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Hope for the Worst: Occasional Reinforced Extinction and Expectancy Violation in the Treatment of OCD

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An inhibitory learning conceptualization of treatment mechanisms in exposure-based therapy appears to better account for durability of symptom reduction and index overall learning. Presented here is an overview of two core elements of inhibitory learning, expectancy violation and occasional reinforced extinction, as they are thought to function in exposure and response prevention (ERP) for OCD. The overview is then followed by case examples illustrating these processes at work in a naturalistic clinical setting. Implications for treatment are broadly discussed.

Clinicians specializing in the treatment of obsessive-compulsive disorder (OCD) are most fortunate. They have at their disposal one of the most effective forms of psychotherapy that exists for any known psychological disorder: exposure and response prevention (ERP; cf. Greist et al., 2003; Olatjuni, Cisler, & Deacon, 2010). Indeed, scores of RCTs indicate that ERP is effective at significantly reducing symptoms and increasing functioning for a large portion of OCD sufferers across topographical and developmental spectra (Abramowitz, 2006). However, there remain many treatment responders who suffer a relapse following treatment. Although there are many factors that can contribute to this, both researchers and clinicians are devoting increased intellectual rigor towards evaluating putative mechanisms of change previously understood to underlie ERP in order to identify variables that influence durability of gains. Resulting from such investigation is a growing body of evidence suggesting that *emotion processing*—long considered the de facto mechanism of ERP, emphasizing habituation and the incorporation of corrective information—does not sufficiently account for treatment response in ERP (Baker, Mystkowski, Culver, Mortazavi, & Craske, 2010). Instead, *inhibitory learning* may provide a framework that better describes the mechanisms underlying exposure. Perhaps more important, it appears that carrying out ERP with a therapeutic technique consistent with an inhibitory learning perspective may enhance the effectiveness of the intervention and foster sturdier gains (Arch & Abramowitz, 2015; Craske et al., 2008). It is this sort of outcome that is most attractive to all OCD sufferers, but particularly those necessitating a level of care exceeding the once- or twice-per-week outpatient model. The current paper describes implementation of inhibitory learning–informed ERP in an intensive setting designed to cater to such a population.

Keywords: inhibitory learning; exposure therapy; OCD; residential treatment

Processes of Inhibitory Learning

In traditional ERP, clinicians and patients collaborate to create a fear hierarchy consisting of a list of feared stimuli, rank ordered by degree of difficulty. The patient is then tasked with confronting stimuli on the hierarchy, progressing from the least to the most anxiety-provoking. Whether or not a patient is "ready" to progress from one stimulus to another is dictated by the degree of habituation that occurs; the prevailing wisdom is that a patient can move on to the next stimulus once his/her anxiety has decreased by 50% when confronted with the current stimulus (Benito & Walther, 2015; Tiller, 2015). The problem is that a wealth of evidence from both basic and applied research indicates that degree of habituation (either within or between sessions) does not predict how well patients do in treatment (e.g., Baker et al., 2010; Kircanski et al., 2012). Further, the habituation-focused approach of emotion processing theory presupposes that the treatment works by altering or undermining the nature of the fear structure underlying the OCD. However, the preponderance of phenomena such as renewal, spontaneous recovery, reacquisition, and reinstatement of fear suggests that the initial fear structure

remains intact. This perspective builds from seminal work by Bouton (2004), and lays the foundation for inhibitory learning theory as more recently articulated by Craske and colleagues (2008; 2014). Inhibitory learning theory suggests that numerous variables, aside from reduction in fear, contribute to durable fear learning (Craske et al., 2008). Two such variables, violation of expectancy and occasional reinforced extinction, are described here.

Violation of Expectancy

Violation of expectancy is the degree to which the expected outcome of an exposure task stands in contrast to what actually occurs (Craske et al., 2014). For example, a patient may expect that if she states aloud and in detail an intrusive thought that harm will come to a family member (i.e., the conditioned stimulus; CS), that harm will actually befall that person (the unconditioned stimulus, US). This CS-US "excitatory" association underlies OCD and is reinforced by engagement in rituals and avoidance. Craske and colleagues (2014) state that a violation of expectancy during an exposure session helps to establish an inhibitory association with a feared stimulus that is built alongside the original, excitatory association (Dunsmoor, Niv, Daw, & Phelps, 2015; Zbozinek & Craske, 2016). In this case, should the patient repeatedly carry out the exposure of articulating the intrusive harm thought (i.e., come into contact with the CS) and find that harm does not come to her family (i.e., no US), expectancy is violated and the CS-noUS "inhibitory" association is developed. Inhibitory learning is said to have occurred when a patient more readily accesses the CS-noUS inhibitory association in the presence of the CS than she does the excitatory CS-US pairing.

Delivering ERP from an inhibitory learning perspective, then, differs from doing so from an emotion processing perspective (i.e., traditional ERP) in several key ways. Because of the decreased emphasis on habituation, it is less important for the clinician to prompt a patient to track subjective units of distress (SUDS) ratings throughout the duration of the exposure. Instead, a patient can be asked to make declarative statements concerning what she may expect to occur prior to the exposure. This is done for the purposes of increasing the salience of the stimuli involved (i.e., CS, the expectancy, and putative US) so as to bring the patient in contact with what unfolds. The patient would then be asked to bring her attention to the putative match/mismatch between expectancies and actual outcome after an exposure has completed. Further, expectancies may be tracked repeatedly during the process of the exposure, depending on the nature of the obsession and expected outcomes. Critically, this approach differs from "behavioral experiments" that may comprise a subcomponent of traditional cognitive therapy for OCD in that patients interact with the expectancy violation on an experiential level (i.e., coming into close contact with the full complement of sympathetic arousal and observing the sequelae of that) rather than on a language-based level (i.e., a clinician stating: "do you see now that you did not have a heart attack after doing the exposure?"). The implicit message sent during such an exposure session is that contact with and curiosity/inquisitiveness around fear is paramount to the learning process rather than the mere observation that fear expression can fade with time.

