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Research Article

Body drawings as an assessment tool in somatoform disorder

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ABSTRACT

As part of the assessment of somatoform disorder, body drawings may provide complementary information to augment self-report questionnaires. This study examined the psychometric quality of observer ratings of objective characteristics of 180 own body drawings made by persons referred to treatment for somatoform disorder and 67 post-treatment drawings. Physical features of the drawings such as eyes, hands, size and angle of perception, were scored. These observer ratings were correlated with participants' responses on the Dresden Body Image Questionnaire (DBIQ-35) and with a single assessment by art therapists of the clients' relationships to their bodies. Changes in the observer ratings before and after therapy were evaluated. Inter-rater reliability was adequate to excellent for ten observer ratings and the art therapist ratings. Categorical principal components analysis of observer ratings indicated a 2-factor structure comprising *details* (factor 1, $\alpha = 0.76$) and *basic elements* (factor 2, $\alpha = 0.73$). Both factors correlated with the art therapists' rating (Spearman's $\rho = -0.53$ and $\rho = -0.36$) but not with DBIQ-35 scales. Factor scores improved after therapy. Assessment of objective characteristics of body drawings in clients with somatoform disorder indicates reliability, sensitivity to change and initial validity. These assessments may help to improve evaluation of client characteristics and treatment effectiveness.

Introduction

People with a somatoform disorder have a complex and problematic relationship to their bodies (Kalisvaart et al., 2012; Sertoz, Doganavsargil & Elbi, 2009). Somatoform disorder, the precursor to the diagnostic category of somatic symptom and related disorders in DSM 5 (American Psychiatric Association, 2013), is characterised by physical symptoms that suggest a general medical condition but which are not fully explained by this condition or by the direct effects of a substance or other mental disorder. People with somatoform disorder experience their body as being dysfunctional (Röhricht, 2011) and have difficulty acknowledging and understanding body signals and to adapt their behaviour to these signals (Creed, Henningsen & Fink, 2011; Henningsen, Zipfel & Herzog, 2007; Kalisvaart et al., 2012; Nijs, Paul & Wallman, 2008). This disturbed *body-relatedness* is a core focus in the treatment of somatoform disorder and can be defined as awareness of the body and self, by understanding, accepting and adjusting to bodily signals, by respecting and regulating the body, by trusting and esteeming oneself and by being autonomous (Kalisvaart et al., 2012). Assessing how a client with somatoform disorder experiences his or her own body could inform indication and contraindication for specific treatments and evaluation of treatments. This paper evaluates objective features of body drawings as a possible assessment method in clients with somatoform disorder.

Neural representations of the body develop at an early age (Gottwald, 2015), are well established in children aged 7–11 years (Fontan et al., 2017) and stay relatively persistent during adulthood (Pazzaglia & Zantedeschi, 2016). Neural mechanisms other than those involved in language and cognition enable people to reflect on their bodies and these include proprioception and interoception (Khalsa et al., 2018; Ogden & Fisher, 2015) and face recognition (Morita et al., 2017). Clients with somatoform disorder often struggle with their body and emotions (Lind, Delmar & Nielsen, 2014; Payne & Brooks, 2016) and some authors consider that clients may be trying to take control of their physical symptoms by withdrawing from their bodies (Luyten, van Houdenhove, Lemma, Target & Fonagy, 2013; Price & Mehling, 2016)

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or even by dissociating from them (Nijenhuis, 2000). It has been suggested that poor integration of the different neural pathways may be involved in this (e.g., Calsius, de Bie, Hertogen, & Meesen, 2016).

Self-report questionnaires, addressing cognitive processes, may not be sufficient to assess the experience of the body in its full range. It can be assumed that in particular the more implicit side of body experiences such as body identity, posture, movement patterns and automatic behaviour are difficult to self assess for the client with somatoform disorder due to dissociative features being present. In order to assess the implicit aspects of body experience, non-verbal tools such as physical tests, behavioural observations (Emck, Plouvier & van Lee, 2012; Lausberg, 2009) or artistic expressions may reveal relevant information not available through self-report questionnaires (Assmann, Borkenhagen & von Arnim, 2010). Body drawings, as a form of self-report of body experience, may be appropriate because drawings rely less on conscious reflective mechanisms of the brain, are non-intrusive and are quick and easy to administer (Betts, 2006).

