Running Head: ANXIETY-CONTROL STRATEGIES

Anxiety-Control Strategies: Is there Room for Neutralization in Successful Exposure Treatment?

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Abstract

Cognitive-behavioral theory suggests that anxiety-control strategies such as neutralization, distraction and various forms of safety behavior have the potential to diminish the effectiveness of and/or interfere with exposure treatment. Yet, it is common practice when treating individuals with anxiety disorders to employ various anxiety-control strategies as a means of assisting clients/patients with difficult exposure situations. Questions surrounding the issue of which anxiety-control strategies help *vs.* hinder exposure-based treatments (and under which circumstances) have been a topic of much investigation and continue to be a focus of theoretical debate. The present article reviews several key studies which collectively shed some light on this debate. The evidence suggests that clients' anxiety-control strategies may be less likely to become counter-productive when: (i) they promote increases in self-efficacy, (ii) they do not demand excessive attentional resources, (iii) they enable greater approach behavior and integration of corrective information (via "disconfirmatory experiences"), and (iv) they do not promote misattributions of safety. Theoretical and clinical implications of these findings are discussed, and future directions for research in this area are suggested.

Keywords: anxiety; neutralization; safety behaviour; distraction; exposure.

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Clinically anxious individuals use a number of strategies to control unpleasant thoughts, images and emotions. Common examples of these strategies include direct (behavioral) avoidance, thought suppression, overt compulsions, and various forms of subtle avoidance (e.g., distraction, mental rituals, safety-seeking behaviors, etc.). For the purposes of this review, the terms "anxiety-control strategies" and "anxiety-neutralizing behavior" will be used interchangeably to refer to these collective acts, given their proposed common function (i.e., of controlling - or "neutralizing" - anxiety).

Cognitive-behavioral theories of anxiety disorders (e.g., Beck, Emery & Greenberg, 1985; Clark, 1999; Salkovskis, 1996) suggest that avoidance and other forms of anxiety-neutralizing behaviors are counter-productive, such that they provide temporary relief from fear and discomfort, yet maintain anxiety in the long run. Nevertheless, many (subtle) avoidant strategies are utilized in clinical practice as a means of easing clients into anxiety-provoking treatment situations. Indeed, Craske, Street and Barlow (1989) note that "distraction is … used often, both by clients as a method of coping with high levels of anticipatory anxiety, and by therapists in their instruction to clients of ways to approach feared situations" (p.664). Salkovskis, Clark and Gelder (1996) make the theoretical distinction between adaptive coping strategies (e.g., rationalization, avoidance of real threats), which are employed to manage anxiety, and maladaptive safety behaviors (e.g., neutralization, carrying "safety aids", avoiding *perceived* danger, etc.), which are intended to prevent the occurrence of feared catastrophes. It is hypothesized that maladaptive safety behaviors prevent the unambiguous disconfirmation of negative beliefs, thus maintaining the perceived validity of these beliefs and related fears

(Salkovskis, 1996). However, in clinical practice it is often difficult for therapists to discern whether their clients' coping efforts may be counter-productive, and evidence examining this issue is mixed (Thwaites & Freeston, 2005). Thus, it is important to consider the following question: "Under what circumstances (if any) can clients' anxiety-neutralizing behavior facilitate exposure treatment for anxiety disorders, and what are the mechanisms involved?"

The current discussion presents a selective review of findings that pertain to this question. Although there is currently no clear consensus regarding the defining features of many of the constructs under review, we compare studies that have examined the effects of similar anxiety-control strategies on exposure-driven fear reduction. Because the counter-productive effects of direct (behavioral) avoidance are well-established, research on this issue is not reviewed here. Likewise, the consequences of thought suppression (e.g., Purdon, 1999, 2004; Purdon, Rowa, & Antony, 2005; Rassin, Merckelbach, & Muris, 2000) and overt compulsions (e.g., Rachman, 2002; Salkovskis, 1999) have recently been reviewed elsewhere, and thus, are not covered here. The present review focuses on three broad areas of investigation: (i) the effects of distraction on fear reduction both during and after exposure (ii) the effects of safety behavior on anxiety and fear-related cognitions, and (iii) the effects of neutralization on subsequent anxiety/discomfort and urges to neutralize. Theoretical and clinical implications of these findings are discussed, and promising directions for further research are suggested.

Theoretical Background

Mechanisms of Fear Reduction

While anxiety disorders are among the most effectively treated forms of psychopathology, the mechanisms by which anxiety and fear reduction occur during exposure treatment are not yet fully understood (Hofmann, 2008; Oliver & Page, 2003; McNally, 2007;

Schmid-Leuz, Elsesser, Lohrmann, Jöhren & Sartory, 2007). Traditionally, behavior theorists have relied on habituation models (e.g., Groves & Thompson, 1970) to explain these processes. These models suggest that conditioned fear responses are subject to extinction with repeated and prolonged exposures to feared stimuli, similar to processes involved in habituation to novelty (Agras, 1965; Mowrer, 1939; Watts, 1971). Exposure duration, stimulus intensity and attention to phobic cues are hypothesized to be key moderators of fear extinction (Watts, 1971, 1974; Watts, Trezise, & Sharrock, 1986). Accordingly, it is predicted that events or behaviors that interfere with these essential components of exposure should compromise the amount of fear reduction achieved, as well as increase the probability that the individual will experience a return of fear upon subsequent exposures (Watts, 1974). For example, distraction and other forms of cognitive and/or behavioral avoidance during exposure are hypothesized to negatively impact upon fear reduction (Rodriguez & Craske, 1993).

The concept of emotional processing (Rachman, 1980; Foa & Kozak; 1986; Foa, Huppert, & Cahill, 2006) was later proposed in an attempt to explain the mechanisms of exposure-driven fear reduction from an information processing (i.e., cognitive) perspective. Foa and Kozak's (1986) theory, which elaborates on the earlier work of Lang (1977, 1984) and Rachman (1980), proposes that feared stimuli and their meanings are represented in memory as fear "structures" or "prototypes" that consist of associations between fearful emotions, cognitions and behavior. These fear structures can be accessed upon exposure to the corresponding feared stimuli. However, it is hypothesized that for lasting fear reductions to occur: (i) the fear structure must be fully activated in memory (as evidenced by heightened emotional arousal and self-reports of fear), and (ii) internal representations of the feared stimulus must be modified through "corrective information" that highlights the innocuous nature of the

stimulus and thereby decreases harm expectancy (see also Hofmann, 2008). It was originally proposed that these necessary conditions serve to weaken associations between elements of the fear structure and allow extinction of the fear response to occur. However, Foa et al. (2006) have noted that recent developments in animal research (e.g., Bouton, 2004; Myers and Davis, 2002; Rescorla, 1996) suggest that learned safety information creates a new set of associations between fear cues and safety (i.e., a "safety structure") which *inhibits* the fear response, rather than *replacing* and/or *modifying* the original fear structure. Notwithstanding this conceptual revision, the emotional processing model predicts that behavioral and cognitive avoidance strategies (e.g., safety behaviour, distraction, etc.) that interfere with the activation and/or modification of fear structures (or learning of new "safety structures"?) during exposure should hinder fear reduction and promote the return of fear.

