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Investigating an Acceptance and Commitment Therapy-Based Exposure Therapy Intervention in Treatment-Refractory OCD and Related Disorders: Changes in Psychological Flexibility, Treatment Engagement, and Treatment Perceptions

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Abstract

While exposure therapy is the most effective psychological treatment for obsessive-compulsive, anxiety, and traumatic stress-related disorders, it is not universally effective, indicating a need for further treatment optimization. This study investigated a shift in approach to exposure therapy with 29 treatment-refractory adults in an OCD clinic not responding to standard treatment, comprising habituation-based exposure therapy. Participants completed a standard exposure as continuation of standard clinic treatment, followed by an Acceptance and Commitment Therapy (ACT) consultation session to assess psychological inflexibility processes interfering with treatment progress, and then an ACT-based exposure targeting behavior change through increasing psychological flexibility. After each exposure, participants and independent raters reported levels of psychological flexibility, rituals, distress, treatment engagement, and treatment perceptions. We observed that the shift to ACT-based exposure was associated with greater psychological flexibility, treatment engagement, treatment acceptability, and treatment preference. These findings suggest there may be situations where ACT-based exposure has particular utility.

Keywords: Exposure therapy (with response prevention), Acceptance-based approaches, Cognitive-behavioral therapy, Obsessive Compulsive Disorder, Mechanisms of change in psychotherapy, Process research

Investigating an Acceptance and Commitment Therapy-based exposure therapy intervention in treatment-refractory OCD and related disorders: Changes in psychological flexibility, treatment engagement, and treatment perceptions

Exposure therapy is the most effective psychological treatment for obsessive-compulsive, anxiety, and traumatic stress-related disorders (Carpenter et al., 2018), but it is not universally effective. As a field, we continue to work to help those not responding to standard versions of empirically supported treatments by investigating alternative treatment methods that seek to optimize existing approaches. One emergent area of interest lies in the integration of Acceptance and Commitment Therapy (ACT), a third-wave cognitive-behavioral therapy (CBT), with exposure therapy to treat obsessive-compulsive disorder (OCD) (Twohig et al., 2015).

Through the years, exposure therapy for OCD has been conceptualized under several evolving cognitive-behavioral frameworks. The origins of the modern clinical perspective on exposure therapy lie in the emotional processing model (Foa & Kozak, 1986), which emphasizes presenting avoided stimuli to activate fear (a process facilitated by simultaneous ritual prevention in OCD), with the explicit goal of exposure being the reduction of distress, or habituation. Subsequently, the inhibitory learning model (Craske et al., 2008, 2014) translationally proposed inhibitory learning as the central mechanism underlying therapeutic change within exposure therapy and provided various techniques to optimally promote inhibitory learning, including removal of safety signals and use of multiple contexts during exposure. Rather than the focus of exposure being the reduction of fear, as in the habituation model, the goal of exposure in the inhibitory learning model is experiencing expectancy violation.

ACT-based exposure is not inconsistent with principles underlying inhibitory learning, and shares a lack of focus on fear habituation, but is a significant shift in approach to exposure therapy in that it frames the purpose of exposure in a different light. From an ACT perspective,

the purpose of exposure is to create behavior change in the presence of behavioral repertoire-narrowing stimuli by increasing psychological flexibility. Psychological flexibility is about learning a more functional relationship with inner experiences so that one can live a meaningful life. With increased psychological flexibility, clients can experientially learn how to allow their values to drive behavior instead of aversive stimuli. The construct of psychological flexibility comprises six core processes: defusion, acceptance, present moment awareness, self-as-context, values, and committed action (see Hayes et al., 2012). During ACT-based exposure, clients focus on seeing their thoughts as thoughts (defusion; "I'm having the thought that I can't cope with this") instead of as how things are (literally being unable to cope). They learn to be open and welcoming to unwanted inner experiences (acceptance), which ironically decreases the distress they have about their distress, and allows attention and energy to shift to the exposure task at hand. By focusing on what is happening in the moment (present moment awareness), new learning is facilitated about how the world actually works instead of how their mind says it works. Clients aim to see themselves as the place where thoughts and feelings happen (self-as-context), instead of being defined and controlled by them. This perspective shift creates the freedom to choose actions based on one's values instead of based on rigid stories about who they are and what they can and cannot do. When clients gain clarity about what is personally meaningful to them (values), it is easier both to know which actions to take in the presence of distress and uncertainty and to persist in those actions even when distress and uncertainty are high. Lastly, when clients learn how to take flexible, values-based action (committed action) in the presence of distress, their behavior is no longer guided by rules in their head (e.g., "If I do this exposure exercise, I will get better"), but instead guided by what actually works to create a

meaningful life (e.g., learning that holding one's child is meaningful and fulfilling even when having thoughts of harming the child), and thus their behavior becomes naturally reinforcing.

Compared to other models of exposure therapy, there exists less research investigating the processes of change in ACT-based exposure for OCD. While the data are at times mixed, researchers have generally found that psychological flexibility is significantly related to OCD, with greater inflexibility being associated with higher levels of symptoms (Bluett et al., 2014; Reuman et al., 2018). Additionally, prior work has shown that psychological flexibility skills can enhance one's ability to engage in aversive tasks (Gutiérrez et al., 2004; Hayes et al., 1999), including exposure exercises (Eifert & Heffner, 2003; Levitt et al., 2004). More recently, research has demonstrated that, specifically, greater levels of client willingness to experience unwanted thoughts and feelings (acceptance) is associated with faster symptom reduction in residential/day treatment for OCD (Reid et al., 2017). Finally, a recent study found that the best predictor of treatment response in exposure therapy for OCD was a strong acceptance/tolerance rationale, even more so than time spent engaging with in-session exposures (Ong et al., 2022).

It remains unclear if there are particular clients who may benefit most from a specific model of exposure therapy. Meta-analyses and randomized controlled trials comparing traditional CBT and ACT treatments across heterogeneous anxiety disorders demonstrate largely comparable performance of both intervention models, with ACT treatment outcomes being mediated through increases in psychological flexibility (Arch, Eifert, et al., 2012; Bluett et al., 2014; Twohig & Levin, 2017). Yet, work investigating moderators of treatment is beginning to identify situations where one approach may be preferable; in one study, ACT outperformed traditional CBT in participants with anxiety disorders who also carried a comorbid mood disorder (Wolitzky-Taylor et al., 2012). In secondary analyses of another study comparing

traditional exposure and ACT-based exposure, dysfunctional cognitive appraisals predicted greater OCD symptom severity to a larger extent in the traditional exposure condition compared to the ACT-based exposure condition, indicating a decoupling effect in ACT-based exposure (Ong et al., 2020). Of note, much research in this area compares the efficacy of entire modalities of intervention (e.g., traditional CBT vs. ACT) that may include elements of exposure. For example, one component analysis study of mental obsessions and compulsions found comparable levels of rated treatment acceptability between a single session each of traditional exposure and ACT therapy (Fabricant et al., 2013). On the other hand, less work has directly isolated and compared exposures framed from differing perspectives. There is one randomized controlled trial to our knowledge that directly compared exposure therapy from a standard CBT perspective and exposure therapy from an ACT perspective in OCD (Twohig et al., 2018). This study found both interventions to be comparably effective, with no differences in treatment engagement or acceptability. Another study found no difference in people's perception of treatment credibility when exposure therapy was framed from different rationales (e.g., traditional CBT perspective versus ACT perspective) (Arch et al., 2015). While the field has made some progress in beginning to investigate treatment moderators, there remains room for further inquiry. Whether there are certain sub-populations for whom an alternative approach to exposure may result in greater treatment progress—especially if these populations have not responded to a standard approach—remains an open question.

