Australian Journal of Educational & Developmental Psychology. Vol 2, 2002, pp 42-48

Brief Report

Confirmatory factor analysis of the social anxiety scale for children

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ABSTRACT

A confirmatory factor analysis was performed on responses from 436 (234 female, 202 male) primary school students to the La Greca et al. (1988) Social Anxiety Scale for Children (SASC). While loadings for one SASC item were ambiguous, results generally supported the original two-factor (Fear of Negative Evaluation and Social Anxiety and Distress) scale structure. Internal consistencies for the two subscales were also high. Recommendations for further refinement work on the scale are made.

INTRODUCTION

Recent research in educational psychology has demonstrated the importance of students' social relationships in predicting a broad range of schooling outcomes. Several studies have found correlations between students' perceptions of school psychosocial contexts and levels of task engagement and academic performance (e.g., Voekel, 1996; Fine, 1991; Finn & Rock, 1997). Others have reported positive relationships between the quality of students' peer relationships and levels of achievement motivation (Wentzel & Asher, 1995), emotional well-being (Parker & Asher, 1993), and school adjustment (Coie et al., 1992). Results such as these have led some researchers to suggest that social goals be incorporated explicitly into major theories of achievement motivation (e.g., Urdan & Maehr, 1995).

Although much of the research on students' peer relationships has focused on cognitive factors such as social problem-solving skills (Ladd, 1999), a number of studies have also demonstrated the importance of affective factors in moderating social interaction outcomes. Social anxiety is generally viewed to be a maladaptive affective response to social situations (e.g., King, 1990). Watson and Friend (1969) operationalized social anxiety as (i) experiences of distress, discomfort, fear, or anxiety in social situations, (ii) deliberate avoidance of social situations, and (iii) fears of receiving negative evaluations from others. Social anxiety has been found to correlate with several indices of child and adolescent adjustment such as depression (Gonzalez, et al., 1996) and feelings of loneliness (Johnson, LaVoie, & Mahoney, 2001). Given the potential significance of social anxiety as a moderator of psychological adjustment and social relationships, there is a clear need for well-validated measures of its presence in children at the primary and secondary school levels.

The Social Anxiety Scale for Children (SASC) developed by La Greca et al. (1988) was designed to assess the three anxiety facets outlined by Watson & Friend (1969). Owing to its relative brevity and the simplicity of its wording, the SASC is well suited for use with younger children. In the SASC, students are asked to indicate how often each of 10 statements is true for them (e.g., "I worry about what other kids think of me") on a three-point scale (never, sometimes, always). In the original study, an exploratory factor analysis of responses from 287 second- to third-grade students suggested the presence of two SASC factors: One relating to a fear of negative evaluation (FNE), and the other relating to social avoidance and distress (SAD). Although this solution accounted for an acceptable percentage of variance in SASC item scores (64.4%), loadings for some items were modest (e.g., 0.34), with one item ("I worry

about doing something new in front of other kids") cross-loading on the FNE and SAD subscales.

It is possible that manifestations of social anxiety are somewhat less differentiated in younger students than in adolescents and adults. That is, for students at this level, social anxiety may manifest more as a unidimensional construct. The goal of the present study was to provide a further evaluation of the factor structure of the SASC in a sample of primary-aged students. Given the low and somewhat ambiguous loadings reported in the original evaluation, the present study used confirmatory factor analysis (CFA) to compare the original two-factor SASC model with an alternative one-factor solution. If students' social anxiety at this level is relatively undifferentiated, the fit of the one-factor model (adjusted to reflect enhanced model parsimony) would not be expected to differ significantly from that of the original two-factor.

METHOD

The initial study sample comprised 440 students from seven state primary schools in Western Australia. All were participants in a large-scale project that aimed to evaluate the impact of cooperative learning methods on students' academic performance and school engagement. Based on data from the 1996 Population Census (Australian Bureau of Statistics, 1997), four schools were located in relatively low SES areas (socio-economic disadvantage indices within the upper 25th percentile), while the other three serviced relatively high SES suburbs (socioeconomic advantage indexes within the upper 10th percentile). Table 1 shows numbers of males and females within each of the grade levels represented.

Grade Level	Female	Male	Total	% Total
Four	22	13	35	7.95
Five	75	78	153	34.77
Six	119	102	221	50.23
Seven	20	11	31	7.04
Total	236	204	440	100.00
% Total	53.63	46.36	100.00	100.00

Table 1. Numbers of Females and Males in Each Grade Level

All procedures used in the project conformed to standards for ethical research practice established by the American Psychological Association and the Australian Psychological Society. Only students who returned signed consent forms were permitted to take part in the research. Although classroom teachers were present during the testing sessions, the researcher gave all relevant instructions and collected the completed survey forms.

