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Methodological assessment of behavioural problem dimensions in adults with dental fear

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Abstract – *Objectives:* In the assessment and treatment of persons with dental fear, there may be other psychological/behavioural factors than fear itself and traditional measures of psychopathology that should be considered. Longitudinal natural history studies are needed to find such variables. The present study investigated whether the same behavioural problem dimensions (internalizing, externalizing, attention) found among children and adolescents with behaviour management problems and/or dental fear could also be found among severely fearful adult patients. *Methods:* The participants were 230 consecutive adult patients applying for treatment for severe dental anxiety at a specialized clinic. Patients completed a version of the Rutter behaviour questionnaire that was adapted for adults. Comparison data were the Hospital Anxiety and Depression scale and self-rated anger evoked by dental fear. Background data, including dental fear, were also collected. Descriptive statistics, principal components analyses, group comparisons and correlations were calculated. *Results:* Of the three behaviour problems scales we adapted for adults, two (Internalizing and Attention) had acceptable psychometric properties and meaningful relations with the comparison variables. In contrast, the third problem scale (Externalizing) proved to have less satisfactory properties and relations, especially for men. Patients with severe phobia had higher levels of problem behaviours than patients with less severe phobia. *Conclusions:* Internalizing and Attention scales for adults seem promising for use in future prospective studies of the natural history of dental fear. The Externalizing scale, however, needs to be studied with a wider range of comparison variables and measures of social desirability.

Key words: behaviour problems; behavioural dentistry; dental fear; psychometrics

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Dental fear (DF) may cause frequent and serious problems for both the dentist and patient, and it often gives rise to a number of deleterious effects (1–3). Well over a third of Swedish adults admit to being fearful and 5% can be regarded as extremely fearful or phobic (2). Individualized treatments make it possible for the fearful adult individual to regain treatment competence and maintain regular dental contacts in general dentistry (1, 4, 5).

Nevertheless, we think that different subgroups of patients could benefit further from different treatment regimens. Some evidence for this assertion comes from a number of studies using a widely used psychopathologic symptom survey (i.e. the Symptom Checklist 90 Revised; SCL-90-R; 6); specifically, in an Israeli study patients with DF who failed in behaviour modification reported more somatization, psychoticism and symptoms on a psychological distress index than patients who were treated successfully (7). However, other researchers found that the only pretreatment psychopathological score found to be predictive of dental anxiety 1 year after treatment was somatization (8). In contrast, the Israeli group has found the psychological distress index, general anxiety, phobic anxiety and interpersonal sensitivity, but

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not somatization, to be correlates of dental anxiety (9). These somewhat mixed findings support the contention by Aartman et al. (10) that research should seek to broaden the types of variables that are used to discriminate between groups of patients with DF by including other measures than merely DF and traditional measures of psychopathology. In addition, it has been found that the specific aetiology components influence treatment outcome (11); however, the reliability and validity of this finding are limited by the length of time between the onset of fear (often childhood) and the measurement point of the study. Thus, treatment effects must be interpreted in the light of the long time elapsed between the study and the aetiological experiences reported by the patients. This retrospective study design is common in present studies of adults with DF, as avoidance and negative emotions towards dentistry have generally been present during most of the patients' adult lives.

There are a number of questions concerning DF, including the identification of different subgroups and their benefits from different treatment regimens, which can be answered only in a natural history perspective. However, longitudinal studies are scarce (12, 13) and to our knowledge no studies have specifically aimed to predict and follow the development from childhood into adulthood. In a series of investigations, it is our purpose to increase the understanding of DF in dentistry by studying the natural history of these reactions in both children and adults.

In research on dental treatment problems among children, difficulties because of psychological/behavioural factors, often combined with an aggravating caries situation, are commonly labelled DF because patients' behaviour may liken fear reactions (i.e. avoidance, late cancellations, refusals, crying, anger). However, in a Swedish study (14) cluster analyses revealed four different fear and personality subgroups within a group of 4–12-year old children with behaviour management problems: (I) Nonfearful, extrovert, outgoing, (II) Fearful, extrovert, outgoing, (III) Fearful, inhibited and (IV) Externalizing, impulsive. Arnrup et al. (14) found three behavioural problem dimensions to be included in the description of the clusters, namely: internalizing behaviour problems (psychosomatic complaints, general fear and worry; cluster III); externalizing behaviour problems (in conflict with others, destructive to self and others; cluster IV); and attention problems (restless, fidgety; cluster IV). There were no signs of behavioural problems in clusters I and II. Interestingly, four similar clusters were found at follow-up (average 6 years) after the first measurement (15).

