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Therapeutic Process During Exposure: Habituation Model

Kristen G. Benito, Ph.D.^{*} and Michael Walther, Ph.D.

Alpert Medical School of Brown University/Bradley-Hasbro Children's Research Center

Abstract

The current paper outlines the habituation model of exposure process, which is a behavioral model emphasizing use of individually tailored functional analysis during exposures. This is a model of therapeutic process rather than one meant to explain the mechanism of change underlying exposure-based treatments. Habituation, or a natural decrease in anxiety level in the absence of anxiety-reducing behavior, might be best understood as an intermediate treatment outcome that informs therapeutic process, rather than as a mechanism of change. The habituation model purports that three conditions are necessary for optimal benefit from exposures: 1) fear activation, 2) minimization of anxiety-reducing behaviors, and 3) habituation. We describe prescribed therapist and client behaviors as those that increase or maintain anxiety level during an exposure (and therefore, facilitate habituation), and proscribed therapist and client behaviors as those that decrease anxiety during an exposure (and therefore, impede habituation). We illustrate model-consistent behaviors in the case of Monica, as well as outline the existing research support and call for additional research to further test the tenets of the habituation model as described in this paper.

Description of the Theoretical Model

Overview

According to the habituation model, exposure is effective because it provides structured contact with a feared stimulus while minimizing opportunity for avoidance, escape or ritualizing. The primary goal during exposures is anxiety reduction, which occurs through contact with a feared stimulus in the absence of avoidance, escape, and ritualizing. Thus, when fear elicited by a stimulus has decreased (and avoidance, escape, and ritualizing have not occurred), *habituation* is said to have taken place. Importantly, this model purports that the process of habituation is both passive and internal, such that any active and/or external attempt to reduce anxiety will interfere with the process of habituation by way of providing negative reinforcement. Said another way, behaviors like compulsions provide short-term escape or relief from anxiety and therefore do not allow anxiety to decrease naturally. Both therapists and researchers should be careful to define the term habituation according to this

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^{*}Corresponding author: Kristen Benito, PhD, Alpert Medical School of Brown University, Bradley-Hasbro Children's Research Center, Coro West, Suite 204, 1 Hoppin St., Providence, RI 02903 USA, Kbenito@lifespan.org, Phone: 401-444-8945, Fax: 401-444-8742.

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theoretically consistent definition: reduction in anxiety in the presence of a feared stimulus, while minimizing anxiety-reducing behaviors. Habituation should occur both within an exposure task such that the task becomes easier before ending the exposure, and it should occur across tasks, such that repetition of the same exposure over time elicits lower anxiety.

Presumed Mechanism

The term “mechanism” refers to the underlying psychological, social, and neurophysiological processes through which therapeutic change occurs during treatment (Kazdin, 2009). In exposure therapy, data support various mechanisms, including neural mechanisms (Hauner, Mineka, Voss, & Paller, 2012), cognitive changes (Solem, Haland, Vogel, Hansen, & Wells, 2009), and learning mechanisms (Anderson & Insel, 2006). The mechanism of a treatment is conceptually distinct from the therapeutic processes that engage that mechanism. Therapeutic process is broadly defined as “everything that can be observed to occur between and within the client and therapist during their work together” (Orlinsky & Howard, 1986). Mechanism is also distinct from intermediate treatment outcomes, which may serve as an indicator that the mechanism is being engaged but are not the mechanism *per se*. The term “habituation” can also be thought of as an intermediate outcome (i.e. as an indicator that another process, such fear extinction learning or cognitive change, is taking place). For example, patient ability to resist ritualizing (a therapeutic process variable) may increase the likelihood of experiencing habituation (an intermediate outcome), while the occurrence of habituation could indicate that cognitive change (mechanism of change) is taking place. Given that habituation can be qualitatively observed and measured during exposure (e.g., through subjective ratings), it is therefore a useful guide for tailoring the therapeutic process that is theorized to engage the mechanism.

Rather than focusing on the mechanism itself, which could be neural, cognitive, learning, or some combination thereof, the primary goal of this paper is to elucidate theory-specific therapeutic processes that are presumed to engage the mechanism in exposure-based treatments. According to the habituation model, the process of exposure and response prevention is guided by behavioral theory and an understanding of functional relationships that are specific to a given individual and/or situation. Therefore, the habituation model is more accurately described as a behavioral model of exposure process.

Potential misconceptions about habituation

There are several potential misconceptions about habituation, which are likely due to its historical measurement (Craske, Kircanski, et al., 2008), emphasis on anxiety reduction (Abramowitz & Arch, 2014), and a failure to embed understanding of habituation within the framework of behavioral theory. Common potential misconceptions may include:

1. Habituation must occur during the session. The ideal exposure outcome is not conceived of as simply a reduction in anxiety, but rather as a reduction in anxiety during an exposure task that is not explained by anxiety-reducing behaviors such as compulsions. The key here is not that anxiety drops, but *why* it drops. Habituation that occurs during a “session” (within session habituation) is ideal primarily because the chances of post-session ritualizing are lower. Continued resistance of

rituals after the session is important and may lead to habituation at a time point more distal than the session end. Furthermore, the absence of within session habituation does not discount the possibility of between session habituation.

2. Habituation must be evident at the end of the exposure. Habituation has historically been measured in several ways (Craske, Kircanski, et al., 2008). One such way is by comparing end-state anxiety ratings to other anxiety ratings in the exposure (peak SUDS, beginning SUDS, etc.). One potential issue with this method of measurement is that if end-state SUDS is not lower than peak or beginning SUDS, it is not necessarily the case that habituation has not occurred. This is due to the fluid nature of exposure therapy. For example, a client may have habituated to a feared stimulus in the middle of the exposure, but the therapist may have inadvertently or purposefully caused an escalation in the patient's anxiety by making the exposure more difficult (e.g., moving the feared stimulus closer to the child). Given the limitations of habituation measurement, as outlined in potential misconceptions one and two, conceptual understanding of habituation may likewise have been limited.
3. Habituation is an active process. Habituation is an outcome that occurs in the absence of anxiety-reducing behaviors. Purposeful attempts to “bring down” anxiety are therefore not encouraged. Such techniques are best defined according to their function for a given individual and/or situation (i.e. that they reduce anxiety during an exposure), rather than their topography (i.e. the name or structure of the technique), and could include cognitive restructuring, relaxation techniques, and distraction. These techniques are discouraged because it is thought that they directly interfere with habituation. Thus, habituation is thought to be a passive, not active process. This potential misconception may have occurred due to overemphasis on anxiety reduction as the goal in a habituation model, which limits our conceptual understanding of the circumstances under which habituation is optimally facilitated (Abramowitz & Arch, 2014).
4. Habituation is an “all or none” construct. In an attempt to measure and characterize habituation, others have referred to habituation as an “all or none” construct, which is likely overly simplistic (i.e., either the client habituated to the point of no anxiety or did not). It is probably more accurate to conceptualize habituation continuously, as opposed to categorically. However, there are limited data with which to inform an understanding of the amount of habituation needed for optimal treatment outcome and whether this varies by individual. Finally, understanding of anxiety-reducing behaviors is necessary to accurately measure habituation, as the anxiety rating will need to account for the degree of “undoing” such behaviors provide. This is because the reason *why* anxiety changes is critical. For example, a client who reports a pre-to-post reduction in SUDS would not be considered to have experienced habituation if SUDS ratings decreased as a function of ritualizing or avoidance of the target stimulus over the course of the exposure task. This potential misconception of habituation may occur because of the need to clinically discriminate between a successful and an unsuccessful exposure, resulting in a dichotomous conceptualization. Instead, we argue that conceptualization of

habituation should be embedded within the behavioral theory that underpins ERP (i.e. that avoidance and rituals maintain symptoms).