In contrast, Bandura's (1977) social learning theory states that activities that diminish emotional arousal and enhance an individual's perceived sense of personal mastery and control (components of "self-efficacy") in anxiety-provoking situations should facilitate fear reduction. For example, distraction and other subtle avoidance strategies may help to diminish anxiety in fearful situations, thus allowing phobic individuals to approach feared stimuli for longer periods and to gain a greater sense of mastery over their fears (Rodriguez & Craske, 1993). Therefore, Bandura's social learning framework grants the possibility for anxiety-reducing coping mechanisms to facilitate fear reduction under certain circumstances.

Finally, behavioral neuroscientists have begun to uncover biological mechanisms that may influence exposure-driven fear reduction. For example, it has been established that *N*-methyl-d-aspartate (NMDA) receptor activity in the amygdala plays an important role in diminishing fear in both animals and humans through exposure (Davis, 2002; Walker, Ressler,

Lu, & Davis, 2002). Consistent with this interpretation, recent investigations involving individuals suffering with Social Phobia (Hofmann et al., 2006) and Acrophobia (i.e., fear of heights) (Ressler et al., 2004) have found that administering the NMDA agonist d-cycloserine (DCS) shortly before exposure reliably enhances treatment benefits (i.e., reduction of fear and anxiety symptoms) in both the short- and long-term. Given that DCS administration only hastens extinction when used in conjunction with exposure (Walker et al., 2002), it has been hypothesized that NMDA receptor activity may serve to consolidate learning of corrective information (i.e., safety in the presence of feared cues). In addition, based on animal research (Milad & Quirk, 2002) which has found a negative correlation between activity in the medial prefrontal cortex (mPFC) and return of fear, McNally (2007) has hypothesized that "any intervention that can boost activity in the mPFC during exposure to fear provoking stimuli may yield therapeutic benefits". However, it is not currently known how various anxiety-control strategies may affect these cortical processes, and further investigation is required to determine their effects.

Factors Involved in the Maintenance of Fear and Anxiety

Salkovskis (1996) describes the "neurotic paradox" as the observation that clinically anxious individuals' fears persist despite experiencing repeated safe encounters with anxiety-provoking situations. Behavior theorists have attempted to explain the persistence of these fears with the concept of sensitization due to premature termination of exposure (Battersby, 2000). However, such accounts fail to explain instances in which fear re-emerges following prolonged exposure. Cognitive theories (Clark, 1999; Salkovskis, 1996; Salkovskis et al., 1996) provide a simple explanation for this paradox; it is proposed that phobic individuals' use of subtle safety-seeking behaviors during exposure maintains fear and anxiety by preventing the disconfirmation

of catastrophic cognitions. This effect is clearly illustrated in the following hypothetical example: A client who believes that they will faint if their anxiety escalates beyond a certain threshold may sit down or lean on a wall for support whenever they feel a sudden emergence of anxiety symptoms. When their anxiety passes and they do not faint, they are likely to consider the situation a "near miss" and to attribute the non-occurrence of the feared event (i.e., fainting) to their preventive efforts, thereby reinforcing their maladaptive beliefs, predictions and behavior (Salkovskis, 1996). As such, it is proposed that individuals who routinely employ safety behaviors in anxiety-provoking situations are more likely to experience a return of fear upon subsequent encounters with the feared situation(s). It is also hypothesized that some anxiety-control strategies have the unintended effect of increasing the individual's anxious response (e.g., sweating, blushing, trembling, etc.), thus initiating a vicious cycle of anxious symptoms and behavior (Clark, 1999; Salkovskis, 1996). Accordingly, proponents of the cognitive theory suggest that exposure treatment can only be maximally effective if these subtle avoidance behaviors are eliminated.

Another phenomenon that may contribute to the long-term maintenance of fear and anxiety is the over-prediction of fear. The over-prediction of fear simply refers to an overestimation of how frightened one will be when encountering an anxiety-provoking situation. Rachman and colleagues (Rachman & Bichard, 1988; Rachman & Lopatka, 1986a, 1986b) propose that over-prediction of fear typically follows aversive experiences in which fear was under-predicted (e.g., an unexpected panic episode). The extreme fear associated with these unanticipated panic episodes is hypothesized to subsequently increase anticipatory anxiety and fear predictions in situations that resemble the original experience. According to Rachman and Bichard (1988):

> The tendency to over-predict fear remains relatively unchanged unless and until disconfirmations occur. In most clinically significant fears that are accompanied or followed by strongly avoidant behavior, the possibilities of experiencing such disconfirmations are limited. In this way, their over-predictions of fear can be preserved from disconfirmation, and continue relatively unchanged (p.308).

Thus, again a vicious cycle is created in which the over-prediction of fear encourages the use of counter-productive avoidant strategies (including subtle avoidance), which, in turn, maintain over-predictions.

Background

Distraction vs. Focused Attention During Exposure

Borkovec and Grayson (1980) suggested that the "objective presentation of stimuli does not guarantee *functional* exposure to those stimuli" (p.118, emphasis added). They further implied that the amount of fear reduction achieved as a result of exposure should be less in cases where information processing is compromised (e.g., due to distraction).

The first study to explicitly test these claims was conducted by Grayson, Foa and Steketee (1982), who manipulated participants' focus of attention during *in vivo* exposure and examined the effects on fear reduction. In this study, individuals diagnosed with Obsessive-Compulsive Disorder (OCD) were exposed to a highly-feared contaminant for 90 minutes on each of two consecutive days. Each participant completed the exposure under conditions of both distracted and focused attention, in a counterbalanced design. In the distracted exposure condition, participants held the contaminated object with one hand, while playing a video game with the other hand. In the focused exposure condition, the experimenter had participants talk about the contaminant they were holding and the discomfort it aroused. Consistent with the

notion that distraction prevents functional exposure, participants who underwent the distracted exposure condition on the first day demonstrated significantly less between-session habituation than those who were instructed to focus on the feared stimulus during the first exposure.

