

## An initial investigation into the processes of change in ACT, CT, and ERP for OCD

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### Abstract

Six adults diagnosed with obsessive compulsive disorder (OCD) were treated with either acceptance and commitment therapy (ACT), cognitive therapy (CT), or exposure with ritual prevention (ERP) in a preliminary attempt to clarify the similarities or differences between the purported mechanisms of change that underlie these treatments. A new process measure was constructed with items assessing psychological flexibility, cognitive reappraisal, and extinction. This process measure was given weekly along with a measure of OCD severity. Visual analyses suggest that one of two participants in the ACT condition exhibited the highest overall changes on psychological flexibility, while the other participant showed equivalent overall scores on all processes. Both CT participants had highest scores on extinction and psychological flexibility, followed by cognitive reappraisal. ERP had the most consistent results, with both participants generally reporting extinction to be the most notable process of change. Although there was individual variability, raw scores indicate that extinction was the most central mechanism, but that psychological flexibility showed the greatest change when accounting for pretreatment levels of familiarity. Strengths, limitations, and future directions are discussed.

Keywords: obsessive compulsive disorder, mechanisms of change, acceptance and commitment therapy, exposure, exposure with ritual prevention, cognitive therapy

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The development of empirically based treatments for obsessive compulsive disorder (OCD) has gone through many phases and has been informed by several practices. Initial applications of behavioral treatments for anxiety disorders were directly linked to laboratory research on conditioning (e.g., Jones 1924; Wolpe, 1958). Meyer (1966) refined these procedures for the treatment of OCD into what we now know as exposure and ritual prevention (ERP). Behavioral processes such as respondent conditioning and operant avoidance (e.g., Mower, 1960) were proposed as the processes through which the effects were produced in ERP (Eysenck & Rachman, 1965; Rachman & Hodgson, 1980). ERP has been well-researched and its effectiveness demonstrated (Abramowitz, Franklin, & Foa, 2002), and remains a first line intervention for adult and childhood OCD. However, secondary to the difficulties associated with ERP including high drop-out and treatment refusal rates, and partial treatment response, cognitive approaches to OCD have increased in popularity (e.g., Rachman, 1997, 1998; Salkovskis, 1985; Wilhelm & Steketee, 2006).

Original cognitive conceptualizations of anxiety disorders focused on the role of inaccurate cognitions as proposed by Beck (1976) and Ellis (Ellis, 1962). Carr (1974) and McFall and Wollersheim (1979) put forward initial cognitive conceptualizations of OCD. Since that time, cognitive conceptualizations of OCD evolved (Rachman, 1997, 1998; Salkovskis, 1985) to incorporate the detrimental effects of thought control (Clark, Ball, & Pape, 1991; Tolin, Abramowitz, Przeworski, & Foa, 2002), thought action fusion (Shafran, Thordarson, & Rachman, 1996), and inflated responsibility (Salkovskis et al., 2000), as well as other concepts (e.g., Wilhelm & Steketee, 2006). Nevertheless, cognitive theorists postulated that belief change at least partially mediates changes in behavior (e.g., Rachman, 1997, 1998; Salkovskis, 1985).

At the same time that CT was developing, a separate line of research grew out of behavior analysis that focused on language and cognition as explicated in relational frame theory (Hayes, Barnes-Holmes, & Roche, 2001). Based on this line of research and a functional contextual approach to science, another version of "CBT," acceptance and commitment therapy (ACT) (Hayes, Strosahl, & Wilson, 1999), developed. ACT generally focuses on the function of cognitions and other inner experiences to

decrease their impact on overt behavior without targeting the content of these inner experiences. Overt behavior is addressed through values work (e.g., future directed motivational enhancement) and commitments to behavior change. The data on ACT as a treatment for OCD is limited to a time-series design and one randomized clinical trial comparing ACT to Progressive Muscle Relaxation (Twohig, Hayes, & Masuda, 2006, Twohig et al., 2010).

The addition of ACT and other third generation therapies has led to a noticeable amount of theoretical discussion on the similarities and differences of these treatments. Special issues on this topic have occurred in *Clinical Psychology Review* (Longmore & Worrell, 2007; Hofmann, 2008a; Worrell & Longmore, 2008), *the Behavior Therapist* (DiGiuseppe, 2008; Hayes, 2008a; Leahy, 2008; Moran, 2008; O'Brien, 2008; Salzinger, 2008) one review dealing with the treatment of anxiety disorders in *Clinical Psychology Science and Practice* (Arche & Craske, 2008; Hoffman, 2008b; Hayes, 2008b; Heimberg & Ritter, 2008) and one issue on OCD specifically *Cognitive and Behavioral Practice* (Chosak, Marques, Fama, Renaud, & Wilhelm, 2009, Himle & Franklin, 2009; Tolin, 2009; Twohig, 2009; Twohig & Whittall, 2009); these are in addition to individual reviews and replies that exist (DiGiuseppe, 2006; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hoffman & Asmundson, 2008; Levin & Hayes, 2009; Öst, 2008; Powers, Zum Vörde Sive Vörding, & Emmelkamp, 2009).