It is important to note that the clusters found by Arnrup et al. (14, 15), including the behavioural problem dimensions, are interpreted as constituents of DF and/or behaviour management problems, as opposed to consequences of DF. Examples of the latter are the psychological reactions (16, 17), e.g. preoccupied with thoughts of the need to see a dentist, worry about teeth falling apart; the interpersonal relations (17), e.g. hiding DF from other people, having arguments with others about going to the dentist; and the avoidance/social inhibition (16, 17), e.g. hide teeth when smiling, avoid socializing because of the state of teeth. We acknowledge that there is an overlap between constituent characteristics of DF and consequences of DF, for example between DF behaviours and the psychological reactions mentioned above. There is probably also a 'vicious cycle' (18) by which the two concepts are related. Nevertheless, we think that the fact that the behavioural problem dimensions were found in children as young as 4-years old (14) strengthens the view that they are more characteristics than consequences of DF.

Although designated variously, the three behavioural problem dimensions internalizing, externalizing and attention are widely recognized in psychological and psychiatric child research (19, 20). The dimensions internalizing and externalizing should not be confused with the mid-level personality construct internal versus external locus of control, which includes individuals' personal beliefs about their ability to influence life events (21). Instead, the behavioural problem dimensions focus mainly on emotional and conduct problems (20). There are two well-established measures of the behavioural dimensions: the Rutter parents' and teachers' scales (20, 22) and the Child Behaviour Checklist (CBCL; 19). The Rutter scales have the advantage of being considerably shorter than the CBCL.

In the present study, we aim to investigate whether behavioural problem dimensions among children and adolescents with behaviour management problems and/or DF (14, 15) can be found among adults with DF. If so, that would help future natural history studies to identify different subgroups of patients and also give insight into how to

better adapt treatment regimens to the individual patient. Although adult DF questionnaires have frequently been adapted for use among children, to our knowledge no attempts have been made to adapt children's questionnaires for use among adults. Thus, our specific aim was to explore the three widely used behavioural problem dimensions in children (internalizing, externalizing, attention; 19, 20) in a group of severely fearful adult patients, and to evaluate an adapted adult version of the Rutter scale in relation to established adult measures of general emotional reactions. Furthermore, it was expected that elevated scores of Internalizing behaviour problems would be associated with increased general psychological distress. It was also expected that elevated Attention scores would be related to increased restlessness, whereas we expected elevated Externalizing behaviour problems scores to be associated with increased anger in response to DF.

Materials and methods

Participants and procedures

The study was conducted at a clinic specialized in treatment and research on DF at the Institute of Odontology, Göteborg University, Sweden, during 1 year (October 2003–September 2004). The participants were 230 consecutive adult patients applying for treatment for severe dental anxiety, who were investigated in conjunction to their first visit to the clinic. A screening process allowed inclusion of only those patients who refused conventional dental treatment and who were willing to enter the research project. After written consent, each patient answered the psychometric questionnaires (see below) before seeing the dentist for anamnestic interview. The local ethics committee approved the study.

Measures

Background data included age, sex, previous dental contacts (regularity and time since last visit) and DF. The latter was measured with Swedish versions of the Dental Anxiety Scale (DAS; 23, 24) and the Dental Fear Survey (DFS; 25, 26). The DAS consists of four items. Responses are scored from 1 to 5 and summed to yield total scores between 4–20. High scores indicate high anxiety. A score of 13 or above has been suggested to indicate dental anxiety (27). Previous research has shown normative data for the Swedish DAS to correspond well with American population norms, with population mean around eight and dental phobic patients ranging between 15–20 (24, 28). The DFS consists of 20 items with five-point response scales, summed to give total scores between 20–100. Population mean levels have been estimated at 36.6 for Americans (29), whereas data from Sweden and Denmark on fearful or phobic populations range from 75.8–88.8 (26, 30–32). Factor analysis has suggested three distinct areas of fear reactions (33): avoidance/anticipation (nine items), autonomic/physiologic arousal (five items), and fear of specific objects or situations (five items).