Such expectancies, of course, are as diverse as the myriad specific symptom presentations of OCD, and can range from the expectation of specific feared outcome such as people dying/getting injured or "bad things" happening to them, all the way to more amorphous, existential threats. To an extent, the expectancies then dictate both the design of the exposure as well as the method by which it is carried out. It is important that the exposure is carried out to facilitate contact with the appropriate CS and for the appropriate duration so as to maximally violate expectancies (cf. Craske et al., 2014).

For example, it would be important that a patient who fears losing his mind and becoming violent as a result of coming into contact with household chemicals carries out exposures that (a) place him in contact with such chemicals and (b) keep him in contact for a duration that exceeds the point at which the patient believes he would have lost his mind. Another example might target expectancies around the patient's own capabilities in the context of unwanted thoughts. This patient might be tasked with deliberately having intrusive sexual thoughts about one's parent while engaging in a conversation with this parent for sufficient time to allow the patient to observe that her ability to carry on this conversation amid such thoughts exceeds her expectations. In this example, the patient might be prompted to note expectancies versus experience at numerous times during the exposure in order to observe longitudinally how the ebb and flow of anxiety can exist independently of behavior. In still another example, a patient who has concerns that coming into contact with emotionally contaminated items would result in a loss of sense of self might be tasked with longer term experience tracking in order to observe expectancy violation. That is, the patient may fear that the "effects" of the exposure might not occur until many days, weeks, or months subsequent to its implementation. The patient would then be invited to notice such long-term outcomes of exposure and whether they match what was expected. It is important to emphasize that patients are not being asked to *prove* that their obsessions are untrue, but rather simply *notice* and interact with the experience firsthand instead of solely interacting with cognitions and appraisals of said experience.

Because of the reduced emphasis on habituation as intended outcome, what constitutes a productive exposure

might differ from traditional thinking when operating from an inhibitory learning perspective. A clinician would not celebrate a reduction in anxiety (i.e., exclaiming "great!" when a patient notices habituation has occurred) or use such changes in anxiety to dictate treatment (i.e., progressing stepwise through a hierarchy). Maximal expectancy violation might come instead from increasing the variety of stimuli used irrespective of levels of difficulty or habituation that has or has not occurred (cf. Abramowitz & Arch, 2014). While resisting rituals during exposure is a desired outcome from any theoretical perspective, engaging in explicit coping statements to motivate such adherence ("I won't do my rituals, I will let the anxiety reduce on its own"; cf. Abramowitz, 2009) might be replaced with simply noticing that one has the capacity to resist rituals regardless of affective experience—an important expectancy violation. Thus, an exposure beginning and ending with high SUDS can be seen as useful. Notably, reducing emphasis on habituation helps clinicians avoid a conundrum in logic that might arise when taking a traditional approach. Most clinicians would agree that a core lesson to be learned in exposure therapy is that *anxiety is not inherently dangerous*, indicative of pathology, or something that needs to be eliminated when it arises. However, patients can encounter an implicit mixed-message when a clinician uses habituation as a benchmark for progress and an indicator that the patient is ready to move on to the next exposure. Specific levels of anxiety should factor less, not more, into determining behavior. If one accepts the premise that OCD is a disorder of experiential avoidance, exposure should not be implicitly framed as the adaptive way to eliminate an unwanted experience.

Occasional Reinforced Extinction

Given the crux of ERP treatment involves encountering and reducing control over the myriad environmental forces that hold sway over one's life, there are many opportunities for a patient to experience expectancy violations once they begin paying attention. However, because of this very truth, there are invariably cases where "bad things" do happen in the context of carrying out ERP. That is to say, the expectancy violation occurs in the unwanted direction. For example, a patient may actually become physically ill with a stomach virus (US) shortly after engaging in contamination-focused ERPs. In such cases, the initial excitatory CS-US pairing is said to have been partially reinforced. Interestingly, evidence from laboratory investigations in the mechanisms of inhibitory learning suggest that such *occasional reinforced extinction* (ORE) may serve to actually *strengthen* extinction and thus foster increased access to the inhibitory CS-noUS association (Woods & Bouton, 2007). In such laboratory studies, it is discovered that the administration of an occasional reinforcer (US) to rats during the extinction phase—that is, when the rats found themselves in a context where the CS was otherwise *not* paired with the US, following an initial acquisition phase—resulted in significantly slower rates of fear reacquisition compared to rats that did not experience ORE (Woods & Bouton, 2007).

Although an exhaustive review of the evidence for and putative mechanisms of ORE is beyond the scope of this paper, it is worthwhile to describe the current understanding of why ORE works in this way and the extent that this fits within the framework of inhibitory learning theory. Much of the interpretation of the beneficial effects of ORE falls under the umbrella of expectancy violation (cf. Craske et al., 2008; 2014). We might broadly consider two points at which expectancy violation occurs. The first occurs when the US is introduced, given that the patient may have come to expect that the US does not follow the CS once she has been engaged in exposure therapy for a period of time. This expectancy violation increases the salience of the CS and might signal to the patient a return to the conditioning context (i.e., the excitatory CS-US association), if not for the occurrence of the *second* expectancy violation: that continued contact with CS in spite of the US occurrence demonstrates that the CS is associated with numerous, non-US stimuli. For example, a patient who becomes physically ill (US) following exposure to touching and cross-contaminating with public bathrooms finds that continued engagement in such exposures reveals the illness to be a relatively rare occurrence. Further, the patient may find that becoming ill (now the CS) does not result in hospitalization or death (US).