Summary of Empirical Evidence

According to the habituation model, exposures should be optimal when 1) fear is activated, 2) behaviors providing negative reinforcement via anxiety reduction are minimized (e.g., rituals, avoidance), and 3) anxiety reduces within and across exposure tasks (habituation; Craske, Kircanski, et al., 2008; Craske, Waters, et al., 2008; Foa & Kozak, 1986). Note that this model differs from the Emotional Processing Theory (EPT; Foa & Kozak, 1986). The primary difference is that EPT is a model of mechanism purporting that activation of a “fear structure” and corrective learning through exposure results in replacement of that fear structure with a “non-fear structure” (Foa & Kozak, 1986), while the habituation theory outlined in this paper is a model of therapeutic process built on functional analysis and is somewhat agnostic to the precise underlying mechanism.

1. **Evidence for the Importance of Fear Activation.** Theoretically, activation of fear is necessary in order to create a situation in which to engage the mechanism underlying exposure (Foa & Kozak, 1986). Activation of fear should be relevant to an individual’s idiosyncratic experience with the fear, and include a relevant stimulus (i.e. a feared object or setting), fear response (i.e. subjective fear, physiological changes), and fear meaning (i.e. feared consequences; (Lang, 1971). Fear activation is thought to be necessary in order to create a context for extinction learning to occur in response to a given fear. Most commonly, Fear Activation has been measured in one of several ways: 1) peak or initial SUDS during an exposure task, or 2) peak or initial psychophysiological markers during an exposure task (Craske, Kircanski, et al., 2008).

Findings regarding the relationship of fear activation to treatment outcome have been mixed. Several studies of heart rate as a marker of fear activation during exposures have shown a relationship with treatment outcome, such that higher peak fear predicted better outcome (Beckham, Vrana, May, Gustafson, & Smith, 1990; Foa & Kozak, 1995; Kozak, Foa, & Steketee, 1988; Lang, Melamed, & Hart, 1970; Pitman, Orr, Altman, Longpre, Poire, & Macklin, 1996). A number of other studies have failed to find a relationship between peak fear and outcome (e.g., (Foa et al., 1983; Kamphuis & Telch, 2000b; Pitman, Orr, Altman, Longpre, Poire, Macklin, et al., 1996; Sloan & Telch, 2002a). However, given that the *definition* of an exposure involves approach to a feared stimulus, the traditional conceptualization and measurement of fear activation may be too limited. The majority of papers measuring fear activation have done so by calculating the initial or peak fear using SUDS ratings and/or physiology measures. This presumes a linear relationship with outcome such that higher initial fear should relate to better treatment outcomes. Instead, it may be that moderate levels of fear are related to best outcome or that fear activation is best conceptualized as a dichotomous variable (i.e. fear is activated vs. fear is not activated). For example, it may only necessary for anxiety to be “on” rather than “high” for the situation to produce learning. Future studies of fear activation should explore other ways of conceptualizing and measuring this

construct. Finally, according to behavioral theory, fear activation is a necessary but not sufficient element for optimizing exposures. Therefore, examining the relationship of fear activation to treatment outcome will be most relevant when including information about habituation and anxiety-reducing behaviors.

2. Evidence for the Importance of Minimizing Anxiety Reducing Behaviors. Nearly all exposure-based treatments emphasize the importance of minimizing overt attempts to reduce anxiety such as ritualizing, avoiding the exposure stimulus, or using safety signals. Safety signals are defined as behaviors that function to cue safety and reduce anxiety in the short-term but do not reduce anxiety in the long-term (Thwaites & Freeston, 2005). However, according to behavioral theory, any behavior that immediately reduces anxiety will also be negatively reinforcing and interfere with the natural habituation process. This should be true of client behaviors (e.g., rituals), family behaviors (e.g., accommodation), and therapist behaviors (e.g., accommodation, distraction). Therefore, this class of behaviors is best defined according to function (i.e. anxiety-reducing), rather than topography (e.g., behavioral avoidance, ritualizing, cognitive reappraisal, relaxation; Wolgast, Lundh, & Viborg, 2013). This is particularly true for treatment of OCD, as behaviors that reduce anxiety are highly idiosyncratic across and even within individuals. For example, hand-washing may reduce anxiety related to contamination with bathroom germs but could also increase anxiety related to exposure to chemicals in public water. The ability to minimize anxiety reducing behaviors during exposures rests on the foundation of careful functional analysis. This can be challenging, as behaviors that reduce anxiety can be very subtle (e.g., mental rituals, gaze aversion) and difficult to recognize. Children and clients with minimal insight/motivation may present additional challenge to conducting accurate functional analysis, as ability to understand and participate in the process of identifying anxiety reducing behaviors is limited. Functional analysis is likely to be incredibly complex, and to unfold over the course of treatment, both for therapists and for researchers wishing to identify these behaviors.

Therapists and treatment manuals cite the importance of minimizing overt anxiety reducing behaviors, such as rituals and safety signals. A body of research also supports the idea that minimizing safety behaviors is important for exposure efficacy. In adults with hypochondriasis who were randomized to a group that increased use of safety behaviors showed corresponding increases in anxiety, contamination fear, and avoidance behavior compared to controls (Olatunji, Etzel, Tomarken, Ciesielski, & Deacon, 2011). In adults with Claustrophobia, exposures accompanied by safety behaviors produced poorer outcomes relative to exposures accompanied by threat appraisal or nothing. In another study of adults with claustrophobia, the availability of safety behaviors (rather than their actual use) interfered with fear reduction during exposures (Powers, Smits, & Telch, 2004), though it is important to note that fear reduction as measured in this study may not reflect habituation. In a study of adults with OCD, those who received instructions for minimizing rituals had better outcomes compared with those who did not (Foa, Steketee, & Milby, 1980). However, other studies have not supported the idea that

safety behavior should be minimized, and stand in contrast to the generally supported notion that minimizing safety behavior is important for treatment outcome. Rachman and colleagues (Rachman, Radomsky, & Shafran, 2008) hypothesized that judicious use of safety behavior and anxiety control strategies can be useful for initially increasing client willingness to participate in exposure. However, this does not indicate that later exposures without safety signals would not be optimal. In adults with claustrophobia, clients permitted to use “judicious” safety behavior had outcomes similar to those who were not permitted to use them (Deacon, Sy, Lickel, & Nelson, 2010). In contrast to that study, another recent study by Sy and colleagues (Sy, dixon, Lickel, Nelson, & deacon, 2011) showed that undergraduates with claustrophobic fear who were instructed to use safety behaviors fared *better* after exposures compared with those having the option to use safety behaviors and those not having the option to use safety behaviors. Finally a recent study by Rachman and colleagues (Rachman, Shafran, Radomsky, & Zysk, 2011) did not show the benefit of limiting anxiety-reducing behaviors during a contamination task for non-clinical volunteers, though this was a nonclinical sample and results were only extended to 2-week follow up.

