Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention

Abstract

Background: Living in line with one's values is believed to be beneficial for a person's well-being. Working with values in the therapeutic context often reveals that individuals do not live congruent with their chosen values. This study aimed to investigate how patients' valued behaviors change during an Acceptance and Commitment Therapy (ACT) and how these changes are associated with functioning. Further, this study aimed to examine whether valued behaviors changed depending on pre-treatment levels of symptomatology.

Methods: This was a standardized randomized controlled trial with an ACT intervention. Participants were 41 adult patients with treatment-resistant panic disorder. Measurements were completed at pre-treatment, 4-weeks-post-treatment, as well as 6-months after treatment. Results: The discrepancy between how important something is and how much someone does in accordance to their values decreased across treatment. Higher pre-treatment panic symptomatology led to higher improvements in valued action, compared to lower pre-treatment symptomatology. Yet, all patients reached comparable end-points. Functioning increased over the entire study period and increases in functioning were associated with increases in importance and valued action.

Discussion: Our study extends prior findings about valued behaviors in ACT by showing that treatment-resistant patients with panic disorder decreased the discrepancy between what is considered important and valued action. Further studies investigating changes in valued behaviors across various diagnoses and treatments are clearly necessary.

Keywords

Acceptance and Commitment therapy; values; valued behaviors; panic disorder; treatment-resistant patients; functioning

Introduction

Living according to one's values is beneficial for a person's well-being (Rogers, 1965). One therapy that explicitly concentrates on values is Acceptance and Commitment Therapy (ACT). ACT is a variant of cognitive behavioral therapy (CBT) and, one of the central goals of ACT is to help clients live more in touch with and act according to their values. In ACT, values are defined as "freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for that activity that are intrinsic in engagement in the valued behavioral pattern itself" (Wilson & DuFrene, p. 64, 2009). Concentrating on values in the therapeutic context often reveals that individuals do not live in line with their stated values (Michalak, Heidenreich & Hoyer, 2011; Wilson et al., 2010). Individuals may be clear about what they value but their behavior towards their values may be ineffectual or infrequent. The reason for this may include that individuals form behavior patterns that allow them to avoid experiences and events with uncomfortable sensations. As a result, values may be compromised.

ACT is believed to help by linking specific actions to the client's own chosen values in order to achieve valued action. Valued action can be defined as effective behavior linked to chosen values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Interestingly, patients with mental disorders may show less valued action compared to healthy counterparts. For instance, patients with Generalized Anxiety Disorder (GAD) reported less valued action compared to non-anxious controls, and after an ACT intervention valued action increased significantly. Patients with high levels of symptomatology increased less in valued action compared to those with lower levels of symptoms. Another study showed that engaging in valued action is associated with both improved quality of life and well-being and less seizures in epilepsy patients (Lundgren, Dahl, & Hayes, 2008).

Prior research showed that most complaints of individuals entering psychotherapy are

about domains in interpersonal areas (Davies-Osterkamp, Strauss, & Schmitz, 1996). In another study more than half of the sample chose social relationships as most meaningful to them as opposed to religion, physical activities and other domains (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). Further, a considerable number of anxiety and depression patients rate social domains such as relationships, parenthood, and intimacy as essential treatment goals (Grosse, Holtfort & Grawe, 2002). Although the significance of social domains has been identified, to our knowledge no study has directly compared how patient's valued behaviors differs and changes within treatment in respect to social and non-social domains.

Given the concentration of values within ACT, it is reasonable to expect that this change is associated with an increase in functioning. That is, a person who is engaged in his/her life in a way that is subjectively meaningful is also likely to subjectively report high levels of functioning. Indeed, a number of studies investigated the impact of ACT on functioning, e.g., within the treatment of chronic pain (e.g. McCracken & Yang, 2006; Steiner, Bogusch, & Bigatti, 2013; Vowles & McCracken, 2008). In accordance with the WHO definition, functioning is in the present study understood as the ability to carry out objective performances and routine activities in a given life domain, for instance at home, work, school and other areas in which roles may have to be performed. Other outcome studies also showed that ACT interventions are associated with improved functioning, for instance in the treatment of eating disorders (Juarascio, Forman, & Herbert, 2010), substance use disorders (Luoma, Kohlenberg, Hayes, & Fletcher, 2012) and worksite stress (Flaxman & Bond, 2010). Vowles and McCracken (2008) showed that daily functioning improved significantly throughout the study period.