Bouton and colleagues (Bouton, 2004; Woods & Bouton, 2007) frame these phenomena with regards to the effect of context on learning. The extent to which an organism accesses the inhibitory CS-noUS association is thought to be highly dependent on context. As such an organism that developed the inhibitory association in a context completely free of US is likely to interpret the appearance of a US as a signal to a return to the *conditioning* context, that is, the excitatory CS-US combination. In short, the occurrence of a US "sets the occasion" for a relapse (Woods & Bouton, 2007). When occasional US is presented in the context of extinction learning, the organism is essentially incorporating such occurrences as part of the *extinction* context. The organism learns that US occurrence is not necessarily a return to the excitatory association and instead sets the occasion for more extinction, thus access to the CS-noUS inhibitory association remains. This phenomenon constitutes a promising area of study to the fields of behavioral addiction, substance abuse, obesity, and the like (e.g., Fuchs, Lasseter, Ramirez, & Xie, 2008; van den Akker, Havermans, & Jansen, 2015). Anecdotally, one might notice how the experience of dieting to lose weight might

differ depending on rigidity of approach. A person who diets with the mentality that any and all junk food is strictly off limits may find that such a diet "falls apart" over the holidays once that first slice of pumpkin pie is eaten, whereas someone who allows for the occasional "cheat" food is able to maintain their diet for longer stretches.

Inhibitory Learning in Practice

The current paper aims to use two case examples to illustrate the implementation of techniques to promote inhibitory learning during the treatment of OCD, particularly as it relates to these core processes of expectancy violation and occasional reinforced extinction. These cases describe patients who were treated in an intensive residential setting (Intensive Residential Treatment [IRT]; cf. Stewart et al., 2005) for OCD. This program comprises individual therapy, family therapy, group therapy, and pharmacological intervention over the course of several weeks, with 24/7 staffing. The patients completed between 2 and 4 hours of ERP each day (some therapist/staff-assisted and some self-directed), in accordance with the treatment plan devised by the individual therapist. Please note that the following cases have been deidentified. The content was reviewed by the patients and consent for publication was provided.

Case "Jane"

An inhibitory learning approach may be particularly useful for individuals reporting limited habituation during previous efforts to complete exposure, as might often be the case for those presenting for IRT. Such individuals can exhibit higher degrees of severity and clinical complexity, thus necessitating the high level of care. Controlled implementation and evaluation can be challenging though, as many of the most critical exposure exercises may be unplanned or occur outside of predetermined exposure time frames. The following case exemplifies both the unique challenges and powerful benefits of utilizing inhibitory learning strategies in IRT settings.

Patient Demographic

"Jane" was a Caucasian female in her mid-30, raised in a household that actively practiced Judaism. The client indicated she was not particularly religious at the time and was primarily practicing as a form of compulsion. She was referred to residential treatment for OCD due to limited response to outpatient ERP and significant increases in the intensity of her distress/anxiety when confronting triggering stimuli during exposure. Based on clinical assessment at admission, she met diagnostic criteria (based on DSM-IV-TR) for a primary diagnosis of OCD, major depressive disorder, and agoraphobia without history of panic (secondary to her OCD).

Presenting Symptoms and Case Conceptualization

Jane's OCD presentation centered on scrupulosity symptoms, specifically fears of being possessed by the devil. To gain certainty that she hadn't inadvertently become possessed or sold her soul to the devil, her primary compulsions included seeking reassurance from religious figures (within Judaism, Catholic, and Christian faiths), in-depth research about the existence of the devil, possession, and exorcisms. As her OCD intensified (i.e., progressed through the fear acquisition phase), she experienced feedback from several religious figures who suggested she "didn't have OCD" and may be struggling with demonic possession. At this pretreatment stage, the reinforcement of fear served only to worsen her symptoms. Following these events, she began to struggle with additional intrusive thoughts, including that she doesn't actually have OCD, but instead has a psychotic disorder that is untreatable. This led to multiple discussions with treatment providers and research on the application of psychosurgeries for OCD. These symptoms were exacerbated due to intense perfectionism and the belief that she "had to know" if she truly had OCD before she could move forward with her life. When she became triggered, insight into her symptoms decreased and the belief that she was struggling with various forms of demonic possession intensified. At this point in her exposures, the clinical team noticed a significant increase in suicidality.

Upon admission, the client indicated a Yale-Brown Obsessive Compulsive Scale (Y-BOCS) score of 18/40 (see Figure 1 for weekly Y-BOCS data). Additionally, assessment indicated significant depression symptoms with a Hamilton Depression Scale-6 (HAMD-6) score of 17/22. At admission, Jane also demonstrated elevated scores on the Obsessive Beliefs Questionnaire-44 (OBQ-44) subscales of Need for Perfectionism and Certainty and Importance/Need to Control Thoughts (see Table 1 for scores).

Treatment Approach

Prior to attending intensive ERP-based treatment, Jane had completed a limited number of ERP-focused sessions on an outpatient basis. However, given the level of suicidality present when she would engage in exposure exercises, the majority of the outpatient work focused on facilitating acceptance of uncertainty and preparing her for a more intensive level of care. Upon admission to the program, she engaged in daily ERP, in addition to cognitive therapy focused on increasing insight into her symptoms and integration of cognitive-behavioral strategies for depression. Regarding medication, she entered the program on 250 mg of clomipramine, 150 mg of lamotrigine, 5 mg of memantine, 300 mg of seroquel, and 1 mg clonazepam (PRN). These medications were unchanged during her time in treatment.

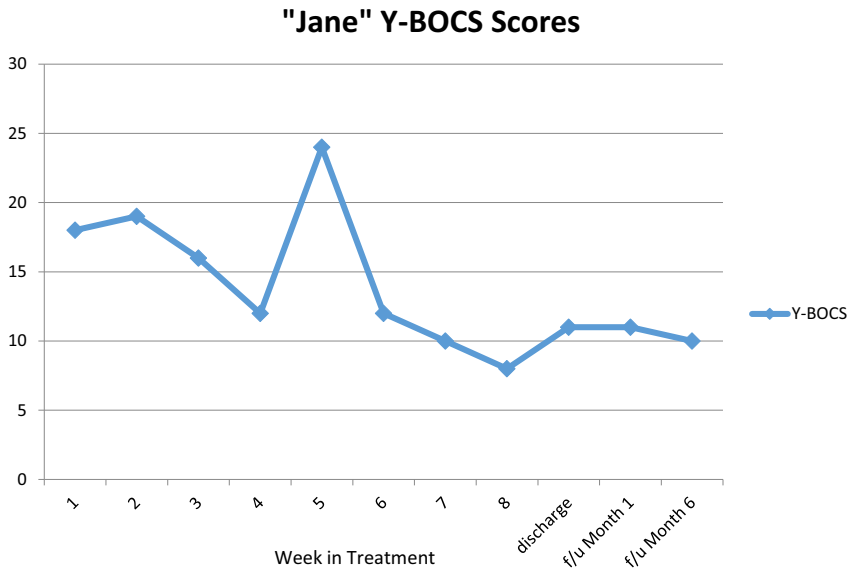

Figure 1. Symptom progression/reduction across treatment for patient "Jane."