Generally, all these reviews cover the same issue: Is ACT different from current empirically supported behavioral and cognitive behavioral therapies? Interestingly, the focus of these reviews have largely been based on comparisons of the techniques used in each treatment and opinions on whether they are notably similar or different (e.g., Arche & Craske, 2008; Hayes, 2008a, b; Leahy, 2008; Tolin, 2009). In many situations these reviews will delve into the purported processes of each treatment with little agreement between authors (e.g., Arche & Craske, 2008; Hayes, 2008b; Heimberg & Ritter, 2008). This confusion is exemplified in a recent OCD case conference where experts of each therapy described the treatments and purported mechanisms of action in CT (Chosak et al., 2009), ERP (Himle & Franklin, 2009), and ACT (Twohig, 2009), with the commentary suggesting that these interventions are more similar than different (Tolin, 2009). Open debate and discussion are great for science but they should never replace empirical evaluation. This has been recognized by most authors on this topic and requests for work on mechanisms of action have been placed by almost all authors (e.g., Arche & Craske, 2008; DiGiuseppe, 2006, 2008; Hayes 2008 a, b; Hofmann, 2008c, Heimberg & Ritter, 2008; Öst, 2008; Tolin, 2009) but the work is slow to come.

This study is based on a suggestion from Arche and Craske (2008) where they suggest an empirical approach to this debate involving a study “comparing processes in ACT versus CBT using the same mediation measure for both or different measures for each. Assessing the same mediators across both treatments, including measures that are hypothesized as specific to each, facilitates the examination of shared and distinct processes of change across ACT and CBT” (p. 272). This is a difficult task because the proposed processes in these treatments are unclear and will take defining. Additionally, temporal changes require frequent and repeated assessments, and self-report of psychological processes can be difficult for some participants secondary to the covert nature of these experiences. Even though this is a complicated task, research on the processes of change in ACT, ERP, and CT for OCD is critical. In this investigation, empirical procedures were used to define the mechanisms of action in each treatment, and the resulting measure was validated for use in this study. Next, previously used time series methodology (Greiner et al., 2008; Rhéaume & Ladouceur, 2000; Storchheim & O'Mahony, 2006) were used to assess the differential impact of ACT, CT, and ERP on the purported processes in each of these treatments. This question is answered by looking at the following issues: 1) the psychological processes clients are familiar with before pretreatment, 2) overall, which process are most salient for each treatment, and 3) which processes increased the most as a result of treatment.

## Method

### *Phase 1: Measure development*

There are no existing measures of psychological flexibility (PF), cognitive reappraisal (CR), and extinction (EX) as seen in the treatment for OCD; therefore, the research team was forced to create one. Using the two-stage process described by Lynn (1986) the representativeness of the items used to measure PF, CR, and EX was established. In the first stage, multiple items were generated by the first two authors (M. P. T. and M. L. W.) who are arguably experts in the treatment of OCD. 30 items (10 items per process) that asked about PF, CR, and EX were generated and refined. Further, these items were sent to five experts (N=15) in each treatment (ACT, CT, ERP) who were asked to comment on all 30 items. Feedback from these experts was used to further refine the measure.

In the second stage, five individuals with expertise in this area were identified. These experts were given access to an online questionnaire containing the 30 items. Using the scale and verbiage described by Lynn (1986), each expert was asked to rate the content relevance for each of the three processes. Thus, each of the 30 items had a PF, CR, and EX content relevance score. From these expert ratings content validity index (CVI) scores, a widely used means of quantifying content validity, were obtained (Lynn, 1986, Waltz & Bausell, 1981). Using this two-stage process, 29 of 30 items were found to be content relevant to their targeted process. To assure that the items differentiated between the processes, an additional step similar to that used for obtaining the CVI to determine validity occurred. Only items that were rated as “very relevant” to the targeted process and did not receive this rating for the other two processes by four of five raters were considered to sufficiently differentiate between processes. After this step, seven items remained valid for both the PS and CR, and six items remained valid for the EX process. Total scores are created by summing the items for each subscale and dividing by the number of items in that subscale. Higher scores represent a greater level of that process.

### *Phase 2: Assessment of Treatment Processes*

In the second phase of the study, six adults (two in each condition) whose primary diagnosis was OCD were treated with either twelve 60-minute individual sessions of either ACT, CT, or ERP. OCD severity and all three processes (PF, CR, EX) were assessed at pretreatment and the beginning of each therapy session.

### *Participants*

All participants were referred to an established anxiety disorders clinic for treatment of OCD. Participants were seen as part of normal therapist case loads, and participants were assigned as openings occurred in therapists' case loads. No participants were excluded from this investigation, and they were not in treatment elsewhere. Diagnosis of OCD and the severity of symptoms was determined using the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID) (First, Spitzer, Gibbon, & Williams, 2002) and the Yale Brown Obsessive Compulsive Scale (YBOCS) (Goodman et al., 1989). OCD was the primary disorder for all participants. Specifics for all participants are provided in Table 1.

