



Isolating the effect of opposite action in borderline personality disorder: A laboratory-based alternating treatment design

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ABSTRACT

Evaluating the unique effects of each component included in treatment protocols for borderline personality disorder (BPD) is a necessary step in refining these interventions so that they only include skills that drive therapeutic change. One strategy, included in several prominent treatments for BPD, is acting opposite to emotion-driven behavioral urges; engaging in behaviors that are inconsistent with an experienced emotion is thought to lead to reductions in its intensity, though this has not been empirically-tested. The present study was a single-case experiment, specifically an alternating treatment design, that explored the effects of a laboratory-based adaptation of opposite action (versus acting consistent) on emotional intensity. Sixteen individuals with BPD attended six laboratory sessions in which they were instructed to act consistent with an induced emotion in half the sessions and opposite in the other half. Participants were randomly assigned to the specific emotion (i.e., anxiety, sadness, anger, and shame/guilt) that was induced across all study sessions. Findings from visual inspection and percentage of non-overlapping data suggest that acting opposite (versus consistent) leads to significantly greater decreases in emotional intensity for those in the sadness and guilt/shame conditions, but not those in the anxiety or anger conditions. Possible interpretations of these findings are presented. Replication outside of the laboratory context is necessary to draw further conclusions of the clinical implications of these findings.

Borderline personality disorder (BPD) is a severe psychiatric condition that is characterized by impairment across several domains of functioning (American Psychiatric Association, 2013). Specifically, symptoms of BPD include: emotion dysregulation (i.e., mood lability, anger), interpersonal distress (i.e., frantic attempts to avoid abandonment, relationship instability), behavioral difficulties (i.e., self-injurious behaviors, impulsive self-destructive behaviors [binge eating, substance use, sexual-risk taking]), identity disturbance (i.e., unstable sense of self, chronic emptiness), and cognitive vulnerabilities (i.e., dissociation, transient paranoia).

Over the past twenty years, several treatment protocols for BPD have emerged. Dialectical Behavior Therapy (DBT; Linehan, 1993) has accumulated considerable empirical support, and treatments such as Transference-Focused Therapy (TFT; Clarkin et al., 2001), Mentalization-Based Treatment (MBT; Bateman & Fonagy, 2004), Schema-Focused Therapy (SFT; Young, Klosko, & Weishaar, 2006), and General Psychiatric Management (GPM; McMain et al., 2009) also appear promising (for a review, see: Neacsiu & Linehan, 2014). These approaches are all intensive, long-term (usually at least one year), and have, understandably, focused on targeting the life-threatening and therapy-

interfering behaviors that often characterize this disorder. BPD, however, is a heterogeneous disorder with diagnostic criteria that can be combined to create over 300 unique symptom presentations (Ellis, Abrams, & Abrams, 2008) and there is evidence to suggest that the majority of individuals with BPD do not demonstrate the recurrent life-threatening behaviors that warrant intensive, long-term care (Trull, Useda, Conforti, & Doan, 1997; Zimmerman & Coryell, 1989). As such, exploring evidence-based strategies for abbreviating interventions, along with identifying patients that may benefit from a shorter course of treatment, is an important next step in BPD research.

One potential method to increase treatment efficiency for patients with BPD may be to ensure that the multi-component interventions applied to this disorder include only active ingredients; this may be achieved by evaluating the unique contributions of each strategy in a larger treatment package. Of course, for treatments that contain a great number of components (e.g., the distress tolerance module of DBT includes 11 distinct skills; Linehan, 2015), efforts to isolate the effects of each skill may seem overwhelming. Focus on skills that are theoretically linked to core mechanisms maintaining symptoms may allow therapists to prioritize the most potent components that, when

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presented as part of an abbreviated package without less effective strategies, may lead to the most robust treatment effects (Sauer-Zavala et al., 2017).

Several functional models of BPD account for the importance of negative emotionality in the development and maintenance of this disorder. For example, Linehan's construct of emotional vulnerability, an important risk factor in her biosocial model of BPD, is defined as high reactivity to emotion-provoking stimuli, strong intensity of emotional responses, and a slow return to baseline levels of emotional functioning following a trigger (Linehan, 1993). Similarly, recent work characterizing BPD as an emotional disorder also suggests that aversive reactions to frequently occurring negative emotions are central to the maintenance of this disorder (Sauer-Zavala & Barlow, 2014). Empirical studies have indeed demonstrated greater levels of negative emotions in BPD compared to nonclinical controls and other personality disorders (Henry et al., 2001; Koenigsberg et al., 2002; Levine, Marziali, & Hood, 1997) and have linked this emotional intensity to severity of BPD symptoms (Cheavens et al., 2005; Rosenthal, Cheavens, Lejuez, & Lynch, 2005; Yen, Zlotnick, & Costello, 2002). Additional studies utilizing physiological measures also indicate heightened emotional intensity and reactivity in BPD (Austin, Riniolo, & Porges, 2007; Ebner-Priemer et al., 2005, 2007). Furthermore, neuroimaging studies suggest that individuals with BPD display reduced hippocampal, orbitofrontal and amygdala volumes and increased amygdala activation in response to emotional cues (see: Rosenthal et al., 2008).