Given the delusional quality surrounding her scrupulosity symptoms, the beginning of treatment focused on helping her identify her rituals, particularly the presence of mental rituals and how researching religion and topics related to the devil and OCD treatment could serve as rituals. Subsequently avoided/triggering items and tasks were identified. Given the pervasiveness of her religious concerns, focus was given to functional daily tasks, such as engaging in conversations with others while resisting confessing and reassurance-seeking rituals. Additionally, imaginal scripts and loop tapes to feared statements, such as "I may not have OCD" and "I may be possessed by the devil and never know for sure," were completed and integrated with daily tasks. For example, Jane would listen to loop tapes in the background while cooking/eating with the milieu, engaging in conversations with staff/peers, completing graduate school applications, and going on community outings on the weekends.

Following 10 weeks of intensive/residential treatment, a significant reduction in her OCD symptoms was noted (Y-BOCS total score at discharge = 11/40). Most important, following unexpected triggers, she exhibited increased resilience, pushing through the resulting surge of anxiety and depression symptoms to reengage in daily/functional activities and social interactions within a couple of hours, compared to multiple days of isolation and social withdrawal that had previously followed unexpected triggers. A reduction in suicidality was also noted along with reductions in depression symptoms (HAMD-6 at discharge = 2/22) and intensity of obsessive

Table 1
Admission and Discharge Scores for Jane and Madison on the Y-BOCS, HAMD-6, OBQ, and DOCS

	Madison		Jane	
	Admission	Discharge	Admission	Discharge
Y-BOCS	31	12	18	11
DOCS				
Germs/contamination	2	0	0	0
Harm/injury/bad luck	10	5	0	0
Unacceptable thoughts	16	6	11	5
Symmetry/completeness/not just right	3	0	0	0
HAMD-6	17	2	13	2
DTS	30	41	22	39
OBQ subscales				
Responsibility/threat	99	87	106	65
Perfectionism/certainty	87	73	106	69
Importance/control of thoughts	77	42	67	23

beliefs according to the OBQ subscales, along with an increase in distress tolerance ability based on the Distress Tolerance Scale (DTS). These gains were maintained at both 1- and 6-month follow-up (see Table 1).

Expectancy Violation

One of Jane's greatest struggles across treatment was the belief that she could not move forward with her life in a meaningful way. Specifically, she struggled with applying to graduate school and looking for a new job that fit her specialty without "knowing" if she had OCD and "if [she] was treatable." The expectation that she could not engage in *meaningful* occupational activities or make progress on her job search without "figuring it out" contributed to the persistent depression/suicidality she experienced when she became highly triggered. She reported feeling hopeless, as she would not be able to know if she was possessed until she dies. However, around Week 5 of treatment, the client was unexpectedly confronted with the realization that her current job was in jeopardy due to reorganization. This resulted in significant increases in her symptomatology. Further, following the loss of her job, she also had a fight with her significant other, in which they decided to end the relationship. Following this news of the reorganization, the client worked to find a new job, and was able to successfully apply and interview. While this was a long-term process spanning multiple weeks, it was a powerful example of expectancy violation that was unplanned, occurring as a result of unforeseen environmental circumstances. Following this experience, she demonstrated a significant shift in her ability to recover from difficult and unexpected triggers across symptom domains.

A subsequent exposure focused on attending a Christian service without engaging in rituals around reassurance seeking, praying about demonic possession, or attempting to confess that she might be possessed, provided another opportunity for expectancy violation. Interestingly, Jane up to this point had been actively considering transitioning from Judaism to Christianity, with the goal of "making sure" she could be forgiven for any accidental possession. Prior to the exposure, the goal of resisting confessing and reassurance seeking was set and the client described her expectation of extreme anxiety and guilt furthering her confusion about which faith is the "right one" for her to practice. However, during this exercise Jane reported that she did not experience a significant spike in her anxiety. Further, she realized she did not connect with the Christian faith and that if she was going to continue to practice any religion she wanted it to be Judaism. This presented a unique challenge as it removed the option of converting to Christianity "just in case" she was possessed. Even though challenging the desire to switch faiths was not a specific target of the exposure, her expectation of having this as a "back-up plan" was challenged and she realized she would have to live with the potential of being possessed without a safety plan. It was at this point where she became more willing to accept uncertainty around the possession fears, especially when confronted with unexpected triggers or triggering situations that occurred outside of circumscribed exposure times. Note that we are not suggesting that the relative lack of anxiety in this instance was necessary to constitute a productive exposure. Had she experienced marked anxiety, as expected, the expectancy violation may have instead been noticing her capacity to navigate her life amid said anxiety and guilt while allowing such experiences to go unresolved.

Occasional Reinforced Extinction

As Jane progressed through treatment, she became better able to tolerate uncertainty surrounding possession during the exposure sessions. However, unexpected triggers (especially outside of the identified exposure time) continued to elicit increased depression and suicidality. One example occurred within an exposure session structured around reading passages and online articles about exorcism. She unexpectedly encountered an article which included a passage by a psychiatrist who stated they had observed instances that could not be explained by their medical training and could only be understood in terms of the possession phenomena. Further, it suggested many cases of misdiagnosis stem from misattribution of demonic influences. Jane experienced this article as "confirming" her fears that possession is real and that her diagnosis was incorrect because the professionals were not adequately versed in both psychology/psychiatry and issues of possession. Prior to extinction, this experience would have likely resulted in a spiral of suicidality and ritualistic behavior and decreased engagement in treatment because an authority figure had confirmed her fear. However, at this later stage of treatment, Jane responded to this "worst case scenario" with much greater openness to feeling the trigger without ritualizing or escaping it. As a result, she recovered more quickly and viewed the unexpected trigger as an opportunity to live out the philosophy of living with uncertainty (aka, "desirable difficulty") and develop greater self-confidence.