Projective assessment techniques, particularly drawing a person or a figure of self, have been debated. The scientific evidence for the validity and reliability of drawings as a reflection of psychological characteristics is weak both as a measure of subjective interpretation as well as for scoring objective features (e.g., Betts, 2006; Lilienfeld, Wood & Garb, 2000). Increasing clinical experience of the observer also does not appear to improve validity of these measures for psychological diagnostic purposes and the validity seems not to add information to other assessment methods (Lilienfeld et al., 2000). However, when body- and illness-related issues need to be assessed, drawings have been found to be of value. Research in patients with cardiovascular diseases (Broadbent, Ellis, Gamble, & Petrie, 2006; Reynolds, Broadbent, Ellis, Gamble, & Petrie, 2007), headache (Broadbent, Niederhoffer, Haguec, Corter, & Reynolds, 2009), brain injury (Jones et al., 2016), eating disorders (Guez, Lev-Wiesel, Valetsky, Kruszewski Sztul, & Pener, 2010) and Cushing's syndrome (Tiemensma et al., 2012) showed correlations between objective physical features of drawings of the affected body part, such as size or detail, and clinical severity, illness perception and distress. Moreover body drawings have been indicated to be sensitive to change in a small randomised controlled trial involving dance movement therapy for patients with fibromyalgia; the intervention group used more details and made larger drawings of themselves after six months of therapy than the treatment-as-usual group (Bojner Horwitz, Kowalski, Theorell & Anderberg, 2006). Self-report questionnaires did not reveal this positive change; a finding also confirmed by video interpretation techniques.

Assessment in somatoform disorder generally encompasses a diagnostic interview and other verbal measurement tools. Although body drawings can be part of assessment and therapy in mental health care (Oster & Crone, 2004), they have thus far not been studied as part of assessment in somatoform disorder. Non-verbal instruments such as body drawings are used by art therapists in our treatment centre, because it is assumed that they help to reveal implicit information about the relationship to the client's body. Our study was primarily designed to test the premise that certain characteristics of body drawings can give an indication of the severity of the troubled relationship to the client's body. In analogy to most illness-related research of drawings (e.g., Guez et al., 2010; Jones et al., 2016; Tiemensma et al., 2012), we chose to evaluate a rating procedure focusing on objective characteristics of body drawings as these can be scored in a quantitative, scientifically reliable way (Chirila & Feldman, 2012) and such a procedure is more easily applied and replicated by others. Therefore, the aim of our study was to examine whether objective features of own body drawings, made by people with somatoform disorder, can produce complementary information to self-report questionnaires of own body experience. To that end the reliability, factorial validity and sensitivity to change in observer scores with regard to the physical features of body drawings made by people with somatoform disorder were examined. The physical features chosen were those that art therapists considered to be an indication of the severity of problems in body experience.

To attain preliminary knowledge of the construct validity of the scales found in the factor analyses, we examined the association with a single rating given by art therapists on the severity of the dysfunctional relationship to the body as shown in the drawing and with scores on a body-related self-report questionnaire: the Dresden Body Image Questionnaire (DBIQ-35, Pöhlmann, Roth, Brähler & Joraschky, 2014).

In line with previous observations of small correlations between different modes of assessment (Ganellen, 2007), we expected to find small correlations between body drawings that represent implicit experiences and questionnaire scores that assess explicit awareness of the body. Although medium correlations have been reported elsewhere (Bojner Horwitz et al., 2006, Broadbent et al., 2006, Tiemensma et al., 2012), the dissociation that may occur in somatoform disorder was expected to reduce the size of possible correlations. Since clinical severity, illness perception and distress have been associated with size and details of drawings (e.g., Bojner Horwitz et al., 2006; Broadbent et al., 2009), the scales of the DBIQ-35 that have most in common with these aspects were expected to correlate with the scores of the drawings, namely: vitality and acceptance of the body.

Moreover, we evaluated the sensitivity to change in scores by comparing drawings made before and at the end of multi-disciplinary treatment. This comparison indicates the possible relevance of assessment of drawings as outcome measures.