Of individuals starting treatments, a large number do not respond to treatment. For anxiety disorders a number between 33 and 50% were estimated (e.g. Taylor, Abramowitz, & McKay, 2012). That estimate does not include patients who have residual symptoms despite

some treatment success (Brown & Barlow, 1995; Fava & Mangelli, 1999). Treatment-resistant patients may especially benefit from ACT, as this treatment changes the focus from symptom reduction to the engagement in valued behaviors (Clarke, Kingston, James, Bolderston, & Remington, 2014; Clarke, Kingston, Wilson, Bolderston, & Remington, 2012; Hayes, Strosahl & Wilson, 2012; Gloster et al., 2015). Further, in ACT patients learn to live more flexibly with their symptoms and include values in their every day life even though symptoms may persist (Gloster, Chaker, Klotsche, Hummel & Hoyer, 2011; Hayes, Strosahl & Wilson, 2012).

Thus, building on the relevance of valued behaviors (Michelson et al., 2011), and perhaps in particular in treatment-resistant patients (Clarke, Kingston, James, Bolderston, & Remington, 2014; Gloster et al., 2015) we aim to investigate changes of valued behaviors and their association with functioning in a standardized randomized controlled trial with an ACT intervention. We hypothesize, (1a) that valued behaviors increase over the course of the study, (1b) that valued behaviors in social and non-social domains differ from each other at all time points and, (1c) that valued behaviors in social domains increase more than in non-social domains. Given that no research has examined how valued behaviors differs in respect to social and non-social domains, we considered our analyses addressing these hypotheses as exploratory. Further, we hypothesize (2) that initial lower levels of panic symptomatology are associated with a subsequent higher increase in valued action. Finally, we expect (3a) functioning to increase over the course of the study and (3b) a positive association between increases in valued action and increases in functioning.

Methods

Design

Data were collected within a randomized controlled trial (RCT) of ACT compared to Waiting list (WL) for patients with treatment-resistant PD and/or agoraphobia (PD/A) in

Germany. Patients were randomized to immediate treatment (n =33) or a WL condition (n=10). Follow-Up (FU) took place after 6 months. A comprehensive description of the procedures can be found elsewhere (Gloster et al., 2015). That study examined the efficacy of patients with PD and/or agoraphobia that were non-responding to prior state-of-the art therapy and switched to ACT.

Participants

Participants were recruited from a sample used in a prior RCT study on the effects of exposure based CBT that failed to improve (for details see Gloster et al., 2015). Forty-one patients with a primary DSM-IV diagnosis of PD with or without agoraphobia were included in the study. The majority of the sample was female (69.8%), with an average age of 36.9 years and had 10-13+ years of education and was employed. Most of the patients had a comorbid disorder, and among them social phobia and any specific phobia were most frequent. Furthermore, patients had on average a history of 42.3 previous therapy sessions of a state-of-the art treatment of CBT, pharmacotherapy, or both (cf. Gloster et al, 2015).

Patients were eligible for inclusion in the trial if they failed or had insufficient improvement in previous gold-standard treatments (Gloster et al., 2009; Gloster et al., 2011). Specifically, patients with prior psychotherapy were supposed to have had ≥ 20 sessions of empirically supported treatments, such as cognitive-behavioral therapy with exposure in situ, cognitive restructuring etc. Patients with prior pharmacology had an intake of an approved drug for the minimum dosage in line with the recommended guidelines (Bandelow et al., 2008).