Key Points

This case demonstrates how occasional reinforced extinction can be a powerful tool in exposure practices and illuminates the importance of timing, in that occasional reinforcement may serve to further extinction learning if presented during the extinction phase, or further the fear learning if presented during the acquisition phase (i.e., prior to treatment engagement). The ability to directly control when the reinforcement occurs can pose a challenge due to unforeseen aspects of the environment. Even in well-controlled exposures, therapists will not always know when a particular detail has inadvertently reinforced

one's fear behaviors. For example, Jane completed many exposures that were meant to replicate "daily interactions" such as engaging in conversations with staff without confessing that she might have sold her soul to the devil or probing them for information about their own religious faith. However, in the course of these discussions, staff would sometimes inadvertently disclose a piece of information that revealed their Christian faith (e.g., wearing a cross necklace or mentioning an academic institution known to have a religious foundation). There were times that simply inferring someone's faith reinforced Jane's belief that she must convert to Christianity since these staff members were perceived as "not condemned" and identified as Christian.

As we learn more about the essential elements of effective exposure therapy, it is tempting to control as many of these aspects as possible so that they occur at an "optimal" time; however, we must work to avoid reifying a particular path through treatment when we know that human learning and perspective taking does not happen in a linear, predictable manner. In our actions and words as clinicians, we have an opportunity to model a more open, growth mindset when it comes to how treatment unfolds. Tragedies big and small can be meaningful and instructive by connecting people to what they already know about having OCD; the rituals have not been protecting anyone or preventing harm and have actually done damage in their life. In these cases, there has been a violation of the expectancy that "my actions matter and can keep people safe" or "it's better to at least try to prevent harm with rituals."

Case "Madison"

The patient, "Madison," was in her early 40s, lived alone, and worked part-time in a grocery store. She presented for residential treatment due to increasingly severe OCD symptoms that resulted in a significant loss of occupational and social functioning, as the patient had taken leave from her job, had been unable to complete adult education classes, and had been largely isolative for the previous several months prior to admission. She had been struggling with OCD since her early teen years, and had experienced reasonable success in ERP treatment at both outpatient and residential levels of care prior to this admission.

Presenting Symptoms and Case Conceptualization

Madison presented for treatment struggling with intrusive thoughts related to a broad theme of becoming a social pariah, banished to a life of loneliness and misery. This typically manifested as a fear that she would be arrested and thrown in jail, wherein various horrors would be visited upon her. She had obsessions that she would inadvertently cause an accident/hit a person while driving, which spurred her to largely avoid this activity. But even while simply walking in populated areas or navigating her own private world, she struggled with the possibility that she would do something that would result in her arrest and incarceration. She had obsessions that she might be a pedophile, which resulted in her feeling as though she could not spend time around child-age relatives or younger customers at work. She lived in fear of harsh judgments from others, particularly those that she cared about (parents and other family members). When any of these thoughts entered her awareness, she would feel the urge to repeat her current action until she felt that the thought was sufficiently neutralized (i.e., she was able to complete the action without that thought active in her mind). This obsessive-compulsive cycle could affect literally any activity she was engaging in, which resulted in her being largely inactive and withdrawn. Upon admission to treatment, her Y-BOCS score was a 31/40, and she scored at 10/20 and 16/20 on the Responsible for Harm and Unacceptable thoughts subscales, respectively, of the Dimensional Obsessive Compulsive Scale.

When considering Madison's OCD symptoms in a broader context, we observed that their manifestation was, in part, cause and consequence of other symptoms commonly associated with social anxiety and depression. Madison's fear of negative evaluation from others resulted in her largely avoiding or enduring multiple types of social situations (e.g., spending time with groups of peers, pursuing potential romantic relationships, etc.) with significant distress. Like most with social anxiety, her fear of the cost of this negative evaluation is that she would be shunned and ostracized by her peers. When this feared consequence was explored more deeply, Madison revealed a concern that this occurrence confirmed that she was, essentially, a "lesser" person who was inherently awkward, flawed, unlikeable, and unfit for the world. This low self-image served as the conduit between OCD/social anxiety and a slew of depressive symptoms, including long bouts of sadness, withdrawal, anhedonia, guilt, and shame. The depression was, of course, maintained and reinforced by her sustained avoidance and withdrawal. In sum, one might say that Madison's OCD behaviors served a broad dual function: to protect her from both the harm of incarceration, but also to protect her from the confirmation of depressive beliefs and the resultant painful emotional experience.

Treatment Approach

Madison engaged in ERP augmented with elements of motivational interviewing (MI) and acceptance and commitment therapy (ACT). She engaged in intensive treatment for a total of 7 weeks, completing between 1–4 hours of ERP 7 days per week in addition to attending CBT-based therapy groups. Regarding medication, she entered the program on a full dose of fluoxetine (80 mg) augmented

with aripiprazole (5 mg) and memantine (15 mg). Memantine was increased to 20 mg at Week 1.

As is standard practice in ERP, among the first tasks in treatment was to create a "trigger list," which identified stimuli and contexts that provoked Madison's OCD symptoms. This list comprised items detailing in-vivo exposures such as watching film clips and looking at imagery related to incarceration, physically walking around in close proximity to others in public (i.e., shopping malls), visiting prisons, and driving her car, especially while at night or while distracted. In addition, numerous discrete thoughts (i.e., "I might be a pedophile") and would-be scenarios served as grist for imaginal exposures. Such stimuli were incorporated into exposure plans whereby Madison would encounter each of the above stimuli, typically via combination of in-vivo and imaginal exposure/loop tape. For example, Madison would watch clips from movies containing prison violence while at the same time listening to a recording of her own voice describing that such violence would be visited upon her should she abstain from her rituals and avoidance. She would also play this loop tape while walking through child-filled areas of a shopping mall and through the speakers of her car while she drove around neighborhoods populated with many bikers and pedestrians. In addition to completing exposures, care was made to incorporate activities such as pursuit of interests/hobbies and tasks related to school and work for the purposes of behavioral activation. ACT-informed approaches such as cognitive defusion and mindful acceptance were incorporated to target negative self-talk sparked by depressive automatic thoughts. For example, she was encouraged to see the thought "Madison is a terrible person" as simply a thought rather than a command to engage in rumination and isolation. She would write the thought down on paper and hang it up in her living space to demonstrate to herself that she could treat it in the same way one might treat a poster on a wall: there to be examined and engaged with, if desired, but also that which can be treated as quite literal window dressing. That is, the thought can be treated as a component of her experience but not the focus.