Behaviour problem dimensions were assessed by a Swedish version (34) of the Rutter behaviour questionnaire (20, 22). The questionnaire was originally designed for completion by parents or teachers, but was modified and shortened in this study for self-report. The Rutter scale consists of items describing detailed child behaviour problems and items describing common psychosomatic complaints or behaviours. The response format is a Likert scale from 1 (does not apply at all) to 5 (applies very well). Out of the original 32 items, 17 were regarded relevant for use in adults and included in the present questionnaire. Of the 17 items, six represented Internalizing behaviour problems, eight Externalizing problems and three Attention problems (19, 20). Item transformation to a self-rating format for adults was unproblematic for most of the 17 items. In some instances, where the original item dealt with typical child behaviours, some changes were required. For instance, the original 'Is often disobedient' was changed to 'I rarely do things the way I am told to', and 'Bullies other children' to 'Is often mean to others'.

General anxiety and depression, assessed with the Swedish version of the Hospital Anxiety and Depression (HAD) scale (35, 36), were used as comparison variables concerning Internalizing behaviour problems. The HAD is a widely used and reliable measure of presence and severity of clinical anxiety and depression (37, 38). Item 11 from the HAD (I feel restless as if I have to be on the move) was used as a separate comparison regarding attention problems. The factor Externalizing behaviour problems was compared with anger in response to DF as measured by the clinic's patient enrolment questionnaire (i.e. Does your dental fear make you feel angry?). This single question has a yes/no response format.

Statistical methods

Descriptive statistics were calculated for each variable. Gender and fear level differences were studied using the *t*-test and the Mann–Whitney *U*-test where applicable. All group comparisons were two-tailed.

In line with previous research on behavioural problem dimensions (19, 20), three factors were extracted from the correlation matrix of the 17 Rutter items with a principal components analysis. Analyses were performed in the total sample and among men and women separately. Both orthogonal (Varimax) and oblique (Promax) factor rotations were performed. In the Promax rotation kappa was set to 4. Factors and items were retained if the same items grouped together in both rotations and reflected the same underlying dimension with regard to conceptual content. Cronbach's alpha was used to estimate the internal consistency reliability of the multi-item scales/factors. Values exceeding 0.70 were judged acceptable for group comparisons (39).

Nonparametric (Spearman) correlations were used to study the relations between the behaviour factors, DF and the comparison variables. To compensate for the number of calculations performed, the minimum level of significance was set to $P < 0.01$.

Results

Participants

The sample included 230 participants, 144 (63%) women and 86 (37%) men. The age ranged from 20 to 75 years, with a mean of 36.6 (SD = 10.5). Women and men did not differ in age, t (227) = 0.05, $P = 0.96$. Almost a third, 62 (28%) persons, stated that they had never completed a dental treatment, whereas 99 (45%) reported dentist visits only when in pain, 21 (10%) stated regular but infrequent dental contacts and 40 (18%) reported regular dentist visits. There was no gender difference in previous dentist visits, Mann–Whitney $U = 5412.50$, $P = 0.41$. The mean DAS score was 17.0 (SD = 2.8) and the mean DFS score was 78.9 (SD = 13.5). Women and men did not differ in the DAS, t (228) = 1.7, $P = 0.09$, but women had higher scores in the DFS, t (228) = 2.6, $P = 0.01$. Consequently, women had higher scores in DFS Autonomic arousal, t (228) = 2.6, $P = 0.01$, and DFS Fear of specific objects or situations, t (228) = 2.3, $P = 0.02$, but not in DFS Avoidance, t (228) = 1.8, $P = 0.07$.

Psychometric properties of the adapted Rutter scale for adults

Missing values were found for only 1.3–3.9% of the different items in the adapted Rutter questionnaire. The first three-factor extraction in the total sample explained 53.9% of the total variance. Both rotations converged in five iterations and produced factors with identical items. The three factors were very similar to the three dimensions found by others (19, 20), but three items (no. 7. easily lose self-control, no. 10. have poor concentration, no. 17. outburst of fury) loaded on factors that were not in accordance with item content. After deleting these items, a second three-factor extraction explained 55.1% of the total variance. Again, both rotations converged in five iterations and produced identical factors. All 14 retained items loaded >0.40 on their own factor (Table 1). Item-discriminant validity was acceptable, although a bit low for two items (no. 4 and no. 6; Table 1). The content of the three resulting factors was identical to the Internalizing, Externalizing and Attention factors used by others (14, 19, 20). Internalizing explained 22.8% of the total variance, Externalizing 19.2% and Attention 13.0%. The analysis in the subgroup of women resulted in a structure identical to the total sample, whereas it was difficult to identify three conceptually separate factors in the subgroup of men (data not shown). Due to the small number of men, the following analyses were performed using the three-factor structure found among women and in the total sample.

