witnessed in Forrest et al.'s (2002) research with earlier versions of the Expagg scales.

The results suggest that it is not reasonable to conclude that the differences in the responses between the versions of the measure can be attributed to the type of opponent and/or the form of aggression. Muncer and Campbell (2000) likewise caution against viewing Expagg as dependent upon variables such as form of aggression and type of opponents. This research supports their reservations regarding Archer and Haigh's (1999) emphasis on the influence of these mediating variables. From the present re-analysis of -Archer and Haigh's (1999) data it can be argued that the factor structure of these measures remains insufficiently validated. Incorporating the mediating variables into models of the dimensionality of the Expagg measures did not improve the validity. Consistent with Forrest et al.'s (2002) findings, the scales do show serious amounts of misfit from the theory to the observed data. The relationships Archer and Haigh (1999) predict are not supported when confirmatory factor analytic techniques are implemented.

Haigh (1996) and Archer and Haigh (1997) have reported relatively consistent exploratory factor analytic solutions for both the general Revised Expagg and the new Revised Expagg. The present findings cast doubt on the existence of stable instrumental and expressive beliefs factors in the various versions of Expagg. Previous attempts at validation on these measures are based on exploratory factor analysis, the statistical and theoretical limitations of which are well documented (Bollen 1989; Pedhazur and Schmelkin 1991). More rigorous methodological procedures, such as confirmatory factor analysis, are required in order to assess the psychometric qualities of the various Expagg measures. The acceptance of single instrumental and single expressive beliefs factors in these measures seems premature.

There are many statistical reasons for the models not fitting the data, such as effects of non-normality and/or the ordinal nature of the responses. A likely reason, however, is that the Expagg scale in its current form does not have a sound factor structure. The analyses reported by Archer and Haigh (1997, 1999) appear to support a priori predictions and are consistent with previous literature, thereby suggesting that the quality of the data is adequate: but the factor analysis of the same data shows no theoretically based structure.

The various versions of Expagg are widely used in aggression research conducted all over the world (e.g. Baumgartner 1995; Paty 1998; Puyat 2000). These studies tend to cite the previous exploratory factor analytic solutions of Campbell et al. (1992, 1999) and Archer and Haigh (1997) as evidential of sufficient psychometric investigation. For measures with such extensive application and usage it is important that they display adequate psychometric properties. It must be demonstrated that the measure is both reliable (in terms of internal consistency and temporal stability) and valid. Both Campbell et al. (1992) and Archer and Haigh (1997) report that their exploratory factor analyses solutions are consistent with their contradictory theoretical predictions. This study recommends that more rigorous psychometric evaluation is required than the traditional use of exploratory factor analysis, especially when there are conflicting theoretical models within the literature that seek to explain the patterns of variation within the data.

[126]
---
[127]

It is not in contention that the work in this area does not have considerable utility. The work on social representations of aggression has proven extremely influential and has greatly extended the understanding of how people perceive anger and aggression within their lives. It has been especially important in broadening the study of aggressive experience to women. However, it is strongly suggested that further validation research of the various versions of Expagg are required, using large sample data and appropriate statistical procedures. The recent papers by Campbell et al. (1999) and Muncer and Campbell (2000) surmise the importance of such issues and somewhat further psychometric standing, although without confirmatory evidence to substantiate the more exploratory methodology further investigation is certainly warranted.

Although, this analysis has revealed evidence of problems with the Expagg scales' construct validity, it has also added to our understanding of the nature of people's perceptions on aggression. The results clearly indicate that viewing instrumental and expressive beliefs as quite distinct constructs is a significantly more accurate theoretical representation. Consistent with the previous findings of Forrest et al. (2002) and Archer and Haigh (1997) there is very strong evidence that people hold quite flexible "beliefs about aggression." People are clearly not "locked" into perceptions based upon social representations, but both men and women endorse both instrumental and expressive beliefs. This suggests that both men and women view aggression instrumentally some of the time, and at other times they see it in more expressive terms. Turning to the literature on domestic violence, Goldner et al. (1990) suggests that aggression can be perceived as both instrumental and expressive at the same time. Aggression is recognised as being about social control over another person, as being about power, but simultaneously it is viewed as being "a frightening, disorientating loss of control" (Goldner et al., 1990: 346).

People's perceptions of aggression can therefore appear to be quite contradictory at times. This may be one of the reasons why Expagg displays some psychometric problems with construct validity. It could well be that theorising two relatively orthogonal factors underlying these measures do not capture the complexity of people's beliefs about aggression. Clearly more research is required to examine the content and structure of how people think and feel about aggression within their lives.

