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Identification of the underlying factor structure of the Derriford Appearance Scale 24

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Abstract

Background. The Derriford Appearance Scale24 (DAS24) is a widely used measure of distress and dysfunction in relation to self-consciousness of appearance. It has been used in clinical and research settings, and translated into numerous European and Asian languages.

Hitherto, no study has conducted an analysis to determine the underlying factor structure of the scale.

Methods. A large (n=1265) sample of community and hospital patients with a visible difference were recruited face to face or by post, and completed the DAS24.

Results. A two factor solution was found to be the best fit to the data. A main factor, general self consciousness (GSC), was represented by 18 items. Six items comprised a second factor, sexual and body self-consciousness (SBSC). The SBSC scale demonstrated greater sensitivity and specificity in identifying distress for sexually significant areas of the body.

Discussion. The factor structure of the DAS24 facilitates a more nuanced interpretation of scores using this scale. Two conceptually and statistically coherent sub-scales were identified. The SBSC subscale offers a means of identifying distress and dysfunction around sexually significant areas of the body not previously possible with this scale.

Introduction

The psychological distress and dysfunction associated with visible differences associated with disease, traumatic injury and congenital and developmental abnormality has been increasingly documented over recent years (Bessell, Dures, Semple, & Jackson, 2012). Difficulties reported include social avoidance, fear of negative evaluation, shame, and anxiety (Rosser, Moss, & Rumsey, 2010). Applied psychologists, including health, clinical, and counseling psychologists have been at the forefront of developing interventions to support people with psychological needs arising from visible differences (Bessell et al., 2012), and in developing a clearer understanding of the differentiating factors and processes between those who adjust well, and those who struggle to cope and manage with differing appearances.

In order to make a meaningful assessment of interventions, and also to be able to have a relevant, specific and well defined outcome variable in theoretical explorations, a team of plastic surgeons and psychologists created the Derriford Appearance Scale 59 (Carr, Harris, & James, 2000). This psychometrically sound measure derived from patient reports in plastic surgery, has shown to be valid and reliable in clinical and general population samples. It has been translated into multiple languages, for example, Japanese and Nepalese (Carr, Moss, & Harris, 2005; Keiko et al., 2008; Singh, Singh, Moss, Roy, & Baral, 2013). In 2005, Moss, Carr and Harris published a shorter form of the scale, the Derriford Appearance Scale 24 (DAS24), which retained the psychometric properties of the DAS59 but was quicker for participants to complete and had greater face validity (Carr et al., 2005). Originally envisaged as unifactorial, the subsequent widespread use of DAS24 in medical, and psychological practice, as well as in psychological

research has led to a reconsideration of the constructs DAS24 identifies, specifically if it is a multifactorial measure. Therefore the purpose of the current study was to investigate the factor structure of DAS24 for people who have visibly different appearance.

Method

Ethics

The research was approved by National Research Ethics Service UK Research Ethics Committee (Central and South Bristol - 05/Q2006/19), and is consistent with the Declaration of Helsinki ethical principles. Participants were recruited in accordance with ethical guidance for obtaining informed consent, which included a two-week period to consider opting into the study.

Participants

Sample size was based on recommendations by Comrey and Lee on minimum sample size in factor analysis (Comrey & Lee, 1992). They indicate that more than 500 is very good, whilst 1000 or more observations is excellent. For the current study, increasing sample sizes beyond 1000 served to enhance power and provided the opportunity to obtain a wide sample over multiple clinical groupings.

Participants aged over 18 years old who self-identified as being visibly different and with fluency in written and spoken English were recruited from community and clinical settings. Six hundred and fourteen community participants were recruited through advertisements and general practice doctors' surgeries, whilst 651 clinical participants were recruited via outpatient clinics (prosthetics, dermatology, ophthalmology and general plastics (plastics & burns), ear, nose and throat clinics (including cleft lip and palate) cancer clinics (head and neck, skin) and laser treatment. Participants were recruited from locations across the United Kingdom (Bristol,

London, Bradford, Sheffield and Warwick). In total, 1265 participants were recruited. 867 of the whole sample were female (68.5%), 354 male (28.0%). 474 of those in the community sample were female (77.2%), 120 were male (19.5%). Similarly, 393 of those in the clinic sample were female (60.4%), 234 were male (35.9%). The mean age of the whole sample was 47.3 years (range 18-91, SD 16.7 years) with the mean age in the community sample 44.9 years (range 18 – 91; SD 16.2 years), marginally lower than in the clinic mean age 49.7 years (range 18 – 89; SD 16.9 years). 783 (61.9%) of the whole sample reported being married or living with partner, 183 (14.6%) living with friends or relatives and 287 (22.9%) living alone. 81% of the whole sample were white, with the other 12% either Pakistani, Indian, Black Caribbean, Black African or other, 7% did not state their ethnicity. The percentages are similar in both the clinic and community sample.