During the survey sessions, students were assured that their responses would remain confidential, and would not be interpreted on an individual basis. Students did not record their names on the survey forms. Instead, they were asked to construct their own identification codes to allow for the matching of SASC scores with other survey measures. The classroom teachers were asked to keep a list of codes against names to ensure that these were used consistently across measures. The lists were constructed by asking students to record their

names and codes on a sheet circulated during the first testing session. Students were informed of the purpose of the list, and assured that (i) they would not be released to the researcher, and that (ii) they would be destroyed at the end of the final testing session. Although all participating schools received summary reports, no references to individual results were made in these documents.

Despite the relative simplicity of SASC item wording, each statement was read aloud by the researcher in the fourth-grade classes to ensure that no confusion arose in the interpretation of each statement. In other classes, students completed the scale independently, asking for clarification as required. While there was some variation in the length of survey sessions across classes, the time taken to complete the scale never exceeded 15 minutes.

RESULTS

All data screening, preprocessing, and analysis procedures were performed using LISREL 8.51 (Joreskog & Sorebom, 2001). Initial screening runs indicated that two students (both fifth-grade males) had failed to complete the entire questionnaire. As the scale comprised only 10 items, a listwise deletion was used in both cases. A further two students (2 females from grade 6) were identified as multivariate outliers ($\alpha = 0.0001$), and these cases were also excluded from the final data set, reducing the final analysis sample to 436 (236 females, 202 males). Full item statements and abbreviated labels are presented in Table 2. Descriptive statistics and bivariate correlations for the 10 SASC items are shown in Tables 3 and 4, respectively.

No.	Full Item Statement	Item Label
1	I am afraid that other kids will not like me.	Notlike
2	I worry about being teased.	Teased
3	I worry about what other kids think of me.	Thinkof
4	I feel that kids are making fun of me.	Makefun
5	I worry about what other kids say about me.	Sayabout
6	I worry about doing something new in front of other kids.	Doingnew
7	I feel shy around kids I don't know.	Shy
8	I'm quiet when I'm with a group of kids.	Quiet
9	I get nervous when I talk to new kids.	Nervous
10	I only talk to kids that I know really well.	Onlywell

Table 2. Full SASC Item Statements and Abbreviated Labels

Item	*N*	*M*	*SD*	*Skew*	SE_{sk}	*Kurt.*	SE_k
1.Notlike	436	.828	.591	.064	.117	-.322	.233
2.Teased	436	.860	.633	.122	.117	-.560	.233
3.Thinkof	436	.796	.645	.219	.117	-.677	.233
4.Makefun	436	.736	.679	.382	.117	-.833	.233
5.Sayabout	436	.872	.619	.089	.117	-.451	.233
6.Doingnew	436	.858	.582	.024	.117	-.188	.233
7.Shy	436	.711	.590	.179	.117	-.575	.233
8.Quiet	436	.725	.577	.106	.117	-.518	.233
9.Nervous	436	.688	.624	.341	.117	-.664	.233
10.Onlywell	436	.667	.596	.277	.117	-.649	.233

Table 3. Descriptive Statistics for the 10 SASC Items

Item	1	2	3	4	5	6	7	8	9	10
1.Notlike	1.000									
2.Teased	0.371	1.000								
3.Thinkof	0.242	0.211	1.000							
4.Makefun	0.379	0.390	0.281	1.000						
5.Sayabout	0.392	0.435	0.385	0.367	1.000					
6.Doingnew	0.196	0.327	0.258	0.283	0.275	1.000				
7.Shy	0.266	0.205	0.179	0.257	0.282	0.382	1.000			
8.Quiet	0.279	0.215	0.193	0.201	0.267	0.438	0.636	1.000		
9.Nervous	0.303	0.180	0.152	0.190	0.229	0.308	0.541	0.412	1.000	
10.Onlywell	0.176	0.102	0.065	0.118	0.139	0.268	0.497	0.521	0.406	1.000

Table 4. Bivariate Correlations Between SASC Items

Results for each confirmatory factor model tested are summarized in Table 5. Several indices were used to assess model fit. As the chi-squared statistic (χ^2) is heavily dependent on sample size (Hu & Bentler, 1995), the table presents parsimony-weighted χ^2/df ratios rather than probability levels (owing to the relatively large sample size for this study, all *p*s were less than 0.001). In general, χ^2/df ratios ranging from 2 to 5 are considered to represent adequate model fit (Tanaka, 1993). Given the nested structure of the alternative models tested, all model comparisons are based on the chi-squared change ($\Delta\chi^2$) statistic (Hu and Bentler, 1995).