The same team of researchers attempted to replicate this study using a between-participants design (Grayson, Foa, & Steketee, 1986). Although an identical protocol was used, their findings were at odds with those of the original experiment. Both groups failed to demonstrate between-session anxiety reduction, and contrary to expectation, participants who completed exposure while distracted reported greater within-session anxiety reduction than participants in the focused condition. In fact, the only finding that suggested an advantage for focused exposure was that participants' heart rate gradually decreased during exposure in the focused condition, while high levels of physiological arousal were maintained throughout the exposure in the distracted group.

Craske, Street, Jayaraman and Barlow (1991) studied individuals with snake and spider phobias to determine: (i) how distraction during *in vivo* exposure affects phobics' experience of fear in the short term, and (ii) whether phobic individuals who are not given any specific instructions during exposure will demonstrate a natural tendency to use cognitive avoidance (i.e., distraction) to cope with fearful encounters. Using a repeated measures design, student participants were exposed to either a live snake or spider (depending on their primary fear) under three conditions: natural exposure, focused exposure, and distracted exposure. Distracted exposure involved listening for key words presented in an audio-taped message and indicating each time the key words were played by placing a check mark on a sheet of paper, while maintaining *visual* focus on the feared animal. In contrast, the focused exposure condition involved listening to an audio-taped passage that included instructions to maintain both visual

and attentional focus on the feared stimulus (e.g., by examining different aspects of the animal closely). The order of focused and distracted exposure conditions was counter-balanced, and in all cases, was preceded by the natural exposure condition and followed by a baseline assessment period. It was found that participants experienced less subjective fear during distracted exposure than during focused exposure, regardless of the order of conditions, while heart rate remained stable across all conditions. Also, subjective fear ratings in the natural exposure condition most closely resembled those provided by participants in the distracted condition. The authors concluded that distraction may inhibit the immediate elicitation of fear in anxiety-provoking situations, and that phobic individuals may naturally tend to counteract attentional biases towards threat with cognitive avoidance.

In a study of individuals with Claustrophobia, Kamphius and Telch (2000) tested several predictions derived from emotional processing theory. Participants were randomly assigned to one of four exposure conditions: (i) guided threat reappraisal (GTR), (ii) cognitive load distractor task (CL), (iii) GTR + CL, or (iv) exposure only (EO). In the GTR condition, participants were told to attend to evidence concerning the validity of their core fears, while participants in the CL condition performed a demanding dual-process distractor task. Participants in the GTR + CL condition were given both sets of instructions, but were told to prioritize the distractor task. Overall, participants completed 30 minutes of *in vivo* exposure, which was broken down into blocks lasting a maximum of 5 minutes each. A number of fear indices (e.g., subjective anxiety ratings, peak fear, heart rate variability, etc.) were collected throughout the procedure and participants were classified according to end-state functioning at post-treatment and follow-up (2 weeks) assessments. Results were generally consistent with predictions derived from emotional processing theory. Although participants in all four conditions demonstrated significant within-

trial habituation, those in the GTR conditions reported significantly greater reductions in subjective anxiety from pre- to post-exposure than participants in the CL condition. Also, a statistical trend suggested that participants in the two distraction groups showed greater return of fear at 2-week follow-up. Thus, in general, results showed that participants' engagement in a cognitive load task during exposure hindered the amount of fear reduction achieved, whereas instructions to test negative beliefs led to greater symptom reduction, indicating that cognitive factors play a role in exposure-based fear reduction.

More recently, Telch and colleagues (2004) asked a group of individuals reporting extreme claustrophobic fear to complete a total of 30 minutes of *in vivo* exposure under one of four conditions: (i) increased threat, (ii) neutral, (iii) cognitive load (CL), or (iv) exposure only (EO). The increased threat condition consisted of attending to fear-relevant threat words (e.g., trapped, suffocate) and forming images of these words, while participants in the neutral condition performed the same task with neutral words (e.g., banana). Meanwhile, participants in the CL condition performed a demanding cognitive task (i.e., the Seashore Rhythm Test; Halstead, 1947), which required a great deal of their attentional resources. Consistent with prediction, participants in the CL condition demonstrated less symptom improvement at post-treatment than participants in the EO condition. However, contrary to what the emotional processing model (Foa & Kozak, 1986) would predict, individuals in the increased threat condition did not demonstrate greater fear reduction at post-treatment than participants in the neutral or EO conditions. This finding is particularly noteworthy given that participants in the neutral condition performed a threat-irrelevant task which likely functioned as a mild distractor. It is important to note however, that the threat manipulation was not effective in eliciting greater

fear activation (in terms of subjective ratings and heart rate) during exposure in comparison to the other conditions.

Most of the evidence reviewed thus far suggests that distraction has the potential to hinder exposure treatment and to promote the return of fear. However, Page and his co-workers have provided compelling evidence that at least some forms of distraction during exposure may actually facilitate both short- and long-term reductions in fear and anxiety. In a first study, Penfold and Page (1999) examined whether manipulating attentional focus during *in vivo* exposure influenced anxiety reduction among individuals with strong blood and injection-related fears. Participants completed three weekly exposure sessions (duration = 10 minutes) under one of three experimental conditions: focused exposure, distracted exposure, or exposure alone. Participants in the distracted exposure condition were engaged in neutral (stimulus-irrelevant) conversation with the therapist (e.g., regarding plans for the future, hobbies, etc.), while those in the focused exposure condition were asked to discuss their thoughts, feelings, and physiological reactions to the feared stimuli. Visual attention was directed towards fearful stimuli regardless of condition. It was argued that stimulus-irrelevant conversation represented a more ecologically valid form of distraction than the more "artificial" distractors (e.g., video games, demanding cognitive tasks) that had been used in most prior studies. Results showed that exposure-plus-distraction led to greater within-session anxiety reduction than focused exposure or exposure alone. However, no group differences were found on a behavioral approach test (BAT) immediately following exposure.