Similarly, some studies of adults with phobias have shown that use of distraction vs. focused exposure results in better short-term outcomes for distraction on within- and between-session measures such as subjective fear, self-efficacy, and behavioral approach (Johnstone & Page, 2004; Oliver & Page, 2003). However, despite appearing contradictory, these results are actually consistent with habituation theory, which states that distraction, which is an anxiety-reducing behavior in the short term, would therefore result in better short-term outcomes on such measures (e.g., lower subjective anxiety ratings at the end of the session). It would be important to link these findings regarding distraction to indices of clinical improvement (e.g., functional impairment, overall symptom severity) to determine whether they extend to treatment response, and to also look at durability of that treatment response. Furthermore, researchers have suggested that some coping strategies may inadvertently function to reduce anxiety and impede treatment in the long-term, and that the difference between adaptive coping and safety behaviors should be decided by the function of the behavior on short- and long-term anxiety (Thwaites & Freeston, 2005). Future studies should examine this more closely in relation to treatment outcome.

The role of safety behaviors and distraction during exposure should be studied in other populations, particularly in adults and children with OCD, given that OCD symptoms include extensive safety behaviors in the form of rituals. Additionally, although researchers have shown that non-clinical analog studies of OCD are generally relevant for clinical samples (Abramowitz et al., 2014), there may be meaningful differences between those who are seeking treatment vs. those who have symptoms but are not seeking treatment vs. non-clinical analog samples. It may be that more impaired and/or treatment-seeking individuals require more stringent limits on safety-seeking behavior in order to engage the treatment mechanism. Although further research is needed regarding the role of anxiety-

reducing behaviors during exposure, given the theoretical rationale that anxiety-reducing behaviors may interfere with habituation, it may be conservatively suggested that clinicians continue to encourage patients to refrain from these behaviors. Further, anxiety-reducing behavior should be considered continuously and idiosyncratically. That is, the extent to which a given set of safety behaviors “undoes” the anxiety caused by the exposure stimulus is important for the ultimate success of the exposure and probably varies by individual. Finally, it may be that clients engaging in safety behaviors during exposure feel better and have higher self-efficacy initially, but that the effects of such exposures are less durable compared with those that do not employ safety behaviors. Future studies should be careful to assess differences at varied points of follow-up.

Recently, researchers have focused on use of “linguistic processing” that may enhance treatment outcome. This can be alternatively conceptualized as a form of encouraging mental contact with an exposure stimulus and focusing on relevant fears. For example, in a treatment trial of adults with spider phobia, clients who described the spider and their accompanying emotional response (e.g., “I feel anxious that the disgusting tarantula will jump on me) fared better at 1-week follow-up on measures of skin conductance and behavioral approach, when compared with exposure + cognitive reappraisal, exposure + distraction, and exposure alone (Kircanski, Lieberman, & Craske, 2012). According to the habituation model, linguistic processing techniques should be incorporated into exposures based on idiosyncratic assessment of their function. Those statements that maintain or increase anxiety are likely to be helpful; while any that reduce anxiety would be counter to the principles of this model. In their use of linguistic processing, Kircanski and colleagues (2012) instructed participants to choose labels for the stimulus as well as the emotional response. This strategy is likely to be appropriate so long as it increases or maintains anxiety level. Future studies should examine the utility and timing of this strategy for producing optimal patient outcome.

Finally, conclusions regarding the role of anxiety-reducing behaviors and relationship to fear activation and habituation cannot be made at this time. We are not aware of any studies of fear activation or habituation that account for the role of anxiety reducing behaviors in measurement of anxiety level (i.e. SUDS or psychophysiological measures). Given the complexity of identifying these behaviors, particularly for individuals with OCD, development of novel measurement strategies for researchers and therapists is needed, and future studies should focus on the role of anxiety-reducing behaviors in understanding relationships between fear activation, fear reduction within and across exposures, and treatment outcome.

3. **Evidence for the Importance of Habituation.** The role of habituation during exposures has received considerable empirical attention in recent years, with mixed findings. Most commonly, habituation has been measured in one of several ways: 1) the difference between peak and ending SUDS within one exposure task (within-session habituation; WSH), 2) the difference between peak SUDS in an initial task

and peak SUDS in later exposure to the same task (between-session habituation; BSH), and 3) reduction in psychophysiological markers of anxiety within or across exposure tasks (Craske, Kircanski, et al., 2008).

In our clinical experience, WSH is the habituation measure often used by therapists to guide treatment choices, and is also less likely than BSH to be confounded with increasing difficulty of exposure tasks over the course of treatment. In general, examination of WSH reveals that fear level usually declines during exposures (Grayson, Foa, & Steketee, 1982; Grey, Sartory, & Rachman, 1979; Grey, Rachman, & Sartory, 1981; Watson, Gaiend, & Marks, 1972). Some studies have also linked WSH to improved treatment outcome (Beckham et al., 1990; Foa et al., 1983; Pitman, Orr, Altman, Longpre, Poire, & Macklin, 1996). Additionally, some studies have shown that groups with more WSH have better short-term outcomes (e.g., (Borkovec & Sides, 1979; Oliver & Page, 2003). However, some of these studies have been confounded by the use of anxiety-reducing behavior, which would result in lower anxiety levels but not be considered habituation. Further, many studies have not found a link between WSH and client outcome e.g. (Kozak et al., 1988) (Pitman, Orr, Altman, Longpre, Poire, & Macklin, 1996; Pitman, Orr, Altman, Longpre, Poire, Macklin, et al., 1996; Riley et al., 1995). However, this habituation model would predict that if anxiety lowers because of anxiety-reducing behaviors, it should not be considered WSH. When anxiety-reducing behaviors are not accounted for as a possible explanation for a decrease in anxiety, it may result in habituation “false positives” that decrease ability to detect a meaningful relationship between WSH and outcome. Studies that include exposures designed to end at the point of peak fear (i.e. ending before WSH occurs) show that exposure therapy is still effective, though these are confounded by the occurrence of subsequent exposures during treatment that may or may not have ended after a reduction in anxiety, as well as the possibility that habituation occurred after measurement had ended (i.e. post-session; (Emmelkamp & Mersch, 1982; Rachman, Craske, Tallman, & Solyom, 1986).

Additionally, several studies have shown clinical improvement in the absence of evidence for WSH (Kamphuis & Telch, 2000a; Lang & Craske, 2000; Sloan & Telch, 2002b; Tsao & Craske, 2000; van Minnen & Hagenars, 2002). Clinically, it is our impression that many therapists “ramp up” exposure difficulty as the exposure proceeds—making it likely that habituation could occur at any point in the session but be followed by a purposeful increase in task difficulty (and therefore, anxiety). If WSH is calculated at the end of the session, it could appear as though anxiety was maintained or even increased when habituation actually did occur at an earlier time in the exposure window. When WSH is measured at the end of the exposure only, it could result in the false conclusion that treatment improvement occurs in the absence of WSH. Importantly, none of the above studies accounted for effects of anxiety-reducing behaviors or the timing of habituation measurement, and thus, we cannot conclude that there is no link between WSH and treatment outcome on the basis of these alone.