Given Madison's struggles with fearing negative evaluation, there were many instances early in treatment during which her adherence to her exposure plan was conceptualized as avoidance. That is to say, she engaged in exposures for the purposes of pleasing her therapist and other program staff, but not necessarily for the purposes of challenging her fears. Because of this, care was made to ensure that Madison was given ample time to complete her exposures in a self-directed manner where staff would not be privy to her adherence to the plan. Further, therapists were instructed not to redirect Madison when she began to engage in a ritual, but rather give her space to make the choice to either complete the ritual or retrigger on her own accord. More generally, the people-pleasing was challenged by including elements of ACT to address the relationship between Madison and her treatment plan. Specifically, her engagement in exposures was framed as consistent with moving towards who and what is important to her (i.e., values) rather than as moving away from potentially disappointing/garnering negative evaluations from therapists and staff. This was done to derive appetitive rather than aversive functions with respect to her exposures.

At the end of treatment, Madison's Y-BOCS scores had reduced to a 12/40 and her scores on the Responsible for Harm and Unacceptable thoughts subscale of the Dimensional Obsessive Compulsive Scale (DOCS) fell to 5/20 and 6/20, respectively (see Table 1 for scores).

Expectancy Violation via Occasional Reinforced Extinction

Madison's progression through treatment was nonlinear, as evidenced by her weekly YBOCS ratings illustrated in Figure 2. In particular, the jump in symptoms at Week 3 was concomitant with the first of three significant instances of ORE that occurred in treatment. In each of these instances, Madison came into contact with stimuli and experiences consistent with a "worst possible outcome" scenario according to her OCD thoughts.

The first occurrence came in the context of her completing exposures tackling intrusive thoughts related to pedophilia. Madison was tasked with spending time in a public area in close proximity to young children. In one instance, she was tasked with deliberately having thoughts that she might be a pedophile while in the general proximity of a day care on the premises of the hospital campus. While completing the exposure, she was approached and questioned by a day care staff. This staff person felt that she was suspicious and wondered why she was spending as much time as she was in the vicinity of the (outdoor) play area.

In response to this, Madison became significantly distraught, as she interpreted the employee's response as veritable proof that others found her repugnant and that the content of her thoughts were inherently awful and fit to be condemned. This reinforced OCD-related beliefs concerning the importance of thoughts and their need to be controlled, hence the uptick in OCD symptoms following an initial drop. While she was allowed space to verbalize her concerns and her experience was validated, the team encouraged Madison to move forward with her exposures despite this occurrence. She was encouraged to embrace the possibility of this person's negative evaluation being representative of the general public, but to practice continuing to move ahead with valued action despite this possibility.

Over the course of the subsequent few days, Madison's distress related to this experience notably lessened. Unprompted, she began to make note of the extent that

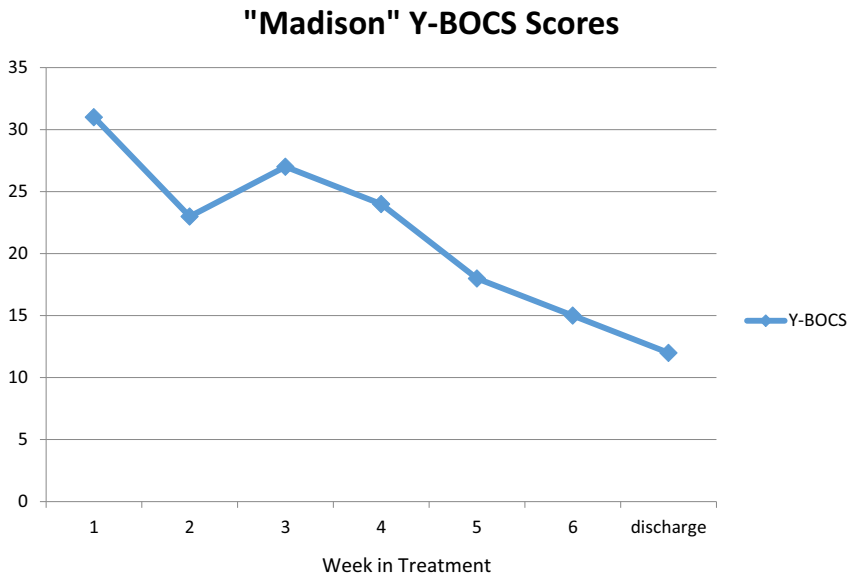

Figure 2. Symptom progression/reduction across treatment for patient "Madison."

this occurrence was "probably a good exposure for (her)" but also that the employee's suspicious response to her spending time in an outdoor public place was, to some extent, unreasonable. Of note, this recovery from the event occurred without the use of cognitive restructuring or other thought-challenging/reframing approaches common to CBT.

The second and third occurrences of ORE came in the context of Madison engaging in driving exposures to target her fears of causing harm. During the fourth week of treatment, Madison was completing a driving exposure during which she found herself driving alongside some construction occurring on the passenger side of her car. As she was adjusting her car towards the center of the road to avoid the construction, she found that she did not adjust properly and knocked over a few of the warning signs that the construction crew had erected. Again, Madison's immediate reaction was that this is proof that her engaging in driving only results in catastrophe. However, in short order, Madison was able to return to baseline on her own accord. She realized that although this occurrence was not ideal and a bit of a hassle to deal with (i.e., needing to deal with damage to her car, suffering embarrassment), she had underestimated her capacity to manage such a situation.