Two alternative indices of absolute fit (the Goodness of Fit Index, GFI; and the Adjusted Goodness of Fit Index, AGFI) and three incremental fit indices (the Non-Normed Fit Index, NNFI; the Comparative Fit Index, CFI; and the Root Mean Square Error of Approximation, RSMEA) are also presented for each model. The GFI and AGFI indices assess the extent to which specified models reproduce the sample data. Unlike the GFI, the AGFI takes degrees of freedom into account, imposing a penalty to less parsimonious models (i.e., those that incorporate additional parameters). For both indices, results ranging from 0.92 to 0.95 are generally deemed to indicate acceptable model fit (Bollen & Long, 1993).

Incremental fit indices compare the adequacy of specified models to a nested baseline alternative. For example, the NNFI can generally be interpreted as the proportion of improvement that a specified model produces over a alternative model in which all observed variables are uncorrelated (Hu and Bentler, 1995). The CFI also compares specified and baseline models, but uses the non-central chi-squared (χ^2) as a reference distribution. Some have suggested that the latter distribution is more appropriate for models that are minimally misspecified (e.g., Fan, Wang, & Thompson, 1997). For the latter two indices, figures of 0.90 and above are generally considered acceptable (Bentler & Bonnet, 1980). The RSMEA is based on the magnitude of model residuals, and thus provides an index of model *mis*fit. Browne and Cudeck (1993) suggest that RMSEAs of 0.05 or less indicate a close fit to the data, with values of up to 0.08 representing reasonable to fair approximation errors in the population.

Model	χ^2	*df*	χ^2/df	*RSMEA*	*GFI*	*AGFI*	*NNFI*	*CFI*
1. One-factor SASC Model (Test for Unidimensionality).	424.40	35	12.13	0.160	0.84	0.74	0.69	0.76
2. La Greca et al. (1988) Two-Factor Model (FNE and SAD).	114.58	34	3.37	0.069	0.95	0.93	0.91	0.93
3. Modified Two-Factor Model (item "doingnew" cross-loaded).	70.20	33	2.13	0.051	0.97	0.95	0.95	0.96

Table 5. Fit Statistics and Indices for Five CFA Models

As indicated, the initial one-factor model tested did not fit the data well, $\chi^2/df = 12.13$, RSMEA = 0.16. The La Greca et al. (1988) two-factor model produced a significant reduction in χ^2 over this model ($\Delta\chi^2 = 309.82$, $\Delta df = 1$, $p < 0.001$). Although the GFI, AGFI, NNFI, and CFI indices for the La Greca et al. model were within acceptable ranges, the RSMEA was still somewhat high (0.07). Based on the modification indices, the path between the item "doingnew" and the SAD factor was then freed, producing the modified two-factor model (Model 3 in Table 5). Freeing this parameter produced a further significant decrease in χ^2 ($\Delta\chi^2 = 44.38$, $\Delta df = 1$, $p < 0.001$). As all associated fit indices were within acceptable ranges for the latter model, and as there was no evidence of further item cross-loadings, no further modifications were imposed. Factor loadings for each of the items on the two SASC factors are shown in Figure 1. All loadings were significant (ts > 4.58, ps < 0.05), although error variances for some items (e.g., "thinkof" on FNE) were still moderately high.

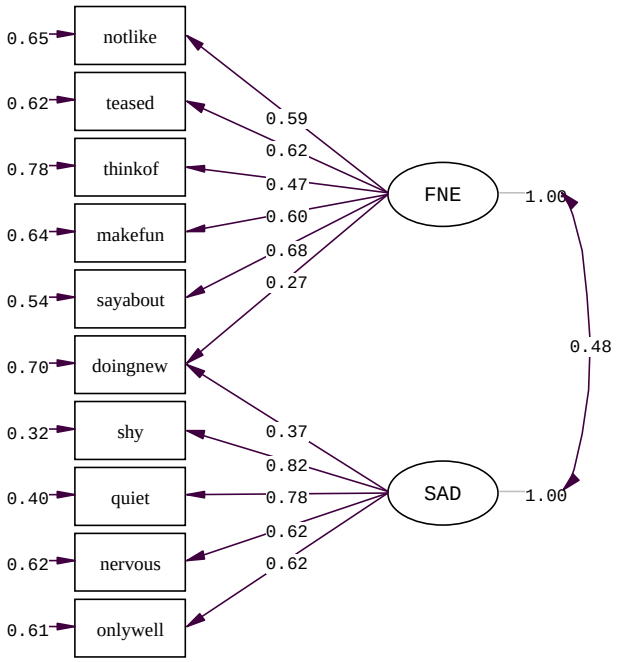
Alpha coefficients were also computed to allow a direct comparison of results with those reported by La Greca et al. (1988). The Cronbach's α for SASC Total scores was 0.81, which

was slightly higher than that reported in the original evaluation ($\alpha = 0.76$). For the FNE factor, an α of 0.76 was obtained with the item "doingnew" included. With this item excluded, the α reduced slightly to 0.75. These coefficients are slightly lower than those reported for this factor in the original study ($\alpha = 0.83$). For the SAD factor, the coefficients obtained were again slightly higher (0.80 including or excluding the "doingnew" item) than for the original evaluation, which reported a somewhat low internal consistency for this subscale (0.63).