Methods

Participants

This study was conducted at a tertiary mental health centre, specialising in psychosomatic medicine. Clients admitted to this institution have had medically unexplained symptoms on average for ten years, have received about five previous treatments for somatoform disorder in primary or secondary care and have comorbid mood, anxiety, or a personality disorder in about half of the cases (van der Boom & Houtveen, 2014). People who were referred to treatment for somatoform disorder completed self-report questionnaires and were asked to make drawings of their bodies as part of the diagnostic procedure. At the time of our study, somatoform disorder was diagnosed by trained psychologists according to DSM IV criteria (American Psychiatric Association, 2000) and confirmed by the resident medical doctor and psychiatrist. Clients that were diagnosed with a somatoform disorder as the primary diagnosis were considered for multidisciplinary treatment focusing on body-related mentalisation, acceptance and commitment therapy, cognitive-behavioural modulation, and the dynamic family environment therapy. Exclusion criteria for treatment in this centre are a) a diagnosis of hypochondriasis or body dysmorphic disorder; b) a diagnosis of addiction, bipolar disorder, or psychosis; c) presenting in a crisis situation requiring immediate attention; or d) currently receiving treatment from a specialised physician outside the centre. The study was conducted in accordance with the principles of the Declaration of Helsinki (Revision, Fortaleza, Brazil, 2013) and it was approved by the Institutional Review Board of the mental health centre (2013–30/oz1317/ck). All participants provided written informed consent.

In the diagnostic phase, drawings from 180 clients were analysed. Forty-one of these drawings could not be linked to a client file because no name was provided on the paper. Nevertheless these were included in the factor analysis in order to analyse as many drawings as were available. Sixty-one clients also completed the DBIQ-35 in the same time period as their first drawing and 67 made a second drawing after treatment.

The mean age of the 180 clients was 41 years (SD = 12, range 17–66, 41 age unknown) and 75% were female (five gender unknown). The detailed diagnoses of the clients that were linked to a file were: undifferentiated somatoform disorder (33%), conversion disorder (19%), pain disorder (11%), other primary diagnoses (affective, anxiety

and personality disorder; 17%) and unknown (21%).

The subgroup that made a second drawing (n = 67, 77% female) were all clients with somatoform disorder as a primary diagnosis, who had received multidisciplinary treatment, including art therapy. The mean length of treatment was 14 (SD = 7, range 7–31) months and there were no significant differences in age, gender, questionnaire or drawing scores between this subgroup and the group that did not make a second drawing.

Instruments

Body drawings

Participants were instructed to pay attention consecutively to the different parts of their body and subsequently draw how they experienced their body, using a lead pencil on an A3 sized (441 × 325 mm) sheet of paper. Participants were free to choose the orientation of the sheet (landscape or portrait).

In order to decide which features of the body in the drawings should be considered, five specialised art therapists met to arrive at a consensus on which aspects of the body drawings they considered significant in somatoform disorder. Interrupted lines, incorrect proportions and disconnected or missing body parts were considered signs of disconnection or dissociation from the body. Accentuated and magnified parts were seen as a preoccupation with these parts of the body and the omission of senses or hiding body parts as disconnection from other people. Omission of gender features was linked to possible discomfort with gender characteristics in the body. The content of surroundings was considered an indicator of the degree of perceived safety in the world, in line with Gerge and Pedersen (2017). With regard to position on the sheet, placement in the middle was associated with importance and present state (Gerge, 2017), whereas placement to the left was connected with the past and to the right with the future. In line with the literature, the size of the body depicted was seen as an indicator of pain and discomfort (Bojner Horwitz et al., 2006), i.e. the more paper used reflected less suffering, unless where the drawing was too big for the sheet. The use of symbols and words in drawings occurred too infrequently and was therefore considered too individualistic to make any general interpretations.

After defining the relevant items, testing the usability was achieved by scoring 20 drawings and redefining the categories and finally a 12-item observation scale was devised comprising physical features of body drawings that could be scored not only by trained art therapists but also by untrained observers. Scores were given for nine objective features (1. the presence of eyes in the drawing, 2. the number of other senses, 3. the presence of hands and 4. of feet, 5. the number of limbs (with elbow or knee), 6. surroundings, 7. the position of the body on the sheet of paper, 8. angle of perception and 9. fit to the page, see Table 1) and three observation scores (gender clarity, unity of the body and presence of accentuated parts). Also the size of the drawing was calculated by multiplying the length by width of the depicted body.