A recent study by Deacon et al. (2013) compared four treatment groups receiving interoceptive exposure (IE; hyperventilation trials) for respiratory concerns: “Intensive” IE in which clients continued trials until prediction of fear was < 5%, “Basic” IE in which clients completed a set number of trials without resting between trials, “Standard” IE in which clients received a set number of trials with rest period between trials and use of diaphragmatic breathing, and a control condition. Results showed that the Intensive IE group had superior outcomes compared with the others. Though the authors concluded that this was the result of optimizing inhibitory learning by continuing the exposure until fear prediction had declined, it is inherently confounded with the possibility that anxiety may have also declined during that time and that these results were due to the occurrence of habituation in the Intensive IE group. Furthermore, asking clients to rate anxiety level vs. fear prediction may not be measuring substantially different constructs. Future studies should take care to determine 1) that these are different constructs, 2) whether they relate differentially to treatment outcome, and 3) if possible, the longitudinal course with which change in each takes place (i.e. does anxiety reduction precede change in fear prediction or vice-versa?).

Similarly, the role of BSH to treatment outcome is unclear, with some studies finding benefit and some studies showing no relationship (Craske, Kircanski, et al., 2008). However, most researchers acknowledge that this is difficult to measure during treatment, as the expectation is for exposures to constantly increase in difficulty. This is not merely a methodological detail, but is likely to fundamentally confound interpretation of the role of BSH across a course of treatment. Presumably, if a client is still having the same level of anxiety during an exposure at the beginning vs. the end of treatment, the client would not be classified as having improved symptoms/functioning. Furthermore, treatment studies attempting to disentangle this issue by repeating the same exposures many times run the risk of limiting pace of client improvement, which is problematic from both a scientific and a human subjects perspective.

Further understanding of the importance of habituation in relation to one presumed mechanism of exposure, fear extinction learning, comes from literature using d-cycloserine (DCS). DCS is a partial agonist of the glycine recognition site of the N-Methyl-D-Aspartate receptor, has been shown to enhance fear extinction learning in animals and has been used in several human trials to augment the effects of exposures. Results of DCS augmented exposure in clinical samples have shown mixed effects, with some studies showing augmentation effects and some showing poorer outcome in clients receiving DCS vs. placebo. However, recent studies have shown that the effects of DCS may depend on the success of exposures, where end fear level is used as the marker of exposure success. In adults with social anxiety disorder, only clients having low end fear showed clinical improvement with DCS vs placebo (Smits, Rosenfield, et al., 2013), and clients with high end fear showed *less* clinical improvement vs placebo. Similarly, in adults with height phobia, clients receiving DCS vs. placebo only showed benefit when fear was low at the end of exposure and showed less improvement vs. placebo when end fear was high

(Smits, Hofmann, et al., 2013). This underscores the potential importance of habituation and the need to better understand and measure exposure process variables (e.g., therapist behaviors) as well as intermediate outcomes (e.g., habituation) that relate to the presumed mechanism of action (e.g., extinction learning, cognitive change).

At this time, available data do not support firm conclusions regarding the role of habituation and its relationship to exposure mechanism and treatment outcome. However, the current conceptualization and measurement of habituation suffers from some substantial limitations. According to behavioral theory, only a reduction in anxiety that is not better accounted for by an anxiety-reducing behavior should be considered “habituation” and would therefore be associated with improved treatment outcome. Available methods for measuring anxiety reduction do not account for such behaviors/events.

Existing strategies for measuring habituation are based on changes in SUDS and psychophysiological measures, and therefore suffer from the same limitations outlined above (see “Fear Activation”), including presumption of a linear relationship between habituation and outcome (i.e. that more is better) and failure to use empirically derived guidelines for deciding the optimal amount of habituation for a given exposure. For example, studies of overlearning during exposure therapy have shown no additional benefit for continuing an exposure past the point of fear reduction (Farchione, 2002; Rachman, Robinson, & Lopatka, 1987). Furthermore, overlearning may interfere with treatment outcome when it occurs at the expense of completing additional exposures (Rachman et al., 1987). Importantly, all conditions in these studies required some attenuation of fear before discontinuing an exposure, and treatment outcomes were improved in all groups.

Additionally, the current conceptualization of habituation presumes that it should happen at the end of the exposure, though data have not yet explored whether habituation can occur at other points in the exposure. Clinical experience suggests that not all therapists end an exposure following habituation--many therapists continuously adjust the difficulty such that habituation can be followed by increasing the difficulty of the exposure and providing another opportunity to habituate. Finally, the theory suggests that the role of habituation is important during all exposures, not only those occurring within a treatment session. Limiting examination of habituation to in-session exposures likely provides an underestimate of an individual’s total “dose” of habituation across treatment. Future studies of habituation, like those of fear activation and anxietyreducing behaviors, should explore other ways of conceptualizing and measuring this construct.

Selecting an exposure task

We will consider each of the following clinical issues in the context of the three tenets of habituation theory during exposure: fear activation, minimization of anxiety-reducing behavior, and habituation.

Hierarchy Development

1. **Fear Activation.** In order to best activate fear, the habituation model emphasizes the importance of individual functional assessment of symptoms and relationships between obsessions and compulsions, rather than assessment that is based on topography of symptoms (Conelea, Freeman, & Garcia, 2012). For this reason, hierarchies should be tailored to the individual and it is not optimal to use a “standard” set of hierarchy items across clients. Development of hierarchy items should consider cues that are most relevant for the given individual, and include relevant stimuli (i.e. a feared object or setting), fear responses (i.e. subjective fear, physiological changes), and fear meanings (i.e. feared consequences; (Lang, 1971). The relative importance of each of the above cues will vary by individual, and the primary focus of the exposure should be on the most relevant combination of these three areas. For example, a client with somatic concerns may have a high level of fear related to fear response (e.g., heart rate) that is related to a meaning (e.g., having heart disease)—in which case, the exposure task should aim to produce and focus on both elevated heart rate and fear of heart disease. This approach to hierarchy development requires therapists to have a sophisticated understanding of functional relationships among symptoms and ability to best activate the “core fear(s)” of a given individual. The hierarchy should be rated using a SUDS scale that is appropriately modified for development (e.g., a 1–10 scale or 1–3 scale for younger clients vs. the standard 1–100 scale). The hierarchy is usually ordered from least- to most-anxiety provoking exposures, and exposures should be chosen for their increasing level of difficulty across treatment. However, the hierarchy should not be mistaken for a list of tasks to be completed in lock-step fashion: rather, the hierarchy will change constantly throughout treatment to reflect changes in anxiety level and/or therapist’s understanding of the core fear.