We sought to investigate whether shifting to an ACT-based exposure approach would result in clinical changes with a treatment-refractory population in an OCD clinic who were not responding to standard treatment, comprising exposure therapy conducted from a habituation model. Given that the previous body of literature suggests psychological inflexibility plays a

role in the presentation of anxiety-related disorders, changes in psychological flexibility are associated with symptom improvement, and that ACT is associated with changes in psychological flexibility, we were curious if a shift in approach to ACT-based exposure would be associated with changes in treatment processes, outcomes, and treatment perceptions in this population. In a within-subjects, single-session design utilizing multiple informants, we examined whether there were changes in psychological flexibility, number of rituals performed, distress, treatment engagement, compliance, acceptability, and treatment preference following the intervention shift. We predicted that the shift to ACT-based exposure would be associated with higher ratings of psychological flexibility, treatment engagement, compliance, acceptability, and treatment preference. We additionally expected no changes in reported distress, but fewer reported rituals in the ACT-based exposure.

Method

Participants

The sample consisted of 29 adult participants (41.4% female) with a mean age of 35.38 years (SD=11.76) recruited from an intensive residential/day treatment program for OCD and related disorders between 2012-2014. The sample was primarily white (82.8%) and consisted of clients who were referred or self-referred and admitted to McLean Hospital's OCD Institute (OCDI). The majority of participants enrolled in this study carried a primary diagnosis of OCD (69.0%) based on clinician judgment, and treatment for all participants centered around exposure therapy for OCD and related disorders characterized by anxiety symptoms (see OCDI Treatment section below and **Supplementary Methods**). Participants enrolled in this study were those deemed to not be making the expected progress in treatment at the OCDI as determined by the client's behavior therapist, with an average OCDI treatment length of 45.83 days (SD=18.70)

before study enrollment. So as not to confound the study with varying levels of motivation for treatment, all enrolled participants were already motivated for and exhibiting effort in treatment (e.g., pushing themselves to complete exposure tasks and exerting effort to resist rituals). See **Table 1** for a breakdown of sample demographics and other characteristics, including diagnoses and average levels of symptoms.

OCDI Treatment

During the time this study was conducted (2012-2014), intensive residential/day standard treatment at the OCDI consisted of individual, group, and milieu therapy, all of which were based upon principles of CBT. The treatment largely focused on exposure therapy, as clients engaged in an average of four hours of exposure each day, which was divided into an average of one coached hour and three self-directed hours. At the time of this study, standard exposure therapy at the OCDI was focused on facilitating exposure to feared stimuli while preventing rituals and tracking distress reduction, a habituation model of exposure. Inhibitory learning theory (Craske et al., 2008) and its application to exposure therapy had not fully penetrated the OCD treatment community, and these strategies were not yet formally incorporated into exposures at the OCDI.

Measures

Post-Exposure Session Questions (PESQ). This measure was developed by the authors to assess psychological flexibility, number of rituals performed, levels of distress, treatment engagement, and treatment preference, as no existing validated measure assesses these constructs during a given exposure session. Questions demonstrated face validity and partially overlapped with previously published work (see Levitt et al., 2004). Ratings were collected from both participants (PESQ-P, **Supplementary Table 1**) and independent raters (PESQ-R,

Supplementary Table 2) in a multi-informant method, except for treatment preference, which was reported by participants only. Psychological flexibility was measured with items assessing defusion, acceptance, and values. Note that three psychological flexibility processes (present moment awareness, self-as-context, committed action) were not formally included on the PESQ-P and PESQ-R. While these processes were targeted in the ACT-based exposure as needed to increase specific elements of psychological flexibility that appeared to be interfering with treatment progress, their overlap with defusion, acceptance, and values was judged sufficient enough to warrant exclusion in order to simplify the measures and reduce participant burden (see **Supplementary Methods**). Treatment engagement was measured with items assessing effort to follow the exposure plan while resisting rituals, trouble initiating the exposure, and willingness to do the exposure again. Only participants rated willingness to do the exposure again, as third parties are unable to accurately assess this construct. See **Supplementary Methods** for further detail.

Exposure Compliance Rating Scale (ECRS). Treatment compliance was assessed with the ECRS (**Supplementary Table 3**), consisting of a single item measuring the extent to which the participant complied with the exposure session, as determined on a Likert scale by the independent rater.

Treatment Evaluation Inventory-Short Form (TEI-SF). The TEI-SF (Kelley, Heffer, Gresham, & Elliott, 1989) is a participant self-report 9-item questionnaire used to measure perceived treatment acceptability, with good reliability (α = .85). A modified 8-item version of the measure was used in this study, omitting a question that is relevant only to people with developmental disorders.

Procedures

Written informed consent was obtained from eligible participants in accordance with the McLean Hospital Institutional Review Board. The study consisted of two study sessions scheduled on two consecutive days in the morning.

Data were first collected on the standard exposure session the day before the ACT-based exposure intervention as this study was a test of an intervention shift for clients who were not responding to standard clinic treatment. During this session, a trained exposure therapy coach guided the participant through a 50-minute standard exposure session designed by the participant's behavior therapist to focus on facilitating contact with distressing/avoided stimuli, resisting rituals, and tracking distress reduction. A trained research assistant observed the session as the independent rater. Immediately following the session, the participant completed the PESQ-P and TEI-SF, and the rater completed the PESQ-R and ECRS.

During the second study session the next day, an ACT-trained therapist (JC) first conducted a 50-minute ACT consultation session with the participant, observed by an ACT-trained exposure therapist (NG). In this consultation session, the therapist assessed and targeted psychological inflexibility processes (e.g., cognitive fusion instead of defusion, experiential avoidance instead of acceptance, lack of values clarity instead of values clarity) that appeared to be interfering with the participant's treatment progress. Following the consultation session, the ACT-trained exposure therapist coached the participant through a 50-minute exposure similar to the one the participant completed during day one of the study, but with an emphasis on using the ACT concepts and skills taught during the previous ACT consultation session. In contrast with the standard exposure session, the ACT-based exposure intervention focused on coaching the participant through facing distressing/avoided stimuli while learning to see distressing/avoided thoughts and feelings as experiences they were having rather than reflections of reality

(defusion), being open to experiencing these thoughts and feelings (acceptance), and behaving in ways that are personally meaningful in response to the stimuli (values). The consultation session enabled us to first identify the specific, idiosyncratic stimuli creating cognitive fusion, experiential avoidance, and/or lack of values clarity and then to shift the focus of exposure work to practicing defusion, acceptance, and values-focused action in their presence.

For example, during an ACT-based exposure intervention with a participant practicing making quick decisions while refraining from over-thinking, the participant practiced doing this while simultaneously defusing from the thought, “This treatment isn’t going to work for me.” More specifically, the therapist interjected statements like, “This treatment isn’t going to work for you” and other random positive, negative, and neutral thoughts while the participant practiced relating to the therapist’s statements as mere unhelpful or helpful sounds and shifting attention back to making quick decisions without over-thinking (see Hayes et al., 2012 for a full description of the related "Taking your mind for a walk" exercise). The ACT consultation facilitated the addition of this defusion component by revealing that the participant had been internally, yet not overtly, disengaging from the exposure exercise in response to distressing thoughts about treatment being unsuccessful. More specifically, the participant shared in the ACT consultation session that in treatment thus far he had been willing to follow his exposure plan, but he was often ruminating about whether the exposure plan would actually help him instead of focusing fully making quick decisions. Immediately following the ACT-based exposure intervention, the participant again completed the PESQ-P and TEI-SF, and the rater completed the PESQ-R and ECRS.