Women scored higher than men on Internalizing (Table 2). Women also tended to have higher scores on Externalizing (not significant). Attention showed no gender differences. Cronbach alphas in the total sample were acceptable (Table 3). Alphas for the two sexes were very similar for both Internalizing and Attention. Alpha did not reach the preset criterion level for men in relation to Externalizing.

Internalizing correlated significantly with DAS, DFS and the DFS subscales Avoidance and Autonomic arousal (min–max = 0.23–0.27). Externalizing had no significant correlations with the DF measures. Attention correlated significantly with DFS and the subscale Autonomic arousal (0.19 and 0.21). We also compared the more severely phobic half of the sample with the less phobic half, as

Table 1. Final rotated loadings of the adapted Rutter scale for adults

	Rotated factor loadings		
Factor and items	I. Internalizing	II. Externalizing	III. Attention
Factor I. Internalizing			
16. Felt stomach-ache or sickness	0.74	−0.01	0.22
11. Tend to be afraid of new situations	0.74	0.16	0.11
8. Often feel miserable	0.73	0.40	0.01
5. Often worried	0.72	0.26	0.17
15. Felt head-ache	0.60	−0.01	0.17
6. Rather solitary	0.53	0.42	−0.01
Factor II. Externalizing			
9. Rarely do as told	0.11	0.74	0.00
14. Often mean to others	0.00	0.70	0.00
1. Frequently have words with others	0.35	0.58	0.16
4. Often destructive to self and others	0.40	0.56	0.20
12. Often tell lies	0.01	0.56	0.01
13. Been dishonest	0.00	0.43	0.25
Factor III. Attention			
2. Very restless, hardly ever still	0.23	0.15	0.89
3. Squirmy, fidgety	0.29	0.21	0.87

Principal component analysis with Varimax rotation.

Table 2. Item statistics of the adapted Rutter scale for adults

	Total (n = 230)	Men (n = 86)	Women (n = 144)	Men versus women
Factor and items	Mean (SD)	Mean (SD)	Mean (SD)	t
Factor I. Internalizing				
16. Felt stomach-ache or sickness	2.76 (1.23)	2.40 (1.19)	2.97 (1.20)	−3.47**
11. Tend to be afraid of new situations	2.52 (1.47)	2.27 (1.35)	2.68 (1.53)	−2.08*
8. Often feel miserable	2.76 (1.44)	2.44 (1.33)	2.96 (1.48)	−2.66**
5. Often worried	3.21 (1.38)	2.86 (1.38)	3.42 (1.34)	−3.00**
15. Felt head-ache	3.09 (1.17)	2.94 (1.13)	3.17 (1.19)	−1.40
6. Rather solitary	2.44 (1.41)	2.49 (1.31)	2.40 (1.47)	0.47
Total average Factor I	2.79 (0.97)	2.57 (0.95)	2.93 (0.96)	−2.77**
Factor II. Externalizing				
9. Rarely do as told	1.68 (1.03)	1.64 (0.86)	1.72 (1.14)	−0.63
14. Often mean to others	1.25 (0.63)	1.19 (0.63)	1.29 (0.64)	−1.14
1. Frequently have words with others	1.67 (0.93)	1.46 (0.84)	1.78 (0.96)	−2.66**
4. Often destructive to self and others	1.60 (0.96)	1.53 (0.97)	1.65 (0.97)	−0.94
12. Often tell lies	1.26 (0.54)	1.27 (0.50)	1.25 (0.57)	0.25
13. Been dishonest	1.33 (0.70)	1.36 (0.75)	1.36 (0.78)	0.05
Total average Factor II	1.47 (0.55)	1.41 (0.46)	1.51 (0.58)	−1.38
Factor III. Attention				
2. Very restless, hardly ever still	2.63 (1.32)	2.66 (1.28)	2.62 (1.34)	0.22
3. Squirmy, fidgety	2.52 (1.35)	2.58 (1.32)	2.50 (1.37)	0.43
Total average Factor III	2.57 (1.27)	2.62 (1.24)	2.55 (1.29)	0.41

*$P < 0.05$; **$P < 0.01$.