In the case of Monica, the core fear is related to harm avoidance, the specific variant of which is chemical contamination. Relevant stimuli associated with this core fear for Monica include “unnatural” ingredients found in food and household products. Feared consequences include development of a neurological disease (e.g., Parkinson’s) or cancer. Items on Monica’s hierarchy would ideally include a range of contact with relevant stimuli, with “contact” involving the specific ways in which Monica believes that she could develop a neurological disease or cancer (such as touching cleaners with bleach or eating unlabeled food items). Hierarchy items could also focus on thoughts about feared consequences, such as saying “I might have cancer” or “This food is dangerous.” Ideally, hierarchy items will combine more than one domain (e.g., eating unlabeled food while thinking about developing cancer), in order to most closely match the client’s core fear as well as to maximize the likelihood of complete focus on fear, and thus appropriately activate fear during the exposure. These domains do not need to be targeted with separate exposures before combining them into one exposure task, provided the combined task is not so difficult that it cannot be completed without anxiety-reducing behaviors.

2. **Anxiety-reducing Behavior.** In the development of hierarchy items, it is critical to consider anxiety-reducing behavior. These behaviors are best defined according to their function (i.e. decreasing contact with or focus on the stimulus), rather than their topography (e.g., behavioral avoidance, cognitive reappraisal, relaxation; see Wolgast et al. 2013 for more). The following are guidelines for using information about anxiety-reducing behaviors to optimally develop a hierarchy:

Prescribed Techniques (“Dos”)—

- a. Be sure to emphasize minimizing all forms of avoidance (rituals, distraction) both during and after the exposure task (as relevant) while obtaining hierarchy ratings. In the example of Monica, each item on the hierarchy would be described along with relevant considerations for minimizing anxiety-reducing behaviors. For example, her therapist might ask, “What would your number be for eating this unlabeled food without spitting it out or researching pesticide toxicity—for the rest of the day?” The therapist should also make sure to include complete focus on the exposure task as part of rating hierarchy items. For example, Monica’s therapist might ask “What would your number be for eating this unlabeled food and focusing completely on any OCD thoughts that come up, like getting cancer?”
- b. Titrate difficulty based on the characteristics of the task (vs. characteristics of anxiety-reducing behaviors, as described in “Don’ts”). In the example of Monica, a good way to titrate the difficulty of touching a cleaner with bleach may be by varying her proximity to the bottle (e.g., add items for sitting across the room, touching with one finger, or hugging the bottle) if she believes that closer proximity affects the likelihood of a feared consequence, or by choosing an item that she considers to be less risky (e.g., bathroom cleaner with ammonia).
- c. Use artificial means of titrating the task, when necessary—as long as the task is still relevant to the core fear. This technique for development of hierarchy items is most likely to be useful when it is difficult to find tasks that are easy enough using characteristics of natural tasks alone. Should this happen, it is still desirable to avoid titration based on anxiety-reducing behavior, and artificial means of titration are preferred. In the example of Monica, if touching the bleach bottle directly is very difficult, easier items can be created by artificial means. One example of this is introducing intermediate items (“thing-to-a-thing”; e.g., touch a tissue to the bottle, then have Monica touch the tissue).

Proscribed Techniques (“Don’ts”)—

- a. Titrate the difficulty by setting time limits on exposures—this may result in reduction of anxiety due to anticipated escape (not habituation). In the example of Monica, hierarchy items should be titrated upward or downward using the techniques above, and should not contain time limits (e.g., touch the bleach bottle for 10 minutes) unless duration of contact is relevant to Monica’s OCD (i.e., longer duration of contact results in a greater likelihood of feared consequence; in such a case, duration may be used to appropriately titrate exposure difficulty).

- b. Titrate the difficulty using distraction or other avoidance. An example of a hierarchy “don’t” for Monica would be to touch the bleach bottle while talking with her therapist about another topic or playing a game. It would be preferable to create an easier task (e.g., touching the bottle with a tissue) that Monica can focus on completely.
3. Habituation. The concept of habituation does not need to be emphasized during hierarchy development per se, and in some cases it may be proscribed to discuss habituation during the development of the hierarchy, to the extent that it functions to cue eventual “escape” from the exposure task.

Exposure Selection—Given the emphasis of this theory on minimizing anxiety-reducing behaviors, the ideal exposure is one that is judged to be maximally difficult while still able to be completed without anxiety-reducing behaviors. For this reason, exposures of moderate overall difficulty are likely to be preferable to those that are very easy or very difficult. It is important to note that the actual difficulty level of an exposure may or may not be closely tied to the SUDS rating itself. Objectively, some clients reporting SUDS of 8/10 may appear extremely anxious to the therapist and the exposure cannot be conducted as planned, while others reporting an 8/10 may look moderately anxious to the therapist and can complete the task. Thus, exposure difficulty level should be informed by therapist judgment and stage of treatment (i.e. beginning vs. end) as well as SUDS.

The optimal titration of exposure difficulty will be highly idiosyncratic to a given individual and may be influenced by a variety of factors, such as insight, developmental level, and baseline level of anxiety (i.e. existing level of anxiety outside of the exposure task). The exposure hierarchy should be used to guide choice of a moderately difficult exposure and should be continually revised throughout treatment and prior to each exposure. This revision process is critical to ensure 1) activation of the most relevant core fear by adding or revising exposure tasks as new information about fears is obtained over the course of treatment, and 2) appropriate titration of exposure difficulty, as the difficulty level of a given task is likely to change across treatment. Additionally, it is important to note that the hierarchy does not need to be completed in order and it is not proscribed to choose items of varying difficulty levels from the hierarchy so long as no item is so easy that it does not produce fear or so difficult that it cannot be completed without significant anxiety-reducing behavior. In the case of Monica, items she has rated as moderately difficult would be most appropriate to begin with (e.g., eating packaged food or fresh food without a label, smelling unnatural products, using unnatural soap or body wash). However, Monica’s therapist should ensure that the moderate ratings for these items hold up after clarifying the expectation to avoid all anxiety-reducing behaviors and to focus completely on the task and any relevant thoughts during the exposure.

Exposure “set up”

Exposure Rationale

The rationale for the exposure should include a discussion of the exposure technique more broadly, as well as specific information about how we believe exposures work. Ideally, this

should happen at the beginning of treatment as part of more general psychoeducation about OCD and treatment options. Many times it will be appropriate to repeat the rationale over the course of treatment and to use experiences during exposure to illustrate the theory underlying the rationale. The description of habituation should include emphasis on both within-exposure and across-exposure habituation and should be careful to illustrate that habituation only takes place when clients are fully approaching the exposure stimulus. In the case of Monica, the therapist may use the following rationale:

When they happen, OCD thoughts usually increase anxiety. At that point, the anxiety may feel unmanageable and result in a ritual. The effect of the ritual is to bring anxiety down, usually pretty quickly. One example of this that I heard from you is that OCD thoughts about “unnatural” chemicals make you feel really anxious. One example of a ritual related to this worry is avoiding food that might have touched something nonorganic. When you avoid non-organic foods, anxiety goes down. The problem with this is that it’s a short-term solution—eventually, the anxiety about chemicals will keep coming back. Exposures are a way to make it less likely that the anxiety about chemicals will keep coming back. Exposures involve doing something that makes you feel anxious, like eating food without a label, and at the same time making sure that you don’t do any rituals (like asking questions about the food). Exposures only work when you limit rituals and anything else that makes you feel less anxious quickly—like thinking about something else. Eventually, if you stay with the exposure long enough, your anxiety will start to go away on its own—without doing anything to make that happen. Also, if you do the exposure many times, you should notice that it gets a little bit easier each time.