Intervention

An adapted manual of ACT for anxiety disorders was used (Eifert & Forsyth, 2005). ACT is a behavioral treatment and its general goal is to increase psychological flexibility (PF). PF consists of six processes: acceptance, present moment awareness, defusion, self-as-context (observer perspective), value clarification, and valued action. All six core processes of

psychological flexibility were addressed. Values were discussed in the initial session and concentrated again in the second half of the treatment (cf. Eifert & Gloster, 2016). Over the course of treatment patients learn to become more aware and accepting of anxiety and other uncomfortable emotions. Patients ultimately acquire this new stance so they can engage in important domains of their life while experiencing anxiety or unpleasant emotions. The intervention consisted of eight sessions administered twice weekly over 4 weeks. The sessions lasted between 90 and 120 min. The intervention was administered by graduate students of a CBT university training center. Therapists were experienced in CBT, but had no prior experience with ACT treatments. In addition, therapists were trained with a 3-day intensive training, readings, self-study and were tested via a competency test. The manual was also successfully applied in a large randomized clinical trial comparing ACT and CBT (Arch et al., 2012). After a 4-week waiting period patients in the WL were offered treatment. Patients in the WL did not receive treatment during the FU period.

Measures

Valued Living Questionnaire (VLQ-2; Wilson, Sandoz, Kitchens, & Roberts, 2010).

Values were measured with the Valued Living Questionnaire. Respondents rate one a 1-10 scale the importance of 10 different domains: family, marriage /couples/ intimate relationships, parenting, friendship, work, education, recreation, spirituality, citizenship, and physical self-care. Using the same scale, respondents are asked to rate how consistently they have lived in accord with each value. The respondents' ratings are used to generate four different scores of different facets of valued behaviors: (1) importance; (2) valued action; (3) valued living composite; and (4) valued living discrepancy. The (1) importance score and (2) valued action score are created by adding the responses of the respective category and calculating the average across the 10 domains. The (3) valued living composite is a weighted mean of valued action and is calculated by multiplying the (1) importance and (2) valued action responses for each area. The valued living composite can range from 10-100 and takes

into account the relative importance a respondent assigns to a given value in the context of how consistently it was lived. The (4) valued living discrepancy is the difference between importance and the actual valued action and is calculated by subtracting importance from valued action. The discrepancy score can range from -9 to 9. A study on the psychometric properties of the VLQ in undergraduate students indicated adequate internal consistency (Cronbach's $\alpha = .74$) (Wilson et al., 2010) .

In the present paper, we refer to the four different scores (i.e., importance, valued action, valued living composite and valued living discrepancy) as facets of valued behaviors, whereas valued behaviors is used as an overarching term for the four different facets.

Valued Behaviors in Social vs. Non- Social Domains. To examine valued behaviors (importance, valued action, valued living composite and discrepancy) in social domains the mean of the domains family, intimate relationships, parenthood and friendships were compared to the remaining six non-social domains (e.g., work, education, etc.).

Panic and Agoraphobia Scale (PAS; Bandelow, 1995). The PAS is a self-reported 13-item questionnaire that measures levels of panic symptoms, avoidance, anticipatory anxiety, disability, and worries about health. All items are scored from 0 to 4. Scores on the PAS have good reliability, and are sensitive to change (Bandelow, 1995; Gloster, Wittchen, et al., 2011).

World Health Organization Disability Assessment Schedule (WHODAS 2.0, Üstün, Kostanjsek, Chatterji, & Rehm, 2010). The WHODAS 2.0 is a 36-item self-administered questionnaire. It captures the following six life domains: Cognition, mobility, self-care, getting along, life-activities, and participation. Patients are asked to rate how much difficulty they had in these specific domains of functioning in the past 30 days. Results from a validation studies with a sample having conditions such as depression, osteoarthritis, osteoporosis, rheumatoid arthritis, chronic widespread pain (CWP), and low back pain demonstrated good reliability scores (Cronbach's $\alpha = .85-.95$)(Garin et al., 2010; Üstün,

Kostanjsek, Chatterji, & Rehm, 2010). For the present study an overall WHODAS score was used, whereas higher item scores mean more difficulty.

