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Reliability and first validity of the inner correspondence questionnaire for painting therapy (ICPTh) in a sample of breast cancer patients

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ABSTRACT

Objectives Art therapy (ArT) such as mindfulness-oriented painting therapy is increasingly used in psychosomatic, oncological integrative and rehabilitative medicine. Though it remains unknown how ArT works, we hypothesize that an engaged participation with painting ('Inner-Correspondence') contributes to improved symptom scores. In the context of a comprehensive cohort study for breast cancer survivors with cancer-related fatigue, we developed a patient-reported outcome measure to assess 'Inner Correspondence' with painting therapy and conducted a first validation study.

Design A 24-item questionnaire on 'Inner Correspondence' (ICPTh) was administered after ten weeks of intervention and at six month followup together with concurrent scales (Inner Correspondence and Peaceful Harmony, Cancer Fatigue Scale, Hospital Anxiety and Depression Scale, Internal Coherence Scale). Statistical assessment included reliability- and factor analyses.

Results A total of n = 68 BC (mean age, 58.2 years, SD = 8.7) participated in the preliminary validation study. Exploratory factor analysis revealed a robust 22-item scale with an unambiguous four-factor solution explaining 78% of total variance and the following subsales: 1) therapy congruence and relaxation (11 items), 2) inner development and mood (6 items), 3) artistic skill (3 items) and 4) task congruence (2 items). The 22-item ICPTh yielded high reliability (Cronbach's alpha = .966, item-total correlation = .497 – .883, test-retest reliability = .888).

Conclusions We present a reliable instrument to measure 'Inner Correspondence' with painting therapy. Due to the small sample size and sample selection further validation studies are indicated.

1. Introduction

Already in ancient Greece, philosophers knew about the transformational power of art, poetry and music.[1,2] The idea of art being an expression of a patients' inner life was discussed in works of Sigmund Freud and Carl Gustav Jung at the beginning of the last century.[3–5] Also Rudolf Steiner, the founder of Anthroposophic Medicine assumed that drawings and other expressive art forms can bring 'inner mental qualities onto surface'[6] and 'emotional aspects of the soul, such as mood, pain and happiness find externalization in the outer world'.[7–9] Different forms of art therapy (ArT) have been implemented as complementary elements within treatment programs of psychosomatic, oncological rehabilitative and integrative medicine.[10–14]

Although a cathartic and subsequent transformational effect of ArT on psychological, spiritual and health-related dimensions is widely acknowleged[10–12] there is still a lack of clinical studies with adequate

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sample sizes and randomized controlled designs. Two systematic reviews published by Wood et al.[15] and Geue et al.[11] report on studies investigating different forms of ArT and its impact on patients suffering from cancer and associated cancer-related fatigue (CRF). Other studies examining different patient groups found positive benefits for ArT such as improved emotional expression and regulation,[16] capacity to change behaviors such as disease and life management,[16,17] increased insight and comprehension,[16] better health-related quality of life,[18,19] improved social functioning,[13] reduced symptom scores e.g. fatigue,[11,19] reduction of depression, anxiety[16,20–22] and stress.[20,23] Despite the positive effects of ArT, it remains unknown how ArT works which should be subject of further research.

Anecdotal evidence of professional artists, healthy individuals but also patients who engage in the arts report a wide range of experience during painting (e.g. 'trance like state', pathway to the 'here and now').[24,25] Similar experiences have been made by individuals practicing mindfulness-based therapies and relaxation techniques, such as mindfulness-based stress reduction,[26] mindfulness-oriented body approaches (e.g. yoga, eurythmy), spiritual excerses (e.g. meditation) and therapeutic relaxation techniques (e.g. progressive muscle relaxation, autogenic training, body scans) which are increasingly used to complement treatment programs for various patients groups.[27–34] An improved 'relaxation response'[35,36] has found to positively impact clinical outcomes e.g. [37]. We characterize being engaged with painting as 'Inner Correspondence' and hypothesize that this variable might contribute to an enhanced 'relaxation response'. In our study, we adapt the conceptual framework by Büssing et al. (2011) who examined 'Inner Correspondence' with mindfulness-based movement therapies onto mindfulness painting therapy.