Exposure Instructions

Both at the beginning of treatment and prior to each exposure, therapists should give careful instructions about desired client and/or parent behaviors, as well as some information about the therapist’s own behaviors. Although the therapist should have given the rationale for exposure including an explanation of habituation as described above, it will be important that the therapist does not give specific guidelines about when the exposure would end (e.g., that it would end when anxiety goes down by half). This is to avoid the client anticipating the end of the exposure, and thus provide negative reinforcement via escape (i.e. “whiteknuckling”). In the case of Monica, the therapist may use the following instructions:

This exposure will start when we touch and eat the food without a label. During the exposure, I will ask you for your anxiety rating regularly. I will also ask you to focus on the food, on any thoughts you might have about the food, including worries about cancer or Parkinson’s, and on any feelings you have in your body while eating the food. It might be tempting to ask questions about whether the food is safe, but it’s my job to NOT answer those questions. I will also help you remember to pay close attention to the exposure. I will let you know when I think we can stop the exposure.

The therapist should end the exposure following some meaningful amount of anxiety reduction in the absence of anxiety-reducing behaviors. A clinical guideline that is often

used is a 50% reduction from starting anxiety, in which anxiety-reducing behaviors, if present, were not judged to be mostly responsible for the anxiety decrease. Similarly, Monica could be instructed to complete home exposures until she experiences a 50% reduction from starting anxiety, with heavy emphasis on being accurate with SUDS ratings so as not to result in premature escape from the exposure (i.e. making lower ratings in order to be “done”). If the therapist feels that Monica will struggle with this task, he or she may wish to enlist the help of a parent to support her during home exposures. However, at this time the 50% reduction guideline is entirely based on clinical lore and there are no empirical data to guide the decision to end exposures. This is an area that warrants significant research attention in order to provide therapists with more accurate guidelines.

Exposure “dos and don’ts”

Optimal Therapist Behaviors during Exposure

Optimal therapist behaviors during exposure are presented in Table 1. Prescribed therapist behaviors are those that theoretically function to increase or maintain the client’s contact with the exposure stimulus and would therefore facilitate the occurrence of habituation. These include discouraging client avoidance behavior (e.g., asking Monica to maintain eye contact with unlabeled food, asking her to avoid asking questions about the food, asking her to “re-expose” by touching the exposure stimulus again if she wipes her hands), discouraging client avoidance of thoughts (e.g., asking Monica to verbalize fears of developing cancer), making statements that function to increase or “ramp up” anxiety (e.g., therapist agrees that Monica is looking a little sick and might have cancer, asking Monica to eat a second unlabeled food item), and taking actions to reduce parent/family accommodation (e.g., asking Monica’s parents to resist answering any questions she has related to the safety of the unlabeled food). Asking for frequent anxiety ratings is also a prescribed therapist behavior, as it functions to inform therapist understanding of anxiety level, but it also encourages clients to stay in mental contact with the exposure task. It is important to note that prescribed therapist behaviors could be most important when applied contingently (e.g., Monica’s therapist discourages avoidance after observing her attempt to spit some food out), OR could be important regardless of the events that precede it.

Proscribed therapist behaviors are those that theoretically function to decrease a client’s level of anxiety during the exposure and therefore impede the likelihood of a client experiencing habituation. These include prompting clients to use relaxation (e.g., cueing Monica to use anxiety-reducing imagery or deep breathing), prompting clients to employ cognitive techniques *that function to reduce anxiety* (e.g., emphasizing low dose of pesticides on the unlabeled food), therapists providing accommodation (e.g., telling Monica that the food is safe because it is washed before being sold), therapists engaging in distraction techniques (e.g., playing a card game), therapists talking about unrelated topics (e.g., building an unrelated hierarchy during the exposure; talking to Monica about her weekend), or teaching skills that are counter to the principles of CBT (e.g., teaching Monica to use thought-stopping).

One behavior that is neither prescribed nor proscribed, but may be important to consider, is the use of “externalizing” language to distance the client from his/her symptoms. This

involves using language that refers to OCD in the 3rd person and serves to provide clients with some distance from OCD thoughts or impulses while still remaining in contact with the exposure and with fear cognitions. For example, Monica's therapist might say "What is OCD saying to you right now?" rather than "What thoughts are you having right now?" This technique is often used with children, who are encouraged to name their OCD in order to better externalize their symptoms and to assist families in adopting a "non-blaming" attitude toward the child. This particular technique is more consistent with the concept of cognitive defusion (vs. cognitive restructuring), and does not have a hypothesized theoretical function on anxiety level in the moment, but may serve to enhance participation and motivation. However, given the emphasis of this model on function rather than topography of in-session behavior, therapists should not use this technique with clients for whom it serves to decrease anxiety level (e.g., for a client having scrupulosity concerns, externalizing language may serve to "undo" a belief that something is his/her fault).

Optimal Client/Family Behaviors During Exposure

Optimal client/family behaviors are presented in Table 2. Prescribed family and client behaviors are those that theoretically function to increase or maintain anxiety during an exposure. Prescribed family behaviors include those described above as prescribed therapist behaviors. Prescribed client behaviors include engaging in approach behavior (e.g., Monica swallowing the unlabeled food, maintaining eye contact with the unlabeled food), approaching fear cognitions (e.g., staying focused on the thought that she might get cancer), and approaching feared sensations (e.g., noticing increased heart rate).

Proscribed family and client behaviors are those that theoretically function to decrease anxiety during an exposure. Proscribed family behaviors include those described above as proscribed therapist behaviors. Proscribed client behaviors include use of rituals (e.g., spitting out food, asking questions), avoidance of the exposure stimulus (e.g., averting gaze), escape behavior (e.g., leaving the room, requests to use the bathroom), using cognitive techniques to reduce anxiety (e.g., Monica telling herself that this is unlikely to happen; attempts to push thoughts of cancer out), using relaxation to reduce anxiety (e.g., using deep breathing), or using distraction (e.g., attempts to talk about other topics, thinking about other things).

Ending exposure

When is the Exposure "done?"

It is appropriate to end an exposure when anxiety has reduced and was judged by the therapist to be mostly in the absence of anxiety reducing behaviors. There is no standard exposure length, and setting a time limit as a way to titrate exposure difficulty is not optimal (see "Proscribed Techniques" above). However, savvy therapists with clients who habituate quickly may use this as an opportunity to increase the difficulty of the exposure in order to provide the client with another opportunity for habituation. Though this may increase the pace of client improvement and is standard practice among specialists, it likely contributes to difficulty drawing conclusions about habituation using standard measures at standard times during a session (i.e. WSH and BSH). Importantly, this relies heavily on therapist

judgment about 1) what constitutes enough anxiety reduction and 2) what anxiety reducing behaviors have occurred and the extent to which those behaviors have “undone” the anxiety elicited by the exposure task. It will be critical for future studies to develop guidelines about the right amount of these things, as well as measures to support therapists in making those decisions. It is also critical for therapists to use time-management skills appropriately, to facilitate optimal ending of the exposure with time remaining for debriefing and instructions for continuing response prevention after session’s end.