To further illustrate differences in approach between the standard exposure session and ACT-based exposure intervention, the following is an example of how the exposures were

conducted with a participant struggling with obsessions about his inability to concentrate while reading. In the standard exposure, the participant read a story he had written about how he was losing his ability to concentrate and would not be able to enjoy his life because of his lack of concentration. The exposure therapy coach encouraged the participant to come into contact with his fear of losing his concentration, worked to prevent the participant from engaging in mental rituals such as worry/rumination, and tracked subjective units of distress. The participant read the story repeatedly until he experienced distress reduction.

In the ACT-based exposure intervention, the same participant practiced reading from a book he wanted to read (a personally meaningful, valued behavior) while noticing when obsessions occurred (e.g., "I can't focus") that were distracting him from reading. When obsessions occurred, the therapist would write the content of the obsessions on a piece of paper and give it to the participant to have next to him (defusion). When the obsessions started to distract him from reading again, the participant was coached to lift the paper in front of his face to acknowledge that he was becoming caught in the obsessions. He would then shift and return to reading (valued behavior) while placing the paper next to him to symbolize his willingness to read while allowing the obsessions to be present (acceptance). The participant was never directly told to stop himself from engaging in mental rituals, but was encouraged to notice when obsessions were distracting him, allow them to be there, and return his attention to his book. Tracking of subjective units of distress did not occur, and instead the therapist prompted the participant as needed to be open to his obsessions and distress while gently shifting attention back to reading.

Of note, on their face, both approaches to exposure here share some overt behaviors, (e.g., reading). Yet, the two interventions are framed in a different manner and therefore encourage a different focus and internal stance within the participant.

Analyses

To determine whether the standard exposure session and the ACT-based exposure intervention differed on multivariate factors of psychological flexibility and treatment engagement, we conducted one-way repeated measures multivariate analysis of variance (MANOVA) using multRM from the MANOVA.RM package (version 0.5.3) (Friedrich et al., 2019, 2022) in R (version 4.2.1). Ratings made by participants and independent raters were analyzed in separate models for each set of factors (psychological flexibility: defusion, acceptance, values; treatment engagement: effort to follow exposure plan and resist rituals, trouble initiating exposure, willingness to repeat exposure). In contrast to standard MANOVA, which requires satisfaction of several assumptions, with MANOVA.RM we utilized a parametric bootstrap approach that "provides a… comprehensive methodological route to inference for multivariate and repeated measures data" (Bathke et al., 2018, p. 2) and is robust to violations of normality and heteroskedasticity as well as suitable for smaller sample sizes (Friedrich & Pauly, 2018). For these models, we reported the parametrically bootstrapped (10,000 iterations) multivariate ANOVA-type statistic (MATS; analogous to an F statistic in the standard approach) and p-value. For each significant omnibus model, we performed post-hoc univariate repeated measures calculations to determine which factors contributed to the rejection of the null hypothesis. For these post-hoc analyses, we reported the parametrically bootstrapped (10,000 iterations) univariate ANOVA-type statistic (ATS; analogous to a t-statistic from a post-hoc t-test in the standard approach) and p-value. All reported p-values were corrected for multiple

comparisons at the level of the hypothesis, using false discovery rate (FDR) correction (Benjamini & Hochberg, 1995).

For univariate computations of whether rituals, distress, and treatment acceptability differed between interventions, we conducted paired samples t-tests, with ratings made by participants and independent raters analyzed in separate models. One participant did not report the number of rituals they performed in the ACT-based exposure, and non-numerical values (infinity, or constant ritualizing) were reported for rituals by independent raters for two participants in both the standard exposure and ACT-based exposure intervention; these three cases were excluded listwise in the rituals analyses. A Wilcoxon signed-rank test was used to assess whether treatment compliance differed by exposure type, as this test is appropriate for use with ordinal data. Lastly, a chi-square goodness of fit test was used to determine whether there was a significant pattern in the distribution of participant treatment preferences.

Results

Psychological Flexibility

Repeated measures MANOVA revealed that participant-reported psychological flexibility significantly differed between interventions (MATS=8.34, p=.02) (**Figure 1**). Post-hoc analyses demonstrated that this pattern of results was driven by differential values ratings (ATS=8.75, p=.02), defined as the extent to which participants felt the exposure was focused on helping them work towards what is important to them in life. Values ratings were higher for the ACT-based exposure intervention (M=87.93, SD=20.38) compared to the standard exposure session (M=70.48, SD=28.79). Psychological flexibility as reported by independent raters demonstrated a similar pattern of results at a trend level (MATS=5.46, p=.051) (**Supplementary Figure 1**), again driven by values ratings (ATS=5.61, p=.08), with higher ratings for the ACT-

based exposure intervention (M=98.97, SD=4.09) compared to the standard exposure session (M=92.93, SD=14.11).

Rituals and Distress

Paired samples t-tests revealed no differences in the number of rituals performed between interventions, as assessed by both participants and independent raters. There was no difference in levels of distress between interventions as assessed by participant ratings, and a trend level difference of higher distress in the ACT-based exposure intervention (M=81.38, SD=18.66) compared to the standard exposure session (M=72.93, SD=21.57) as assessed by independent raters (t(28)=-2.04, p=.051) (**Supplementary Figure 2**).

Treatment Engagement

There were no differences in participant-reported levels of treatment engagement between interventions. However, independent rater-reported levels of treatment engagement significantly differed by intervention (MATS=4.94, p=.009) (**Figure 2**). Post-hoc analyses revealed that these findings were driven by differential ratings in amount of effort exerted to follow the exposure plan while resisting rituals (ATS=7.39, p=.02), such that there were higher effort ratings in the ACT-based exposure intervention (M=80.69, SD=14.92) compared to the standard exposure session (M=70.52, SD=20.24).

Treatment Perceptions

Treatment compliance did not differ between interventions. Treatment acceptability significantly differed between interventions (t(28)=-2.58, p=.02), with higher acceptability ratings for the ACT-based exposure intervention (M=32.28, SD=4.72) compared to the standard exposure session (M=29.45, SD=4.54) (**Figure 3**). Furthermore, participants significantly preferred the ACT-based exposure intervention (X^2 (2, N=29)=27.59, p<.001), with 79% of

participants (n=23) preferring the ACT-based exposure intervention, 10% (n=3) preferring the standard exposure session, and 10% (n=3) indicating no preference (**Figure 4**).

Discussion

In treatment-refractory clients at an OCD clinic not responding to standard treatment, we examined a shift in treatment approach. Compared to continuing standard treatment comprising exposure therapy aligned with the habituation model, a single session of ACT-based exposure therapy was associated with higher reports of psychological flexibility and higher independent rater reports of treatment engagement. Specifically driving this pattern of results was higher values ratings, meaning participants (and raters, at a trend level) reported the ACT-based exposure intervention was more focused on helping them work towards what is important to them in life. Specifically driving the higher rater reports of treatment engagement in the ACT-based exposure was higher rater reports of effort exerted to follow the exposure plan while resisting rituals. We additionally found the ACT-based exposure intervention to be related to more positive perceptions of treatment, including higher ratings of treatment acceptability and an overall preference for ACT-based exposure. These findings elucidate clinically relevant changes that occurred when shifting the framework of exposure therapy and contribute insights towards mapping when alternative treatments may be most suitable.