The primary goal of the study was to develop and preliminary validate a self-report outcome questionnaire to assess 'Inner Correspondence' with painting therapy (ICPTh).

2. Methods

2.1. Ethics and framework of the validation study

The validation study was embedded in the framework of the Cancer-related Fatigue Study (CRF-2) for breast cancer survivors with cancer-related fatigue. CRF-2 was conducted as tri-center, prospective, parallel, three-armed, active-controlled, open-randomized pragmatic trial in a comprehensive cohort design study from June 2011 to December 2013. A 10-week multimodal therapy (MT) was developed with four treatment components: Eurythmy therapy, psychoeducation, sleep education and anthroposophic painting therapy (APT). Subsequently MT and the Combination Therapy (CT) of MT and Aerobic Therapy was compared to standard Aerobic Therapy (AT). Primary effectiveness parameters were the Cancer Fatigue Scale (CFS-D)[38] and the Pittsburgh Sleep Quality Index (PSQI).[39] A detailed description of the study is outlined in Kröz et al.[40] The study was operated according to the Declaration of Helsinki Guidelines, approved by the local ethics committees, subject to GCP-conform on-site monitoring and registered in the German Clinical Trials Register (DRKS-ID: DRKS00003736).

2.2. Participants

Participants for the validation study were women with a breast cancer diagnosis and chronic CRF without metastases who read and signed informed consent and were allocated by preference or randomization to the treatment groups in which painting therapy was applied. Participants were included in the study if they met the following inclusion criteria: female breast cancer, diagnosis of chronic cancer-related fatigue (at least 6 months, Fatigue Numerical Scale $\geq$ 4, CFS-D $\geq$ 24), a maximum of 36 months since the end of surgery/ radiotherapy/ chemotherapy and 45 months after first diagnosis. For further in- and exclusion criteria (see [40]).

2.3. Development of the Inner Correspondence with painting therapy (ICPTh)

The operationalization of our construct was condcuted in two steps. For our study, the conceptual framework of 'Inner Correspondence' based on preparatory work of Büssing et al. who conceptualized 'Inner Correspondence' as inner involvement and engagement with yoga and eurythmy therapy[41] was transfered to painting therapy. Secondly, we developed a self-report measure to evaluate 'Inner Correspondence' with Painting Therapy (ICPTh). For the construction of the scale, an expert panel (three physicians with expertise in internal medicine, integrative anthroposophic medicine and psychometry, three art therapists with expert knowledge in ArT and clinical work, and one statistician) formulated 24 items. The ICPTh was designed as multidimensional outcome measure covering aspects of engagement and involvement with painting, relaxation and mood, developmental aspects promoted through painting, artistic abilities and task congruence (to control for social desirability effects). Each item measured 'Inner Correspondence' with painting therapy on a 5-Point-Likert Scale. The following measures were completed by the patients to additionally assess discrimant- or convergent validity of the construct.

2.4. Measures

After ten weeks of treatment (T1) and at six month follow-up (T2) participants completed a battery of self-report measures including the newly developed ICPTh . The following scales were used as convergence criteria: Inner Correspondence /Peaceful Harmony with Practices (ICPH),[41] Cancer Fatigue Scale (CFS-D),[38] Hospital Anxiety and Depression Scale (HADS),[42] Internal Coherence Scale (ICS)[43] and one item to measure satisfaction with painting therapy.[14]

2.4.1. Inner Correspondence/Peaceful Harmony with Practices (ICPH)

The scale Inner Correspondence /Peacefulness with practices is a short and valid patient-reported questionnaire measuring inner correspondence with mindfulness practices using 12 (+ 2 optional) items. The ICPH reveals a high Cronbach's alpha with r = .95 ranging from .68 to .87. The overall score (of the transformed scale) ranges from 0 to 100%; a cut-off at 50% indicates either lower or higher congruence with the mindfulness practices.[41] Correlations of the ICPH were moderate with the Freiburger Mindfulness Index and with the Brief Multidimensional Life Satisfaction Scale.[41] This scale is used to assess construct validity of the ICPTh; it is expected to show positive associations.