Given the important role of negative emotionality in BPD pathology, treatment components that address this vulnerability may be particularly useful for symptom improvement. Asking patients to behave in ways that are counter to their emotion-driven urges, often referred to as opposite action (Linehan, 1993), is one strategy hypothesized to lead to reductions in the intensity of activating emotions. The inclusion of this element in psychological treatment draws from a long tradition in more basic emotion science suggesting that the most fundamental way to change an emotion is by altering the action-tendencies associated with it (Amir, Kuckertz, & Najmi, 2013; Barlow, 1998; Izard, 1971, 1977). Despite its presence in treatments for BPD, the role of acting opposite to emotion-driven behaviors in reducing emotional intensity has not been isolated empirically.

The purpose of the present study was to explore whether a laboratory-based adaptation of opposite action in response to emotion-driven behavioral urges leads to reductions in the intensity of emotional experiences. To this end, participants with BPD engaged in an alternating treatment design (ATD; Barlow & Hayes, 1979) in which subjects were used as their own control by rapidly alternating two experimental conditions within the individual. In the first condition, participants were instructed to act opposite to their behavioral urges (using a standardized list of behavioral prompts) following an emotion induction, while in the second condition, they were instructed to act consistent with these urges. These two conditions were rapidly and randomly alternated across six sessions and effects of these conditions were explored for several discrete emotions (anxiety, sadness, anger, and shame). It was hypothesized that, across emotions, when participants were instructed to act opposite (versus consistent) with their emotion-driven behavioral urges, they would demonstrate greater reductions in the discrete emotion induced.

1. Method

1.1. Participants

Individuals with BPD ($N = 16$) participated in the present study. Inclusion criteria consisted of the following: (a) Diagnostic and Statistical Manual (5th edition, *DSM-5*; American Psychiatric Association, 2013) diagnosis of BPD; (b) willing to maintain a stable dose on prescribed psychotropic medication throughout the study duration in order to ensure that observed effects are due to

experimental manipulations; and (c) fluent in English. In order to maximize generalizability, exclusion criteria were based solely on the well-being of the participant and consisted primarily of conditions that would require prioritization for immediate treatment. Specifically, these conditions included: (a) Current *DSM-5* manic episode, schizophrenia, schizoaffective disorder, or organic mental disorder; (b) clear and current suicidal risk (intent); and (c) current or recent (within three months) history of drug dependence.

Participants were recruited from local treatment sites using IRB-approved flyers, as well as via online sites (e.g., craigslist, university jobs board). Upon self-referral to the study, potential participants completed a brief telephone screening and, if eligible, were scheduled for an in-person appointment to obtain informed consent and confirm inclusion/exclusion with an in-depth diagnostic assessment (described below). Of the 82 individuals that completed an initial phone screen, 44 were scheduled for an in-person diagnostic assessment and 29 attended this appointment. Following the in-person assessment and consent procedures, 12 participants were withdrawn by study staff because they did not meet study inclusion/exclusion criteria, leaving 17 eligible individuals. One person withdrew prior to completing any experimental procedures because they reportedly did not have time to commit to the study, resulting in 16 participants with complete data. Demographic and other baseline data for these 16 participants is reported in the Results section.

1.2. Study design

All study procedures were approved by our University's Institutional Review Board. Single case experimental design (SCED) was utilized to conduct this study; methods and results are reported in accordance with single-case reporting guidelines in behavioral interventions (SCRIBE; Tate et al., 2016). Specifically, we employed an alternating treatment design (ATD; Barlow & Hayes, 1979) in which two interventions are administered to each participant in a randomized, alternating fashion, allowing for comparison of these strategies on outcomes within the individual. By using each participant as their own control, this strategy reduces threats to internal validity as any change witnessed between conditions is considered to be due to the condition variable and not extraneous factors such as history, maturation, or regression to the mean. Additionally, replication of effects across participants provides preliminary evidence of generalizability and external validity (Barlow, Nock, & Hersen, 2008).

Following a diagnostic interview assessing study inclusion/exclusion criteria, participants were randomly assigned to one of four discrete emotion conditions (anger, sadness, anxiety, and guilt/shame); randomization was stratified such that four participants were assigned to each condition. Participants then attended six study sessions (across a 10-week window) in which their assigned emotion was induced via a 10-min writing task. Specifically, participants in the anger, sadness, and guilt conditions were asked to write about a time in the past year when they experienced the emotion associated with their condition. Given the future-oriented nature of anxiety, participants in this condition were instructed to write about upcoming events that were currently provoking anxiety. This method for inducing emotion has been successfully implemented in prior research with BPD patients (see: Sauer & Baer, 2012). In order to ensure that comparable levels of emotion were being generated within and across emotion conditions, participants created a list of emotion-eliciting events in the first session prior to completing emotion inductions. They rated the emotional intensity of each identified situation (on a 1–100 scale) and six situations rated above 60 (to ensure sufficiently strong emotion is induced) were chosen as the basis for the induction writing assignments.