Table 1. *Participant Characteristics Table*

Participant	ACT1	ACT2	CT1	CT2	ERP1	ERP2
Sex	M	F	F	F	M	F
Mar. Stat.	M	M	M	S	S	M
Age	25	36	42	23	23	32
Yrs of Ed.	16		16	14	15	16
Race	C	C	C	PA	Japanese	C
Yrs. W/ OCD	9	16	1.5	1.5		2
Compulsion	PO	checking	P.O.	PO washing	ordering checking	check
Diagnoses	OCD	OCD PDA SP GAD ADDM	OCD MDD	OCD SAD	OCD MDD TS	OCD
Meds	Effexo	prn Xanax	Zoloft, Klon	none	none	Effexo
Pre YBOCS	<b>22</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>23</b>	<b>16</b>
O	11	8	12	8	12	8
C	11	10	0	14	11	8
Post YBOCS	<b>1</b>	<b>1</b>	<b>8</b>	<b>12</b>	<b>10</b>	<b>10</b>
O	1	1	8	4	6	5
C	0	0	0	8	4	5

Sex, M=male, F=female; Marital status, M=married, S=single; Years of education begin with first grade (e.g., 12=high school education, 16=four years of post high school education); Race, C=Caucasian, PA=Pacific Asian; Diagnoses: ADM=adjustment disorder with depressed mood, GAD=generalized anxiety disorder, PDA=panic disorder with agoraphobia, MDD=major depressive disorder, SAD=social anxiety disorder, SP=specific phobia, TS=Tourette's Syndrome

### Materials

*Process Measure.* The process measure was developed by the authors using the previously described procedure. The process measure is comprised of 20 questions that assessed PF, CR, and EX. The questions were randomized, and they were answered on a seven-point Likert-type scale (1=never true, 7=always true). Possible scores for PF, CR, and EX, are between 1 and 7 with higher scores representing more of that process. Additionally, the measure included questions 1 (time occupied by obsessive thoughts) and 6 (time spent performing compulsions) from the YBOCS to assess changes in obsessions and compulsions.

*Yale-Brown Obsessive Compulsive Scale.* (YBOCS) (Goodman et al., 1989). The YBOCS was used to establish the severity and type of OCD symptoms. Each of the 10 items are rated on a 0 (none) to 4 (extreme) for a total possible score of 40. According to Taylor (1998), the YBOCS demonstrates acceptable psychometric properties. Interrater reliability ranges between .80 and .99, and test-retest reliability (two weeks) is between .81 and .97.

### *Procedures*

Prior to being assigned to a therapist, participants completed a standardized intake session involving completing the SCID, YBOCS (CT1 only completed a self-report YBOCS at posttreatment), and a standard clinical interview where questions on background and functioning were covered. All assessments were completed by an assessor who was trained by M. L. W. to competency on the SCID and YBOCS. Results from all assessments were presented to the M. L. W. for confirmation prior to the client being assigned. The process measure was completed at pretreatment, the beginning of each therapy session and at posttreatment. All clients received 12 individual one hour sessions (with the exception of participant 6 who received only 10 sessions). At the end of therapy all participants completed the SCID and the Y-BOCS with an assessor who was blind to the treatment received and to the nature of the study.

### *Treatments*

Three treatments were delivered in this investigation: ACT, CT, ERP. All therapies were delivered based on available treatment manuals: ACT (Twohig et al., 2006), CT (Whittal & Robichaud, in press), ERP (Wilhelm et al. 2008; Rowa et al., 2007). Manuals were assessed to limit overlap of primary treatment components in the following ways: Training in defusion and psychological flexibility were not included in CT and ERP; cognitive restructuring or addressing cognitive appraisals did not occur in ACT or ERP, and exposure exercises (including behavioral experiments) were not included in CT or ACT.

### *Acceptance and Commitment Therapy for OCD*

ACT as a treatment for OCD involves: 1) looking at the success of attempts to regulate obsessions in both the short- and long-term, 2) a discussion of how many events in the world can be controlled but that this process may not necessarily apply to obsessions, 3) accepting obsessions and associated anxiety, 4) training in psychological defusion (experiencing inner experiences as only thoughts, feelings, and bodily sensations and nothing more), 5) training in self as context (noticing self as different than obsessions), 6) training in mindfulness and being present with inner experiences without attempting to regulate them, 7) clarifying values (areas of life that are important to the client), and 8) increasing behavioral commitments to engage in value-based activities. No exposure exercises were explicitly prescribed to occur during or outside of the sessions.

### *Cognitive Therapy*

CT as a treatment for OCD involves psychoeducation and an introduction to the cognitive model of the maintenance of OCD. The ubiquity of intrusions was identified and the importance of the appraisal process identified. Cognitive treatment for OCD is idiographic and depends upon the nature of the patient's specific beliefs and interpretations but can include challenges to inflated responsibility, overestimation of threat, overimportance and need to control thoughts as well as perfectionism and certainty. Alternative nonthreatening and neutral interpretations are developed in treatment and evidence for them is collected through a variety of strategies including piecharting, surveys, and cognitive challenging.