2.4.2. Cancer Fatigue Scale (CFS-D)

The Cancer Fatigue Scale is a reliable and valid three-dimensional (physical, cognitive and affective fatigue) questionnaire developed by Okuyama et al.[44] in Japan and translated and validated in German.[45] CFS-D is measured with 15 items on a 5-Point-Likert Scale (0 = not satisfied at all; 4 = very satisfied). CFS-D reveals high reliability with Cronbach's alpha r = .93 and good test-retest reliability.[45] It is one of nine scales being suggested on NCI website to capture cancer-related fatigue syndrome.[46] Fatigue may decrease inner correspondence.

2.4.3. Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale is a valid and widely used 14-item questionnaire and measures anxiety, depression with seven items each and distress (all 14 items) on a 4-Point-Likert Scale validated on internal patients.[42] The HADS reveals a good internal consistency for both of its subscales: Anxiety (7 items) and Depression (7 items) and good test-retest reliability and validity.[47]

2.4.4. Internal Coherence Scale (ICS)

The Internal Coherence Scale is a short, highly reliable and valid 10-item questionnaire based on a 5-point Likert Scale. Eight items measure Inner Coherence and Resilience and form the first subscale. The second

subscale captures Thermo-Coherence with 2 items. The internal consistency (Cronbach's alpha) and test-retest reliability (after 4–8 weeks) are very good and good with r = .91 and r = .80 respectively, with satisfying content and construct validity.[43] It is suggested that this scale is positively associated with the ICPTh.

2.4.5. Satisfaction with painting therapy

The Patient Satisfaction Questionnaire comprises 8 items to measure overall treatment satisfaction (1 item), satisfaction with each therapy component (5 items) and two additional open format items for patients' feedback. One item of the scale was used to measure satisfaction with painting therapy on a 5-Point Likert Scale.[14]

2.5. Treatment component: anthroposophic painting therapy

Anthroposophic painting therapy (APT) as therapeutic application[48] is often practiced with patients in anthroposophic hospitals and outpatient settings.[49] It differs from other art therapeutic programs in using disease specific drawing techniques (e.g. wet-on-wet drawing, dynamic form-drawing, layer drawing), natural materials (such as plant-color-extract) and mindfulness elements to re-establish balance.[7,48] Painting therapy was one of four treatment components of the 10-week multimodal treatment program.[14] We modified the APT-sequence of rhythmic painting (day-night beginning with dark blue and adding progressively yellow) by Frieling & Auer[50] into a 10-week intervention program for oncologic patients including two free-associated paintings in session 1 and 10. The painting therapy sequence for oncologic patients is a structured group session program. Sessions start with 5 min. of dynamic-form-drawing and end with a small reflection round on each patient's drawing. A detailed manualized description of the program is outlined in Kröz et al.[14]

2.6. Statistical analysis

All statistical analyses were performed with SPSS version 20 for Windows. For the questionnaire validation we conducted a reliability analysis with a stepwise check of the item-total correlation for each item. Interrelatedness of items, overall reliability, reliability-if-item-deleted and reliability of subscales were displayed using the internal consistence coefficient: Cronbach's alpha.[51] Statistical criteria for item fitness was set at an item-total score of r = .40.[52] For the factor-analytic assessment, a principal component analysis with orthogonal Varimax rotation and Kaiser normalization was calculated to group correlated items to specific factors/subscales. Cases with missing data were listwise excluded from the analyses.

3. Results

3.1. Participants

A total of 126 breast cancer survivors with CRF were included in the study. 71 patients (MT = 30 and CT = 41) completed the 10-week (T1) intervention and 68 provided data for analysis at T1 and T2. Two patients of the CT group refused to take part in the painting therapy (treatment too long; the treatment is not for me). One patient dropped out after completing all sessions of APT. Table 1 shows the sample description of all patients.