In order to assess the inter-rater reliability, all items in 39 drawings were scored independently by two research assistants. In addition to this, the specialised art therapists provided a general rating of their assessment of the severity of the dysfunctional relationship to the body on a scale from 1 (healthy) to 7 (very severely disturbed relationship to the body). To asses inter-rater reliability of these art therapist ratings, 29 drawings were scored independently by three art therapists. All other drawings were scored by single art therapists. Neither the client nor the phase of treatment were known by the art therapists. All drawings were rated for relationship to the body by the art therapists but 12 had missing values on the observer ratings, for example where the client drew a symbolic body.

Questionnaire

The Dresden Body Image Questionnaire (DBIQ-35, Pöhlmann et al., 2014; Scheffers, van Busschbach et al., 2017) is a 35-item questionnaire with positively and negatively worded items comprising five subscales: body acceptance (e.g. “I wish I had a different body”), vitality (e.g. “I am physically fit”), physical contact (e.g. “Physical contact is important for me to express closeness”), sexual fulfilment (e.g. “I am very satisfied with my sexual experiences‘) and self-aggrandisement (e.g. “I use my body to attract attention’). Level of agreement with items was scored on a 5-point Likert scale ranging from 1 = “not at all” to 5 = “fully”. Higher subscale scores indicate a more positive body experience. Internal consistency of the subscales (Dutch version) in a non-clinical sample was good, varying from Cronbach’s $\alpha = 0.74$ for the subscale physical contact to $\alpha = 0.91$ for the subscale sexual fulfilment (Scheffers, van Busschbach et al., 2017; Scheffers, van Duijn, Bosscher, Wiersma, & van Busschbach, 2017). People with somatoform disorder scored substantially lower on all subscales than a non-clinical sample (Scheffers, Kalisvaart et al., 2017).

Data analysis

SPSS Version 20 was used for all statistical analyses. Inter-rater reliability was computed using Cohen’s Kappa (Landis & Koch, 1977; Siegel & Castellan, 1988) for nominal variables and intra-class correlations for ordinal and continuous variables (Hallgren, 2012).

In order to rate global individual differences, in lieu of interpreting the observations in terms of signs (Betts & Groth-Marnat, 2014), categorical principal components analysis was used to identify dimensions in the observations. The nominal and ordinal scores of the pre-treatment drawings were transformed into continuous, normal distributed scores, with categorical principal components analysis. Subsequently, these transformed variables were rotated, using principal components analysis with oblimin rotation (Linting, Meulman, Groenen & van der Kooij, 2007). Criteria for excluding items for factor analysis were a factor loading < 0.40 or a loading > 0.32 on two or more factors (Costello & Osborne, 2005). For the determination of the number of factors, the scree plot of Eigenvalues and interpretability of factor solutions were used. Internal consistency of the subscales was examined with Cronbach’s α.

Factor scores based on the transformed item scores after categorical factor analysis were correlated with scores on the DBIQ subscales and the severity rating, using Spearman’s ρ for non-normal and ordinal distributions. Items that did not load on a factor were not analysed separately, except for the size of the drawings, since this feature was shown to be relevant in former research (Bojner Horwitz et al., 2006; Broadbent et al., 2006; Reynolds et al., 2007). Size was analysed separately for landscape and portrait orientation of the sheets.

Results of the participants who made drawings before and after treatment were analysed per factor and separately for the art therapist rating using repeated measures analysis of variance (normal score distributions) and Wilcoxon matched-pair signed-rank test (skewed score distributions).

Results

Inter-rater reliability

Inter-rater reliability was excellent for seven items ($ICC > 0.75$ or $\kappa > 0.80$), substantial ($0.61 \leq \kappa \leq 0.80$) with regard to surroundings and position on the sheet and fair ($0.21 \leq \kappa \leq 0.40$) for gender clarity. Two observation scores (unity of the body and accentuated parts) had poor inter-rater reliabilities ($0.21 \leq ICC \leq 0.40$) and were not used in further analysis. The inter-rater reliability for the art therapist ratings, based on the ratings of three therapists, was fair ($ICC = 0.55$).

Factor analysis

Table 1 shows the results of the factor analysis. Categorical principal components analysis indicated a 2-factor structure (explained variance

Table 1
Pattern Matrix with factor loadings of the physical features of 180 body drawings[a] and category scores based on transformed scores after categorical principal components analysis.