### *Exposure with Ritual Prevention*

ERP as a treatment for OCD began by defining and describing OCD. The behavior model of the development of OCD is based on the two-factor theory and the treatment model based on habituation to obsessional stimuli that occurs when escape and avoidance do not occur were also presented at beginning of treatment. This model was reviewed at the beginning of each therapy session. Clients developed exposure hierarchies based on their individual presentations. Therapy largely focused on weekly in-session exposure exercises and daily out of session exposure homework exercises. Treatment ended with a discussion on relapse prevention.

*Therapist Competency and Treatment Supervision*

All therapists are competent in treatments that they delivered. ACT was delivered by M. P. T. who was trained by the developer and has extensive experience using ACT with OCD (Twohig et al., 2006, Twohig et al., 2010); CT was delivered by M. L. W. who is considered an expert in the use of CT with OCD (Whittal et al., 2005); and one ERP client was treated by M. P. T. and one by R. G. who both have experience using ERP (e.g. Twohig, Whittal, & Peterson, 2009) and both of whom were under the supervision of M. L.W. who is also an expert in the use of ERP (McLean et al., 2001; Whittal et al., 2005). Both M.P.T. and R. G. received formal training on the use of ERP from M. L. W. prior to seeing participants in the ERP condition. They also received weekly supervision on their implementation of ERP.

Results

*Did OCD Severity Decrease as a Result of the Interventions?*

Consistent with single subject research, visual inspection of obsession and compulsion scores were used to determine the effects of the interventions (Barlow, Nock, & Hersen, 2008). As shown in Figure 1, when obsessions, compulsions, or both were reported as being present, a reduction was experienced regardless of the form of therapy received. Statistical analyses support the visual inspection (see table 2). When obsessions were reported as being problematic there was a significant decrease in these symptoms in four of the six cases (CT2 and ERP1 did not experience a statistical decrease in obsessions although there was a clinically significant change). When compulsions were endorsed as being problematic, four of five participants experienced a significant decrease in symptoms (CT2 reporting no significant decrease in compulsions). These are also consistent with pre- and post-treatment YBOCS scores for all participants (see Table 1).

Table 2. *Statistically significant changes on outcome and process measures by comparison group*

	Comparison 1 <sup>a</sup>					Comparison 2 <sup>b</sup>					Comparison 3 <sup>c</sup>				
	Outcome Measure		Process Measure			Outcome Measure		Process Measure			Outcome Measure		Process Measure		
	O	C	PF	CR	EX	O	C	PF	CR	EX	O	C	PF	CR	EX
ACT1	+++	-	+++	-	-	+++	++	-	-	-	+++	+++	+++	-	-
ACT2	-	+++	-	-	-	-	-		++	+	+	+++	++	+++	+
CT1	+++	-	+++	-	+++	++	-	-	-	-	+++	-	+++	+	+++
CT2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ERP1	-	-	-	-	-	-	-	-	-	-	-	++	+	-	++
ERP2	+++	+++	-	-	-	+++	++	-	-	-	+++	+++	-	-	-

<sup>a</sup> Comparison between initial score and average of midpoint scores

<sup>b</sup> Comparison between averaged midpoint scores and averaged final scores

<sup>c</sup> Comparison between initial score and averaged final scores

- = not significant; + = significant improvement at p < .05; ++ = significant improvement at p < .025; +++ = significant improvement at p < .005 (for one tailed tests)

*Which Processes did Participants Report Using Before Treatment Began?*

Raw scores on the process measures are depicted in Figure 1. The initial scores on the process measures show that participants entered treatment with differing levels of familiarity with the three psychological processes. At the initial session, two of the six participants (ACT1, and ERP1) endorsed PF as being utilized less than CR and EX. For two participants (CT1 and ERP2), PF and CR were endorsed as being utilized equally, and for the remaining two participants (ACT 2 and CT2) PF was endorsed as being utilized more than CR, with one participant (ACT2) endorsing EX as being utilized more than PF

and CR, and the other (CT2) endorsing EX as being utilized less. Initial scores averaged across all six participants at pretreatment are as follows: PF 4.45 (1.16), CR 4.67 (0.85), EX 5.03 (1.19) (see Figure 2). A series of pairwise t-tests comparing all three conditions found no statistical differences.

#### *Which Process Scores Were Reported as Being the Most Salient as a Result of Treatment?*

When using visual inspection with repeated assessments of multiple dependent variables to determine level of impact, one looks for high degrees of separation between data that is replicated across assessment points. The less overlap between the data points the greater the difference. The magnitude is of much less concern than separation of data points (Barlow et al., 2008). This process works like a “magnifying glass” to help show differences across independent variables (Hayes, Barlow, & Nelson-Gray, 2001) (see figure 1 for raw scores on process measures). PF was clearly the most salient for ACT1, but ACT2 reported all processes as being equally used. The results for the CT participants were unexpected. Both participants reported PF and EX as being more salient than CR processes. Finally, the findings for the ERP participants were the clearest; EX processes were clearly the highest. These findings suggest that these processes are at least somewhat distinct from each other, but that they are not necessarily affected in the expected directions by their respective treatments. Figure 2 shows the averaged scores for all six participants. When looking at the average raw scores it is seen that EX, is the most notable followed by PF then CR.