3.2. Reliability and factor analysis

During reliability analysis with a stepwise examination of the item-total correlation for each item using the 'alpha-if-item-deleted-function' in SPSS, we excluded the following two items from the 24-item pool due to poor corrected item-total correlation (< .40): item 6 ('I was overwhelmed by the tasks given to me at art therapy') and item 10 ('I tried to act on suggestions the art therapist gave me') shared content with item 11: 'I carried out the instruction of the art therapist consciously'. Suitability of the data set was examined using Kaiser-Meyer-Olkin criteria (KMO) which revealed a 'meritorious' coefficient with KMO = .896 (df = 231) indicating fitness of data for a factor analysis.[53]

Table 1
Sample Description.

Demographic Variable	Total
completed at T1	Over all sample (n = 68)
Age (years) Mean (SD)	58.04 (8.8)
Years since first diagnosis	2.3 (0.8)
Years since chemotherapy	1.6 (0.6)
Marital Status (%)	9 (13.4)
Single	37 (55.2)
Married	17 (25.4)
Divorced	4 (6.0)
Widowed	1 (1.5)
Not specified	
Children: yes (%)	52 (76.5)
Children at home: yes (%)	16 (23.5)
Employment (%)	28 (41,1)
Employed	4 (5.9)
Housewife	12 (17.7)
Unemployed	20 (29.4)
Pensioner	2 (2.9)
Other	2 (2.9)
Not specified	
Profession	26 (38.2)
Apprenticeship	4 (5.9)
Technical College	6 (8.8)
University of Applied Science	16 (23.5)
University Degree	1 (1.5)
Other	15 (22.1)
Not specified	
Cancer related Therapies	68 (100.0)
Surgery: yes (%)	36 (52.9)
Adjuvant Chemotherapy: yes (%)	55 (80.9)
Adjuvant Radiotherapy: yes (%)	44 (64.7)
Adjuvant Antihormonal Therapy: yes (%)	15 (22.1)
Adjuvant Mistletoe Therapy: yes (%)	
Tumor status	51 (75)
I	14 (20.6)
II	3 (4.4)
III	

Table 1: Sample characteristic description in absolute and relative frequencies of patients (n = 68).

The factor analysis revealed a rotated component matrix with four factors explaining 79% of total variance. Factor 1: *Therapy Congruence and Relaxation,* a subscale with 11 items showed an excellent internal consistency (Cronbach's alpha = .964) and explained a large proportion of the overall variance with 59.4%. Factor 2: *Inner Development and Mood*, a subscale with 6 items revealed high internal consistency (Cronbach's alpha = .919) and explained 7.4% of total variance. The third factor: *Artistic Abilities* contained three items with a good internal consistency (Cronbach's alpha = .867) explaining 6% of variance. The fourth factor: *Task Congruence* with two items explains 6% of overall variance with a satisfactory internal consistency (Cronbach's alpha = .739). Overall reliability of the questionnaire was very good with an internal consistency of Cronbach's alpha = .965.

Item-item correlation ranged between r = .18 - .87 with a medium score of M r = .53. Corrected item-scale correlation ranged from r = .49 - .88. 5 items from 22 items: item 3 'Experienced painting as beneficial'; item 7: 'Feeling inner well-being after painting'; item 8: 'I became calm and well-balanced while painting'; item 9: 'I felt inner harmony while painting' and item 12: 'Produced images reflected my mood well' revealed, separately, an item-total correlation above $r > .80$. A face validity check of the 5 items showed no redundant information between item 3, 7 and 12. The inter-item correlation between item 8 and item 9 was high with r = .72 but below the statistical criteria of $r \geq .80$, thus we included both items for further analyses.

Table 2
Items of ICPTh.