Item	Factor loadings		Category scores
	Details	Basic elements	
Presence of eyes	**0.91**	0.01	0 No eyes 1 Eyes without pupils 2 Eyes with pupils
Number of other senses	**0.91**	−0.02	0 Zero 1 One 2 Two or three
Angle of perception	**0.69**	−0.26	0 Back or unclear 2 Front, side or several sides
Gender clarity	**0.53**	0.13	0 No 2 Yes
Presence of feet	−0.08	**0.85**	0 No feet 2 Feet present
Number of limbs (with elbow or knee)	0.18	**0.80**	0 Zero or one limb 1 Two limbs 2 Three or four limbs
Fit to the page	−0.13	**0.72**	0 Too big 2 Small or fitting
Presence of the hands	−0.02	**0.70**	0 Nowhere 1 Hidden or behind the body 2 Visible
Surroundings[a]			1 Natural surroundings 2 No surroundings 3 Symbolic and negative surroundings
Position on the sheet[a]			1 Left 2 In the middle 3 Right 4 Several positions

Extraction Method: Principal Components Analysis.
Rotation Method: Oblimin with Kaiser Normalisation.
[a] Factor loadings ≤ 0.18 in categorical factor analysis and therefore not included in rotated solution.

61%). Factor 1 (explained variance 35.2%) comprised items referring to details of the body presented in the drawing: eyes, other senses, gender characteristics and the angle of perception. Factor 2 (explained variance 26.2%) comprised basic elements of the body drawings: limbs, feet, hands and the drawing fitting within the page. Two items (surroundings and position on the sheet) and size did not load on any factor. Internal consistency of the two factors was good: Cronbach's $\alpha = 0.76$ for details and $\alpha = 0.73$ for basic elements and their intercorrelation was low ($r = 0.10$). Factor 2, the basic elements factor, was strongly skewed: 69% of the initial drawings had an optimal score, representing a correct basic drawing with hands, feet and limbs present which fitted within the dimensions of the sheet of paper.

As an example Fig. 1 shows a body drawing of a woman with a history of physical abuse who could not connect to her body. The drawing shows no details and shows a lack of basic elements.

Construct validity

Table 2 shows the correlations of scores based on the objective features of the body drawings ($n = 168$) with the art therapist rating ($n = 180$) and the scale sores on the DBIQ-35 ($n = 61$). The severity rating correlated with both factor 1, the details factor (Spearman's $\rho = -0.53, p < 0.001, n = 168$) and factor 2, the basic elements factor (Spearman's $\rho = -0.34$, $p < 0.001$, $n = 168$). Correlations between self-reported body experience and the scores based on the objective features of the drawings were small and non-significant. In landscape drawings the size of the body correlated with the Acceptance scale of the DBIQ-35 (Spearman's $\rho = 0.50$, $p < 0.05$, $n = 23$); not significant

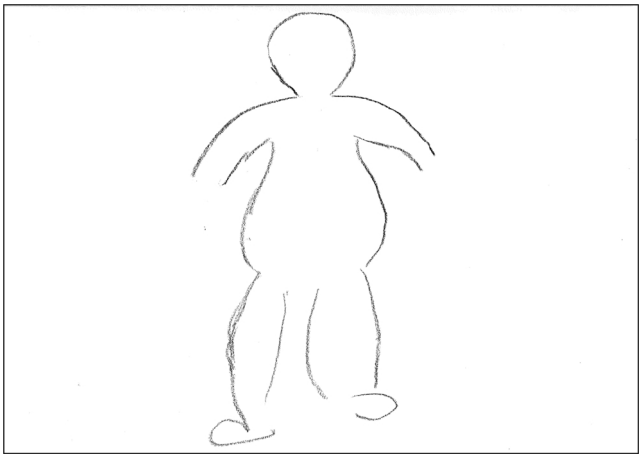

Fig. 1. A drawing by a woman with a history of physical abuse who could not connect to her body. Details and some basic elements are missing.