In a second study, Oliver and Page (2003) sought to replicate and extend this finding by examining both the short- and long-term effects of manipulating focus of attention during exposure. This study used an identical procedure and participant population (i.e., blood- and

injection-fearful individuals) as Penfold and Page's (1999) prior investigation. In line with emotional processing theory, it was hypothesized that distracted exposure may facilitate within-session decreases in anxiety, but hinder long-term improvement by interfering with the activation of fear structures in memory. However, contrary to expectation, participants in the exposure-plus-distraction condition reported the greatest amount of fear reduction both within and between sessions. Furthermore, this advantage was maintained at post-treatment and 1-month follow-up, suggesting that conversational distraction during exposure may facilitate both short- and long-term fear reduction compared to focused and natural forms of exposure.

A third investigation (Johnstone and Page, 2004) extended this line of work to include an examination of exposure-driven fear reduction among spider phobics. Participants were randomly assigned to either distracted or focused exposure conditions. As in the previous studies, participants were instructed to maintain visual contact with the feared stimulus (a live Black House Spider) throughout the exposures, and attention towards the phobic stimulus was manipulated via conversational tactics. However, the exposure schedule was slightly altered in this investigation, such that participants completed three successive exposures (duration = 10-minutes) during their first experimental trial, and an additional exposure session four weeks later. Interestingly, it was found that both subjective and physiological indices of fear did not differ between groups during the initial moments of exposure. Also, neither group demonstrated a significant return of fear, suggesting that both distracted and focused variants of exposure treatment are effective in reducing fear of spiders. Nonetheless, consistent with Oliver and Page's (2003) findings, participants in the distracted exposure condition reported significantly *greater* within- and between-session anxiety reduction than participants in the focused exposure condition, and these results were maintained at 1-month follow-up. Notably, increases in

perceived control were also observed among participants in the distracted exposure group in both of these investigations (Johnstone & Page, 2004; Oliver and Page, 2003).

Lastly, another group of researchers (Schmid-Leuz et al., 2007) recently compared the effects of distracted versus attention-focused exposure among a group of dental phobics. Participants were exposed to a series of fear-eliciting dental tools (i.e., dental probe, drill, needle and pliers) according to an idiographically-designed hierarchy. Acoustic and olfactory stimuli that mimicked those commonly experienced during dental procedures were utilized throughout the exposure, which lasted 60 minutes for all participants. In the attention-focused exposure condition, participants were instructed to contemplate the function of each tool as they manipulated it manually. In contrast, participants in the distracted condition held the instruments in their non-dominant hand while they played puzzle games with the experimenter. Several fear indices (e.g., self-report fear and anxiety ratings, heart rate, state and trait anxiety measures) were collected before and immediately following exposure, as well as at 1-week follow-up. Contrary to expectation, there were no significant group differences in fear reduction (as measured by heart rate and self-report ratings) at post-treatment and 1-week follow-up. Likewise, there were no group differences in avoidance of subsequent dental treatments in the six months immediately following the study. In fact, both groups demonstrated significant and lasting improvement in phobic symptoms (as measured by self-report anxiety ratings), and the only significant group difference that emerged revealed a slight advantage for the focused exposure condition in terms of state anxiety ratings. However, an examination of group means suggests that this group difference was slight, and is unlikely to be clinically meaningful.

Safety Behavior

Salkovskis and co-workers (1996) demonstrated that Panic Disorder patients' choice of safety behaviors is logically related to their catastrophic beliefs (e.g., an individual who believes they are susceptible to experiencing a heart attack might lay down and raise their feet during panic episodes). The first study to examine whether safety behaviors act to maintain anxiety and fear-related beliefs was conducted by the Oxford Group (see Wells et al., 1995). In this study, socially anxious individuals completed two exposure sessions (duration = 5-10 minutes each) in which they encountered a situation that they had identified as being highly fearful. They were given different instructions prior to each exposure, and the order of conditions was counter-balanced. Prior to one exposure session, a cognitive rationale was used to instruct participants to drop their usual safety behaviors. Prior to the other exposure session, participants were not given any specific instructions regarding the use of safety behaviors, and instead were provided with a habituation rationale to explain the mechanisms of fear reduction during exposure. As predicted, decreased safety behavior under cognitive rationale was associated with greater reductions in participants' subjective anxiety ratings and anxiety-related beliefs (within-session) than natural exposure under habituation rationale.

Salkovskis, Clark, Hackmann, Wells, and Gelder (1999) found similar results in a study of individuals suffering with Panic Disorder with Agoraphobia (PDA). Participants in this study performed an idiographically-designed behavioral approach test (BAT) both prior to, and within two days of completing a single, brief exposure session (duration = 15 minutes). During this exposure, half of the participants were instructed to drop their safety behaviours and were given a cognitive rationale, while the other half were told to behave as they normally would in the feared situation, and were provided with a habituation and extinction rationale. Again, individuals who decreased their use of safety behavior during exposure reported significantly

less subjective anxiety and catastrophic beliefs during the follow-up BAT than individuals in the control group.

Similar findings have emerged from several other investigations. For example, Morgan and Raffle (1999) found that specific instructions to diminish the use of safety behavior during exposure significantly increased the effectiveness of standard group CBT for Social Phobia. In addition, two studies recently conducted at the University of Texas suggest that safety-seeking behavior may be an important factor in the maintenance of claustrophobic fear. In the first study, Sloan and Telch (2002) compared the outcomes of exposure with safety behavior utilization (SBU) *vs.* exposure with guided threat reappraisal (GTR) and exposure only (EO) in a sample of claustrophobic undergraduate students. Participants were randomly assigned to complete six brief (5-minute) exposures in a claustrophobic chamber under one of the three conditions described above. Although participants in the SBU condition were made aware of the availability of safety aids (e.g., small window in chamber, intercom, etc.), they were not specifically instructed to use them. Meanwhile, participants in the GTR condition were instructed to test their catastrophic beliefs while in the chamber, and participants in the EO condition were given no instruction. Results revealed a general advantage for the GTR condition, as participants in the SBU group reported the highest ratings of peak fear during BATs at post-treatment and 2-week follow-up, while participants' fear ratings in the EO group fell in between those of the other two groups. Furthermore, participants in the SBU condition exhibited significantly less clinical improvement and between-trial habituation than those in the GTR condition, whose advantage also generalized (although to a lesser extent) to a second BAT.