The third and final occurrence of ORE was perhaps the most dramatic from Madison's perspective. Occurring during the end of treatment, Madison planned a night at the movies with her younger brother. Prior to leaving for the evening, Madison sat in the driver's seat while her brother entered through the passenger side. After a moment, Madison began to drive the car forward—thinking that her brother had gotten into the car and that she had heard the door shut. In reality, her brother was not completely in the car and fell out as she began to move. He suffered no injuries, but to Madison, this was a disaster. She felt as though this event confirmed not only the dangers of driving but the dangers she presented to those close to her and her general ineptitude and inefficacy as a human being. Madison strongly considered terminating treatment immediately. However, after a brief bit of validation and MI work, Madison was again tasked with immediately continuing her exposures. She did so, and found that she was able to again recover quickly. In this instance of ORE she very clearly articulated an expectancy violation: she believed that this sort of driving miscue would result in her being castigated by others, but she found that her brother was largely understanding and supportive. She also found that the next time that she drove around friends and family, her anxiety was substantially lower than anticipated, given that this event occurred.

Key Points

The instances of ORE experienced by Madison occurred during both early and late stages of her treatment. The first instance (the overheard comment) resulted in a brief resurgence of OCD symptoms. This is perhaps consistent with the literature, such that the comment (US) following contact with Madison's posted intrusive thought (CS) signaled a return/continuance to the CS-US context. Nevertheless, Madison experienced a substantive drop in symptoms subsequent to the event given that she soldiered on with treatment regardless. Madison's latter two ORE examples did not result in significant post-ORE symptom exacerbation, possibly because they occurred during the extinction phase of her driving exposures. Thus, the US (traffic accident and incident with peer) did not signal a

return to the CS-US context, given that she had gotten to the point where the CS (driving without rituals) predicted *both* -US and -noUS (i.e., inhibitory) associations.

Madison experienced a 60% drop in OCD symptoms after encountering a person who potentially "confirmed" the content of her intrusive thought, an automobile accident, and a loved one becoming injured due to negligence on her part. Expectancy violation appeared to be a core mechanism of the ORE action. In this case, the expectancy violation was not that of an absence of a feared outcome, but a violation of the expected *cost* of that outcome. Phenomenological evidence has long suggested that exaggeration of cost underpins social anxiety and is what distinguishes it from other anxiety disorders and OCD, which are perhaps more often characterized by exaggeration of probability. In this case, when OCD and social anxiety were co-morbid and tightly intertwined, it appeared violating cost expectancies enabled the occasional reinforcement of fear to have a therapeutic effect and promote better learning.

General Discussion

The preceding case examples indicate the ways that expectancy violation and occasional reinforced extinction can play a critical role in patient recovery. Future controlled studies of deconstructed ERP components must be carried out to best evaluate their utility in exposure therapy, and an important limitation of the current case studies is our lack of follow-up data for one of our patients (Madison). Also, the fact that these cases were treated in a fairly unique setting raises further questions related to mechanism of change as well as generalizability. Regarding the former, it is possible that the symptom changes observed in each of these cases were attributable not necessarily to the elements of inhibitory learning experienced, but rather one of the other possible causal agents in a residential program (i.e., imposition of structure, elimination of family accommodation, more general effects of ERP, etc.). A broader study that compares outcomes between matched patients with and without inhibitory learning approaches would better isolate the putative effect.

With regard to generalizability, we argue that the fact that other treatment settings have much *less* structure than IRT actually makes it more likely to come into contact with expectancy violations and occasional reinforced extinction. Because these variables appear to be important predictors of durable learning, a general takeaway is that clinicians might consider loosening control over the parameters of exposures while designing and carrying them out. It is often the case that a clinician will design an exposure with a particular outcome in mind, e.g., that a patient observes firsthand that a feared outcome is unlikely to occur or that a patient can withstand a greater degree of anxiety than anticipated. While this approach is useful and appropriate, it may result in clinicians making concerted efforts to offer a "controlled environment" for the patient in order to maximize likelihood of this outcome. In our experience patients will often acknowledge that the most useful (and anxiety-producing) exposures are the ones that feel ecologically valid and less contrived. In fact, a common lamentation of patients engaged in treatment at our setting is that it can at times resemble a "test laboratory," insulated from the unpredictability of real life. Although the unit is designed to champion risk-taking—e.g., obsessions written in large block letters in the hallways —for some patients there is an implicit sense of safety; that is, staff would not allow a patient to engage in an exposure that was truly dangerous, staff are trained professionals who do not judge patients for the content of their intrusive thoughts, etc. This may subtly adjust patients' expectancies such that they might not expect some exposures to produce feared outcomes to the same extent as they might be in a more uncontrolled (i.e., outpatient, community-based) setting. Allowing for more variables to go uncontrolled may increase likelihood of unexpected occurrence. Patients may benefit from being encouraged to take risks in treatment outside the confines of a predetermined exposure treatment plan for the express purposes of experiencing things going wrong. In this sense, the concept of what constitutes "completed treatment" might actually include the wide range of naturalistic ERPs that one encounters by living life. We can shape our patients' attitudes toward these occurrences by referring to them as "free treatment."

Accordingly, another takeaway from these clinical experiences is that clinicians may consider eliminating the concept of "hypothesis testing" from the framework of the exposure, at least insofar as patients are encouraged to test whether or not feared outcomes will come true. In each of the instances of ORE described here, patients' fears were "confirmed" to an extent (i.e., bad things actually happened). An overemphasis on hypothesis testing/disconfirmation might have set up these patients to react to these occurrences by way of maintaining use of rituals and engaging further with OCD-related belief systems. However, when exposures are set up in such a way that patients are tasked with contacting and embracing the full gamut of the emotional experience (thoughts, emotions, physiology, behavioral urges) rather than tussling with the content of OCD-driven cognitions, they give themselves a chance to learn that the occurrence of the feared outcome does not need to be their undoing. In the cases above, each patient implicitly learned this by maintaining contact with their experiences while moving forward with valued action amid the occurrence of the ORE.