	Factors with Factor Loadings				Mean (SD)	Alpha-if-item-deleted	Item-Total Correlation
Items	**1**	**2**	**3**	**4**			
1 Engaged myself in painting therapy	**.674**			.491	3.38 (.906)	.963	.792
2 Tuning out my general situation while painting	**.828**		.333		3.09 (1.16)	.964	.697
3 Experienced painting as beneficial	**.762**	.308		.339	3.27 (1.01)	.963	.859
4 Good relaxation while painting	**.778**			.387	3.21 (1.10)	.963	.797
5 Painting refreshed me	**.572**	.390		.436	2.84 (1.27)	.963	.793
7 Feeling inner well-being after painting	**.764**	.401			2.86 (1.18)	.962	.852
8 I became calm and well-balanced while painting	**.747**	.447		.306	2.82 (1.17)	.962	.883
9 I felt inner harmony while painting	**.700**	.415			2.66 (1.22)	.963	.805
13 Painting beautiful colors touched me & warmed my soul	**.755**	.515			3.02 (1.25)	.963	.797
14 I became calm and balanced while painting	**.670**		.394		3.04 (1.07)	.963	.795
17 I could center myself and concentrate while painting	**.703**	.384	.301		2.98 (1.07)	.963	.792
Subscale 1: Therapy Congruence & Relaxation					**32.79 (10.59)**		
					2.72 (1.02)		
12 Produced images reflected my mood well	.499	**.631**		.329	2.70 (1.24)	.963	.817
16 I could relate to themes of the painting exercises	.429	**.626**		.341	2.66 (1.24)	.964	.742
19 I grew and developed personally through painting therapy		**.604**	.530		2.11 (.24)	.964	.754
22 Experiencing my own abilities while painting helped me to cope with my illness		**.755**	.331		2.09 (1.24)	.964	.718
23 Experiences while drawing were helpful to cope with the illness		**.850**			2.39 (1.39)	.964	.695
24 I feel enriched by learning about my abilities while painting and drawing	.346	**.732**			2.70 (1.23)	.963	.795
Subscale 2: Inner Development & Mood					**11.75 (5.47)**		
					2.44 (1.09)		
18 I improved my painting skills through art therapy			**.788**		2.14 (1.25)	.965	.581
20 I discovered new abilities while painting		.399	**.779**		2.16 (1.27)	.965	.653
21 I was positive surprised about own abilities while painting			**.855**		2.36 (1.28)	.965	.581
Subscale 3: Artistic Abilities					**6.43 (3.40)**		
					2.22 (1.26)		
15 I could fulfill assigned tasks in painting therapy	.328			**.768**	3.36 (.796)	.965	.547
11 I carried out instruction of art-therapist consciously				**.873**	3.35 (0.76)	.966	.497
Subscale 4: Task Congruence					**6.73 (1.40)**		
					3.41 (1.1)		
Overall Score Sum Scale					**60.43 (19.29)**		
Cronbach's alpha r = .965	**.964**	**.919**	**.867**	**.739**			
Test-rest-Reliability r_{tt} = .888	**.810**	**.872**	**.770**	**.581**			

Table 2 shows the items of the ICPTh. For each item the factor loading and factor assignment, mean, standard deviation, alpha-if-item-deleted value and item-total correlation are presented. Cronbach's alpha and test-retest reliability, mean and standard deviation are presented for the sumscale and subscales.

Additionally, Cronbach's alpha had shown no relevant change in reliability by removing any of these items. A number of n = 63 participants provided data for the ICPTh sum score at T1 and n = 53 participants at T2. Cases with missing data were listwise excluded.

Test-retest reliability, assessed by Spearman's Rho correlations, was high with r_{tt} = .88. Further details on items are displayed in Table 2.

3.3. Correlation analyses

Moderate to strong correlation were found for the ICPTh sum score and its subscales: 1.Therapy Congruence & Relaxation (r = .932); ICPTh 2: Inner Development & Mood (r = .903); ICPTh 3: Artistic Abilities (r = .728) and ICPTh 4: Task Congruence (r = .579). The ICPTh 2 correlated moderately with ICPTh 3 (r = .548) and ICPTh 4 (r = .573) (all $p \leq .001$). Other moderate and weak positive correlations were found with the convergence criteria we described in Table 3. The ICPTh and its subscales 1–3 were moderately correlated with the ICPH ranging from r = .355 to .422 (all $p < .001$) but not with the ICPTh subscale 4. Signficant correlations were found with the following convergence criteria: CFS-D affective (r = −.272), HADS sumscale (r = −.290) and HADS depression (r = −.257), the ICS (r = .317) and Satisfaction with painting therapy (r = .436) (all $p < .05$). Means ± standard deviations of the ICPTh subscales are: ICPTh subscale 1 (32.79 ± /10.59); ICPTh subscale 2 (11.75 ± /5.47); ICPTh subscale 3 (6.43 ± /3.40) and ICPTh subscale 4 (6.73 ± /1.40). Corresponding means ± standard deviations for each of the ICPTh subscales are ICPTh subscale 1 (2.72 ± /1.02); ICPTh subscale 2 (2.44 ± /1.09); ICPTh subscale 3 (2.22 ± /1.26) and ICPTh subscale 4 (3.41 ± /1.1).