Two additional findings from this study deserve mention. First, contrary to expectation, participants' heart rate reactivity during the first 5 minutes of treatment did not differ between

groups, suggesting that levels of initial fear activation did not affect subsequent fear reduction. Furthermore, all participant groups exhibited mean heart rates in the normal (albeit high normal) range for adults at rest during BAT tests at pre-treatment (i.e., all group means < 97 bpm). Although Foa and Kozak (1986) do not offer specific guidelines regarding the degree of physiological arousal (e.g., heart rate bpm) required to facilitate fear extinction following exposure, the amount of arousal exhibited by these participants does not appear to have been sufficient to "fully" activate fear structures in memory. Nevertheless, all groups demonstrated significant reductions in heart rate reactivity and peak fear from pre- to post-treatment. This finding appears to contradict emotional processing theory. Second, a significant number of participants in the SBU condition reported that they did not actually use any safety behavior during exposure. Accordingly, Sloan and Telch (2002) suggested that perhaps it is not safety behavior *utilization* per se that inhibits fear reduction during exposure, but rather, the *availability* of safety aids that causes this detriment. A second study conducted by this research team (Powers, Smits & Telch, 2004) attempted to address this theoretically important question. A large sample of undergraduates reporting severe claustrophobic fears were randomly assigned to one of five conditions: (i) exposure with safety behavior utilization (SBU), (ii) exposure with safety behavior availability (SBA), (iii) exposure only (EO), (iv) credible placebo treatment (PL), or (v) wait list control (WL). Results indicated that the PL and WL conditions were the least effective in reducing fear, and that approximately twice as many participants in the EO condition achieved high end-state functioning at post-treatment and 2-week follow-up as those in the SBU and SBA conditions. Importantly, individuals in the SBU and SBA conditions showed equally poor rates of improvement, suggesting that mere availability of safety aids during exposure is sufficient to hinder fear reduction.

Finally, Kim (2005) recently explored the specific mechanisms involved in reducing fear via exposure with decreased safety behavior. Kim noted that the Oxford Group studies cited earlier (Salkovskis et al., 1999, Wells et al., 1995) were confounded by the fact that participants in each group were given a different rationale prior to exposure. In both studies, participants who were instructed to stop using safety behavior were also provided with a cognitive rationale for completing exposure treatment. In contrast, a habituation rationale was provided to participants in the control conditions. As such, the precise mechanisms by which fear reduction had been enhanced in the decreased safety behavior groups could not be determined from these studies. It was unclear whether the benefits of reducing safety behavior in these studies were due solely to a decrease in the behavior, or whether a cognitive rationale (with an emphasis on the disconfirmation of negative beliefs) was also required to achieve these benefits. To address this issue, Kim randomly assigned socially phobic individuals to one of three groups: (i) exposure with decreased safety behavior under habituation rationale, (ii) exposure with decreased safety behavior under cognitive rationale, or (iii) exposure only. It was predicted that decreased safety behavior under cognitive rationale would produce the greatest reduction in anxiety and catastrophic beliefs, and this is indeed what was found. Thus, Kim concluded that an emphasis on disconfirming negative beliefs is crucial in reducing fear via exposure with decreased safety behavior.

Contrary to the above-reviewed findings, a number of often-neglected studies suggest that the use of safety-seeking strategies during exposure may not be universally detrimental. In fact, it has recently been suggested that the judicious use of safety behavior may be entirely appropriate under certain circumstances, particularly during the early phases of graded exposure treatment (Rachman, Radomsky & Shafran, 2008).

Bandura, Jeffrey and Wright (1974) provided some early evidence for this view in a study which examined the effects of providing safety aids to snake phobics during exposure. In their study, participants were offered minimal, moderate or high use of 'response induction aids' (e.g., gloves) when they were unable to engage in an exposure exercise even after it was modeled to them by the therapist-experimenter. This study found that participants who relied on moderate or high levels of what would today be labeled 'safety behaviors' experienced marked and significantly better improvement (fear reduction) than those who were offered only mild levels of these aids. Given the date of this important experiment, it is not surprising that outcome was reported in terms of self-report and approach behavior. As such, current hypotheses about safety behavior preventing the disconfirmation of maladaptive negative beliefs were not assessed. A more recent study (Milosevic, 2006; Milosevic & Radomsky, in press) sought to address this issue by randomly assigning snake fearful participants to either a treatment as usual (exposure) condition or an exposure-plus-safety-gear condition in which participants could select one or more safety aids (e.g., gloves, goggles, protective clothing) for use during 45 minutes of exposure-based treatment. Results indicated that both groups experienced significant and nearly identical treatment gains (measured through post-treatment approach behavior, self-reported anxiety *and* negative cognitions/beliefs in the *absence* of safety gear), indicating that safety gear neither interfered with outcome nor with disconfirmatory experiences (Milosevic, 2006; Milosevic & Radomsky, in press). It is important to note that during the first part of the exposure session, participants who used safety gear were able to get significantly closer to the snake than those in the control group. Likewise, a larger number of participants in the safety gear group were able to touch and/or hold the snake compared to those in the control group,

suggesting that the judicious use of safety behaviour (Rachman, Radomsky & Shafran, 2008) may present advantages over traditional exposure-based treatments.

Additionally, Rachman and colleagues demonstrated that escape behavior (a form of safety-seeking) does not always hinder treatment of agoraphobic avoidance in a set of innovative studies designed to test the validity of the "golden rule" of exposure (i.e., in order to prevent fear sensitization "try never to leave a situation until the fear is going *down*"; Mathews, Gelder & Johnston, 1981, p.182). In the first of these two studies (de Silva & Rachman, 1984), individuals with Agoraphobia performed eight weekly exposure sessions with instructions to either: (i) stay in the feared situation until their peak fear had declined by at least 50% (anxiety endurance condition), or (ii) withdraw from the situation if their anxiety reached 75% of the highest level they could imagine (escape condition). Measures of self- and clinician-rated anxiety as well as agoraphobic avoidance (as indicated by a BAT test) were taken at pre- and post-treatment. Notably, both groups showed significant pre- to post-treatment reductions in fear and agoraphobic avoidance compared to a wait-list control group, and contrary to the "golden rule" of exposure, individuals in the anxiety endurance condition did not exhibit greater improvement than those in the escape condition. A replication of this study (Rachman, Craske, Tallman & Solyom, 1986) found similar results, and most importantly, demonstrated that treatment gains were maintained among both "endurers" and "escapers" at a 3-month follow-up assessment. Consistent with Bandura's theory, fear reductions were accompanied by increased control ratings, especially among participants who were allowed to escape the situation. Together, these studies provide compelling evidence that the judicious use of anxiety-control strategies may not be detrimental under all circumstances, and prompt a reconsideration of whether it is necessary for clients to endure prolonged high levels of anxiety/distress to benefit from exposure therapy.