Greater psychological flexibility was reported in the shift to the ACT-based exposure intervention, which was expected, as increasing psychological flexibility is an explicit target of ACT. This change in psychological flexibility was driven by higher values ratings, or the degree to which the session helped participants work towards what is important in their life. Interestingly, ratings of defusion and acceptance did not change. It has been found in prior research that standard exposure can increase defusion and acceptance (Arch, Wolitzky-Taylor, et

al., 2012; Reid et al., 2017), so it is possible defusion and acceptance had increased since clients admitted to OCDI and an additional ACT-based exposure did not further increase these levels. It is also possible that learning to relate to internal experiences as merely thoughts and feelings rather than reflections of reality (defusion) and welcoming these experiences rather than trying to change, control, or reluctantly endure them (acceptance) are skills that may take significant practice to develop, requiring more than a single session. Mentally connecting exposure tasks with values and meaning may be an easier skill to engrain in a single session. Qualitative data from our study participants illustrate this possibility. For example, one participant's exposure task was to practice feeling an urge to pick her skin without acting on the urge. Her standard exposure framed this task as focusing on "sitting with the urge" and resisting the urge to pick her skin until her discomfort subsided. In contrast, her ACT-based exposure intervention framed this task as focusing on noticing the urge, and then behaving in a values-consistent way (e.g., behaving as who she would like to be) in its presence. For the participant, this specifically entailed noticing urges to pick her skin and then shifting her attention back to a conversation with the ACT-based exposure therapist, focusing on how this choice would allow her to be more present and engaged with her friends when urges to pick occur in her life:

"The session gave me a lot to think about … [during the standard exposure] I felt I was constantly putting a lot of effort towards resisting the urge to pick [my skin] … [while during the ACT-based exposure intervention] I wasn't counting down the minutes and fighting tooth and nail to resist the urges. Values felt very motivational. The therapist said every moment you don't pick, you're one step closer to being a better friend. I never thought of it like that. I think broadening the scope of my focus helped. I had been thinking of [standard exposure] only as a

time to practice feeling uncomfortable without doing anything about it. I haven't focused deeply on the values behind resisting [skin picking]. There are reasons for and against [skin picking], but my values seem more clear-cut."

This participant account describes a shift in an internal mindset. Values clarification and centering during exposure may provide a way to enhance internal motivation for treatment, especially for a treatment that is often regarded as aversive. While "powering through" exposure therapy is a treatment interfering behavior that constrains new learning, as it functions as a potential safety behavior and impediment to expectancy violation maximization (see Craske et al., 2014 for a discussion of these principles), framing exposure in terms of values-driven behaviors may position exposure tasks as more desirable and additionally reduce the likelihood of "powering through" the work. As psychological flexibility processes are, to a large extent, internal processes, this may address the discrepancy in statistical significance between participant and independent rater results. Though we found the same overall pattern of psychological flexibility and values results regardless of reporter, results were statistically significant per participant report and a trend level of significance per independent rater report; it may be more challenging for a third party to accurately assess such internal processes. Of note, as we assessed change in three of six psychological flexibility processes to reduce participant burden, further research is needed to examine potential differential impacts of exposure type on all psychological flexibility processes.

Contrary to our prediction, we did not observe changes in the number of reported rituals associated with the intervention shift. While the focus on ritual prevention is explicit in standard exposure, rituals are implicitly expected to decrease in ACT-based exposure as the client learns

to notice and welcome unwanted thoughts and feelings while engaging in personally meaningful behaviors, instead of focusing on performing rituals to decrease unwanted internal experiences (Twohig et al., 2015). Given this, the nature of the two types of exposure tasks is relevant. To create opportunities for practice of defusion, acceptance, and values-driven behaviors in the presence of stimuli creating fusion, avoidance, and lack of values clarity, the ACT-based exposures required additional stimuli to be confronted. For example, as mentioned previously, one participant's standard exposure involved making quick decisions while refraining from over-thinking. Their ACT-based exposure focused on making quick decisions while simultaneously defusing from the thought, "This treatment isn't going to work for me," as these types of thoughts had previously been prompting internal disengagement (rumination) from the task. For further examples of the differences in approach between exposure types, see **Supplementary Methods.** With these types of additional co-occurring exercises, the ACT-based exposures might have been experienced as more challenging than standard exposures. On the other hand, one might wonder if engaging in values-driven behaviors in the presence of aversive stimuli could instead function as a distraction and make ACT-based exposures *less* challenging. For example, some exposures called for clients to shift between accepting unwanted experiences and focusing on a conversation with the therapist (values-driven behavior) while in the presence of aversive stimuli. However, participants reported both forms of exposure as equally distressing and independent raters reported ACT-based exposure was more distressing at a trend level. Our data therefore suggests ACT-based exposure was not less challenging, and potentially could have been more challenging. Additionally, in ACT-based exposure, attention is repeatedly drawn back to the aversive stimulus in order to practice shifting back towards values-based behavior, a practice incompatible with sustained distraction. Furthermore, distraction would impede new

learning, but ACT-based exposure is not *less* effective than standard exposure (Twohig et al., 2018), suggesting that ACT-based exposure might facilitate learning differently rather than functioning as a distraction. It is additionally possible that a single session of ACT-based exposure may not result in sufficient mastery of psychological flexibility skills that would lead to ritual reduction, while the standard exposure was in line with the treatment participants had received previously at the OCDI. After all, "[ACT] techniques… are multifaceted and complex, and often paradoxical and confusing to the participants" at first, before reaching mastery (Hayes et al., 2003, p. 75). One participant noted, "I am sort of confused about how I am supposed to not do what the thoughts say or want me to do, and at the same time not ignore them" in reference to not fully understanding how to integrate defusion and acceptance into her exposure therapy. It is likely participants may have needed more practice and guidance with some psychological flexibility skills to become competent; in a single session we observed changes in levels of values-focused action but not defusion or acceptance between interventions, which may be more challenging to master. Increases in psychological flexibility have been shown to relate to decreased OCD symptoms (Bluett et al., 2014), and psychological flexibility might play a more powerful role in symptom change when *all* processes are fully understood and consistently practiced. Indeed, a recent randomized dismantling trial found in a study of distressed college students that increases in *all* psychological flexibility processes, as opposed to targeting only a subset of processes, led to greater improvements on mental health outcome measures (Levin et al., 2020). Consistent with the idea that more than a single session may be needed for ACT to make an impact on rituals—especially in a treatment-refractory population—in one study, individuals with OCD experienced a reduction in rituals following an ACT intervention, but this occurred over several sessions of treatment (Twohig et al., 2006).

Between the two treatment interventions, the ACT-based exposure intervention was associated with higher levels of distress at a trend level when assessed by independent raters only. This result bordered on statistical significance, and it is possible a third party's assessment of distress may not be as reliable as direct self-report. However, if accurate, this speculatively could relate to the point that the additive nature of the ACT-based exposure tasks could have been perceived as more challenging and therefore more distressing. Also, a single session may or may not be representative of longer-term treatment; several studies demonstrate that ACT interventions correspond to decreases in psychological distress that do not occur until much later in treatment or not until follow-up (Luoma et al., 2012). Even so, it is interesting to note that despite this trend-level association with distress, the vast majority of participants preferred the shift to the ACT-based exposure and rated it as more acceptable. The ACT framework of exposure emphasizes acceptance and welcoming of internal experiences, including distress, so perhaps this new way of relating to distress no longer positions it as an impediment to treatment acceptability. A non-mutually exclusive alternative is that the framing of exposure tasks as value-driven behaviors may enhance willingness to be open to distress, rather than seeing it as an obstacle to treatment acceptability. While rituals and distress are important measures of symptoms, this paradox of ACT-based exposure trending towards being more distressing and yet simultaneously more preferred and acceptable additionally points to the philosophical question as to which outcome measures are of interest. Engaging in values-driven behaviors is reflective of quality of life and enables psychological thriving rather than merely the absence of symptoms; perhaps these types of outcomes ought to receive greater empirical attention.