Statistical Analyses

Data were analyzed using SPSS 21.0. Data were cleaned and examined with regard to distributional assumptions (normal distribution, homogeneity of group variances). Hypotheses 1, 2 and 3a were tested with linear mixed models (LMMs). LMMs can incorporate incomplete cases in the analyses and further assume that the missing data pattern is either missing completely at random (MCAR) or missing at random (MAR) in order to lead to unbiased results (Little & Rubin, 2002). Fixed effects were the within-subjects factors time (Hypothesis 1a and Hypothesis 3a), and social versus non-social domains (Hypothesis 1b) plus the interaction between the two (Hypothesis 1c), and the between-subjects variable panic symptomatology (PAS) (Hypothesis 2). We only included a random intercept and no random slope coefficient, as the latter did not improve model fit. Measuring times were baseline, 4-week post-treatment, and the 6-month FU. In order to test hypothesis 2, which examined if levels of panic symptomatology influence valued action, the sample was divided into high, medium and low groups using a tertiary split. For hypotheses 1a to 3a contrasts using linear and quadratic polynomials were calculated for the factor time to test linear and curve-linear time trajectories. As the results from the quadratic polynomials were not significant for hypotheses 1a to 2, they are only reported for hypothesis 3a.

Hypothesis 3b (increases in valued action are positively associated with increases in functioning) was firstly examined by means of a two-sided correlation between the two difference scores “pre-treatment valued action minus post-treatment valued action” and “pre-treatment minus post-treatment functioning (WHODAS)” and secondly tested with the two difference scores “pre-treatment valued action minus post-treatment” and “post-treatment minus FU functioning (WHODAS)”.

Alpha was set at 0.05 for all analyses. Between-group and within-group effect sizes

were calculated according to Cohen's *d*. Effect sizes of 0.2, 0.5, and 0.8 refer to small, moderate, and large, respectively (Cohen, 1988). Reported effect sizes are based on patients who completed questionnaires, using descriptive statistics.

Results

Descriptives

The means and standard deviations of all variables involved in the analyses at pre-treatment, post-treatment and FU are displayed in Table 1. The table shows higher means for social compared to non-social facets across all four facets of patients' valued behaviors.

Between group effect sizes between social and non-social domains are presented in table 2.

Valued Behaviors increase over the course of the study (Hypothesis 1a)

Patients' reported valued living discrepancy decreased over the course of ACT (see Table 3), whereas patients' valued behaviors regarding importance, valued action, and valued living composite did not change over the course of the study (Table 1 and Table 3, left column, and Figure 1).

In order to test whether treatment response is also reflected in valued living discrepancy, we examined responders and non-responders. Responders were defined as ≤ 18 ('mild' or less) on the PAS (Gloster et al., 2015). A t-test revealed a significant difference between responders ($N=23$; $M=-1.28$, $SD=1.04$) and non-responders ($N=8$; $M=-2.47$, $SD=1.47$; $t(32)=-2.74$, $p=0.010$) as defined at post-treatment with respect to patients' valued living discrepancy. Another t-test revealed a significant difference between responders ($N=26$, $M=-1.15$, $SD=0.98$) and non-responders ($N=6$; $M=-1.63$, $SD=1.04$; $t(30)=1.08$, $p=0.029$) as defined at FU with respect to patients' valued living discrepancy.

Valued behaviors in social and non-social domains differ from each other at all time points (Hypothesis 1b)

The results, as shown in the middle column of Table 3 and in Figure 1, indicate that there are significantly higher values for social compared to non-social domains across time

points with respect to all four facets of valued behaviors. Effect sizes between social and non-social domains were medium to high for all four facets: importance, $d=1.08$; valued action, $d=0.58$; valued living composite, $d=0.77$; valued living discrepancy, $d=-0.45$.

To get a clearer idea of the relevance of social domains following treatment we tested the association of social domains with functioning for the facet valued living discrepancy, which was significant ($r=-.49$, $p=0.03$). The lower the valued living discrepancy for social domains after treatment, the higher the functioning at post-treatment.

Valued Behaviors in social domains increase more than in non-social domains

(Hypothesis 1c)

Linear changes in patient's valued behaviors over time did not vary between social and non-social domains for any of the four facets (see right column in Table 3 and Figure 1).