#### *Factoring in Pretreatment Knowledge, Which Processes Moved the Most in Treatment?*

Even though there are not statistically significant differences between the pretreatment scores for the three groups, mean differences indicated the utility of calculating change scores. Changes from pretreatment levels on the process measures are presented in Figure 3. The two ACT participants’ results are consistent with the raw scores: PF was most notable for ACT1 and all three processes increased in ACT2. The findings for change scores are also consistent with raw scores for the two CT participants: PF and EX were the most notable followed by CR. Only the ERP participants had different findings on the raw scores and change scores: PF and EX were highest for ERP1, but no change was seen in EX for ERP2 likely because he was already at ceiling levels throughout treatment. When the change scores were averaged for all participants, PF was shown to have moved 0.71 points greater than CR scores, and 0.43 points greater than EX scores (see Figure 2).

#### *Are Visual Analyses Supported by Statistical Analysis of Outcome and Process Scores?*

To support the findings from visual inspection, data were analyzed using procedures from Mueser, Yarnold, and Foy (1991) to determine which changes over time were significant. This type of analysis has been used in similar studies of process changes in the treatment of OCD (Greiner et al., 2008; Storchheim & O’Mahony, 2006). Following recommendations by Mueser et al., ipsative z scores were calculated for each individual’s PF, CR, and EX process scores, as well as for the obsession and compulsion scores. Because test-retest reliability was not known for these measures, the 1-lag autocorrelation (ACF(1)) was calculated and used as recommended by Mueser et al. The critical difference (CD) was calculated using the ACF(1) and was directional, as process scores were hypothesized to increase during the course of treatment. Next, initial ( $Z_1$ ), midpoint ( $Z_2$ , average of sessions 5-7), and post-intervention ( $Z_3$ , average of the last 3 sessions) scores were calculated. The