CONCLUSION

These results generally support the SASC factor structure proposed by La Greca et al. (1988). The original two-factor (FNE-SAD) model produced a significant improvement in model fit over the one-factor model tested. One item ("I worry about doing something new in front of other kids") did, however, cross-load on the FNE and SAD subscales. Interestingly, it was this item that produced the most ambiguous loading pattern in the original study, with loadings of 0.38 and 0.30 on FNE and SAD, respectively. Thus, refinement work on the scale could explore a rewording or replacement of this item to increase differentiation between the two subscales. Despite this ambiguity, the internal consistencies obtained were high across both factors, providing further support for the psychometric properties of the SASC subscales. Considering these findings in light of the simplicity and brevity of the scale (i.e., survey sessions of less than 15 minutes), the SASC appears to provide a sound and practical means by which to assess social anxiety in younger students.

Figure 1: Final confirmatory factor model



REFERENCES

Australian Bureau of Statistics. (1997). 1996 Census of Population and Housing: Basic Community Profile. Canberra, ACT: The Australian Bureau of Statistics.

Bentler, P.M., & Bonnett, D.G. (1980). Significance test and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606.

Bollen, K.A., & Long, J.S. (Eds.) (1993). Testing structural equation models. Newbury Park, CA: Sage Publications.

Browne, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen and J.S. Long (Eds.), Testing structural equation models (pp. 136-161). Newbury Park, CA: Sage Publications.

Coie, J.D., Lochman, J.E., Terry, R., & Hyman, C. (1992). Predicting early adolescent disorder from childhood aggression and peer rejection. Journal of Consulting and Clinical Psychology, 60, 783-792.

Fan, X., Wang, L., & Thompson, B. (1997). The effects of Sample Size, Estimation Methods, and Model Specification on SEM Fit Indices. Paper presented at the annual meeting of American Educational Research Association. New York, NY.

Fine, M. (1991). Framing dropouts: Notes on the politics of an urban high school. Albany, NY: State University of New York Press.

Finn, J., & Rock, D. (1997). Academic success among students at risk for school failure. Journal of Applied Psychology, 82(2), 221-234.

Gonzalez, K.P., et al. (1996). Social anxiety and aggression in behaviorally disordered children. Early Child Development and Care, 121, 1-8.

Hu, L.& Bentler, P. M. (1995). Evaluating Model Fit. In R. H. Hoyle (Ed.) Structural Equation Modeling: Concepts, issues and applications (pp. 76 - 99). Thousand Oaks, CA: Sage.

Johnson, H.D., LaVoie, J.C., Mahoney, M. (2001). Interparental conflict and family cohesion: Predictors of loneliness, social anxiety, and social avoidance in late adolescence. Journal of Adolescent Research, 16(3), 304-18.

Jöreskog, K. G., & Sörbom, D. (2001). LISREL 8.51 and PRELIS 2.50. Chicago: Scientific Software International.

King, N.J. (1990). School-related fears of children and adolescents. Australian Journal of Education, 34(1), 99-112.

La Greca, A.M., Dandes, S.K., Wick, P., Shaw, K., & Stone, W.L. (1988). Development of the social anxiety scale for children: Reliability and concurrent validity. Journal of Clinicial Child Psychology, 17, 84-91.

Parker, J.G., & Asher, S.R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. Developmental Psychology, 29, 611-621.

Tanaka, J.S. (1993). Multifaceted conceptions of fit in structural equation models. In K.A. Bollen and J.S. Long (Eds.), Testing structural equation models (pp. 10-39). Newbury Park, CA: Sage Publications.

Urdan, T.C., & Maehr, M.L. (1995). Beyond a two-goal theory of motivation and achievement: A case for social goals. Review of Educational Research, 65(3), 213-240.

Voelkel, K.E. (1996). Identification with school. American Journal of Education, 105(3), 294-318.

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. Journal of Consulting and Clinical Psychology, 33, 448-457.

Wentzel., K.R., & Asher, S.R. (1995). The academic lives of neglected, rejected, popular, and controversial children. Child Development, 66, 754-763.