defined by the sample means. In the DAS, the severely phobic group had higher scores on all three behaviour problem factors: $t_{\text{Internalizing}}(222) = 4.2$; $P < 0.00$; $t_{\text{Externalizing}}(217.8$, equal variances not assumed$) = 2.1$, $P = 0.04$; $t_{\text{Attention}}(225) = 2.1$, $P = 0.04$. In the DFS, the severely phobic group had higher levels of Internalizing and Attention problems: $t_{Internalizing}(222) = 4.0$, $P < 0.00$; $t_{Attention}(213.3$, equal variances not assumed$) = 3.8$, $P < 0.00$. The same pattern was found in the DFS subscales Avoidance and Autonomic arousal, whereas there were no differences in DFS situations.

Relations of the adapted Rutter adult scale with the comparison variables

The mean general anxiety score (HAD) was 11.6 (SD = 5.1) and the mean depression score was 6.5

Table 3. Correlations of the adapted Rutter scale for adults with selected comparison variables

	Internalizing			Externalizing			Attention		
	All	Men	Women	All	Men	Women	All	Men	Women
HAD_A	0.54**	0.60**	0.47**	0.32**	0.29**	0.33**	0.47**	0.42**	0.50**
HAD_D	0.56**	0.50**	0.59**	0.37**	0.32**	0.40**	0.36**	0.37**	0.35**
DF anger	0.22**	0.18	0.22*	0.23**	0.13	0.28**	0.12	0.11	0.14
Feeling restless, on the move	0.34**	0.42**	0.28**	0.25**	0.25*	0.25**	0.58**	0.51**	0.62**
Internalizing	-	-	-	0.54**	0.46**	0.57**	0.44**	0.47**	0.43**
Externalizing				-	-	-	0.39**	0.43**	0.38**
Attention							-	-	-
Alpha	0.81	0.83	0.79	0.72	0.63	0.75	0.90	0.89	0.90

All correlations are nonparametric (Spearman).
HAD_A, Hospital Anxiety and Depression scale Anxiety; HAD_D, Hospital Anxiety and Depression scale Depression; DF anger, dental fear makes the respondent feel angry (enrolment questionnaire); Feeling restless, on the move, Hospital Anxiety and Depression scale item 11.
$n_{all} = 230$, $n_{men} = 86$, $n_{women} = 144$.
*$P < 0.05$. **$P < 0.01$.

(SD = 4.2). Women and men did not differ in general anxiety, t (224) = 1.77, $P = 0.08$, or depression, t (224) = 0.96, $P = 0.34$. As expected, Internalizing had higher correlations with anxiety and depression than the other two subscales (Table 3). Attention was more highly correlated with the measure of restlessness (i.e. HAD item no. 11) than were the other two subscales. In contrast, Externalizing was only marginally more highly correlated with its comparison variable, that is, anger induced by DF, than was Internalizing. Most notably, among men no significant relation was found with anger induced by DF. Moderate correlations were found between the three factors of the adapted Rutter scale.

Discussion

Of the three children's behaviour problems scales we adapted for use with adults, two (Internalizing and Attention) had acceptable psychometric properties and meaningful relations with the comparison variables. In contrast, the third problem scale (Externalizing) proved to have less satisfactory properties and relations, especially for men.

The higher the participants scored on Internalizing, the more signs of anxiety and depression they reported. Internalizing is usually associated with elevated levels of emotional distress in children and adolescents (40). The gender difference is consistent with the literature showing that girls and women usually have higher scores on internalizing symptoms than boys and men (40, 41). We think Internalizing partly mirrors the same dimensions as others have found relevant to DF using the SCL-90 (i.e. somatic complaints and psychological distress; 7–9). One exception to the good psychometric properties of the adapted Internalizing scale was that item no. 6 also loaded substantially on the Externalizing factor. Clearly, both Internalizing and the two-item Attention scale need to be further studied and replicated in other adult samples.

We recognize that the comparison variable chosen for Attention was less than optimal; however, as predicted, higher Attention scores were related to higher scores on feelings of restlessness. In contrast to the stable finding that attention problems are more frequent in boys than in girls (42), there was no gender difference in the scores of our adapted Attention factor. However, Attention and Externalizing go beyond what has previously been studied among adults with DF. For example, Attention problems are among the core symptoms of attention-deficit hyperactivity disorder (ADHD). Although previously controversial, ADHD in adulthood is now a valid and reliably diagnosed disorder for which both pharmacological and cognitive-behavioural therapies exist (43). Furthermore, Externalizing and Attention problems were the salient features of the fourth cluster found by Arnrup et al. (14, 15) among children and adolescents and a natural history study into adulthood may now be possible.