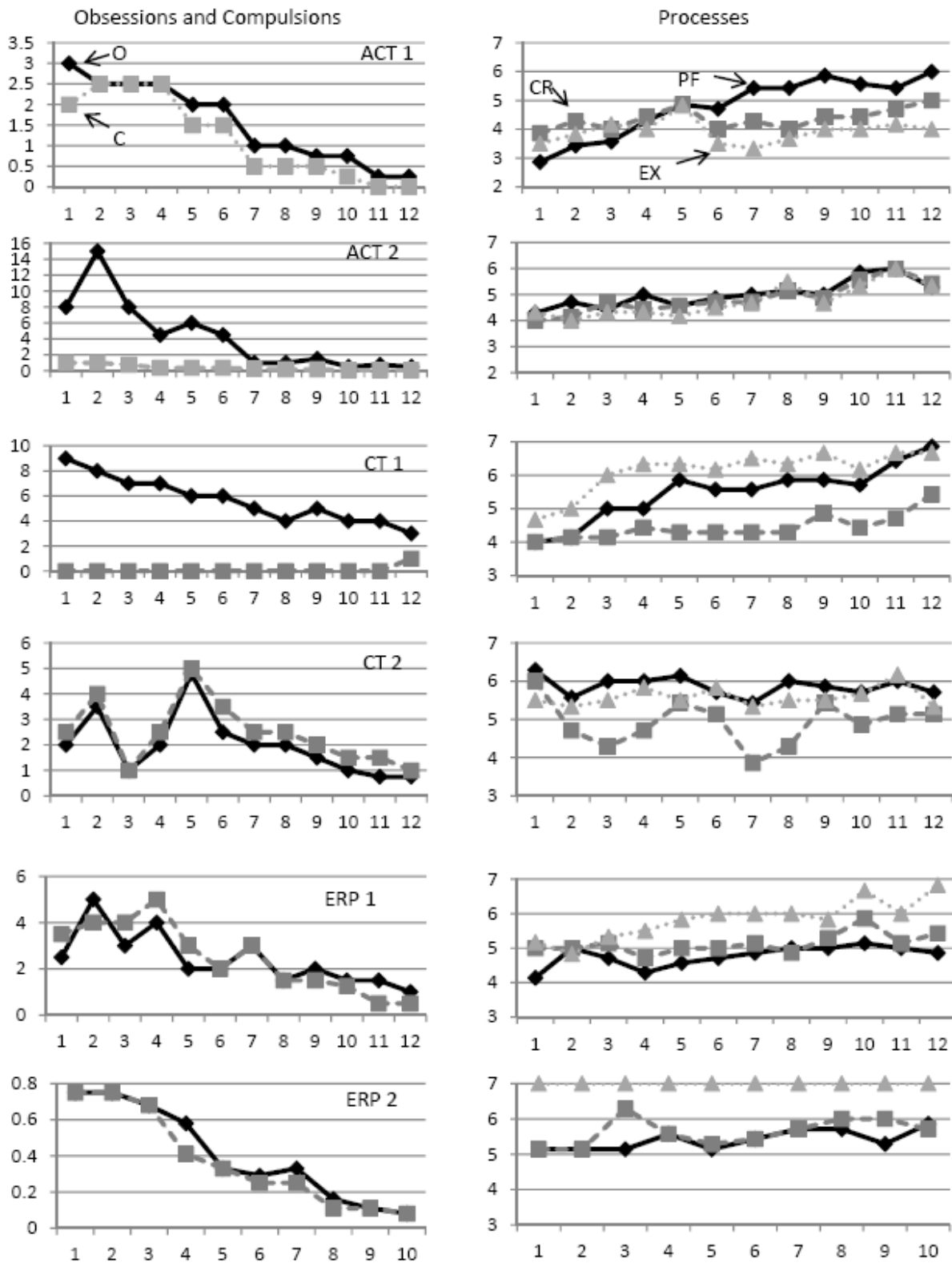


Figure 1. Plot of raw outcome and process scores for each participant



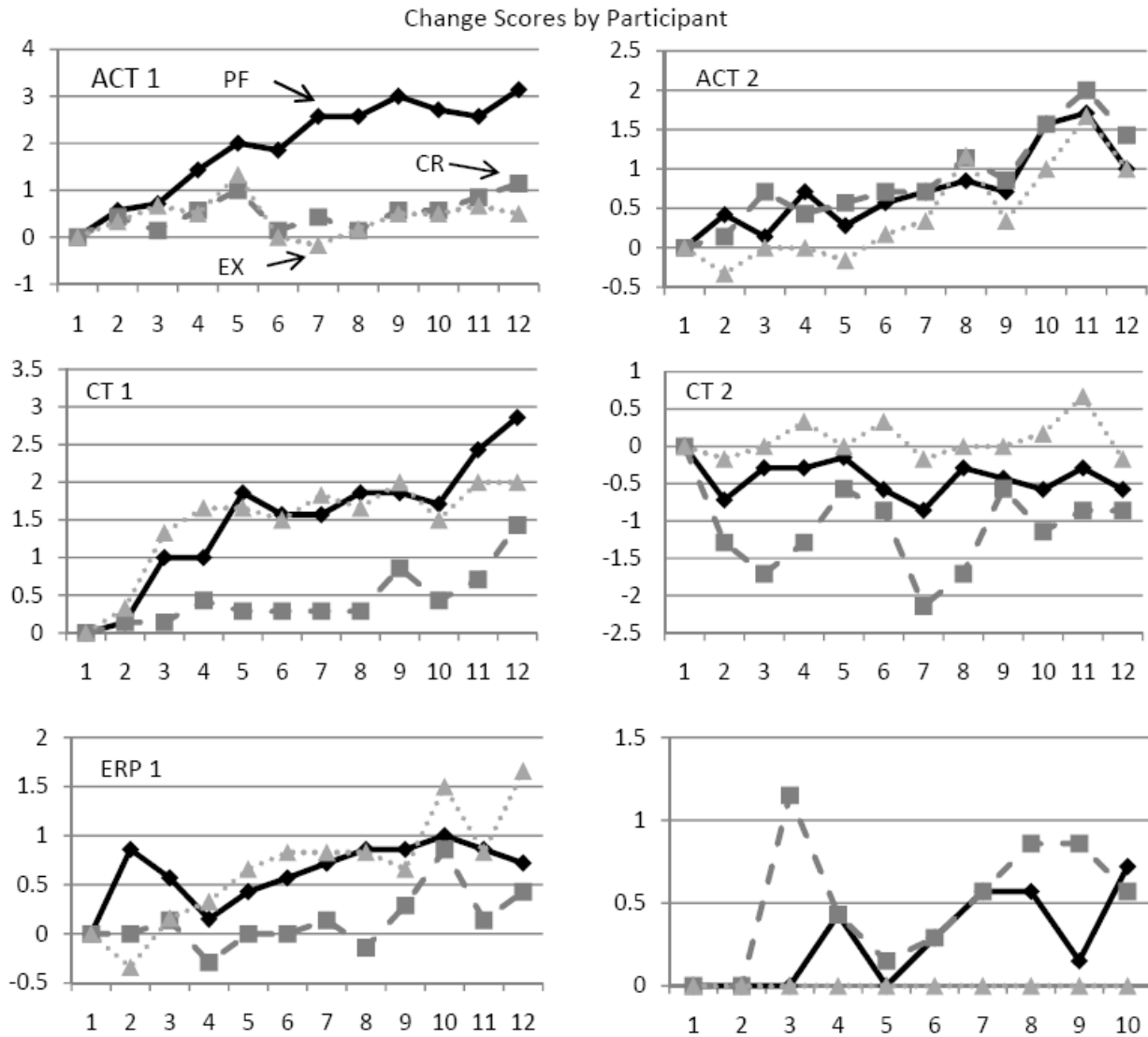


Figure 2. Plot of averaged change and raw scores for all participants

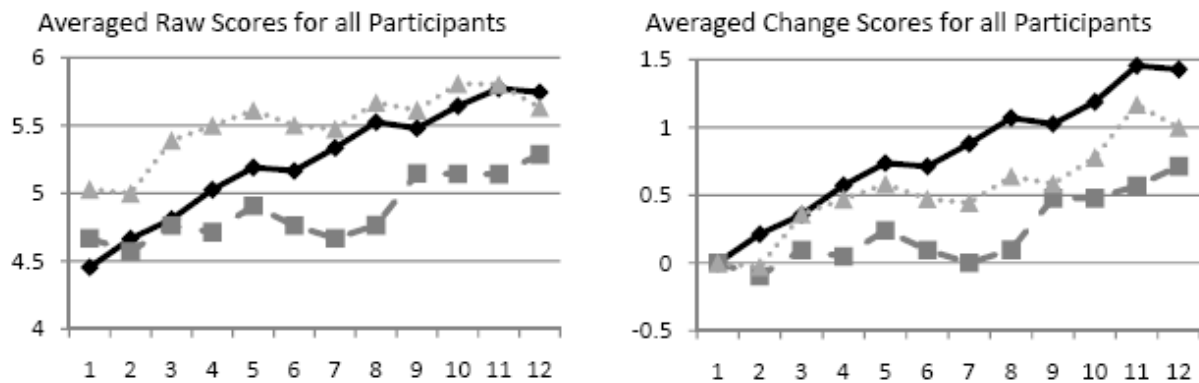


Figure 3. Plot of process measure change scores for each participant

differences between these scores ( $Z_1-Z_2$ ;  $Z_2-Z_3$ ; and  $Z_1-Z_3$ ) were then calculated and compared to the CD scores. In this manner statistically significant differences were able to be determined.<sup>1</sup>

Table 2 shows the different comparisons between the initial, midpoint, and end of treatment scores. ACT1 showed significant movement in PF and this movement was found from initial assessment to midpoint, and from initial assessment to end of treatment. Significant change was not seen on the other processes. ACT2 showed significant movement in CR and EX from midpoint to end of treatment and in all three processes from initial assessment to end of treatment. CT1 showed significant movement in PF and EX from initial assessment to the midpoint, and significant movement from initial assessment to end of treatment on all three processes. CT2 did not show any significant improvement in any of the processes for any of the three comparisons. ERP1 showed significant movement in PF and EX from initial assessment to end of treatment. Finally, ERP2 did not show any significant movement in any of the processes for any of the three comparisons.

### *Discussion*

The primary purpose of this study was to provide initial information on possible processes of change in ACT, CT, and ERP for OCD. Even though this is an initial investigation, it yielded noteworthy findings that will hopefully instigate additional research. Using a measure developed by the authors, it appears that the processes proposed by these treatments are distinguishable. While they are distinguishable, each treatment also affects other processes than the ones they are purported to affect. In some cases a treatment seems to affect a different treatment's process more than its own. One of two participants in the ACT condition exhibited the highest overall scores on PF, while the other participant showed equivalent overall scores on all processes. Both CT participants had the highest scores on EX and PF and then CR. Finally, EX processes were the most notable in the ERP condition. EX raw scores were the highest across all participants, and assessments of change scores (which account for pretreatment familiarity) show that ACT process scores increased the most across all participants.