Table 2
Correlations (Spearman's ρ) of scores on the factors *Details* and *Basic elements* of 168 body drawings with global ratings of severity by art therapists and scores on scales of the Dresden body image questionnaire (DBIQ-35).

	n	Body drawing factor scores	
		Details	Basic elements
Art therapist rating	168	−0.53**	−0.34**
DBIQ Total	61	0.13	0.18
DBIQ Vitality	61	0.14	0.05
DBIQ Acceptance	61	0.22	0.09
DBIQ Sexual fulfilment	61	0.08	0.17
DBIQ Physical contact	61	0.08	0.18
DBIQ Self-aggrandisement	61	0.18	0.08

** Correlation is significant at $p < 0.01$ level (two-tailed).

were the correlations of the size of landscape drawings with Vitality (Spearman's $\rho = 0.09$, $p = 0.69$, $n = 23$) and of the size of portrait drawings with Acceptance (Spearman's $\rho = -0.16$, $p = 0.38$, $n = 33$) and Vitality (Spearman's $\rho = -0.10$, $p = 0.58$, $n = 32$).

Sensitivity to change

Table 3 shows the results with regard to sensitivity to change. Scores of the drawings after treatment ($n = 67$) were significantly higher showing more details and basic body elements than the drawings before therapy. Before therapy, 76% of the drawings showed optimal drawing of basic elements and after therapy 84%. The details factor improved two or more points (out of eight) in 36% of the drawings. The percentage of drawings that had a details score above 6 increased from 31% before to 53% after therapy. The mean art therapist rating

Table 3
Medians and mean of pre- and post-treatment drawings.

	N	Pre-treatment	Post-treatment	*p*
Details Median (inter-quartile range)	66	6 (5–8)	7 (6–8)	0.001
Basic elements Median (inter-quartile range)	65	8 (8–8)	8 (8–8)	0.034
Art therapist rating Mean (*SD*)	67	4.42 (1.38)	3.58 (1.27)	< 0.001

The differences were tested with Wilcoxon matched-pair signed-rank test for *Details* and *Basic elements* and repeated measures analysis of variance for the art therapist rating.

Fig. 2. Drawings by a women who had endured several traumatic bodily experiences and regained confidence in her (painful) body during treatment. The drawings before (left) and after (right) therapy, 18 months later, reflect optimal scores in basic elements on both occasions and a change in the details score from 3 to 8 (theoretical range 0–8).

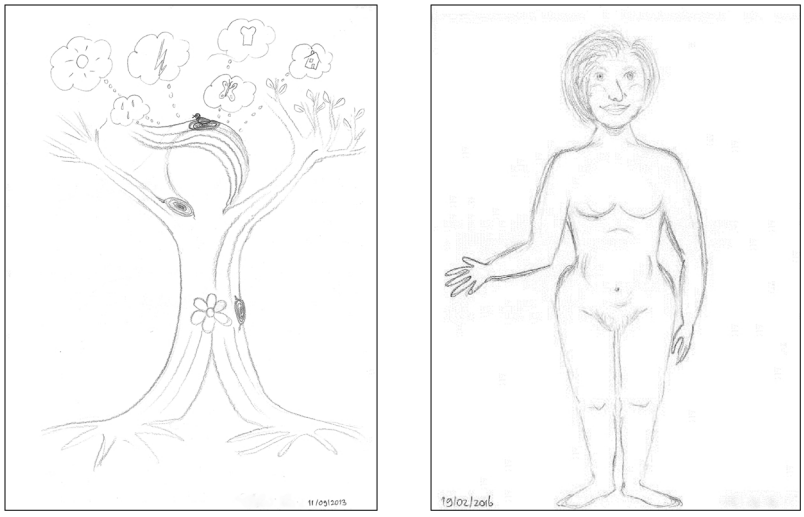

Fig. 3. Two drawings by a woman who mostly trusted her intellect, but regained connectedness with her body after stating that it did not feel like herself before. The drawings before (left) and after (right) therapy, 29 months later, reflect a symbolic drawing at start (no factor scores) and an optimal score on basic elements and details after treatment.

decreased significantly with a medium effect size (Cohens $d = 0.63$). As examples Figs. 2 and 3 show body drawings before and after therapy.

Discussion

This study examined objective features of body drawings as an assessment tool in persons referred to treatment for somatoform disorder. Inter-rater reliability tests indicated accurate scoring of several features of body drawings by untrained observers, unfamiliar with the client and treatment phase. Regarding factorial validity, the objective features reflected two factors (details and basic elements) with adequate internal consistency and low inter-correlation. Both factors correlated with a rating of the relationship to the body by specialised art therapists but not with self-reported measures of the DBIQ. The change in factor scores post therapy reflected improvement.