Following each emotion induction, participants were instructed to either act consistent with or opposite to the emotion-driven behavioral urges associated with the induced emotion. The order of these coping instructions was randomly alternated so that each participant received

Table 1

	Opposite	Consistent
Anger	Maintain a relaxed posture (e.g., unclench hands/jaw, lean back in chair); engage in gentle stretching; sing a song/tell a story in soft tone of voice; describe the “other side” of the story to the researcher; think of compliments for people walking by; write thank you notes; brainstorm a list of kind things to do for friends/family	Maintain an angry body posture (e.g., clench your fists/jaw, sit up straight in your chair); raise your voice/swear/make snarky comments; tear up pieces of paper; throw a stress ball against the wall; bang on the table; vent to the researcher, pace around the room
Anxiety	Maintain a relaxed posture (e.g., lean back in chair, rest palms on lap); take deep breaths; take steps to solve the problem (e.g., make pros/cons list); after problem solving, engage in a pleasant activity (i.e., take a walk around the block, listen to music, play a game on your phone)	Maintain a body stance that is ready for action (e.g., tap your foot, shake your legs, sit up straight, look around the room); describe any physical sensations you’re feeling to the researcher; make a list of everything you need to look out for related to this event/situation (i.e. “what if ___ happened?”); draft texts to friends/family seeking reassurance
Guilt/Shame	Maintain an alert, dignified posture (e.g., sit up straight); tell the researcher about the things you’ve done in the past that you’re proud of; use complimentary language to talk about yourself; text friends to say “hello”; do something to treat yourself (e.g., have a snack, listen to a favorite song)	Maintain a withdrawn posture (e.g., avoid eye contact; tell the researcher about ways you can deny yourself (or punish yourself) to make up for what you did; apologize to the researcher for any minor infractions (e.g., lateness, not doing the exercise right); draft an apology to those you have hurt in the past; think through the situation in detail and really contemplate what you should have done differently.
Sadness	Get moving (e.g., jumping jacks, going for walk around the block); make a plan for something fun to do this weekend; move toward a goal (e.g., make a to-do list of manageable steps to complete a task); listen to an upbeat song; text some friends and family members to say “hello”; tell the researcher a funny story or joke; tell the researcher about a happy memory; play a game with the researcher	Maintain a restful body posture (e.g., put your head down on the table; listen to sad music; Move slowly around the room, like your limbs are really heavy; spend some time really thinking about the causes and consequences of your sadness; allow yourself to cry

Opposite and consistent coping instructions for each emotion condition.

Note: With the help of the study facilitator, patients were instructed to select behaviors from these lists that best represent opposite or consistent actions based on their activating events (mood induction) and behavioral urges (current).

“act consistent” instructions during three sessions and the “act opposite” instructions during three sessions. A computer-generated randomization table was created to balance assignment to emotion condition with the order of session instructions (consistent vs. opposite) and was stratified such that one coping condition was not presented more than two times in a row. Although application of this skill in a therapeutic context typically involves using the patient’s activating event and idiosyncratic behavioral urges to identify an appropriate opposite action, standardized instructions for consistent and opposite coping were presented for each emotion and can be seen in Table 1. The decision to use standardized instructions was made to maximize patient safety, as it may have been difficult to honor patients’ behavioral urges in the consistent sessions, particularly if urges involved self-injurious behaviors. It is, however, important to note that all facilitators of the study sessions were practicing clinicians (doctoral students, a post-doctoral fellow, and a licensed clinical psychologist) with experience leading DBT skills group under the supervision of intensively trained individuals; to the extent possible, study therapists worked with patients to identify the action (opposite and consistent) from the standardized instructions that best fit with each activating event and urges. As is customary in ATDs, the two coping conditions were both presented as credible and effective strategies to the participants in order to minimize any biased results due to expectancy effects (Barlow et al., 2008). Specifically, participants were informed that “the goal of this project is to test out two different strategies for coping more effectively with emotions in order to ascertain the most effective strategy for you.”

1.3. Study assessment

In order to confirm study inclusion/exclusion criteria, participants attended a clinician-rated assessment session prior to completing experimental procedures. First, the BPD module of the Structured Clinical Interview for DSM Disorders (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997) was administered to ensure participants indeed met criteria for BPD. Additionally, modules from the Anxiety Disorders and Related Disorders Interview Schedule-5 (ADIS-5; Brown & Barlow, 2014) were used to assess study exclusion criteria (e.g., substance dependence, manic episode). Study assessors were licensed Ph.D. level psychologists (SSZ, PS) and advanced doctoral students (CCR, JGW) who underwent rigorous reliability training. All diagnostic interviews were audio recorded and a subset (20%) were rated by an additional

clinician; agreement regarding study eligibility (yes/no) was high (Kappa = 1).