Statistical analyses that have been used in other time-series OCD process research (Greiner et al., 2008; Storchheim & O'Mahony, 2006) showed that five of the six participants showed a significant decrease in OCD severity. Of these five participants, four significantly moved some process at some point during treatment. The remaining participant did not experience significant change on any of the processes. Significant movement of processes was not limited to the process targeted by the therapy received. All four participants showed significant movement in other processes, with ACT moving CR and EX, CT moving PF and EX, and ERP moving PF. However, of the participants that significantly moved a process, only PF was moved by all four, with EX being moved by three participants and CR being moved by two of the participants. Additionally, the ACT condition was the only one that saw significant movement in its process for both of its participants. Unfortunately, because the movement in obsessions and compulsions and the movement in the processes occurred at varying times, the direction of the relationship between the processes and the outcomes is unclear.

The findings from this investigation should be looked at as a first step in a long line of research on the differing mechanisms of change in ACT, CT, and ERP for OCD. This study seems to suggest that our most supported treatments for OCD may work through a broader number of processes than originally presumed. While most participants reported a primary process changing, they all reported change in all processes. The target processes in ACT are acceptance, defusion, self as context, being present, values, and behavioral commitments. CT targets similar processes including thought action fusion, attempts to control thoughts, and responsibility. ERP generally focuses on extinction, and depending on the therapist,

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<sup>1</sup> Descriptive data, including ipsative z scores for each treatment phase, the ACF(1), and the critical difference scores used to determine statistical significance at the one-tailed .05, .025 and .005 levels is available from the authors upon request.

challenges to threat overestimation and danger. If we step away from name brands of these therapies and think only about the processes that are being targeted, it becomes apparent that there is some overlap. But the question is whether there is notable difference in the processes targeted in these treatments. This study suggests there may be, but clearly, more work needs to be done in this area.