We also observed changes associated with the intervention shift in terms of greater treatment engagement with and more positive treatment perceptions of the ACT-based exposure

intervention. Independent raters reported higher levels of treatment engagement in the ACT-based exposure, a pattern of results driven by higher ratings of effort exerted to follow the exposure plan while resisting rituals. Although ACT-based exposure does not explicitly focus on ritual prevention, it focuses on engaging in values-driven behaviors, which is incompatible with ritualizing. Treatment compliance was sufficient and did not vary between interventions, but treatment acceptability was significantly higher for ACT-based exposure and 79% of participants indicated ACT-based exposure as their treatment preference. Treatment acceptability and preference are of the utmost importance in psychotherapy; clients choosing to engage in *any* type of beneficial treatment is preferable to not engaging in treatment. ACT-based exposure may be one way to increase participation in treatment, particularly in a severe, treatment-refractory population not responding to standard treatment or for those who may otherwise benefit from an alternative to traditionally-framed exposure.

There were several limitations to this study, including several methodological considerations dictated by the constraints of a naturalistic treatment setting. First, providers were of varying levels of experience, and it is possible that our findings may have been influenced by differences in ACT therapist skillfulness or therapeutic alliance compared to the client's standard treatment therapist. These concerns are partially mitigated both by training study personnel and by data suggesting therapist experience does not significantly impact outcomes for clients with anxiety disorders (Walsh et al., 2019). However, we did not measure nonspecific factors of treatment including therapeutic alliance and skill—future work should address the influence of these factors. The study of treatment-refractory populations introduces several challenges; namely, the possibility that more positive perceptions of the ACT-based exposure may have been influenced by demand characteristics inclining participants to report favorably on a new

intervention, or by participants' hope for something new, given insufficient progress in standard treatment. Our pattern of results was fairly specific, suggesting demand characteristics may not be responsible for driving the findings, but to best investigate this possibility and isolate effects specific to shifts to ACT-based exposure, future work in treatment-refractory populations should directly compare shifts to various forms of treatment. Because we chose to study a treatment-refractory population not responding to standard treatment, participants had prior experience with the standard exposure, as this was essentially a continuation of their prior treatment at the OCDI. Given this experience, it is notable that changes were observed from a shift to only a single session of ACT-based exposure, even if it was delivered by a skilled therapist. By administering the ACT-based exposure second, we were unable to keep independent raters unaware of intervention type, but we gained the ability to assess the intervention shift in isolation. If the ACT-based exposure had occurred first and participants found the ACT skills helpful, it would have been possible for them to incorporate ACT skills into the following session without experimenter knowledge. Studying a severe, treatment-refractory population might limit generalizability and does not, in and of itself, provide *prospective* indications for which individuals might be best suited for which model of exposure. However, testing our hypotheses on this population may provide a conservative estimate of effects, demonstrates that a pivot in therapeutic frame may produce changes even in treatment-refractory populations, and suggests which constructs may be particularly of interest to pursue in future continued work. Participants in this study had heterogenous diagnoses (about 30% did not meet criteria for OCD based on clinician judgment); on one hand, this may be viewed as an indicator of generalizability of our results, but on the other hand, it tempers any claims about applicability of these results to specific disorders. Future work on ACT-based exposure should assess its effectiveness on

treatment-refractory clients with specific diagnoses to test such claims. This study examined a shift to ACT-based exposure from a standard exposure therapy intervention that was based on the habituation model, as inhibitory learning-based exposure was not formally delivered at the OCDI during the time of this study. Despite the emerging consensus that inhibitory learning is the central translational mechanism through which exposure operates (Craske et al., 2008), habituation-based models of treatment derived from emotional processing theory (Foa & Kozak, 1986) are widespread today, so there is value in this investigation. The measures that were developed by the authors are novel and have unknown psychometric properties. Lastly, due to funding and feasibility constraints, this study comprised a single session of the shift in intervention; we consider our findings preliminary evidence suggesting that future research investigating different models of exposure therapy over time is not only merited, but important for advancing the field.

Strengths of this study include a difficult-to-recruit, vulnerable population of treatment-refractory adults in a residential/day treatment setting not responding to standard treatment. This setting allowed for extraneous lifestyle factors and experiences to be relatively controlled. Additionally, a range of process and outcomes variables were assessed, enabling us to examine treatment effects with a high degree of granularity, and multiple reporters were used to help offset bias in perspective. Lastly, the McLean Hospital OCDI is primarily a clinical setting, and this study was the first of its kind to be piloted there. Naturalistic treatment settings enable the examination of interventions as they are delivered in the real world, akin to the strengths in investigating treatment effectiveness in addition to only efficacy.

At an OCD clinic, a shift to ACT-based exposure therapy in a treatment-refractory population not responding to standard exposure therapy was associated with greater levels of

psychological flexibility, treatment engagement, treatment acceptability, and treatment preference. Understanding clinically relevant changes associated with alternative models of exposure therapy can contribute towards the development of strategies to identify which treatments may be most suited to which people. Our findings contribute to the literature providing initial evidence for the positive impact of a shift in exposure approach to ACT-based exposure for treatment-refractory clients. Future work extending this line of investigation is warranted to continue working towards evidence-based methods of optimizing exposure therapy.

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Tables

Table 1. Sample demographics and characteristics

Characteristics	Percent	n
Sex (female)	41.38%	12
Race/ethnicity		
American Indian/Alaska Native	3.45%	1
Asian	6.90%	2
Hispanic/Latino	3.45%	1
Multiracial	3.45%	1
Not reported	3.45%	1
White	82.76%	24
Primary diagnosis		
OCD	68.97%	20
Other obsessive-compulsive-related disorder	3.45%	1
Anxiety disorder	27.59%	8
Comorbid diagnoses		
Anxiety disorder	10.34%	3
Depressive disorder	55.17%	16
Personality disorder	13.79%	4

	Mean	SD
Age (years)	35.38	11.76
Length of treatment prior to study (days)	45.83	18.70
YBOCS*	26.75 (27.47)	6.29 (4.95)
OCD Symptom Checklist obsession domains*	4.46 (4.90)	2.22 (2.27)
OCD Symptom Checklist compulsion domains*	3.61 (4.15)	1.93 (1.93)
QIDS	14.07	5.65
BASIS	31.00	11.99

YBOCS, Yale-Brown Obsessive-Compulsive Scale; QIDS, Quick Inventory of Depressive Symptomatology; BASIS, Behaviour and Symptom Identification Scale-24. See Supplementary Methods for further information.

*Note that 31% of participants did not meet criteria for OCD based on clinician judgement, but the YBOCS and OCD Symptom Checklist were administered to all clients at OCDI at time of study. Means and standard deviations of these measures are reported for the full sample (n=29), with the summary statistics for only those participants meeting criteria for OCD (n=20) presented in parentheses for comparison.