What happens after the exposure?

After the exposure, it is important to discuss any relevant considerations for minimizing anxiety-reducing behaviors even after the exposure is over. For example, Monica may be instructed to avoid brushing her teeth for the remainder of the evening, to the extent that brushing her teeth would neutralize worries about having eaten unlabeled food. If there are events during the evening during which minimizing anxiety-reducing behaviors would be too difficult, the therapist may provide instructions about “re-exposing” following those events. For example, if eating dinner after having touched unlabeled food is too difficult for Monica, she may be instructed to wash her hands before dinner but to re-touch unlabeled food immediately after dinner. For many clients, it is appropriate to involve a parent or spouse in this discussion so that the client has support to implement this plan at home. Given Monica’s age, it would be beneficial to include her parents in this plan.

The present model is most specific to the behaviors and events that happen during exposure; however, it is worth mentioning that events and behaviors during other parts of the session are also important (i.e. preparing for the exposure, debriefing after the exposure). For example, it may be that the window of time following exposure is useful for consolidating learning that occurred during the exposure. Techniques that may be proscribed during an exposure because they reduce anxiety could be beneficial at this time. Use of cognitive tools, such as asking the client to reflect about the occurrence of feared consequences, may aid learning. For example, Monica might say that she has not noticed any preliminary symptoms of Parkinson’s disease as expected. Alternatively, Monica might also notice that, although she cannot disprove the feared consequence by virtue of its time course (i.e. illness would have developed in her 20’s or 30’s), she no longer believes the consequence will occur. However, according to this model, it is not specifically prescribed to engage the client in an analysis of whether feared consequences have occurred, nor are exposures necessarily designed for the purpose of doing so. In contrast to some other models (i.e. Inhibitory Learning Model), therapist questions post-exposure would be less directive and not specific to the question of expectancy. Finally, the time after exposures could also be a useful time to reflect about the process of habituation. For example, Monica might also notice that her anxiety decreased even in the absence of anxiety-reducing behaviors. In the case of Monica, an example of post-exposure discussion illustrates this point:

Therapist: How do you think that went?

Monica: Pretty well—I really didn’t think this would work, but it did.

Therapist: What do you mean when you say it “worked?”

Monica: I feel much better now.

Therapist: So, it sounds like you're saying that your anxiety went down. Why do you think that happened?

Monica: I don't know, it just happened.

Therapist: Did you do anything to make that happen?

Monica: No—that's the thing. Usually I would ask a bunch of questions, but I didn't do anything like that this time.

Therapist: Are you still worried about getting Parkinson's?

Monica: Well, I guess it's still possible. I'm not sure.

Therapist: That's true—anything is possible. Why would you feel better if you could still get Parkinson's?

Monica: It just doesn't worry me as much as it did before.

Therapist: So, what do you think you learned from this exposure?

Monica: I guess I learned that I can do something that feels scary, even if something bad might happen to me.

Therapist: Anything else?

Monica: Well, now I believe you that my anxiety can go away on its own.

Conclusion

When considering the habituation model, it is important to distinguish conceptually between the mechanism underlying exposure, the therapeutic process that engages that mechanism, and intermediate outcomes that indicate the mechanism is being engaged. The therapeutic process variables outlined in this paper are based on functional analysis and are thought to engage the mechanism, but are not the mechanism itself. Likewise, habituation can be conceptualized as an intermediate treatment outcome or initial marker of treatment success, but may or may not be the mechanism per se. None of these relationships have been adequately tested in the research literature, and future studies should employ innovative methods to tease them apart.

The basic tenets of the habituation model suggest that fear activation, minimizing anxiety-reducing behaviors, and habituation are necessary conditions for engaging the theorized treatment mechanism and maximizing the benefits of exposure. This has implications for therapeutic process during exposures, and the role of the therapist is to facilitate these conditions. Therapists should consider this in all phases of exposure-based treatment: providing a rationale for exposures, development of the hierarchy, selection of the exposure task, monitoring their own behaviors during exposure tasks, and debriefing following an

exposure. The case of Monica presented in this series of papers helps to illustrate which behaviors during treatment are consistent or inconsistent with the habituation model.

We want to note that this paper presents optimal conditions for exposures, and real-world exposures are rarely optimal in all of the ways outlined above. From a research standpoint, it will be important to determine the degree to which an exposure can be suboptimal and still be effective. For example, what “dose” of these therapeutic process variables and/or habituation is needed before clinical improvement is seen? What amount of anxiety-reducing behavior can take place before it precludes habituation? Do different therapeutic process variables have different potency for producing habituation/treatment response? Do these factors affect individuals differentially, and what client or therapist variables predict the strength of those relationships?

Clinically, it is important to use information from these suboptimal exposures to inform the design and implementation of subsequent exposures. One indication that an exposure has been “too hard” is if it results in substantial anxiety reducing behavior. When an exposure has been “too hard,” the best short-term (i.e. within the exposure task) option is to encourage the client to re-expose by coming back into contact with the exposure stimulus. Strategies that make the exposure easier by reducing anxiety in the moment (e.g., distraction) are discouraged. The best long-term strategy (i.e. across exposure tasks) is to choose an easier exposure from the hierarchy. An exposure may be “too easy” if it elicits minimal or no anxiety. When an exposure has been “too easy,” the first step should be to ascertain whether subtle or internal avoidance behavior has taken place (e.g., mental rituals). In the absence of such anxiety-reducing behaviors, the best short-term solution is to immediately choose a more difficult exposure from the hierarchy, or to employ greater use of therapist techniques to increase anxiety (e.g., statements that imply risk). In the long-term, it may be helpful to reassess the core fear that the exposure was trying to elicit and revise the hierarchy if necessary.

It is also important to consider the impact of symptom severity on the development of hierarchy items and conduct of exposures. Although it is preferable to eliminate anxiety-reducing behaviors during an exposure, for some clients, particularly those with very severe symptoms, it may be necessary to dismantle rituals before expecting completion of exposure without any rituals (e.g. reduce duration of ritual, eliminate one element of a multi-part ritual). In this case, dismantling rituals should be done such that there is some degree of residual discomfort following the ritual OR that the ritual is completed but the exposure stimulus is re-contacted (e.g., touching a dirty object again after washing hands). However, completion of exposures without anxiety-reducing behavior should be the eventual goal.

Finally, we want to note that this paper focuses primarily on theoretically derived behaviors during the exposure task itself. It is likely that these behaviors have other functions after the (i.e. preparing for exposure, debriefing the exposure). Future studies of therapeutic process in exposure-based treatments should be careful to tease apart function of therapeutic process variables based on the timing within the session.

Review of evidence for the habituation model and optimal exposure behaviors

Although evidence for the relationship of fear activation and habituation to outcome has been mixed, the bulk of these studies have failed to consider the role of anxiety reducing behaviors during exposures. As this is a critical part of the model, future studies should be careful to measure and account for these behaviors when investigating fear activation and habituation in treatment. Additionally, the conceptualization and measurement of fear activation and habituation has been too limited and warrants careful consideration in future studies.