The selected items were considered important by art therapists and only reliable items were used in the analysis. Compared to other research, where aspects of drawings such as the integration of body parts, facial expression or body shape outline are rated on a scale (e.g., Broadbent et al., 2009; Eskelinen & Ollonen, 2010; Guez et al., 2010), our items leave little room for subjective interpretation. This is likely to be an asset in terms of reliability, if it is not at the cost of validity, where the study is concerned with reflection of underlying body-related pathology. Although both factors, details and basic elements, reflect rather technical statistical reductions of the individual differences in drawings, they nevertheless still seem to provide relevant information. The details in the drawings, the presence of eyes, other senses, a (visible) angle of perception and gender characteristics, have in common an ability to personalise (give identity to) the features of the body, whereas the basic elements, presence of hands and feet, fit on the page and the number of limbs, seem to form the outline of a common human figure. In other words, one could say that the two factors represent global ratings of either the content or form of the body, a distinction that has been made before while interpreting drawings (Betts & Groth-Marnat, 2014). The amount of body details in drawings has been used as a characteristic in other research (Bojner Horwitz et al., 2006) but this might represent a more general measure than our details factor which consists of items that are considered to give identity to the body.

Considering the meaning of the details factor especially the angle of perception gives identity to the person by making the body visible (shown from the front) or by concealing it by drawing the body from the back. The other items also add to the identity of the body: eyes and other senses define the face and also express connection to the world (Gerge, 2017; Küchenhoff & Agarwalla, 2012), a connection which may feel troubled when experiencing physical symptoms (Lind et al., 2014; Luyten et al., 2013). Gender features are supposed to give a gender

identity to the body. In somatoform disorder, embodying a painful or tired body can be hard (Afrell, Biguet, & Rudebeck, 2007; Luyten et al., 2013). The change recorded in drawing more details after treatment may reflect the process of improved acceptance of the client's embodied identity.

Regarding the meaning of the second factor, a non-optimal score on basic elements appears to be unusual. The drawings were made after completing an attention focussing body scan and an instruction to draw the body as experienced. Therefore, omitting parts of the body that are easy to be aware of (Danner et al., 2017) suggests a sign of deviance. Some clients drew only a head which may indicate non-acceptance of the body, not being connected to the body, or a strong sense of living in their heads as has been reported previously in somatoform disorder (Lind et al., 2014). Others omitted one basic element, such as a foot or an arm, possibly expressing disconnection with this specific part of the body, as has been reported after trauma (Gerge, 2017) and may be part of conversion disorder. Some made a sketch of the body in which the basic elements were omitted or which fell outside of the confines of the sheet of paper. This also might reflect difficulty relating to the whole body. Overall, the basic elements factor seems to represent acceptance of and connection to the body.

The nomothetic approach of our study included the risk of overlooking the idiosyncratic, individual experiences of the body that was drawn. Less precise aspects, such as omissions, were incorporated in our scoring but the more nuanced features such as interrupted lines, incorrect proportions, clothing and accentuated parts that were indicated by art therapists before the study, were not incorporated in the analyses. Studying these nuances may require a more personalised approach, using the verbal account of the client and the expertise of the art therapist (Betts & Groth-Marnat, 2014; Gerge, 2017). Case studies that offer more precise information about aspects of drawings that change over time as the client improves, may further inform the assessment of body drawings in persons with somatoform disorder.

The correlations of both factor scores with the more general ratings of experienced art therapists indicated that the objective scores do give a reflection of the severity of the dysfunctional relationship to the body as observed by professionals, which endorses the validity of the factor scores. In research into Cushing's syndrome, correlations between a severity rating of symptoms made by professionals using drawings and the Cushing's syndrome severity index were high – around 0.50 (Tiemensma et al., 2012). In the absence of a generic illness severity score for persons with somatoform disorder, no conclusions can be drawn as to the extent to which the factor scores or ratings by the trained professionals actually reflect the severity of a dysfunctional relationship to the body.