There were a number of problems with the Externalizing sub-scale. Most notably, it did not distinctly correlate with its comparison variable. Again, the comparison variable chosen was not optimal. We also acknowledge the spurious effect

on correlations that the yes/no response format in the comparison variable may have. Furthermore, contrary to the gender difference found among children (41), men did not score higher than women. This may owe to the self-report technique, because mothers' ratings of boys as more externalizing than girls are not consistent with children's self-reports (41). More importantly, the internal consistency reliability of the scale for men was inadequate. We note that the items of Externalizing include many behaviours that are socially undesirable. Socially desirable responses are those that mirror what the respondents believe is judged appropriate by society, but not necessarily what they really think or do (44). Thus, there is a risk that problem behaviours are reported in a biased and unreliable way because of the respondents wish to present themselves in a socially desirable manner. This may be reflected in the relatively low mean of the scale (Table 2). Moreover, it is our clinical impression that men under-report more than women. Regrettably, the present study does not include data that could explain why the Externalizing factor performed unsatisfactorily.

The adaptation of the Rutter scales (20, 22) from observer (parents' or teachers') ratings of children to adult self-reports implied a number of potential threats to the validity of these scales. Such threats include change of study object, report method, item wording and aim of measurement. One of the difficulties with changing the study object is how problem behaviours are expressed by children versus adults. The necessary adaptation of item content and wording may have failed to capture the core dimensions of adult problem behaviour. It is possible that the socially unacceptable behaviours in Externalizing were especially vulnerable to this. In addition, a self-report method is much more susceptible to the influence of social desirability than when observer ratings are used. Furthermore, the aim of the original Rutter scales was to discriminate between different types of behavioural or emotional disorders, as well as to discriminate between children who manifest disorders and those who do not. Although the adapted scale for adults was intended to capture problem behaviour, it could be argued that such behaviour among adults with DF may be different from that in children. However, we found that there were more indications of behaviour problems among patients with severe phobia than among patients with less severe phobia. This finding is in line with the view by Aartman et al. (10) that there may be other variables than DF itself and traditional measures of psychopathology that are important descriptors of persons with DF. We would like to add that this finding also strengthens the idea that there are different subgroups of adults with DF, just as there have been found at least four subgroups among children (14) and there seems to be a good deal of stability in the cluster profiles on follow-up in adolescence (15). More sophisticated cluster-analytical techniques and longitudinal studies are necessary to more precisely determine the practical therapeutic implications of these findings. However, in patients with attention problems the traditional DF treatment strategies may need to be supplemented with pharmacological and cognitive-behavioural techniques such as those applied in ADHD management. Furthermore, the treatment of persons that internalize behaviour problems may need to focus more on methods to regulate affective responses as a complement to the anxiety reducing techniques in DF treatment. There is a range of potential methods that vary in level of complexity from the dentist's empathic encouragement to express distress to psychotherapy conducted by a psychologist. Indeed, problems in affect regulation are often seen as a key feature in somatization (45, 46), and may thus partly explain why somatization scores pretreatment predicted dental anxiety one-year after DF treatment (8).

A major strength of the study was that DF levels were in line with previous reports from Sweden and Denmark (24, 26, 28, 30–32). On the other hand, fewer than 100 men participated and this was fewer than the number of participating women; hence, the results regarding the male group are more susceptible to error fluctuations. Second, the limited set of validating variables, especially regarding Attention and Externalizing, provides very little information for evaluating concurrent validity. Third, the correlation between Internalizing and Externalizing was a bit high. One possible reason for this is that all questions comprising these scales are problem-oriented. Many respondents did not perceive that they had any behaviour problems and thus rated themselves low on both Internalizing and Externalizing. The resulting correlation may consequently imply a lack of behaviour problems. Fourth, adult normative data are still lacking and it is therefore not possible to be certain if some of the unexpected findings are attributable to problems in administering the scale

to adults *per se* versus adults with DF, or to the use of the self-report format.

To conclude, the adapted Internalizing and Attention scales for adults seem promising for use in future prospective studies of the natural history of DF. The Externalizing scale, however, needs to be studied with a wider range of comparison variables and possibly with a measure of social desirability.

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