At present it remains uncertain exactly what Expagg is measuring and how consistently it does so. There is no current consensus among researchers about which version of Expagg should be used with regards to sufficient psychometric validation. There is considerable confusion about both the nature and the number of factors underlying these measures. Until these measures can be demonstrated to have stable and consistent, theoretically meaningful factor structures, their usefulness is to a certain extent limited. Problems with the factor structure of these measures obviously have repercussions for the research on social representations/beliefs of aggression that implement these measures. Until such problems are resolved Expagg should be used only with caution. Future research investigating people's perceptions of aggression is needed, which should go beyond the assumption that beliefs fall into either an instrumental category or an expressive one. Aggressive beliefs may well be much more multifarious, and the development of new measures that reflect this would be welcome within the literature.

REFERENCES

Andreu, J.M., Fujihara, T. and Ramirez, M.J. (1998). "Cultural and sex differences in aggression: A comparison between Japanese and Spanish students." Paper presented at the International Society for Research on Aggression, XIII World Meeting, July 12-17, 1998, Ramapo College, Mahwah, New Jersey, USA. http://www.israsociety.com/xiii

Archer, J. and Haigh, A. (1996). "Beliefs about aggressive feelings and actions." In C.F. Ferris and T Grisso (Eds.), Understanding aggressive behaviour in children (p.p. 329-331). Annals of the New York Academy of Sciences, Vol. 794, Sept. 20, 1996.

Archer, J. and Haigh, A. (1997). "Do beliefs about aggressive feelings and actions predict reported levels of aggression?" British Journal of Social Psychology, 36: 83-105.

Archer, J. and Haigh, A. (1999). "Sex differences in beliefs about aggression: Opponent's sex and the form of aggression." British Journal of Social Psychology, 38:71-84.

Archer, J., Monks, S. and Conners, L. (1997). "Comments on SP0409: A. Campbell, M. Sapochnik and S. Muncer's Sex differences in aggression: Does social representation mediate form of aggression? BJSP, 1997, 36, 161-171." British Journal of Social Psychology, 36: 603-606.

Baumgartner, F. (1995). "Effects of instrumental vs. expressive views of aggression on strategies of aggressive behaviour." Studia Psychologica, 37(3): 197-198.

Bollen, KA. (1989). Structural equations with latent variables. Wiley: New York.

Campbell, A. (1995). "Representations, repertoires and power: Mother-child conflict." Journal for the Theory of Social Behaviour, 25(1): 35-57.

Campbell, A. (1996). "Aggression, gender and meaning: Crossing the sex barrier." Keynote address from the Division of Educational and Child Psychology Annual Conference. Leicester: The BPS.

Campbell, A. and Muncer, S. (1987). "Models of anger and aggression in the social talk of women and men." Journal for the Theory of Social Behaviour, 17(4):489-511.

Campbell, A. and Muncer, S. (1994). "Sex differences in aggression: Social representation and social roles." British Journal of Social Psychology, 33:233-240.

Campbell, A., Muncer, S., and Coyle, E. (1992). "Social representation of aggression as an explanation of gender differences: A preliminary study." AggressiveBehaviour, 18: 95-108.

Campbell, A., Muncer, S., Guy, A. and Banim, M. (1996). "Social representations of aggression: Crossing the sex barrier." European Journal of Social Psychology, 26: 135-147.

Campbell, A., Muncer, S., McManus, I.C. and Woodhouse, D. (1999). "Instrumental and expressive representations of aggression: One scale or two?" Aggressive Behaviour, 25: 435-444.

Campbell, A., Sapochnik, M. and Muncer, S. (1997). "Sex differences in aggression: Does social representation mediate form of aggression?" British Journal of Social Psychology, 36(2): 161-171.

Eatough, V., Gregson, M. and Shevlin, M. (1997). "Comments on SP0409: A. Campbell, M. Sapochnik and S. Muncer's Sex differences in aggression: Does social representation mediate form of aggression? BJSP, 1997, 36, 161-171." British Journal of Social Psychology, 36: 383-384.

Forrest, S., Shevlin, M., Eatough, V., Gregson, M. and Davies, M. N. O. (2002). "The factor structure of the Expagg and Revised Expagg: A failure to replicate using confirmatory factor analysis." Aggressive Behaviour, 28(1): 11-20.

Goldner, V., Penn, P., Sheinberg, M. and Walker, G. (1990). "Love and violence: Gender paradoxes in volatile attachments." Family Process, 29(4): 343-363.

Haigh, A.M. (1996). "Gender differences in attitudes towards aggression." MPhil dissertation, University of Central Lancashire.

Hoyle, R.H. and Panter, A.T. (1995). "Writing about structural equation models." In R.H. Hoyle (Ed.), Structural Equation Modeling : Concepts, Issues, and Applications. (P.p. 158-176). London: SAGE.