Neutralization

Neutralization behavior, which is generally associated with OCD, has been defined as an attempt to "put matters right" or "undo" the potential negative consequences of one's thoughts and/or actions that the individual perceives as dangerous (e.g., repeating positive phrases or prayers following blasphemous thoughts to "cancel out" the thoughts and prevent divine retribution) (Rachman, 1976b; Rachman, Shafran, Mitchell, Trant & Teachman, 1996). A decade ago, Rachman and colleagues (Rachman et al., 1996) set out to validate an experimental method for studying neutralization, in a study that was designed to test the hypothesis that neutralization resembles overt compulsions. Based on this hypothesis, it was predicted that neutralization of intrusive thoughts would lead to an immediate decrease in anxiety, and that preventing neutralization would result in a gradual decay of anxiety and urges to neutralize. A group of non-clinical volunteers who demonstrated thought-action fusion (TAF) were selected to participate in this study. TAF refers to the belief that having unwanted, immoral thoughts: (i) might increase the likelihood that negative events will occur (i.e., "Likelihood TAF") and/or (ii) is morally equivalent to performing the inappropriate imagined actions (i.e., "Moral TAF") (Shafran, Thordarson & Rachman, 1996). Participants were asked to imagine a close friend or relative and then to insert their name into the following sentence: "I hope _____ is in a car accident." Next, half of the participants were told that they could do whatever they wished (for 2 minutes) to undo (i.e., neutralize) the effects of the sentence, while the other participants were instructed to do nothing to neutralize their thoughts during the next twenty minutes (although they were allowed to read a magazine). The variables of interest were then measured and instructions were reversed for each group. Thus, a final assessment was conducted twenty-two minutes after the initial anxiety provocation. The authors' predictions were largely supported,

and it was concluded that neutralization behavior is likely to be counter-productive in the long run.

A group of researchers from the Netherlands have since conducted two investigations using a slight variation of this protocol. The first of these studies (Hout, Pol, & Peters, 2001) aimed to replicate Rachman et al.'s (1996) findings. However, measures of anxiety and urges to neutralize were taken at equal points in time for both experimental groups, unlike Rachman and colleagues' study. Hout and colleagues found that participants in both the neutralization and the neutralization prevention groups reported a significant decrease in anxiety and urges to check after only two minutes. Given that spontaneous decay of compulsive urges takes much longer to achieve (Rachman, de Silva, & Roper, 1976), the authors questioned the assumption that neutralization is functionally equivalent to overt compulsions. The second study conducted by this group (Hout, Kindt, Weiland, & Peters, 2003) used a similar protocol, however, participants were instructed to either (i) neutralize, (ii) perform a cognitive distractor task (mental arithmetic), or (iii) they were given no particular instructions following the anxiety provocation. Interestingly, participants in the "no instruction" group reported neutralizing their thoughts as much as participants in the instructed neutralization group, suggesting that even non-clinical individuals may spontaneously neutralize. Consistent with their previous results, it was found that all three groups demonstrated equal reductions in anxiety from initial provocation to the 2-minute assessment point. Furthermore, there were no group differences in subjective anxiety when the anxiety-provoking thought was later re-introduced into consciousness. Thus, it was concluded that reductions in anxiety following unpleasant thoughts are not likely due to the effects of neutralization, but instead might result from other processes such as rationalization.

In a study aimed at uncovering factors involved in the etiology of OCD, Salkovskis, Westbrook, Davis, Jeavons and Gledhill (1997) examined the effects of neutralization on individuals' subsequent discomfort and urges to neutralize. In this experiment, non-clinical participants recorded a 20-second narrative describing their most frequently experienced and highly repugnant obsession onto a looped tape. Next, they listened to this intrusive thought repeatedly during two exposure sessions. During the first session, half of the participants were instructed to neutralize their intrusion, while the other half of participants were instructed to count backwards, in order to control for any maladaptive effects that may be associated with distraction. During the second session, all participants refrained from neutralizing or counting. As expected, participants who neutralized their obsession reported greater decreases in discomfort during the first phase of the experiment. However, they also reported greater discomfort and urges to neutralize during the second exposure than individuals who had previously used distraction. A replication of this study was recently carried out in a clinical OCD sample, and similar results were found (Salkovskis, Thorpe, Wahl, Wroe, & Forrester, 2003). Taken together, these results suggest that neutralization of intrusive thoughts is likely to be counter-productive in the long run, and may contribute to the development of clinical obsessions and compulsions.

Summary of Findings

Fear Reduction

Contrary to predictions set forth by habituation/extinction models of fear reduction, a large number of studies examining the effects of attentional focus during exposure (Craske et al., 1991; Grayson et al., 1982, 1986; Johnstone & Page, 2004; Oliver & Page, 2003; Penfold & Page, 1999; Schmid-Leuz et al., 2007) have failed to demonstrate negative short-term effects in

association with distraction. In fact, several studies have shown that in comparison to attention focusing (Craske et al., 1991; Grayson et al., 1986; Johnstone & Page, 2004; Oliver & Page, 2003; Penfold & Page, 1999) and exposure alone conditions (Oliver & Page, 2003; Penfold & Page, 1999), distraction may actually facilitate within-session fear reduction. Likewise, several studies have shown that the judicious use of safety aids does not interfere with exposure treatment (de Silva & Rachman, 1984; Rachman et al., 1986; Milosevic, 2006; Milosevic & Radomsky, in press), and may actually improve treatment outcomes under certain circumstances (Bandura et al., 1974).

On the other hand, recent studies have also suggested that cognitive load during exposure is associated with less within-session fear reduction than threat reappraisal (Kamphius and Telch, 2000) and exposure only conditions (Telch et al., 2004). Moreover, it has been found that the availability and/or use of safety behavior during exposure inhibits short-term fear reduction in comparison to threat reappraisal (Sloan and Telch, 2002) and exposure only (Powers et al., 2004) conditions.