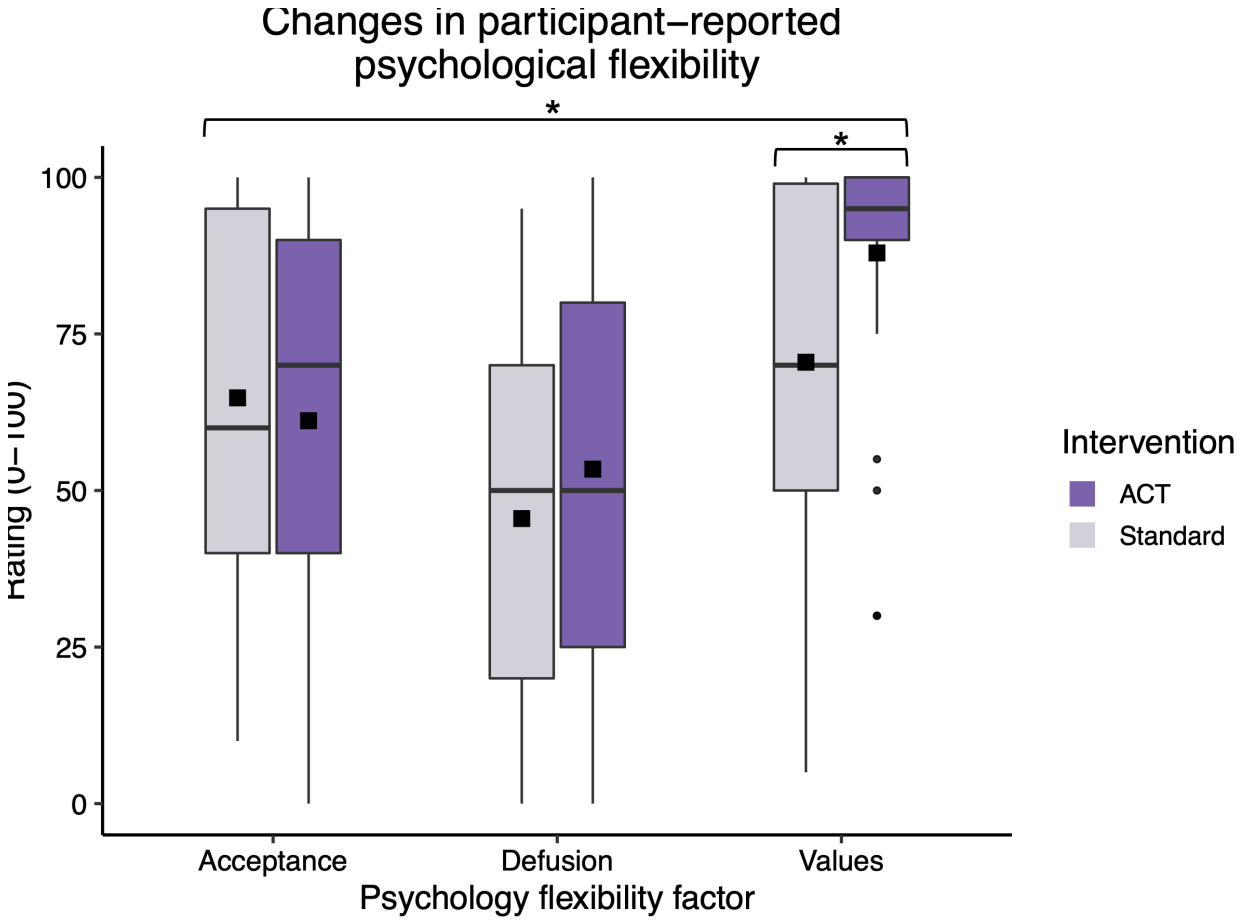
Figure Legends

Figure 1. Changes in participant-reported psychological flexibility.
Psychological flexibility, as reported by participants, significantly differed between interventions (MATS=8.34, p=.02). This pattern of results was driven by differential values ratings (ATS=8.75, p=.02), defined as the extent to which participants felt the exposure was focused on helping them work towards what is important to them in life, with higher values ratings for the ACT-based exposure intervention (M=87.93, SD=20.38) compared to the standard exposure intervention (M=70.48, SD=28.79). Higher ratings indicate greater endorsements of all psychological flexibility factors. The boxplots visualize the first and third quartiles (25^{th} and 75^{th} percentiles), median (horizontal line), mean (black squares), and any outliers (>1.5*interquartile range, black circles). *, p<.05.

Figure 2. Changes in rater-reported treatment engagement.
Treatment engagement, as reported by independent raters, significantly differed between interventions (MATS=4.94, p=.009). This pattern of results was driven by differential ratings in amount of effort exerted to follow the exposure plan while resisting rituals (ATS=7.39, p=.02), with higher effort ratings for the ACT-based exposure intervention (M=80.69, SD=14.92) compared to the standard exposure intervention (M=70.52, SD=20.24). Higher ratings indicate greater endorsements of all treatment engagement factors. The boxplots visualize the first and third quartiles (25^{th} and 75^{th} percentiles), median (horizontal line), mean (black squares), and any outliers (>1.5*interquartile range, black circles). **, p<.01; *, p<.05.

Figure 3. Changes in treatment acceptability.
Treatment acceptability, as reported by participants, significantly differed between interventions (t(28)=-2.58, p=.02), with higher acceptability ratings for the ACT-based exposure intervention (M=32.28, SD=4.72) compared to the standard exposure intervention (M=29.45, SD=4.54). The boxplots visualize the first and third quartiles (25^{th} and 75^{th} percentiles), median (horizontal line), mean (black squares), and any outliers (>1.5*interquartile range, black circles). *, p<.05.

Figure 4. Treatment preference.
Participants significantly preferred the ACT-based exposure intervention (X^2 (2, N=29)=27.59, p<.001), with 79% of participants (n=23) preferring the ACT-based exposure intervention, 10% (n=3) preferring the standard exposure intervention, and 10% (n=3) indicating no preference.


Changes in participant−reported psychological flexibility
*
*
100
75
50
25
0
Rating (0−100)
Acceptance
Defusion
Values
Psychology flexibility factor
Intervention
ACT
Standard

Investigating an Acceptance and Commitment Therapy-based exposure therapy intervention in treatment-refractory OCD and related disorders: Changes in psychological flexibility, treatment engagement, and treatment perceptions

Supplementary Information

Table of Contents

Supplementary Methods

Measures

Psychopathology. Upon admission at the McLean Hospital OCD Institute (OCDI), clients completed the Yale-Brown Obsessive-Compulsive Scale (YBOCS), OCD Symptom Checklist, Quick Inventory of Depressive Symptomatology (QIDS), and Behaviour and Symptom Identification Scale-24 (BASIS). The YBOCS is a structured clinical interview with scores ranging from 0-40 (0-13 mild symptoms; 14-25 moderate symptoms; 26-34 moderate-severe symptoms; 35-40 severe symptoms) (Storch et al., 2015). The QIDS is a self-report questionnaire assessing depression symptoms, with possible scores ranging from 0-27 (<6 no depression; 6-10 mild depression; 11-15 moderate depression; 16-20 severe depression, >20 very severe depression) (Rush et al., 2003). The BASIS is a self-report measure of psychopathology and functioning with overall scores ranging from 0-96, specifically assessing the following domains: depression and functioning, interpersonal relationships, psychosis, substance abuse, emotional lability, and self-harm (Cameron et al., 2007).