This study was never meant to be definitive on this large issue. It was meant to provide initial data on possible processes of change in ACT, CT, and ERP for OCD. This is the first study to date to look at these processes in the treatment of OCD, and hopefully will prompt additional studies. There are limitations to the current investigation that should be addressed in future studies. First, because sessions were not recorded there was no opportunity to rate integrity of treatment. It is possible that the therapies delivered were not consistent with what the scientific community agrees to be ACT, CT, and ERP. This is perhaps a minor concern because the therapists are considered developers of two of the three interventions (ACT and CT) and were well-trained and published in the delivery of the third (ERP). Second, integrity was not collected on the assessor. This concern is also limited in that the assessor also conducted assessments for a large anxiety clinic and was trained to competency by an expert on the topic. Third, because there was no follow-up period, the effects of the treatments and any lasting endorsement of familiarity with the processes is unknown. It is possible that differential effects could be found due to gaining different degrees of integration of the targeted processes.

Finally, the most notable limitation to this investigation is that the processes measure was developed by the authors for this investigation and did not go through standard validation procedures involving factor analysis and test-retest reliability. Measures of these processes for the treatment of OCD do not exist. This is likely because there is not agreement in the scientific community as to the processes of change in these treatments (Tolin, 2009). Instead of waiting for agreement to occur, the authors sought out feedback from 15 of notable OCD researchers as to how they would define these processes of change, and finally had them rate the items for accuracy. The measure created through that validation process was used in this study. Clearly, more work need to be done on a measure for these processes, but this study is the first attempt to create one. Based on the results of the study, the measure appears to be responsive to psychological treatment with results for ACT and ERP being mostly consistent with expectations. The results for CT were not consistent with expectations. This either means that CT affects PF and EX more than CR, or the measure does not work well for that treatment. Either way, this study should be considered a starting point and continue to clarify these issues.

Future research needs to assist with defining the processes that are associated with each of these treatments, developing methods to assess these processes, and conducting the studies that will clarify the processes that are associated with these treatments. Once the processes have been determined, research needs to be conducted on how movement of these processes affects clinical outcomes. Additionally, the possible differential affects of these processes on varying presentations of OCD needs to be examined. A variety of studies including large N studies and additional time-series analyses will help answer these questions.

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## Appendix

### Effects of Therapy Measure

Below is a list of ideas that people may find accurate regarding the effects of therapy. It is unlikely that you will find that they will all apply to you. Please read each question very carefully and rate it on a scale of 1-7 with 1 being never true and 7 being always true. **Please take your time and answer each question as best you can—really think about each item. Again, it is not likely that all items will match your experience.**

1	2	3	4	5	6	7	
Never True	Very Seldom True	Seldom True	Sometimes True	Frequently True	Almost Always True	Always True	
1. I am doing what is important to me no matter what anxiety related thoughts and feelings occur (PF)	1	2	3	4	5	6	7
2. I am collecting new information/evidence regarding the truth (or lack thereof) of my anxiety provoking thoughts (CR)	1	2	3	4	5	6	7
3. When I get in an anxiety provoking situation, I do my best to stay in it until my anxiety goes down (EXT)	1	2	3	4	5	6	7
4. My anxiety provoking thoughts are the result of what I believe about myself, others and the future (CR)	1	2	3	4	5	6	7
5. I know that if I continue to put myself in anxiety provoking situations, my anxiety will gradually decline (EXT)	1	2	3	4	5	6	7
6. I work to identify anxiety related thoughts when they occur (CR)	1	2	3	4	5	6	7
7. I feel some compassion towards my anxiety related thoughts (PF)	1	2	3	4	5	6	7
8. Avoidance makes anxiety stronger; engaging fear weakens it (EXT)	1	2	3	4	5	6	7
9. I know I am not the same as my anxiety related thoughts (PF)	1	2	3	4	5	6	7
10. I pay attention to evidence that goes against my beliefs, rather than focusing solely on events that seem to support anxiety related thoughts (CR)	1	2	3	4	5	6	7
11. I am in touch with my thoughts, feelings, and what is occurring around me (PF)	1	2	3	4	5	6	7
12. When I have an anxiety related thought, I work to think differently (CR)	1	2	3	4	5	6	7
13. Experiencing fear in the moment is necessary for long-term reduction (EXT)	1	2	3	4	5	6	7
14. My anxiety related thoughts do not define who I am (PF)	1	2	3	4	5	6	7
15. I believe the alternative non-anxiety provoking interpretations of my thoughts (CR)	1	2	3	4	5	6	7



16. I don't need to learn to control my feelings in order to handle my life well (PF)	1	2	3	4	5	6	7
17. I do not wait for anxiety free times to live my life fully (PF)	1	2	3	4	5	6	7
18. I can see the errors in my thinking (CR)	1	2	3	4	5	6	7
19. Anxiety associated with exposure will peak, plateau and decline (EXT)	1	2	3	4	5	6	7
20. With repeated practice in a particular situation, the anxiety I experience becomes less and less (EXT)	1	2	3	4	5	6	7

PF = Psychological Flexibility, CR = Cognitive Restructuring, EXT = Extinction

Remove these labels when using.