[128]
---
[129]

Joreskog, K.G. and Sorbom, D. (1993). LISREL 8 Users' Reference Guide. Scientific Software International: Chicago, Illinois.

McKinlay, A. and Potter, J. (1987). "Social representations: A conceptual critique." Journal for the Theory of Social Behaviour, 17(4): 471-487.

Moscovici, S. (1984). "The phenomenon of social representations." In R. Farr and S. Moscovici (Eds.), Social representations. Cambridge: Cambridge University Press.

Moscovici, S. (1985). "Comment on Potter and Litton." British Journal of Social Psychology, 24: 91-92.

Moscovici, S. (1987). "Answers and questions." Journal for the Theory of Social Behaviour, 17: 513-529.

Muncer, S.J and Campbell, A. (2000). "Comments on ‘Sex differences in beliefs about aggression: Opponent's sex and form of aggression' by J. Archer and A. Haigh." British Journal of Social Psychology 39:: 309-311.

Parker, I. (1987). "‘Social representations': Social psychology's (mis)use of sociology." Journal for the Theory of Social Behaviour, 17(4): 447-469.

Paty, B.P. (1998). "Assessing French teachers' perception of aggression using a modified version of the Expagg Questionnaire." Paper presented at the British Psychological Society Social Psychology Section Annual Conference, University of Kent at Canterbury, 21-23 September 1998.

Pedhazur, E.J. and Schmelkin, L.P. (1991). Measurement, Design, and Analysis: An integrated approach. LEA: London.

Plomin, R. and Foch, T.T. (1981). "Sex differences and individual differences." Child Development, 52: 383-385.

Potter, J. and Litton, I. (1985). "Some problems underlying the theory of social representations." British Journal of Social Psychology, 24: 81-90.

Puyat, J.H. (2000). "The social representations of aggression among student groups in UP Diliaman: An exploratory study." Paper presented at the International Society for Research on

Aggression, XIV World Meeting, July 9-14, 2000, University of Valencia, Spain. http://cazorla.uv.es/isra/ESPANOL/cpingles.HTML

Raykov, T. (1998). "On the use of confirmatory factor analysis in personality research." Personality and Individual Differences, 24 (2): 291-293.

Richardson, D.S. and Latane (2000). "Dynamic social impact theory (DSIT) predicts the development of social representations of aggression." Paper presented at the International Society for Research on Aggression, XIV World Meeting, July 9-14, 2000, University of Valencia, Spain. http://cazorla.uv.es/isra/ESPANOL/cpingles.HTML

Richardson, D.S., Huguet, P. and Schwartz, D. (2000). "Social representations of aggression in US and France." Paper presented at the International Society for Research on Aggression, XIV World Meeting, July 9-14, 2000, University of Valencia, Spain. http://cazorla.uv.es/isra/ESPANOL/cpingles.HTML

Steiger, J.H. (1989). EzPATH: A supplementary module for SYSTAT and SYGRAPH. SYSTAT: Evanston, Illinois.

Steiger, J.H. (1990). "Structural model evaluation and modification: An interval estimation approach." Multivariate Behavioural Research, 25(2): 173-180.

Unger, R.K. (1979). "Toward a redefinition of sex and gender." American Psychologist, 34: 1085-1094.

White, J.W. and Kowalski, R.M. (1994). "Deconstructing the myth of the nonaggressive woman: A feminist analysis." Psychology of Women Quarterly, 18: 487-508.

AUTHORS' NOTE

Dr. Sarah Forrest, Psychology Division, Nottingham Trent University, Burton Street, Nottingham, England. NG1 4BU. Email: Sarah.Forrest@ntu.ac.uk. Sarah graduated from the Nottingham Trent University with a BSc. (Hons) Psychology degree in 1998, and studied for her doctorate there from 1998 to 2000, specialising in individual differences in aggressive expression. After temporary lectureships at both Nottingham Trent University and APU (Cambridge) she returned as a full-time lecturer to Nottingham Trent University in 2002, and has recently been awarded her PhD in Psychology. Her research interests include aggressive beliefs and indirect aggression, personality, psychometrics, and multivariate statistics.

Dr Mark Shevlin, E-mail: M.Shevlin@ulster.ac.uk. Mark graduated from the University of Ulster at Jordanstown with a BSc. Applied Psychology degree in 1992, gaining his doctorate in Psychology from the University of Ulster in 1995. After working at the Nottingham Trent University for three years, Mark returned to the University of Ulster (at Magee College) in 1998

to take up his current position as Lecturer in Psychology within the School of Psychology and Communication. His research interests include contemporary multivariate statistics (in particular structural equation modelling), personality and psychometrics.