During their initial diagnostic assessment session, participants also completed several self-report questionnaires. Depression was assessed with the Overall Depression Severity and Interference Scale (ODSIS; Bentley, Gallagher, Carl, & Barlow, 2014) and anxiety was measured with the Overall Anxiety Severity and Interference Scale (OASIS; Norman, Hami Cissell, Means-Christensen, & Stein, 2006). Additionally, BPD symptoms were assessed with the Zanarini Rating Scale for BPD (ZAN-BPD; Zanarini, Weingeroff, Frankenburg, & Fitzmaurice, 2015). Each of these measures is widely used and has demonstrated strong psychometric properties in the above, respective validation studies.

The dependent variable for this study, change in the intensity of the induced emotion following the completion of the coping instructions, was assessed using the Positive and Negative Affective Schedule - Expanded Form (PANAS-X; Watson & Clark, 1994). The PANAS-X is a self-report questionnaire that asks participants to reflect on how they are currently feeling. Subscales measure the intensity of the four discrete emotions represented in this study (fear, sadness, guilt, and anger). This measure is widely used and has demonstrated strong psychometric properties, including internal consistency and stability over time (e.g., Crawford & Henry, 2004). The PANAS-X was presented three times throughout each session: 1) at the start of each session, 2) following the mood induction, and 3) following act consistent/opposite coping instructions. As a manipulation check, the change in emotional intensity from the start of the session to after the emotion induction was examined to ensure that the induction successfully produced the desired emotion. Additionally, participants were asked to rate the extent to which they felt they adhered to the prescribed strategy (acting consistent vs. opposite) following each session.

1.4. Data analytic plan

Visual inspection is the most commonly used analytic tool in SCEDs (Barlow et al., 2008). To conduct these analyses, outcome data are plotted graphically. Conditions are considered to be significantly different from each other if the lines connecting the data points in each condition do not overlap with one another. A larger magnitude of difference between these lines is considered evident of a strong effect (Kratovich & Levin, 2010). To supplement visual inspection, the mean difference between conditions on change in emotional intensity

following the coping instructions was calculated for each participant. Recent years have seen a proliferation of additional methods to evaluate ATDs (for a review, see: Manolov & Onghena, in press) and, in conjunction with visual inspection, these techniques offer tools for quantifying observed effects. Percentage of non-overlapping data (PND-W), a statistical technique adapted for ATDs by (Wolery, Gast, & Hammond, 2010) was used to quantify the differences between conditions. In order to obtain a PND-W value, the first measurement for the opposite action condition is compared with the first measurement for the act consistent condition, the second measurement for opposite action condition is compared with the second measurement for act consistent condition, and so forth. To be considered significant, the PND must be greater than or equal to 70% (Scruggs & Mastropieri, 1998).

2. Results

2.1. Preliminary data

Of the 16 enrolled participants, 13 identified as female and three as male (one male indicated that they are transgender). Participants ranged in age from 18 to 66 years old ($M = 27.71$, $SD = 15.31$). Two participants did not report their age. Nine participants identified as Caucasian, six as Asian, and one participant did not indicate their race. One participant reported being of Hispanic or Latino ethnicity. Table 2 lists the means and standard deviations on baseline scores for symptoms of BPD, anxiety, and depression. These data suggest that our sample exhibited clinically significant levels of depression and anxiety symptoms (Bentley et al., 2014; Norman et al., 2006), and a range of BPD severity (mild to severe; Zanarini et al., 2015).

To determine if the writing task successfully induced the intended emotion each session, scores on the PANAS emotion subscales at the beginning of each session (baseline) and post-mood induction were compared. The mean change on the PANAS subscale for the induced emotion from baseline to after the mood induction was 6.89 ($SD = 5.08$). A paired samples *t*-test indicated that, across conditions, there was a significant difference between baseline ($M = 11.72$, $SD = 3.96$) and post-mood induction PANAS subscale scores ($M = 18.64$, $SD = 5.91$; $t(15) = 5.42$, $p < 0.001$). Additionally, participants were asked at the end of each session how well they had adhered to the coping instructions (“Using the provided scale, please rate the extent to which you followed study instructions to cope with your emotions following the writing task”). Participants endorsed good adherence to instructions ($M = 3.39$, $SD = 0.74$, with four being the highest score).

2.2. Visual inspection

As noted above, the primary analytic strategy in SCED is visual inspection of graphically represented data. Fig. 1 depicts graphs for each participant in which change in emotional intensity following the administration of the coping instructions is plotted for each study session. The black lines connect data points that were collected during sessions in which participants were instructed to act consistent with their emotion-driven behavioral urges, whereas the gray lines connect data points collected during sessions in which participants were encouraged to act opposite. Across all participants in the sadness condition, visual inspection suggests that level of reduction in emotion intensity appears

Table 2
Means and standard deviations for baseline sample characteristics.