Return of Fear

The group of studies reviewed above that assessed return of fear following exposure reported mixed results. Four of these studies (Grayson et al., 1982; Kamphius & Telch, 2000; Powers et al., 2004; Sloan and Telch, 2002) reported findings consistent with habituation-based and emotional processing accounts. Grayson et al. (1982) found that distraction during exposure significantly hampered between-session habituation, while Kamphius and Telch (2000) reported a trend towards greater return of fear in distracted *vs.* natural and focused (i.e., threat reappraisal) exposure conditions. Likewise, Sloan and Telch (2002) found a significantly greater return of fear (at 2-week follow-up) among participants who were allowed to use safety behavior during

exposure compared to individuals who were instructed to test their catastrophic cognitions. Finally, Powers et al. (2004) demonstrated that a mere availability of safety behaviors during exposure was sufficient to compromise between-session habituation in comparison to natural exposure.

In contrast, Page and co-workers' (Johnstone & Page, 2004; Oliver & Page, 2003) findings appear to be more consistent with Bandura's (1977) self-efficacy model. In conjunction with significantly greater increases in perceived control, participants who were *mildly* distracted during exposure exhibited less return of fear than participants in focused (Johnstone & Page, 2004; Oliver & Page, 2003) and exposure only (Oliver & Page, 2003) conditions. Similarly, Rachman and colleagues (1986) found that providing clients with the option to escape during exposure to agoraphobic situations led to higher ratings of control relative to clients who were instructed to endure their anxiety, and did not lead to a subsequent return of fear.

Subjective Anxiety

Consistent with cognitive theory, a number of investigations have demonstrated that neutralization of intrusive thoughts (Hout et al., 2001, 2003; Rachman et al., 1996; Salkovskis et al., 1997, 2003) and distraction (Schmid-Leuz et al., 2007) are associated with short-term reductions in subjective anxiety. It has also been shown that comparable reductions in self-reported anxiety can be achieved within two minutes of anxiety provocation when neutralization is prevented (Hout et al., 2001, 2003). This finding suggests that other processes such as rationalization may be involved in alleviating anxiety provoked by distressing thoughts (Hout et al., 2003). Furthermore, Hout et al. (2003) found that anxiety experienced upon re-exposure to intrusive thoughts did not differ between individuals who had previously neutralized their thoughts and those who did not.

In contrast, the Oxford Group found that neutralization was associated with the maintenance of discomfort and urges to neutralize in studies of both non-clinical (Salkovskis et al., 1997) and clinical (Salkovskis et al., 2003) individuals. In addition, safety behavior use during exposure to anxiety-provoking situations has been shown to inhibit anxiety reduction immediately following the exposure (Kim, 2005; Salkovskis et al, 1999; Wells et al., 1995).

Catastrophic Beliefs

Similar to subjective anxiety, probability estimates regarding the likelihood of feared consequences were found to immediately decrease following neutralization (Rachman et al., 1996). Although follow-up data were not collected in this study, two related investigations (Salkovskis et al., 1997, 2003) found that individuals who neutralized distressing thoughts exhibited subsequent increases in discomfort and urges to neutralize. Based on Salkovskis et al.'s (1996) observation that anxiety-neutralizing behavior is motivated by catastrophic beliefs, it is possible that the return of discomfort and urges to neutralize among these individuals resulted from a re-emergence (or re-activation) of catastrophic beliefs. Lastly, three additional studies that included explicit measures of catastrophic belief (Kim, 2005; Salkovskis et al, 1999; Wells et al., 1995) found that a reliance on safety behavior during exposure to anxiety-provoking situations was associated with greater belief in the likelihood of feared consequences. However, it has also been shown that the use of safety behavior during exposure does not necessarily prevent the disconfirmation of catastrophic beliefs (Milosevic & Radomsky, in press).

Discussion

The purpose of this paper was to assess whether there are circumstances in which anxiety-neutralizing behavior may facilitate exposure and treatment of anxiety disorders. Toward this aim, a number of empirical studies investigating potential moderators of exposure-

based treatment (i.e., distraction, safety behavior, neutralization) have been reviewed. While several factors limit our ability to make solid inferences based on the available evidence, some tentative conclusions seem justified.

Overall, the studies reviewed above support the increasingly accepted view that anxiety-neutralizing strategies have the *potential* to become counter-productive by promoting misattributions of safety, undermining self-efficacy and/or interfering with other possible mechanisms of fear reduction during exposure (e.g., emotional processing). This was especially apparent among studies which examined the disruptive effects of neutralization (Salkovskis et al., 1997, 2003), certain types of safety-seeking behavior (Kim, 2005; Morgan & Raffle, 1999; Powers et al., 2004; Salkovskis et al., 1999; Sloan & Telch, 2002; Wells et al., 1995) and heavy distraction during exposure (Grayson et al., 1982; Kamphius & Telch, 2000; Telch et al., 2004). Although Hout et al. (2003) found that participants in their 'neutralization' condition did not report greater increases in anxiety upon re-exposure to the thought than those who were instructed to 'do nothing', minimal efforts to neutralize the thought were reported by participants in both conditions (i.e., mean ratings of 22 [SD = 28] *vs.* 10 [SD = 22] out of 100, respectively). As such, the clinical relevance of this finding must be called into question. Thus, the majority of evidence provided by these studies indicates that anxiety-control strategies commonly used by phobic clients may be detrimental in the long run.

On the other hand, there is also evidence to suggest that clients' anxiety-control strategies are not inevitably detrimental to exposure treatment (Bandura et al., 1974; deSilva & Rachman, 1984; Rachman et al., 1986; Schmid-Leuz et al., 2007; Milosevic & Radomsky, in press). In fact, it appears that *certain types* of subtle avoidance might actually help anxious individuals to achieve greater success in exposure-based treatments. More specifically, stimulus-irrelevant

conversation during exposure has been shown to produce anxiolytic effects which are both durable and robust (Johnstone & Page, 2004; Oliver & Page, 2003), unlike some other forms of distraction (e.g., demanding cognitive tasks) which have been shown to hinder treatment (Kamphius & Telch, 2000; Telch et al., 2004). Therefore, it is important to clarify what precise mechanisms distinguish conversation from other types of distraction which serve to maintain fear and anxiety. A detailed inspection of the studies reviewed above offers some preliminary clues to this distinction.