Initial lower levels of panic symptomatology are associated with a higher increase in valued behaviors (Hypothesis 2)

We found an interaction effect between linear change across the study period and pre-treatment panic symptomatology ($F(2,60) = 3.44$, $p=0.039$), whereas patients' valued behaviors regarding importance, valued living discrepancy and valued living composite did not show an interaction effect with pre-treatment panic symptomatology.

As shown in Figure 2, the three panic symptomatology groups (low, medium and high) showed different trajectories with respect to valued action. The panic symptomatology groups differed with respect to their means: low panic symptomatology group ($N=12$): $M=8.58$, $SD=4.91$, middle PAS group ($N=14$): $M=26.92$, $SD=5.28$, high PAS group ($N=15$): $M=43.46$, $SD=4.89$. The high panic group increased, whereas the low panic group decreased in valued action during therapy, and the medium panic group remained more or less on the same level between pre-treatment and follow-up. All three groups finally reached similar end-points.

Functioning increases over the course of the study (Hypothesis 3a)

Patients' functioning showed a curve-linear increase over the course of the study (linear trend, $F(1,47) = 28.45$, $p < 0.001$; quadratic trend ($F(1, 45) = 7.05$, $p = 0.011$). Thus functioning increased from baseline to post-treatment, and further mildly between post-treatment and FU.

Increases in valued behaviors are positively associated with increases in functioning (Hypothesis 3b)

Difference scores in patients' valued behaviors and their functioning both measured between pre- and post-treatment were negatively correlated with each other (Importance: $r = -0.485$, $p = 0.026$; valued action: $r = -.45$, $p = .049$; valued living discrepancy: $r = -0.177$, $p = 0.454$ and valued living composite: $r = -0.407$, $p = 0.073$). The negative correlation between the two difference scores implies that increases in valued behavior were related to improved functioning from pre-to post-treatment. The negative correlation between the two difference scores implies that increases in valued behavior were related to improved functioning from pre-to post-treatment.

In contrast, difference scores in patients' valued behaviors between pre- and post-treatment and functioning between post-treatment and FU were not correlated (importance: $r = 0.16$, $p = 0.55$; valued action: $r = -0.15$, $p = 0.589$; valued living discrepancy = -0.51 , $p = 0.42$; valued living composite: $r = -0.002$, $p = 0.99$).

We were also interested to test whether difference scores in patients' valued action in social and non-social domains and their functioning (WHODAS) were related. In fact both difference scores in patients' valued action in social domains and their functioning (WHODAS) measured between pre- and post-treatment were negatively correlated with each other ($r = -0.12$, $p = .65$). This implies that an increase in valued action is associated with improved functioning. Difference scores in patients' valued action in non-social domains and their functioning (WHODAS) were positively correlated ($r = 0.013$, $p = 0.964$). This correlation

between the two difference scores implies that valued action in non-social domain is not related to functioning.

In order to test whether changes in valued action are related to changes in panic symptomatology (PAS), we examined another correlation between valued action and panic symptomatology, both measured between pre- and post- intervention. Difference scores in patients' valued action and their panic symptomatology (PAS) both measured between pre- and post-treatment were negatively correlated with each other ($r=-0.54$, $p=.0002$). This negative correlation between the two difference scores implies that an increase in valued action goes hand in hand with an decrease in panic symptomatology.

Discussion

The aim of this study was to investigate patients' changes in valued behaviors and functioning following an ACT intervention. To the best of our knowledge, this is the first study to examine whether patients' valued behaviors of social and non-social domains differ or show different increases throughout treatment. We found that patients' valued behaviors in social domains were consistently higher than in non-social domains at all time points of the study. The amount of change in social and non-social domains of valued behaviors was the same. Interestingly, although pre-treatment panic symptomatology (i.e., low, medium and high) was associated with different rates of improvement in valued action, all reached the same end-point. Increases in valued action were also associated with increased functioning.

Patients' responses on the different facets of valued behaviors revealed different rates of increases. The facet importance did not significantly change over the course of the study. This is consistent with an earlier study showing that the facet is more stable than others (Wilson et al., 2010). Our patients' responses in importance were slightly lower at pre-treatment compared to subjects from a community sample (Moffitt & Mohr, 2014).