DAS 24 was included as part of a wider Appearance Research Collaboration study that was assessing adjustment to visible difference (Clarke, Thompson, Jenkinson, Rumsey and Newell, 2013). Those who agreed to participate were given a questionnaire booklet to complete at their next outpatient appointment or mailed the booklet by post. Participants self-reported demographic information, and the aspect of their physical appearance they were most sensitive about.

Materials

DAS24 is a 24 item self report scale measuring social anxiety and avoidance in relation to self-consciousness of appearance. Total scores range from 11-96 with lower scores representing lower levels of social anxiety and social avoidance. The authors report high internal consistency, with Cronbach's alpha coefficients $\alpha = .92$ and six-month test-retest

reliability of $r=.68$. It has also shown good convergent and discriminant construct validity with measures of social anxiety, shame, and depression, and divergent construct validity with hysteria. For a detailed description of the psychometric validation of DAS24 please refer to the original article (Carr, Moss and Harris, 2005).

Data analytic strategy

A bootstrapped Kaiser-Guttman with a hypothesised to two factor solution, and a principle component analysis with varimax rotation were implemented. The more frequently used Kaiser-Guttman method was rejected as it can be over inclusive and generate useless factors. Analyses of variance (ANOVAs) were then conducted on the resultant factors to identify variability by gender, recruitment method and location of participants' areas of visible difference sensitivity.

Results and Discussion

Results

Firstly, data were checked for influential observations; we measured changes in the ellipsoid volume of the dataset if an observation was deleted (Chatterjee, 1991). As there were only a small number of influential observations this was acceptable. The data was also assessed to establish if the correlation between variables was high enough for meaningful extraction, which was found to be the case with Kaiser-Meyer-Olkin measure $=0.952$ ($KMO >.09$ is generally confirmed as "marvelous" (Kaiser & Rice, 1974).

Factor structure

A principal component analysis was conducted with varimax rotation. Identical analysis was conducted with separate community and clinical subsamples, and with the total sample. There

was no significant difference between subsamples; with both analyses resulting in a similar solution therefore results from the total sample are reported.

All items loaded on to their respective factors at $\geq .5$. Two components with eigen values >1 were observed. A scree plot of eigen values also showed a clear “elbow” at this point, therefore a two component solution was accepted as the best fit for the data. Component one was defined as “general self-consciousness of appearance” (GSC) and contained 18 items. Factor two contained six items and was defined as “sexual and bodily self-consciousness of appearance” (SBSC). Item loadings are shown in Table 1.

Item summary	F1 GSC loading	F2 SBSC loading
Feel Rejected	.734	
Close into shell	.730	
Feel hurt	.723	
Avoid leaving house	.708	
Feel confident	.680	
Feel Irritable	.673	
Self conscious & irritable at home	.668	
Feel normal	.666	
Distressed at reflection	.640	
Distressed at social events	.637	
Avoid pubs/restaurants	.635	

Feel self conscious of feature	.583
Feel Misjudged	.579
Adopt concealing gestures	.561
Distressed supermarkets/dept stores	.551
Distressed at others' remarks	.539
Self conscious adverse work impact	.524
Feel masculine/feminine	.516
Distressed at beach	.760
Distressed at clothing limitations	.711
Avoid communal changing	.698
Avoid undressing with partner	.656
Distressed at sports/games	.616
Adverse effect on sex life	.587

Table 1: Component loading (loadings shown above 0.5 for clarity)

The two factors accounted for 70-95% of the proportion of the variance. Cronbach's alpha for this sample was $\alpha = .93$ for the whole DAS24, $\alpha = .093$ for the GSC factor, and $\alpha = .080$ for the SBSC factor.