Measure	Minimum	Maximum	Mean	Standard Deviation
ZAN-BPD	9	28	16.50	5.53
ODSIS	0	19	9.81	5.08
OASIS	8	19	11.50	2.88

to be systematically higher in the opposite action condition than the consistent condition. In fact, with the exception of one data point (see Sad2), the data for each condition were non-overlapping, suggesting a significant difference. Similarly, in the guilt/shame condition, the data suggest that opposite action sessions produced greater reductions in emotional intensity than the act consistent sessions; however, despite appearing to be quite large in magnitude, these effects may be less reliable as only two of the four participants demonstrated completely non-overlapping data across coping conditions. Contrary to expectations, participants in the anxiety and anger conditions did not show clear differences in level of emotional intensity as a function of coping condition, with the majority of the data for the two conditions overlapping highly with each other.

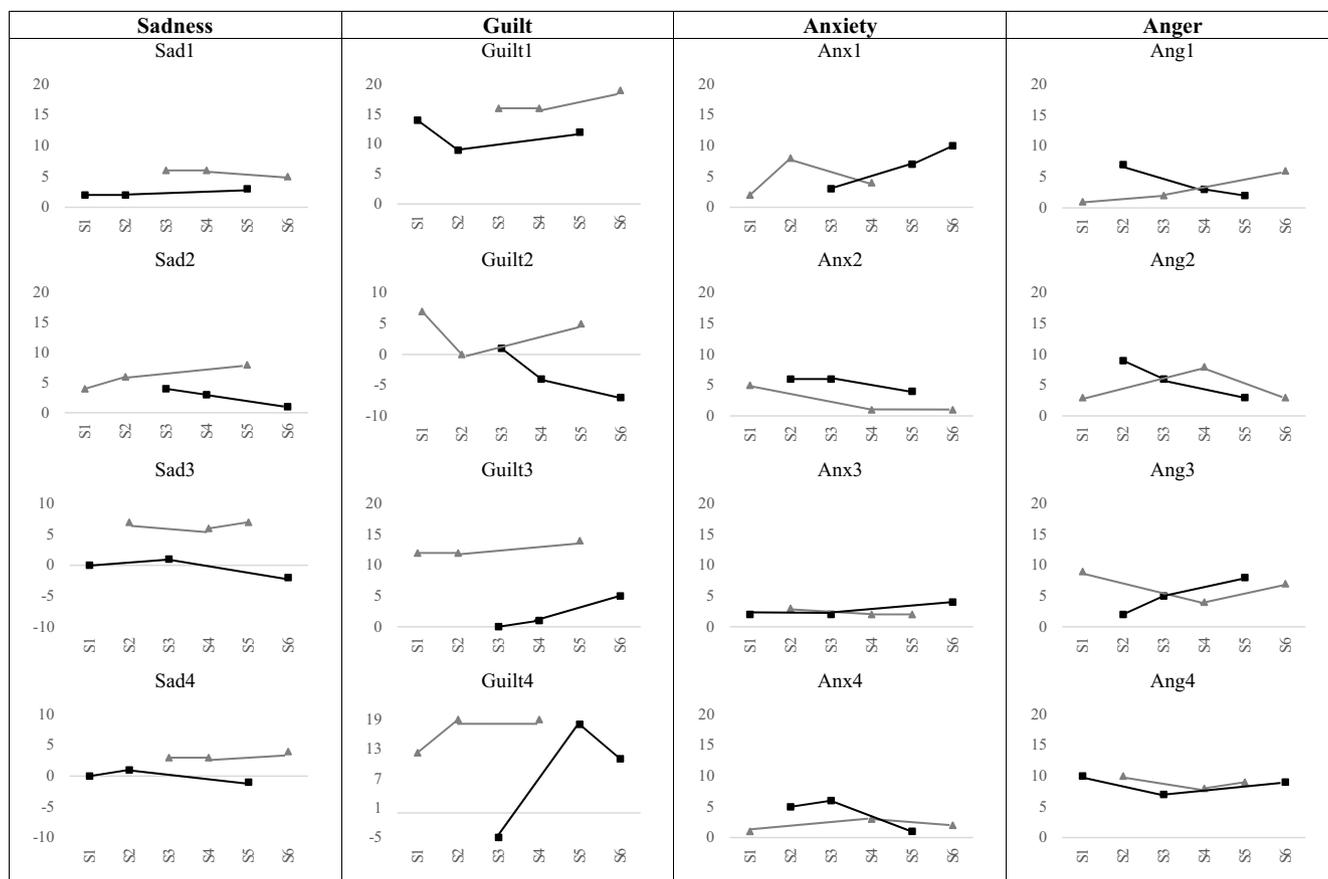
Table 3 supplements visual inspection by providing summary descriptive information; specifically, the mean change in emotional intensity as a function of coping condition for each participant, along with mean difference between conditions, are presented. Taken together, these data largely support the conclusions drawn during visual inspection, suggesting that acting opposite to sadness- and shame/guilt-driven behavioral urges results in larger decreases in emotional intensity than acting consistent, whereas opposite action does not appear to have this effect for anxiety and anger.