Small and non-significant correlations between the factor scores and the self-reported body image scores are in contrast to previous observations of medium correlations between details in drawings and the self-reported illness perceptions of patients with myocardial infarction (Broadbent et al., 2006), depression and anxiety in patients with fibromyalgia (Bojner Horwitz et al., 2006) and perceived personal control and consequences of illness in patients after remission of Cushing's syndrome (Tiemensma et al., 2012). In line with the findings of another study (Bojner Horwitz et al., 2006), analyses tentatively indicate that a larger sized body in the landscape oriented drawings may reflect acceptance of the body but the sample size was too small to draw firm conclusions. The lack of correlation between drawings and the self-report questionnaire used in our study may suggest that drawings and self-reports of the body represent different aspects of the way people relate to their bodies, specifically in clients with somatoform disorder, viz. implicit processes are reflected in drawings and explicit, cognitive processes in self-reports. Somatoform dissociation may explain a disconnection between these modes of processing in this specific group (Nijenhuis, 2000, Price & Mehling, 2016) leading to different outcomes for the drawings compared to the questionnaires. Research is needed to verify these speculations.

Another possible validity check was the analysis of change after therapy. Both body drawing factor scores reflected a positive change after therapy. In previous research, the number of body details increased significantly in fibromyalgia patients after six months of dance movement therapy, compared to a control group (Bojner Horwitz et al., 2006). In our study, also the post therapy rating of the relationship to the body reflected a positive change. The effect size was medium, which is comparable to changes in the Symptom Checklist (SCL-90) somatisation scores in a similar group ($d = 0.51$; Houtveen, van Broeckhuysen-Kloth, Lintmeijer, Bühring & Geenen, 2015). This tentatively suggests that the body drawings in the current study reflect an improved relationship to the body as the scores increased after multidisciplinary treatment. To summarise the findings of this study with respect to the possible validity of the factor scores, the correlation with the ratings of the art therapists and the significant changes after therapy suggest validity of the scoring method.

A strength of this study was the relatively large sample size and the inclusion of an analysis of pre-to-post-treatment changes. A factor analysis of the objective features of body drawings has not been reported upon frequently (Betts, 2006) and this way of reducing the data diminishes the chance of casual results. However this reduction of objective, quantitative data to two dimensions limits the wealth of information that drawings and the subjective verbal account of the client may produce (Betts, 2006). Collecting and interpreting idiosyncratic information is more complex but its clinical applicability for assessment, treatment and treatment evaluation would be worthwhile studying as well. Another limitation is the generalisability: we do not know whether these findings also apply to persons with somatoform disorder not referred for specialised treatment. Also no comparisons were made to matched control groups from the general population or to samples with somatoform disorder receiving no, or less intensive treatment. Regarding other limitations, the surroundings and position on the sheet of paper were not analysed separately because they did not load on any factor. Also unity of the body and accentuated parts were not incorporated due to weak inter-rater reliabilities. These features seem relevant for assessing body experience and might be scored more reliably when art therapists are trained. Other factors that might have influenced the contents of drawings were not considered, e.g. artistic skills, motivation of the client and a possible training effect through exposure to art therapy as part of multidisciplinary treatment. Since basic elements of the body were mostly drawn correctly, a ceiling effect for this factor was observed. This resulted in little differentiation between participants and might also have played a role in the observed low correlations with the questionnaire data.

The present study indicates that drawings of the body do provide additional information about clients with somatoform disorder above and beyond what is available through self-report questionnaires. This provides an incentive for further research. A next step in research is to expand this project by assessing a wider range of data from the perspective of the therapist and the verbal account of the client who is drawing his or her body. Also the influence of body awareness and somatoform dissociation on assessments of body drawings can be examined and whether body drawings can add to the standard assessment used in clinical practice and treatment evaluation. Research comparing the body drawings of persons who dissociate less from their bodies than people with somatoform disorder, could contribute to revealing more of the value of body drawings for the assessment and treatment of clients with a troubled relationship to their bodies. For clinical use, drawings of the body can be a valuable tool because of their non-intrusiveness and the ease with which they can be scored objectively, as well as for the opportunity they offer the client and therapist to talk about and relate to the body as experienced. Post treatment body drawings can also be used to capture changes during therapy.

To conclude, several objective ratings of the drawings were indicated to be reliable, two internally consistent constructs were found, correlation with ratings of the drawings by experts and sensitivity to

change indicated potential clinical significance and the absence of correlation with a self-report measure suggested that analyses of body drawings yield information other than body-related questionnaires provide. This indicates that analyses of body drawings may be a promising assessment tool in somatoform disorder.

Conflicts of interest

None.

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