Patients also did not show a significant increase in the facet valued action over the course of the study. Our results are not in accord with the finding by Michelson et al. (2011),

who found an improvement of valued action between pre-treatment and post-treatment in their GAD group as a result of ACT. One difference between that study and ours is the study length as patients in that study received treatment over 18 weeks as opposed to 4 weeks to post-treatment in our study. Another difference is the sample size, which was slightly smaller in our study. Interestingly, patients in our sample showed higher valued action at pre-treatment compared to adults in a community sample (Moffitt & Mohr, 2014).

As observed in this study, patients' reporting in the facets importance and valued action did not increase significantly over the course of the study. Given that the valued living composite is the mean of the product of the facets importance and valued action, a lack of significant difference is not surprising. To draw a comparison a group of healthy undergraduate students showed similar responses at pre-treatment on the valued living composite (Czech, Katz, & Orsillo, 2011).

We did find, however, that patients' valued living discrepancy (i.e., difference between importance and valued action) decreased significantly over the course of the study, our finding may be explained by the hypothesized change-processes entailed within ACT: Through therapy, patients examine their values, which may result in more awareness. This often leads to the realization that their current actions differ from their chosen values (Hayes, Strohsahl & Wilson, 2012; p. 309). This discrepancy may galvanize and motivate patients for change, also after therapy - an assumption that could be confirmed in our sample as patients improved throughout FU. This change following treatment suggests that the generalization process of applying newly acquired skills continues to unfold during the time in which patients apply techniques learnt in therapy independently. We further observed differences between responders and non-responders that could be reflected in the valued living discrepancy. For non-responders the valued living discrepancy was larger at post-test, but it decreased at FU whereas responders showed a steady progression of valued living discrepancy over the course of treatment. The change in the valued living discrepancy has

some clinical implications, as clinical effort should be on the increase of valued action. It could be that the VLQ is not sensitive enough to capture changes after therapy. Future research building on these findings would benefit from more statistical power as the small sample size limited the power to detect changes in valued action.

As hypothesized, we found that patients valued behaviors in social and non-social domains differed at all time points of the study. Mean level of all four facets were higher for social than non-social domains, and this remained consistent across all time points. To the best of our knowledge, this was the first time the difference between social and non-social valued behaviors was explicitly tested. Our findings are in agreement with earlier (intervention) studies from other areas, such as happiness research. For instance, in the Parks et al. (2012) study more than half of the sample chose social relationships as most meaningful as opposed to other life domains such as religion and physical activities. In addition, it is known that strains of individuals entering psychotherapy predominantly affect interpersonal areas (Davies-Osterkamp et al., 1996) and that the most frequently defined goals of psychotherapy are in interpersonal goals, relationships, and intimacy (Grosse & Grawe, 2002). Further, our finding may be meaningful for prosocial considerations (Wilson, Hayes, Biglan, & Embry, 2014)

We hypothesized that patient's valued behaviors across all four facets (i.e., importance, valued action, valued living discrepancy, and valued living composite) in social domains increase more than in non-social domains while our results suggest that patients increased their valued behaviors to the same extent in both social and non-social domains across all facets. It is possible that the processes that initiate valued action in the most important domains (i.e., those explicitly discussed during therapy) spread to valued action in many other domains. Even finer grained data (e.g., Experience Sampling Methods) would be necessary to capture such change.

Our expectation that patient's initial lower levels of panic symptomatology were

associated with a higher subsequent increase in valued behaviors, was partly supported. As a matter of fact, results showed, that depending on the pre-treatment panic symptomatology (i.e., low, medium and high) patients had different trajectories with respect to valued action only. The group with low panic symptoms at pre-treatment showed initially relatively high valued action and at post-treatment the level of valued action resembled the one of the high panic group. The group with high panic symptoms at pre-treatment, contrary to our hypothesis, had the steepest increase in valued action. It may be that the patients' high levels of panic did not allow them to focus on valued action and through treatment they started to engage in valued action. Interestingly, recent data of session-by-session data, however, suggest that values change before suffering and negative reaction to symptoms (Gloster, Klotsche et al., in review). In that study it was found that levels of valued behaviors preceded changes in subsequent suffering during the treatment as measured at each session. This finding shows that re(engagement) in things that matter to an individual is associated with decreases in suffering. In the end, patients benefitted equally from ACT therapy and reached FU values that were very close to each other. Our findings are in accord with the study of Michelson et al. (2011) which found that the higher the symptom burden, the lower pronounced the valued action.