2.3. Percentage of non-overlapping data

In order to quantify the degree of non-overlap between opposite action and act consistent data points, PND-W was calculated for each participant (see Table 4). As noted above, PND greater than or equal to 70% represents a significant difference between coping conditions (Scruggs & Mastropieri, 1998). Results further bolster the conclusions drawn from visual inspection and descriptive data. Specifically, the majority of participants (7 of 8) in the sadness and guilt conditions demonstrated 100% non-overlap between condition, suggesting that acting opposite to the emotion-driven urges for these emotions leads to significantly greater reductions in emotional intensity than acting consistent. In contrast, the majority of participants in anxiety and anger conditions (7 of 8) did not exhibit significant PND. Of note, the one exception (see: Anx2) demonstrated 100% non-overlap favoring the act consistent condition.

2.4. Case example

In accordance with study procedures, the first patient in the guilt condition (Guilt1), a Caucasian female in her mid-sixties, first worked with the session facilitator to create a hierarchy of situations in the past year that elicited strong levels of guilt or shame. In her first mood induction, she wrote about shortcomings at work that were inconsistent with her reputation as a high performer; following the induction, she described urges (while the situation was unfolding) and currently to focus on all the tasks she performed poorly, ostensibly to prevent them from happening in the future. Since the instructions for session 1 were to “act consistent,” the researcher guided this patient toward the option from the standardized instructions that best matched her idiosyncratic urge: “Think through the situation in detail and really contemplate what you could have done differently.” Session 2 was also assigned to the consistent condition and the patient chose to draft an apology as the behavioral choice that best fit her urges following a mood induction that focused on her (valid) inability to reciprocate in a friendship. Session 3 was the first opportunity to practice option action in response to induced feelings of guilt. The patient wrote about her tendency to “blow off” church choir rehearsals and how her lack of commitment compared to other members led to feelings of inadequacy. In response, she elected to describe her qualities that led to pride and, by describing her commitment to work and family, was able to “give [herself] a break” for not being “all in” at church. In Session 4, the patient wrote about how she made nasty comments to her siblings following a



Note. Gray lines = inconsistent, black lines = consistent, Sad = sadness, Anx = anxiety, Ang = anger, y-axis = change in PAN subscale score, x-axis = session number

Fig. 1. Change in emotional intensity based on post-mood induction and post-coping instruction PANAS subscale scores.

Note. Gray lines = inconsistent, black lines = consistent, Sad = sadness, Anx = anxiety, Ang = anger, y-axis = change in PAN subscale score, x-axis = session number.

misunderstanding about scheduling during the holidays. Her urge was reportedly to punish herself for this “shameful behavior” and, since this was an opposite action session, the study facilitator encouraged her practice/plan self-soothing behaviors. Session 5 was the final “act consistent” session and the patient wrote about guilt induced by shutting out her siblings attempts to help her when she was going through a difficult time. Similar to session 1, her urge was to reply all the aspects of the situation that could have been handled differently, so she again elected to think about the situation in detail in order to find ways she could have responded differently. Finally, the last opposite action session involved a mood induction about lying at work to cover-up missed deadlines, urges to punish herself, and again engaging in behaviors to plan pleasant activities for herself regardless of whether she felt she deserved them. As can be seen in Fig. 1, patient Guilt1 three data points representing change in guilt intensity following opposite action sessions were non-overlapping with the data points for the consistent sessions, suggesting significantly greater reductions in guilt following the opposite action adaptation.

3. Discussion

The goal of this study was to explore whether a laboratory-based opposite action adaptation resulted in short-term reductions in emotional intensity within a sample of individuals with BPD. It was hypothesized that across four distinct emotion conditions (i.e., sadness, guilt/shame, anxiety, anger), participants would demonstrate greater reductions in emotional intensity when instructed to act opposite (using standardized instructions corresponding to typical behaviors associated

with the induced emotion), versus consistent, with their emotion-driven behavioral urges. Overall, results lend mixed support to this hypothesis. Findings indicate that the opposite action adaptation did lead to significantly greater decreases in emotional intensity than did acting consistent, but only for emotions of sadness and guilt/shame; this pattern was not evident in anxiety and anger conditions.