Post-Exposure Session Questions (PESQ). This measure was developed by the authors to assess psychological flexibility, number of rituals performed, levels of distress, treatment engagement, and treatment preference, as no existing validated measure assesses these constructs during a given exposure session. Ratings were collected from both participants and independent raters, except for treatment preference, which was reported by participants only. The number of rituals performed during the exposure session and the level of distress experienced during the exposure session were assessed individually, and the remaining items were grouped into two constructs used in data analysis: “psychological flexibility” and “treatment engagement.”

The following items were considered to reflect the construct “psychological flexibility” in accordance with the ACT therapeutic orientation: the extent to which uncomfortable thoughts and feelings did not influence the participant’s behavior (defusion), how open the participant was to their discomfort (acceptance), and how much they believed the exposure session was focused on helping them work towards what is important in their life (values). Questions related to the ACT processes present moment awareness, self-as-context, and committed action were not included in order to simplify the measure and reduce participant burden. However, these processes were targeted in the ACT-based exposure sessions as needed to increase specific elements of psychological flexibility that appeared to be interfering with treatment progress.

The following items were considered to reflect the construct “treatment engagement:” effort to follow the exposure plan while resisting rituals, trouble initiating the exposure, and willingness to do the exposure again. Because third parties are unable to accurately assess willingness to repeat the exposure, independent raters were not asked this question and assessed only the other two treatment engagement factors.

McLean Hospital OCD Institute

Typical presenting population. The OCDI primarily treats clients with OCD and related disorders, including Social Anxiety Disorder, Generalized Anxiety Disorder, Specific Phobia, Excoriation Disorder, Trichotillomania, and Hoarding Disorder, with common presenting comorbidities including Major Depressive Disorder and a variety of personality disorders. Before admission to the OCDI, clients generally have undergone one or more trials of outpatient (or more intensive) CBT/exposure therapy with minimal benefit; as such, this was the case for clients in our sample.

Standard treatment. Our participants engaged in standard intensive residential/day standard treatment at the OCDI, which during the time this study was conducted (2012-2014) included components of individual, group, and milieu therapy that were all based upon principles of CBT. Exposure therapy was a core treatment element. Coached hours of exposure therapy were provided by behavioral coaches, who are typically bachelors-level counselors who have been trained in exposure therapy for OCD and related disorders. Clients additionally engaged in self-directed exposures. When not engaging in exposure therapy, clients also attended at least three 50-minute therapy groups daily (e.g., cognitive therapy, mindfulness, emotion regulation) which targeted specific symptoms and taught skills from a variety of therapeutic modalities, including CBT, ACT, and Dialectical Behavior Therapy. Throughout the week, clients also met regularly with their treatment team, which included a behavior therapist, family therapist, and psychiatrist.

Comparing Standard Exposure and ACT-Based Exposure

The main manuscript provides two examples of the differences between the standard exposure approach used here, based on the habituation model, and ACT-based exposure. To facilitate further understanding of the differences in these approaches and illustrate the explicit incorporation of psychological flexibility processes into exposures, we provide the following additional examples.

Example 1. Standard exposure: A participant with contamination obsessions practiced touching objects she perceived to be “gross” in the bathroom while refraining from avoidance and handwashing rituals, and tracking subjective units of distress. When this participant engaged in avoidance behaviors such as asking when the exposure would be over and when she could wash her hands, the exposure coach asked her to sit with the feeling of contamination and return her attention to the objects she was touching in the bathroom.

ACT-based exposure: The same participant practiced touching objects she perceived to be “gross” in the bathroom while viewing all experiences she was having as gauges on a car dashboard that can be potentially useful, but also harmful if they are focused on too narrowly at the exclusion of other gauges. The participant practice touching objects in bathroom while noticing which “gauges” she was focused on (e.g., the “This sink is gross” gauge), then shifting focus towards more “useful gauges,” and then repeating these shifts between focusing on “grossness gauges” and “useful gauges.” Useful gauges included her values around having a loving relationship with a pet that might also feel gross, or being more present when with her niece instead of focusing only on contamination obsessions. When this participant engaged in avoidance behaviors such as asking when the exposure would be over and when

she could wash her hands, the therapist asked her what "gauge" she was focused on (in this case, the "anxiety and grossness gauges") and if she would like those gauges to control her behavior, or her "values gauges."

Example 2. Standard exposure: A participant with worries about relapsing when he returned home after treatment practiced sitting with his eyes closed while his exposure coach read aloud his most triggering worries. The participant was coached to practice noticing the worries, then bring his attention back to his breathing as a way to block worry, rumination, reassurance seeking, etc. Subjective units of distress were tracked throughout the exposure.

ACT-based exposure: The same participant practiced planning meaningful activities he wanted to do with his wife when he returns home. Before doing this, he wrote down a few of his biggest worries on a piece of paper. While planning meaningful activities, the participant was coached to tell the therapist when he was starting to worry, at which point the therapist demonstrated different options the participant had for interacting with the worry. One option began with a demonstration where the therapist first pretended to chase the participant around the room with the paper containing his written worries. The therapist then gave the participant the paper to hold on his lap. The participant and therapist discussed how stressful it was to run from the paper, versus simply allowing it to be on his lap. They then discussed how the participant could change his relationship with the worry, such that he could metaphorically allow it to be on his lap throughout the exposure, which ironically would free his attention to more fully plan meaningful activities to do with his wife when home. Throughout the exposure, the therapist continued to return the participant to this theme when he appeared to be getting caught in worries while planning his life at home. When the participant was successfully planning his life at home for a few minutes, the therapist would bring his attention back to the worries on his lap in order to create the opportunity to practice allowing the worry to be present while then shifting his attention back to the meaningful task at hand.

Supplementary Tables

Supplementary Table 1. Participant Post-Exposure Session Questions (PESQ-P)

Please answer each of these questions about the ERP session you just completed. Use any whole number on a scale of 0 to 100:

1) How much effort did you put into following your ERP plan without doing rituals or avoidance behaviors?
   (0 = No effort, 100 = Tried as hard as I could)

2) How much trouble did you have getting started with your ERP?
   (0 = No trouble at all, 100 = It was impossible to get started)

3) How willing are you to do the ERP session again right now?
   (0 = Not at all willing, 100 = Completely willing)

4) During the ERP session, how much were your uncomfortable thoughts and feelings influencing your behavior?
   (0 = Not at all, 100 = Completely influencing)

5) During the ERP session, how hard were you trying to make your discomfort go away?
   (0 = Completely allowing my discomfort to be there, 100 = Trying as hard as I could to make my discomfort go away)

6) How much did you feel the ERP session was focused on helping you work towards what is important to you in life?
   (0 = Not at all, 100 = Completely focused on working towards what is important to me)

7) How distressing was the ERP session for you?
   (0 = Not at all distressing, 100 = Extremely distressing)

8) How many rituals and/or avoidance behaviors did you do during the ERP session?
   (Any whole number from 0 to infinity)

Only answer this question after you have completed both ERP sessions:

9) Which ERP session did you prefer?
   Please circle one:
   First session Second session No Preference

Supplementary Table 2. Rater Post-Exposure Session Questions (PESQ-R)

Please answer each of these questions about the ERP session you just observed. Use any whole number on a scale of 0 to 100:

1) How much effort did the client put into following the ERP plan without doing rituals or avoidance behaviors?
   (0 = No effort, 100 = Tried as hard as they could)

2) How much trouble did the client have getting started with the ERP?
   (0 = No trouble at all, 100 = It was impossible to get started)

3) During the ERP session, how much were the client's uncomfortable thoughts and feelings influencing their behavior?
   (0 = Not at all, 100 = Completely influencing)

4) During the ERP session, how hard was the client trying to make their discomfort go away?
   (0 = Completely allowing their discomfort to be there, 100 = Trying as hard as they could to make their discomfort go away)

5) How much did you think the ERP session was focused on helping the client work towards what is important to them in life?
   (0 = Not at all, 100 = Completely focused on working towards what is important to the client)

6) How distressing was the ERP session for the client?
   (0 = Not at all distressing, 100 = Extremely distressing)

7) How many rituals and/or avoidance behaviors did the client do during the ERP session?
   (Any whole number from 0 to infinity)

Supplementary Table 3. Exposure Compliance Rating Scale (ECRS)

Please circle the item that best corresponds with the client's compliance during the ERP session:

1) Client performed none of the assigned ERP tasks.