4. Discussion

To measure and operationalize 'Inner Correspondence' with painting therapy we developed a 22-item scale with robust psychometric properties showing an unambiguous four factor solution with the following subscales: 1.) therapy congruence and relaxation, 2.) inner development and mood 3.) artistic abilities and 4.) task congruence, explaining 79% of total variance. Overall reliability of the questionnaire was high. Additionally, all subscales were highly intercorrelated and showed very good to sufficient internal consistency. The ICPTh fulfilled content, face and construct validity and correlated positively with inner correspondence and harmony with movement therapy, internal coherence, and satisfaction with painting therapy. Depressive symptoms, distress and affective fatigue were negatively associated. These associations are conceptually sound and underscore construct validity. We were able to expand the construct of 'Inner Correspondence' from mindfulness movement therapy (yoga and eurhythmy) by Büssing et al.[41] to mindfulness painting therapy. The conceptual overlap of both self-report measures was verified by findings of moderate correlations between the ICPH and the ICPTh and its first three subscales. Expectedly, no association with the ICPTh subscale 4 (task congruence) was found which was included to control for potential social desirability effects. Right skewed distributions for the ICPTh subscale 1 (therapy congruence and relaxation) and subscale 4 imply that our sample with CRF was highly congruent with the art therapeutic intervention and experienced high levels of relaxation through an active engagement in the therapy. Ceiling effects of the ICPTh (task congruence) may indicate that our sample was very motivated and eager to fulfill the given painting exercises which was

Table 3
Correlations with Subscales & Convergence criteria.

Variables at T1	ICPTh sum score	ICPTh Therapy Congruence & Relaxation	ICPTh Inner Development & Mood	ICPTh Artistic Abilities	ICPTh Task Congruence
ICPTh (sum score)	1.000	**.932****	**.903****	**.728****	**.597****
Therapy Congruence & Relaxation		1.000	**.753****	**.548****	**.573****
Inner Development & Mood			1.000	**.625****	**.489****
Artistic Abilities				1.000	**.310***
Task Congruence					1.000
CFS-D (sum score)	−.109	−.096	−.137	−.113	−.120
CFS-D physical	−.093	−.068	−.141	−.160	.017
CFS-D cognitive	.031	−.080	−.044	−.014	−.229
CSF-D affective	**−.272***	−.097	−.163	−.039	−.116
HADS (sum score)	**−.290***	**−.333***	−.099	−.190	**−.285***
HADS anxiety	−.230	−.254	−.001	−.141	−.214
HADS depression	**−.257***	**−.322***	−.154	−.178	−.259
ICS (sum score)	**.317***	**.518****	**.405****	**.287***	**.478****
ICPH (sum score)	**.422****	**.361****	**.355****	**.360****	.144
Satisfaction with PT	**.436****	**.423****	**.457****	**.282***	**.263***

Table 3 displays the correlation matrix of the ICPTh sumscale, subscales and convergence criteria such as CFS-D, HADS, ICS, ICPH, and satisfaction with painting therapy. ** $p < .001$ (Spearman rho, 2-tailed), * $p < .05$ (Spearman rho, 2-tailed).

confirmed by the experiences of our art therapists describing the sample as 'highly congruent' with the painting intervention. This might have attenuated the variance for subscale 1 and 4 and might be a potential explanation for ceiling effects.