There are several reasons why acting opposite to sadness may demonstrate particularly robust reductions in this emotion's intensity. For example, opposite action has been linked to behavioral activation (e.g., [Girio-Herrera & Ehrenreich-May 2014](#); [Linehan & Wilks, 2015](#)), a well-established treatment for depression that involves increasing positive interactions with one's environment ([Cuijpers, van Straten, & Warmerdam, 2007](#); [Jacobson et al., 1996](#); [Martell, Dimidjian, Herman-Dunn, & Lewinsohn, 2013](#); [Mazzucchelli, Kane, & Rees, 2009](#)). Promising effects of behavioral activation on depressive symptoms can be found following a single session ([Nasrin, Rimes, Reinecke, Rinck, & Barnhofer, 2017](#)), suggesting that activities like making plans for the weekend or going on a brief walk (examples of opposite action used in the present study) may have an immediate, reinforcing effect. Similarly, participants in our guilt/shame condition also demonstrated short-term reductions in this emotion following opposite action, perhaps due to the fact that the action tendencies associated with both sadness and guilt/shame generally fall within the umbrella of withdrawal behaviors ([Barlow et al., 2018](#); [Linehan, 2014](#)). Acting opposite to guilt/shame (e.g., texting friends to say “hello,” engaging in self-care) also appears to have immediate, perceptible effects in reducing emotional intensity.

Contrary to our hypothesis, our opposite action adaptation was not associated with significantly greater reductions in anxiety or anger,

Table 3
Mean level and difference in change in emotional intensity as a function of coping condition.

Emotion condition	Participant		Mean change in emotional intensity (SD)		Mean difference by coping condition
Sadness	Sad1	Opposite	5.66 (0.58)		3.33
		Consistent	2.33 (0.58)		
	Sad2	Opposite	6.00 (2.00)		3.33
		Consistent	2.67 (1.53)		
	Sad3	Opposite	6.67 (0.58)		7.00
		Consistent	−0.33 (1.52)		
	Sad4	Opposite	3.33 (0.58)		3.33
		Consistent	0.00 (1.00)		
Guilt	Guilt1	Opposite	17.00 (1.73)		5.33
		Consistent	11.67 (2.52)		
	Guilt2	Opposite	3.00 (3.61)		7.33
		Consistent	−3.33 (4.04)		
	Guilt2	Opposite	12.67 (1.15)		10.67
		Consistent	2.00 (2.65)		
	Guilt4	Opposite	16.75 (3.89)		8.75
		Consistent	8.00 (11.79)		
Anxiety	Anx1	Opposite	4.67 (3.05)		−2.00
		Consistent	6.67 (3.51)		
	Anx2	Opposite	2.33 (2.31)		−3.00
		Consistent	5.33 (1.15)		
	Anx3	Opposite	2.33 (0.58)		−0.33
		Consistent	2.66 (1.15)		
	Anx4	Opposite	2.00 (1.00)		−2.00
		Consistent	4.00 (2.64)		
Anger	Ang1	Opposite	3.00 (2.65)		−1.00
		Consistent	4.00 (2.65)		
	Ang2	Opposite	4.67 (2.89)		−1.33
		Consistent	6.00 (3.00)		
	Ang2	Opposite	6.67 (2.52)		1.67
		Consistent	5.00 (3.00)		
	Ang4	Opposite	9.00 (1.00)		0.33
		Consistent	8.67 (1.53)		

Note: Negative values for mean change in intensity denote increased levels following coping instructions (see Sad1 and Guilt 4 following consistent coping). Negative values for mean difference by coping condition denotes reductions in intensity favoring consistent coping.

Table 4
Percentage of non-overlapping data (PND-W) for each patient.

Emotion Condition	Participant	PND-W
Sadness	Sad1	100%
	Sad2	66.67%
	Sad3	100%
	Sad4	100%
Guilt	Guilt1	100%
	Guilt2	100%
	Guilt3	100%
	Guilt4	100%
Anxiety	Anx1	33.33%
	Anx2	0%
	Anx3	33.33%
	Anx4	33.33%
Anger	Ang1	33.33%
	Ang2	33.33%
	Ang3	33.33%
	Ang4	33.33%

Note: Percentage of nonoverlapping data (PND-W) is considered significant when it is 70% or above. Values indicate percentage of opposite action sessions with higher values for reductions in emotional intensity than the adjacent act consistent session.

compared to acting consistent with these induced emotions. In the context of anxiety, this finding was particularly surprising as opposite action has been frequently included as a core component in the treatment of anxiety disorders (e.g., Barlow et al., 2010; Craske & Barlow, 2006). However, it is possible that the benefits of acting opposite to

anxiety are more likely to emerge in the long-term, following repeated approach-oriented behaviors that promote new learning about feared situations (Foa & Kozak, 1986), making difficult to observe short-term change in the intensity of this emotion during a brief laboratory session. Specifically, asking participant to engage in approach-oriented opposite actions to anxiety (e.g., problem-solving a previously procrastinated task) may, in fact, heighten anxiety in the moment, as was seen for one participant in the anxiety condition. With regard to anger, there is evidence to suggest that aspects of this emotion may be rewarding for some individuals, and thus support behavioral efforts to maintain the feeling (Bushman, Baumeister, & Phillips, 2001; Chester et al., 2016; Chester, 2017; Ramirez, Bonniot-Cabanac, & Cabanac, 2005). For example, venting about being treated unfairly (i.e., acting consistent with anger in the present study) may be cathartic and self-validating, while describing the anger-inducing event from another person's perspective (i.e., opposite action) may have been perceived as invalidating.