2) Client performed assigned ERP tasks with no intent or attempt to refrain from rituals/avoidance behaviors.

3) Client performed assigned ERP tasks with intention of refraining from rituals/avoidance behaviors, but with obvious reluctance (e.g., spent little time on ERP tasks, did rituals/avoidance behaviors without making real effort to refrain from doing so).

4) Client made good effort to perform assigned ERP tasks while refraining from rituals/avoidance behaviors, but did several rituals/avoidance behaviors.

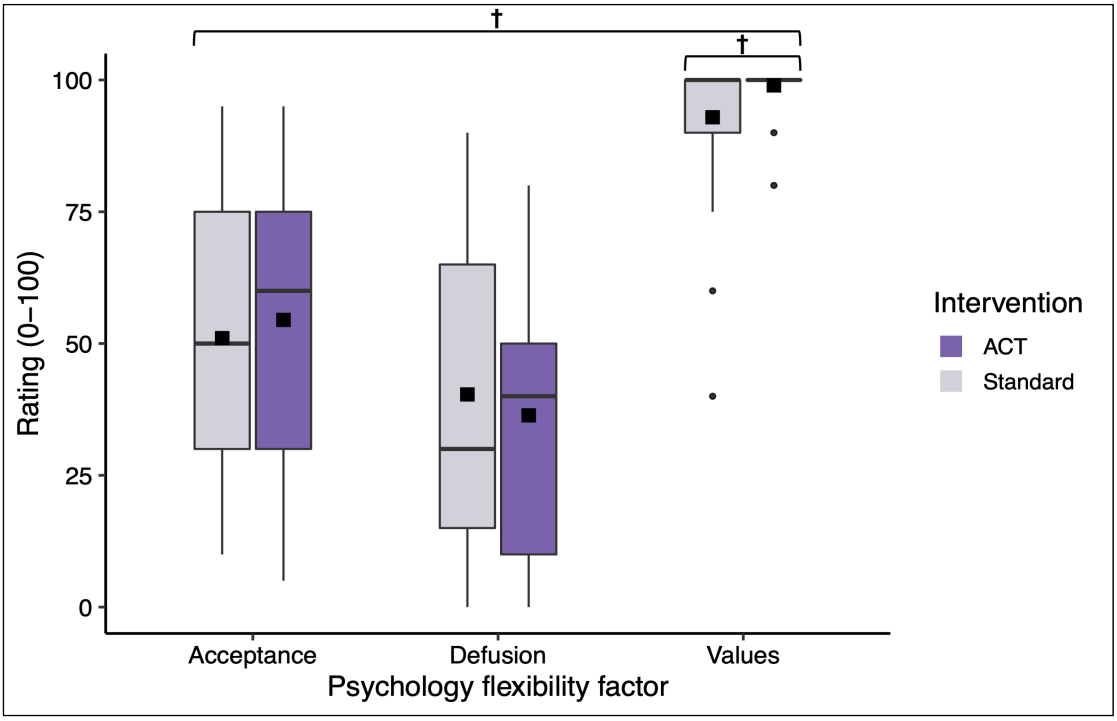
5) Client made good effort to perform assigned ERP tasks with minimal rituals/avoidance behaviors.

6) Client performed assigned ERP tasks while refraining from all rituals/avoidance behaviors.

7) Client performed assigned ERP tasks while refraining from all rituals/avoidance behaviors. Client initiated appropriate opportunities to challenge themself.

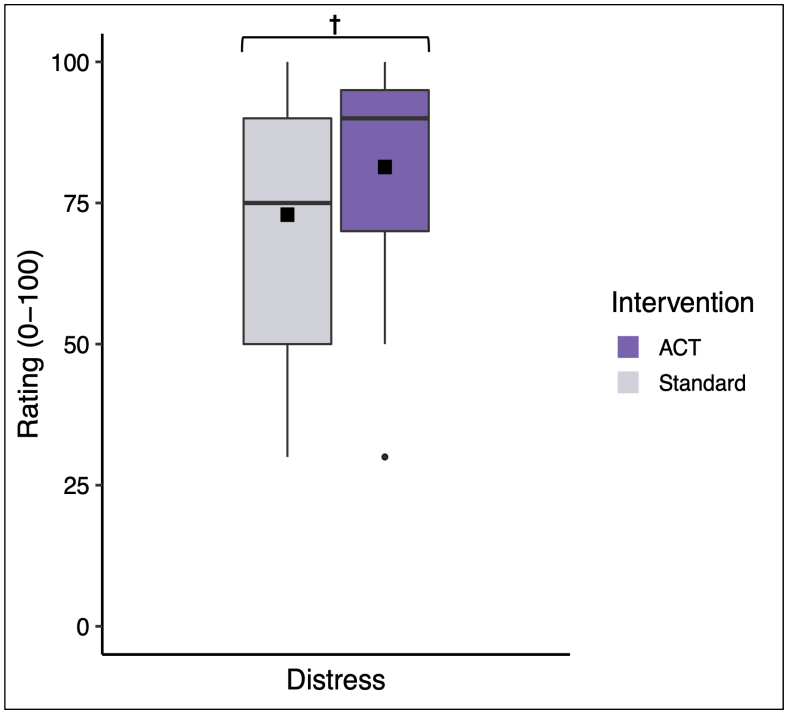
Supplementary Figures

Supplementary Figure 1. Trend-level changes in rater-reported psychological flexibility



Psychological flexibility, as reported by independent raters, differed at a trend level between interventions (MATS=5.46, p=.051). This pattern of results was driven by differential values ratings (ATS=5.61, p=.08), defined as the extent to which participants felt the exposure was focused on helping them work towards what is important to them in life, with higher values ratings for the ACT-based exposure intervention (M=98.97, SD=4.09) compared to the standard exposure intervention (M=92.93, SD=14.11). Higher ratings indicate greater endorsements of all psychological flexibility factors. The boxplots visualize the first and third quartiles (25th and 75th percentiles), median (horizontal line), mean (black squares), and any outliers (>1.5*interquartile range, black circles). †, p<.1.

Supplementary Figure 2. Trend-level changes in rater-reported distress



Distress, as reported by independent raters, differed at a trend level between interventions (t(28)=-2.04, p=.051), with higher distress ratings for the ACT-based exposure intervention (M=81.38, SD=18.66) compared to the standard exposure intervention (M=72.93, SD=21.57). The boxplots visualize the first and third quartiles (25th and 75th percentiles), median (horizontal line), mean (black squares), and any outliers (>1.5*interquartile range, black circles). **†**, p<.1.

Supplementary References

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