The results of our correlation analysis allows several implications. One is that 'Inner Correspondence' with mindfulness-based art therapy could explain exemplarily 'why' other mindfulness-based therapies show particular effectiveness in improving psychological outcomes domains as proven by many outcome studies.[21,26,54,55] Another implication is, that 'tuning out' external stimuli (general outside situation) e.g. [56] being completely absorbed in painting, becoming calm, balanced and relaxed (ICPTh subscale 1) is associated with better internal coherence and resilience (ICS), lower depressive symptoms (HADS-depression) and higher levels of development and mood (subscale 2). Similarly, 'Inner Correspondence' (ICPH) in individuals practicing yoga and eurythmy showed moderate to strong associations with the presence and the acceptance component of mindfulness. Also, in yoga practitioners ICPH was moderately related to positive mood states, (psycho-emotional) lightheartedness/relief and dimensions of spirituality, and weakly with mental health or symptom scores. Being congruent with the movement practices or painting in terms of inner engagement may contribute to the treatment effectiveness when an active 'inner participation' with e.g. yoga or painting rather than simple imitation is required.[57,58] Finally, we found that 'Inner Correspondence' with art therapy (ICPTh subscales 1 and 2) correlates moderately with satisfaction with painting therapy.

There are several limitations to recognize in this study. One is the lack of a control group and the relative small sample size composed of female participants who were middle aged breast cancer survivors with CRF, particularly interested in integrative medicine. The scope of generalization is therefore limited and further research with other patient groups are needed to assess discriminative validity between clinical samples and/or healthy controls. Another limitation is that we only measured 'Inner Correspondence' once after ten weeks of ArT. Additionally, 'Inner Correspondence' with painting therapy was developed as outcome measure to assess the degree of inner involvement with painting, but cannot be used as baseline assessment. Another limitation is that factor 1: 'Therapy Congruence and Relaxation' is the strongest factor with 11 items compared to the three remaining factors with 2–6 items. Future evaluations of this scale should include a weighting statistical procedure (e.g. confirmatory factor analysis) to confirmatively examine the influence of the different subscales.

In terms of examining sensitivity to change for the ICPTh, our study would have benefited from either a comparison group (e.g. healthy individuals or different patient group) or additional endpoints. However, we aimed to design an outcome measure and were less interested in the procedural outcome of the scale. Another limitation in terms of construct validity is, that we did not correlate our scale with other mindfulness measures or assessed associations with 'relaxation response'. Additionally, painting therapy was only one element of a multimodal therapy which included other therapeutic techniques. How much variance is explained by only painting therapy maintains unclear.

An objective assessment of art therapists might elucidate if the ceiling effects for the ICPTh subscale 1 are due to high internal correspondence and not pure social desirability effects (right skewed distribution of task congruence). However, high scores of satisfaction with painting therapy and a very low attrition rate (2%) contradicts this assumption. A strength of our study is the assessment of test-retest reliability at six-month follow-up which was surprisingly high and points to a potential high stability of the ICPTh. Another strength of the study is, that we contributed to the evidence to consider ArT as mindfulness-based interventions since it seems to produce relaxation effects comparable to other mindfulness-based interventions.

Future research needs to investigate if 'Inner Correspondence' is a more generalizable concept which might function as potential mediator explaining the relationship between mindfulness therapies and symptom burden and/or treatment satisfaction e.g. [59].

To conclude, our study is a preliminary validation of a multidimensional self-report outcome questionnaire to measure 'Inner Correspondence' with ArT with robust reliability. Further validation studies of our new questionnaire should include a statistical weighting procedure to clarify the dimensionality of our construct. More research is needed to understand the full extent of how mindfulness-oriented treatments (e.g. art therapy and yoga) work and influence treatment outcomes.

Authors' contributions

Conception and development of the questionaire: MK, AD, BGK, AB; development of the intervention program: MK, MR, RZ, MG, CG; Collection and assembly of data: MK, BB, FtB, RZ; Data analysis and interpretation: MK, AM, AD, BGK, AB MR, RZ, MG, CG; Manuscript writing: AM, MK, MR, AB. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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