Findings from the present study may have several important clinical implications following replication in contexts with greater ecological validity. If similar results are obtained in situations relevant to each patient (outside of the laboratory setting), knowledge of which emotions support immediate changes in emotional intensity following opposite action may frame how clinicians approach use of this strategy across different clinical presentations. For example, patients who struggle with anxiety and anger may benefit from additional psychoeducation and normalization of short- and long-term consequences of engaging in opposite action. This may help increase initial buy-in with the skill by managing expectations that one likely will not immediately feel better following acting opposite to emotional behaviors. It may also be helpful to follow-up on these patients' experiences after opposite action (e.g., several minutes, hours, days later) and reflecting back on the emotional process to reinforce long-term benefits of acting opposite.

Additionally, isolating the effects of discrete treatment strategies may be instrumental in improving dissemination of evidence-based treatments. Ensuring interventions consist only of strategies that produce measurable change (i.e., “active ingredients”) allows for maximizing the therapeutic benefit of shorter treatments, increasing their chances of being disseminated. SCEDs conducted in laboratory settings represent a low-cost method to begin testing engagement of target mechanisms for discrete treatment strategies, though it may be difficult to create ecologically valid approximations of skills in this context. With regard to the present study, there are characteristics of the opposite action manipulation that limit its relevance to Linehan's (1993) conception of this skill in DBT and contemporary emotion science. In particular, emerging research highlights the importance of context (see: Barrett, 2017) and the ability to differentiate/describe nuanced emotional experiences (Barrett, 2006, 2012; Kashdan, Barrett, & McKnight, 2015) for selecting the most beneficial regulatory response (Gross, 1998).

Although study facilitators (all experienced DBT clinicians) attempted to personalize the behavior selected from our standardized instructions based on patients' activating event (i.e., contents of the mood induction) and current behavioral urges, the use of such instructions is inconsistent with the idiosyncratic nature of emotions and, subsequently, acting opposite to them. The inclusion of our “act consistent” control condition necessitated the use of standard behavioral prompts given that we did not want to give patients license to engage in risky emotional behaviors. Additionally, our manipulation check to ensure that patients indeed followed instructions to act opposite or consistent with the induced emotion was face valid and may have been subject to impression management.

Furthermore, the present study assessed the effects of one skill taken from larger treatment protocols for BPD. As noted above, the short duration of the study sessions may have precluded our ability to observe longer-term effects of the coping conditions, particularly for the anger and anxiety conditions. Additionally, it is possible that patients may respond differently to opposite action when taken out of its full

therapeutic context. For example, if preceded with treatment modules such as psychoeducation about the functional nature of emotions and motivation enhancement for treatment engagement, participants may have responded differently to the use of the skill. There may be limits to extent to which treatments can be abbreviated, along with whether skills can be separately entirely from a larger therapeutic package (e.g., online treatments), and still promote improvement in symptoms; this is a necessary area for future study.

An additional limitation of the present study is our sample size. Of course, it is important to note that small samples are customary for SCEDs as the within-subjects experimental design provides strong internal validity that allows us to draw causal conclusions. Although the case for external validity is less robust, a repeated pattern of results across subjects provides evidence of a generalizable effect. Our procedures for the allowance of individuals on psychotropic medications may represent another limitation; although participants were asked to remain on a stable dose in order to infer that any observed effects were due to the experimental manipulation, it is possible that the passage of time may have allowed a therapeutic dose to build in patients' systems and affect our findings. Finally, the present study combined guilt and shame within one condition. Although guilt and shame are often referred to interchangeably, there is some evidence that these emotions are provoked by different circumstances. Specifically, guilt is felt if we've crossed *other's* values, whereas we feel shame if we've crossed *our own* values (Dearing, Stuewig, & Tangney, 2005; Tangney & Dearing, 2002; Wicker, Payne, & Morgan, 1983). It is possible that combining shame and guilt may have minimized this difference, potentially impacting the clarity of results in this condition.

4. Conclusions

To our knowledge, this study is the first of its kind to isolate the effects of laboratory-based adaptation of opposite action across several discrete emotions. Findings lend support to the inclusion of this skill in BPD interventions, particularly for use in response to acute feelings of sadness and guilt/shame. However, results suggest that, in the short-term, acting opposite to anxiety and anger does not appear to lead to significantly greater reductions in emotional intensity than acting consistent with these emotions. Given the laboratory nature of the present study, along with the challenge of representing this skill in this context, future research to replicate findings in more ecological valid settings is needed before clinical implications can be drawn. Understanding the unique contributions of treatment components are necessary, with particular regard to whether they engage the core mechanisms maintaining symptoms, along with in what contexts (e.g., for which emotions) they should be employed. Shorter treatments that included only active ingredients are may have advantages for ultimate widespread dissemination in community practice.

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