Variability in factor response by gender and recruitment method

As would be expected, men scored lower than women on both factors (i.e., were less distressed). For GSC, men's mean = 29.6, sd = 11.5, whereas for women mean = 35.0, sd = 11.9. For SBSC,

men's mean = 6.9, sd = 4.7, whereas women's mean = 10.5, sd = 5.6. This was significant in both cases. For GSC, $F(1,1000) = 43.389$, $p < .0001$, $\eta^2 = .042$, and for SBSC, $F(1,1161) = 101.576$, $p < .0001$, $\eta^2 = .080$. In addition, the effect sizes indicate that this variation was small for GSC but medium to large for SBSC. There were also significant difference between community and clinical samples, with higher scores noted for the clinical samples; for GSC this was $F(1,1035) = 9.812$, $p < .002$, $\eta^2 = .009$ whilst for SBSC $F(1,1203) = 16.357$, $p < .0001$, $\eta^2 = .013$, however the effect sizes were very small.

Variability in factor response by area of sensitivity

For areas of the body where participants identified their main area of sensitivity in a less sexually significant location (nose or hands) GSC was significantly greater compared to those not self conscious of these body areas. This was not the case for SBSC. Furthermore, scores for participants who identified their main area of sensitivity about their appearance as a more sexually significant or concealed location of their body were significant on both GSC and SBSC, with larger effect for SBSC sizes, as indicated in Tables 2 and 3.

Table 2 GSC: Those concerned vs those not concerned about specific body parts

	<i>Df</i>	<i>F</i>	η^2	<i>P</i>
Nose	1,1035	26.835	.025	<.0001
Hands	1,1035	11.238	.011	<.0001
Breasts	1,1035	78.251	.071	<.0001
Mouth	1,1035	18.805,	.018	<.0001
Abdomen	1,1035	57.290,	.0052	<.0001

Table 3 SBSC: Those concerned vs those not concerned about specific body parts

	<i>Df</i>	<i>F</i>	η^2	<i>p</i>
Nose	1,1203	.788	.001	.181
Hands	1,1203	.356	.000	.551
Breasts	1,1203	154.488,	.114	<.0001
Mouth	1,1203	6.956	.006	<.0001
Abdomen	1,1203	124.212	.094	<.0001

As shown in Table 2, GSC was significant, regardless of location of appearance sensitivity, with small to medium effect sizes. For SBSC there were large effects if the area of sensitivity was the breasts or abdomen. However, if the area of sensitivity was the mouth, the results were significant but with a much smaller effect size than GSC. There was no significant difference in SBSC between those concerned about their nose (compared to those not concerned about their nose) or hands (compared to those not concerned about their hands).

Discussion

Principal component analysis of DAS24 generated two factors, General Self-Consciousness of appearance (GSC) and Sexual and Bodily Self-Consciousnesses of appearance (SBSC). Further analysis of the factor scores indicated that this two factor solution correlated with dominant area of appearance self-consciousness. There was a greater likelihood of significance and large effect sizes for SBSC for people identified their main area of sensitivity in a region of their body that was sexually significant or concealable by clothing. Issues concerning appearance and sexual

difference for people with a visibly different appearance are recognised as neglected areas such as in burns rehabilitation (Ahmad, Masoodi, Akhter, & Khurram, 2013). The lack of understanding of sexual functioning in relation to body image, and any accompanying lack of measurement tools have been cited as a major barrier to developing effective interventions (Corry, Pruzinsky, & Rumsey, 2009; Taylor, Harley, Ziegler, Brown, & Velikova, 2011). Increased understanding of the factor analytic structure of DAS24 and the identification of a brief, six item subscale to measure SBSC adds to the tools available for research and intervention. The specificity of the SBSC factor was demonstrated by the differentiation of the sample according to sexually significant areas, while no difference was observed in SBSC in those concerned/unconcerned about non-sexually significant areas.

A major strength of this study was its robustness, in terms of good data, a well-powered sample and close consideration of the most appropriate method of factor analysis. This permitted clear factor structure to emerge. Further validation of factor stability in other large samples would be useful.

Conclusion

This brief paper adds further utility to well established measure, offering the possibility of using the complete scale, or one of the two subscales as required. It demonstrates the existence of a factor structure beyond the simple total score of the DAS24. The SBSC factor demonstrated greater sensitivity and specificity to distress which is based on a concern arising from sexually significant body areas.

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