With respect to our hypothesis that patient's functioning increased over the course of the study, we found that functioning indeed improved over the entire study period. This finding can be linked to prior literature that examined the effectiveness of ACT in (chronic) pain (McCracken & Vowles, 2014; Vowles, McCracken, & Eccleston, 2007). Chronic pain typically involves serious disruptions of functioning in daily life, and studies suggest that ACT alters responses to pain in a way that leads to reduction of disability and increased functioning (McCracken & Eccleston, 2005). Previous studies used pain-related measures (e.g. McCracken, Vowles, & Eccleston, 2005) or symptom outcome measure (Clarke et al., 2012, 2014) to assess functioning while we used a general measure of functioning in major

life domains.

We hypothesized that patients' increases in the facet valued behaviors during treatment is associated with increases in functioning across two time frames: a) during the treatment (i.e., pretreatment to post-treatment) and b) following the treatment (i.e., post-treatment to FU).

The first test revealed a significant correlation between the two difference scores in the facets importance and valued action. The correlation between difference scores in importance and functioning implies that a person who becomes more aware of how important she/he considers certain life domains starts to engage in actions that are subjectively meaningful to him/her and reports increased functioning at the same time. The correlation between the difference scores in valued action and functioning is in line with earlier research findings that changes in valued action were related to improved functioning from pre-to post-treatment and to FU (Vowles & McCracken, 2008). These findings suggest that a person who starts to engage in actions that are subjectively meaningful to him/her, reports increased functioning at the same time. We did not find a meaningful association between valued living discrepancy and functioning, which is opposed to McCracken and Yang (2006) finding. Hence, less valued living discrepancy was not meaningfully related to improved functioning in our sample. Given that the valued living composite did not change significantly, it may not be surprising that no meaningful relationship between the composite and functioning were found.

The second test revealed that patients' increases in valued behaviors during treatment were not significantly associated with increases in functioning after treatment. The reason for this could be that functioning did not change as much after treatment compared to the time during treatment. The reason for this could be that functioning did not change as much after treatment compared to the time during the intervention.

Notwithstanding, our findings may help to inform about the validity of the VLQ itself. Specifically, our results confirmed our hypothesis 3b (A positive association between

increases in valued action and increases in functioning) and were consistent with theoretical assumptions. The valued action facet was moderately correlated with the construct of functioning (pre- and post-treatment) and this could be interpreted as evidence for validity of the VLQ. Thus, our findings contribute to the literature.

This study needs to be interpreted in the light of several limitations. First, the sample size was relatively small, which may have limited statistical power. Second, in this paper we were interested in treatment related change and therefore did not include the wait-list control condition. As such, the observed findings cannot be interpreted as wait-list controlled effects. Third, in this study we only relied on self-reported measurements. Observations from different sources (e.g., therapist, experience sampling, etc.) may have resulted in alternative findings. Forth, the study sample is limited to patients with treatment-resistant panic disorder and/or agoraphobia. Generalization to other populations needs to be tested.

With these limitations notwithstanding, the current study shows that ACT processes help patients to decrease the discrepancy between how important something is and how much someone does in respect to what is important in one's life. For the first time significant differences between social and non-social domains in patients' valued behaviors were observed, indicating the relative relevance of nurturing social relationships and social life domains in comparison to non-social life domains. Of clinical importance, is that although patients' pre-treatment panic symptomatology differed, patients improved equally. This is an important finding for clinical care that corresponds with the finding that initial levels of panic symptoms are related with different change trajectories in the outcome (Lutz et al., 2014). Patients in our study reported increased functioning over the course of the study, matching earlier findings (McCracken & Yang, 2006; Vowles, McNeil, et al., 2007). Further strengths of the study are a clear definition of treatment resistance and that this study focuses on patients that failed in appropriate prior first line CBT, and is interconnected with studies designed to examine mechanism of action across different levels of analysis, including