Finally, the usefulness of expectancy violation and ORE in exposure therapy may indicate that spending time framing such occurrences is not only important and necessary for treatment but also *desirable* and to be sought after on the part

of the patient. Entering treatment, patients typically (and understandably) relate their feared outcomes with a slew of negative meanings. For example, getting into a car accident means profound embarrassment and social rejection, failing a test means dreams will go unfulfilled, or getting confirmation that one is going to Hell means life can't go on. However, as some are intuitively aware, encountering profound emotional difficulties can shed light on strengths, capabilities, and values that would otherwise go unseen. The panicked, autonomic response to the car accident might result in a patient accessing innate abilities to respond under duress that were never apparent. The anguish in response to the failed test serves as a signal to the patient the extent that s/he values hard work and ambition. The deep fear stemming from the confirmation of going to Hell affords the patient an opportunity to learn firsthand the extent that s/he can tolerate uncertainty, the extent s/he values her faith, and the extent that s/he cares deeply about how s/he treats others. Would any of these patients choose to continue to have those respective difficult emotions if the very existence of each of them means that those strengths, capabilities, and values are held? Framing the expectancy violations and ORE in this way serves to "transform the stimulus function" of these feared outcomes, such that other, more appetitive associations, can be derived from them (Hayes, Barnes-Holmes, & Roche, 2002). Although it might be a stretch for clinicians to encourage patients to deliberately seek out feared outcomes, transforming their function might result in patients navigating the world less cautiously in the service of pursuing what's important to them.

Our hope is that the experiences of the two patients illustrated in this case study helps set the stage for such empirical evaluations, and engender increased creativity, curiosity, and flexibility on the part of patients and clinicians alike in the service of treating this crippling condition.

References

Abramowitz, J. S. (2006). The psychological treatment of obsessive-compulsive disorder. *Canadian Journal of Psychiatry*, *51*(7), 407–416. https://doi.org/10.1177/070674370605100702

Arch, J. J., & Abramowitz, J. S. (2015). Exposure therapy for obsessive-compulsive disorder: An optimizing inhibitory learning approach. *Journal of Obsessive-Compulsive and Related Disorders*, *6*, 174–182. https://doi.org/10.1016/j.jocrd.2014.12.002

Baker, A., Mystkowski, J., Culver, N., Yi, R., Mortazavi, A., & Craske, M. G. (2010). Does habituation matter? Emotional processing theory and exposure therapy for acrophobia. *Behaviour Research and Therapy, 48* (11), 1139–1143. https://doi.org/10.1016/j.brat.2010.07.009

Benito, K. G., & Walther, M. (2015). Therapeutic process during exposure: Habituation model. *Journal of Obsessive-Compulsive and Related Disorders*, *6*, 147–157. https://doi.org/10.1016/j.jocrd.2015.01.006

Bouton, M. E. (2004). Context and behavioral processes in extinction. *Learning & Memory*, *11*(5), 485–494. https://doi.org/10.1101/lm.78804

Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy*, *46*(1), 5–27. https://doi.org/10.1016/j.brat.2007.10.003

Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, *58*, 10–23. https://doi.org/10.1016/j.brat.2014.04.006

Dunsmoor, J. E., Niv, Y., Daw, N., & Phelps, E. A. (2015). Rethinking Extinction. *Neuron*, *88*(1), 47–63. https://doi.org/10.1016/j.neuron.2015.09.028

Fuchs, R. A., Lasseter, H. C., Ramirez, D. R., & Xie, X. (2008). Relapse to drug seeking following prolonged abstinence: the role of environmental stimuli. *Drug Discovery Today. Disease Models*, *5*(4), 251–258. https://doi.org/10.1016/j.ddmod.2009.03.001

Greist, J. H., Bandelow, B., Hollander, E., Marazziti, D., Montgomery, S. A., Nutt, D. J., Okasha, A., Swinson, R. P., & Zohar, J. (2003). WCA Recommendations for the long term treatment of obsessive-compulsive disorder in adults. *CNS Spectrums*, *8*(8), 7–16. https://doi.org/10.1017/S1092852900006908

Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2002). Relational frame theory: A précis. In *Relational frame theory* (pp. 141–154). New York: Springer. https://doi.org/10.1007/b108413

Kircanski, K., Mortazavi, A., Castriotta, N., Baker, A., Mystkowski, J., Yi, R., , Craske, M. (2012). Challenges to the traditional exposure paradigm: Variability in exposure therapy for contamination fears, *Journal of Behavior Therapy and Experimental Psychiatry*, *43*(2), 745–751. https://doi.org/10.1016/j.jbtep.2011.10.010.

Olatunji, B. O., Cisler, J., & Deacon, B. (2010). Efficacy of cognitive-behavioral therapy for the anxiety disorders: A review of meta-analytic findings. *Psychiatric Clinics of North America*, *33*, 557–577. https://doi.org/10.1016/j.psc.2010.04.002

Tiller, J. W. (2015). The Sydney handbook of anxiety disorders: A guide to the symptoms, causes and treatments of anxiety disorders. Boyce, P., Harris, A., Drobny, J., Lampe, L., Starcevic, V., Bryant, R (Eds.). Sydney, Australia: University of Sydney.

van den Akker K., Havermans R. C., Jansen A. (2015). Effects of occasional reinforced trials during extinction on the reacquisition of conditioned responses to food cues. *Journal of Behavior Therapy and Experimental Psychiatry*, *48*, 50–58. https://doi.org/10.1016/j.jbtep.2015.02.001

Woods, A. M., & Bouton, M. E. (2007). Occasional reinforced responses during extinction can slow the rate of reacquisition of an operant response. *Learning and Motivation*, *38*(1), 56–74. https://doi.org/10.1016/j.lmot.2006.07.003

Zbozinek, T., & Craske, M. (2016). The role of positive affect in enhancing extinction learning and exposure therapy for anxiety disorders. *Journal of Experimental Psychopathology*, 1–20.

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