Data regarding optimal behaviors during exposures has also been quite limited, and this represents a relatively new area of research that needs exploration. Nearly all treatment trials that include exposure-based treatment for OCD have used a treatment manual. However, available treatment manuals specify that exposure should happen, but do not provide guidelines about specific therapist or client behaviors during exposure. As reviewed above (“Evidence for Minimizing Anxiety Reducing Behaviors”), ritual prevention is considered to be a critical client behavior, though the actual occurrence of rituals during exposure has not been examined for its relationship with treatment outcome. Very few studies have provided data linking any observed therapist or client behaviors during exposure to habituation or to treatment outcome.

One method for beginning to collect such data is to conduct secondary data analysis using video- or audiotapes from sessions in treatment trials. Traditionally, these session-level data are coded to determine global therapist adherence to the treatment manual. However, microanalytic coding methods are likely to be more appropriate for identifying the client and therapist behaviors as outlined in this paper. This method may also be especially useful for measuring habituation, as the need to identify and account for anxiety-reducing behaviors could be critical for accurate measurement of this construct.

A microanalytic coding system (Exposure Process Coding System; EPCS) has been designed to measure the therapist and client behaviors outlined in this paper (Benito, Conelea, Garcia, and Freeman, 2012). Pilot data from the EPCS in a small sample of young children with OCD indicate initial feasibility, reliability, and validity (Benito, Conelea, Garcia, & Freeman, 2012). Furthermore, some observed therapist behaviors during exposure using the EPCS (i.e. discouraging avoidance, making statements that increase anxiety) were linked to improved treatment outcome in that pilot sample. Our laboratory is currently conducting a larger investigation using the EPCS, the revised version of which includes several novel measures of habituation. We are applying the EPCS to videotaped exposures from three large RCTs for pediatric OCD, and plan to investigate the relationships of these observed therapeutic process variables, as well as habituation, with treatment outcome (Benito, 2014; Frank et al., 2014). Our experience with this study so far suggests a high degree of therapist variability in employing the behaviors described in this paper, even among this group of highly trained therapists who were adherent to the treatment manual.

Notably, we have not devoted space within the present paper to discuss specific differences between the habituation model and other theoretical models of exposure. We believe that the tenets of these models are not necessarily mutually exclusive and have more similarities than

differences. Although the models themselves hypothesize different mechanisms (e.g., cognitive change, psychological flexibility), there are fewer differences in the therapeutic processes hypothesized to trigger those mechanisms. The use of terminology across models that implies a given underlying mechanism likely compounds this problem and results in some difficulty comparing behaviors or concepts that would otherwise be similar at the level of therapeutic process. For example, teaching the concept of willingly and fully experiencing anxiety is important to both ACT and Inhibitory Learning models. This is quite consistent with the principles of the habituation model as outlined in this paper, in that feeling anxiety with minimal anxiety reducing behavior will ultimately facilitate habituation and improvement in treatment.

Additionally, it is likely that any given model may unintentionally include active components from another model, or might intentionally include aspects of those active components with a different “brand name.” The habituation model is a function-based approach, with every activity happening during exposures being in the service of letting habituation occur naturally. This model purports that treatment ingredients should be tailored to the individual and flexible within the bounds of strong functional analysis, and that treatment ingredients should not be delivered in a “cookbook” fashion. However, these function-informed activities are likely to encounter and include active ingredients from other models, such as violation of fear expectancy (Inhibitory Learning) or increased contact with valued activities (ACT). For this reason, attempts to compare models by artificially disentangling these ingredients using a group-based research design is likely to significantly impact external validity of findings and have little bearing on actual clinical practice. Furthermore, it is unlikely that such a group-based approach could measure and report therapeutic process with enough detail to conclude definitively that the manipulation ensured no active ingredients from other approaches. Rather, novel methods for capturing these activities as they unfold in real treatment, while complicated to use and interpret, are more likely to help us understand therapeutic process during exposure.

While there is a growing body of literature in support of various mechanisms underpinning exposure efficacy, particularly in the field of Inhibitory Learning, there is almost no literature describing theory-consistent behaviors during real exposures (i.e. what therapists and clients say or do that makes treatment work). Ultimately, it will be critical to objectively define and measure those behaviors that lead to optimal treatment outcome and then consider their link to the underlying mechanism. It may be that behaviors without a logical link to a purported mechanism (e.g., focusing on fear cognitions as if they are “true”) can still lead to mechanism engagement (e.g., cognitive change). It may also be that more than one mechanism is responsible for change in exposure-based treatment and that incorporating techniques from multiple models will facilitate tailoring to individual needs and ultimately produce the most robust change during treatment.

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Highlights

- The habituation model is a behavioral model emphasizing the natural decrease of anxiety, in the absence of anxiety-reducing behaviors, that happens during exposure
- Three conditions are necessary for optimal benefit from exposure: fear activation, minimization of anxiety-reducing behavior, and habituation
- Prescribed behaviors during exposure are those that increase or maintain anxiety
- Proscribed behaviors during exposure are those that decrease anxiety

Table 1

Habituation Model: Prescribed and proscribed therapist behaviors during exposure

Therapist “Dos”		Therapist “Don’ts”	
Prescribed Behavior	Empirical Support	Proscribed Behavior	Empirical Support
Discourage Avoidance Behavior	Benito et al., 2012	Prompt use of relaxation	
Discourage avoidance of thoughts	Benito et al., 2012 Kircanski et al., 2012	Prompt use of cognitive tools to decrease anxiety	
Make statements that increase anxiety	Benito et al., 2012	Provide Accommodation	
Reduce parent/family accommodation		Distraction	Frank et al., 2014 Sloan & Telch, 2002b
Take frequent anxiety ratings		Talk about unrelated topics	Frank et al., 2014

* Note that all behaviors in the “do” category can be conceptualized as increasing or maintaining anxiety during the exposure, while all behaviors in the “don’t” category can be conceptualized as reducing anxiety during the exposure.

** Note: these behaviors refer to theory-driven behaviors during the exposure task only (not before or after)

Table 2

Habituation Model: Prescribed and proscribed client behaviors during exposure

Client "Dos"		Client "Don'ts"	
Prescribed Behavior	Empirical Support	Proscribed Behavior	Empirical Support
Engage in approach behavior		Use cognitive techniques to reduce anxiety	
Approach fear cognitions	Kircanski et al., 2012	Use relaxation to reduce anxiety	
Approach fear sensations		Use distraction	Benito et al., 2012 Sloan & Telch, 2002b
		Escape behavior	Benito et al., 2012
		Use rituals	Benito et al., 2012
		Avoidance behavior	Benito et al., 2012 Powers et al., 2004

* Note that all behaviors in the "do" category can be conceptualized as increasing or maintaining anxiety during the exposure, while all behaviors in the "don't" category can be conceptualized as reducing anxiety during the exposure.

** Note: these behaviors refer to theory-driven behaviors during the exposure task only (not before or after)