genetic research (Domschke et al., 2011; Gloster, Gerlach, et al., 2015; Reif et al., 2014, Straube et al., 2014), fMRI research (Reif et al., 2014; Straube et al., 2014), psychophysiology (Richter et al., 2012) and temporal assessments of changes in therapy (Gloster et al., 2014). More research in the field of valued behaviors in ACT is certainly needed. Future studies should, for instance, investigate the role of values in samples across diagnoses or perhaps more importantly different treatments to determine if results are not limited to patients with anxiety disorders. Our findings show that the ACT techniques play an important role to promote behavior change consistent with personal values, which were associated with increased functioning.

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Table 1.
Descriptive statistics of all outcome measures

	Baseline			Post			FU		
	N	M	SD	N	M	SD	N	M	SD
Facets of Valued Behaviors									
Importance	41	6.69	1.75	35	6.68	1.28	32	6.61	1.32
Social	41	7.73	2.13	35	8.13	1.49	32	8.09	1.42
Non-Social	39	5.98	1.71	34	5.85	1.39	32	5.87	1.46
Valued Action	40	4.73	1.92	34	4.97	1.11	32	5.28	1.76
Social	40	5.35	2.45	34	5.96	1.65	32	6.24	2.32
Non-Social	38	4.38	1.57	33	4.41	1.15	32	4.80	1.75
Valued Living									
Composite	32	62.03	29.79	31	57.09	35.18	32	42.34	19.96
Social	40	46.90	26.88	34	52.86	17.36	32	56.04	19.96
Non-Social	38	31.39	17.56	33	31.66	11.66	32	35.49	19.71
Valued Living	40								
Discrepancy		-1.93	1.87	34	-1.71	1.32	32	-1.32	1.01
Social	40	-2.33	1.96	34	-2.23	1.63	32	-1.84	1.76
Non-Social	38	-1.57	1.64	33	-1.37	1.36	32	-1.07	1.06
General/Symptom Measures									
PAS	41	19.94	11.34	32	14.02	10.76	33	11.62	10.72
WHODAS	41	26.27	15.99	22	14.23	11.36	24	11.19	11.23

Note: PAS= Panic and Agoraphobia Scale; WHODAS=World Health Organization Disability Assessment Schedule

Table 2.
Effect sizes (Cohen’s d) between social and non-social domains and at each time point

	baseline	post	FU
Facets of valued behaviors			
Importance	0.91	1.58	1.54
Valued Action	0.47	1.09	0.70
Valued Living Composite ¹	0.68	1.43	1.03
Valued Living Discrepancy ²	-0.42	-0.57	-0.53

Note: ¹Valued Living Composite = computed mean of the multiplied respondents of the facets importance and valued action scores; ²Valued Living Discrepancy= difference between importance and valued action and is calculated by subtracting importance from valued action

Table 3.
Changes in outcomes scores of valued behaviors over the course of the study

Hypothesis	H1a	H1b	H1c
	Valued Behaviors increase	Valued Behaviors in social and Non-social domains differ	Valued Behaviors in social domains increase more than in non-social domains
	Time	Group	Time x group
	F	F	F
Facets of Valued Behaviors			
Importance	0.08	152.67**	2.16
Valued Action	3.08	35.21**	1.10
Valued Living Composite ¹	2.75	66.39**	1.21
Valued Living Discrepancy ²	4.62*	19.98**	0.004

Note: Time = linear trend for time over the course of the study; Group = comparisons between social and non-social facets; averaged across the three time points; Time x group = linear trend for time times group interaction
¹Valued Living Composite = computed mean of the multiplied respondents of the facets importance and valued action scores;
²Valued Living Discrepancy= difference between importance and valued action and is calculated by subtracting importance from valued action

* p < 0.05
** p < 0.01

Figure(s)

Figure 1: Facets in valued behaviors (importance, valued action, valued living composite and valued living discrepancy) in social and non-social domains of the Valued Living Questionnaire (VLQ) over the entire study period.

Figure(s)

Figure 2. Trajectories of valued action depending on pre-treatment symptomatology