First, both Oliver and Page (2003) and Johnstone and Page (2004) found that participants who engaged in stimulus-irrelevant conversation during exposure reported subsequent increases in perceived control. As predicted by social learning theory (Bandura, 1977), this increase in perceived control was associated with reduced fear responding in the presence of anxiety-provoking stimuli. Although direction of causality cannot be inferred from these investigations, this finding lends support to the theory that perceived mastery over feared situations is an important moderator of fear reduction (Bandura, 1977; see also Powers, Smits, Whitley, Bystritsky & Telch, in press). However, a comparison of changes in perceived control following helpful *vs*. harmful forms of distraction is not currently possible, as this construct was not measured in those studies that found distraction to be counter-productive. Nevertheless, it is conceivable that stimulus-irrelevant conversation during exposure contributed to subsequent increases in perceived control and self-efficacy through a variety of possible means. For example, the pleasant topics of conversation used to distract participants in the aforementioned studies (e.g., discussion of hobbies, travel plans, etc.) may have helped to promote a state of relaxation during exposure. According to Bandura, relaxation in the presence of feared stimuli can greatly affect perceptions of self-efficacy, as emotional arousal is hypothesized to be an

important source of information regarding one's ability to cope. Similarly, Wolpe's (1954, 1968) theory of reciprocal inhibition states that inducing relaxation during exposure to phobic stimuli should facilitate fear extinction via counter-conditioning processes. Although relaxation (e.g., progressive muscle relaxation [PMR]) has not been found to be an essential component of exposure treatment (McNally, 2007), it is plausible to hypothesize that anxious individuals may have felt empowered by their ability to relax during the exposure, resulting in adaptive belief change (e.g., "If I am able to relax in the presence of my worst fear and nothing terrible happens, I must not be in danger after all") (Johnstone & Page, 2004), and a re-interpretation of the meaning of previous anxious symptoms (e.g., "Perhaps my anxiety does not always signal *real* danger"). In contrast, other forms of distraction may be less conducive to relaxation and mastery experiences. In fact, distractors that were used in some of the other studies reviewed above (e.g., video games, cognitive load tasks) may have exerted the opposite effect, giving rise to hyperarousal, frustration, excitement or anticipation (Rodriguez & Craske, 1993). Thus, unlike more intense distractors, calming conversation and other "mild" distractors might promote increases in self-efficacy during exposure to feared stimuli through increased relaxation, increased perceptions of control and/or belief change, which in turn, may facilitate fear reduction. Furthermore, presuming that affect and physiological arousal experienced during exposure influence fear-related cognitions and beliefs, "moderate" distractors such as the puzzle game utilized by Schmid-Leuz and co-workers (2007) may fail to exert an effect on exposure-driven fear reduction since they are less likely to promote a heightened state of anxiety *or* relaxation.

Another factor that may have contributed to differences between helpful and disruptive forms of distraction is the amount of cognitive demand placed on the individual by each type of

task. Presumably, stimulus-irrelevant conversation required less attentional resources than the distractors employed in the other studies reviewed above (e.g., cognitive load and dual-process tasks, puzzle and video games). In comparison to other forms of distraction, conversation may have allowed greater integration of corrective information during exposure, thereby promoting the disconfirmation of negative beliefs and enabling emotional processing to occur. Consistent with this interpretation, Telch et al. (2004) have suggested that "it is not distraction per se that interferes with fear reduction, but the extent to which the distractor task makes attentional resources less available for cognitive processing during exposure" (p.230). However, both Penfold and Page (1999) and Oliver and Page (2003) found that distracted exposure led to greater fear reduction than exposure alone. Given that exposure-only conditions do not require *any* additional cognitive resources, this finding appears somewhat counter-intuitive, and remains to be fully explained.

One possible explanation for this finding is that treatment is facilitated by an optimal level of attentional focus toward feared stimuli during exposure. According to this hypothesis, one would expect that excessive focus on feared stimuli might increase perceptions of threat and heighten anxiety to levels that undermine emotional processing or increase subsequent fear predictions, while too much distraction might inhibit fear reduction by diminishing cognitive resources available for emotional processing (see Antony, McCabe, Leeuw, Sano and Swinson, 2001; see also Johnstone & Page, 2004, McNally, 2007; Rodriguez & Craske, 1993). Consistent with this theory, Johnstone & Page (2004) found that only individuals who were low on initial anxiety benefited from focused exposure in their study. Therefore, it is possible that mild distractors such as stimulus-irrelevant conversation may provide an optimal amount of distraction from threatening stimuli, while helping to maintain a sufficient level of anxiety to

activate fear structures, thereby facilitating the integration of corrective information during exposure. Similarly, mild distraction during exposure might create an optimal environment for the consolidation of extinction learning (e.g., by stimulating the medial prefrontal cortex, increasing NMDA receptor activity, etc.), unlike "heavy" forms of distraction, which may inhibit these cortical processes. Of course, these hypotheses are purely speculative, and await empirical validation.

In summary, clients' anxiety-control strategies appear less likely to become counter-productive when the following four conditions are met: (i) they promote increases in self-efficacy (via relaxation, positive affect, belief change, and/or other means), (ii) they do not demand excessive attentional resources, (iii) they enable greater approach behavior and integration/consolidation of corrective information (via "disconfirmatory experiences"), and (iv) they do not promote misattributions of safety. However, further research is required to determine the validity of these postulates. Also, it remains to be established which of these conditions are necessary and/or sufficient to prevent return of fear following exposure. Importantly, these observations also highlight the fact that clients' array of anxiety-control strategies cannot be classified as helpful or disruptive solely on the basis of presentation (i.e., form). Rather, such classifications require a consideration of the individuals' intention in performing the behavior, the perceived function and consequences of the behavior, and the context in which the act is carried out (Thwaites & Freeston, 2005).

Clinical Implications

A number of practical implications follow from the evidence reviewed in this article. First of all, the extant literature does not support the notion that anxiety-control strategies are *always* detrimental to exposure therapy, or that it is necessary to completely eliminate their use

in order to achieve positive treatment outcomes. In fact, non-clinical individuals routinely employ anxiety-control strategies (e.g., distraction, superstitious acts, etc.) in a variety of circumstances and without significant negative consequences, suggesting that "normative" use of these strategies may serve an adaptive function under certain circumstances. Similarly, the *judicious* use of anxiety-control strategies during the early stages of exposure may facilitate treatment by better enabling clients to approach and/or attend to feared stimuli and to process corrective information (Rachman et al., 2008). Such techniques are commonly employed in clinical practice (e.g., when creating exposure hierarchies), and may be particularly effective if they are framed within the context of behavioural experiments (i.e., hypothesis testing), or if they are conceptualized as "stepping stones" en route to patients'/clients' mastery of feared situations.

That said, the potentially adverse effects of anxiety-control strategies on treatment effectiveness should not be ignored. Rather, the evidence clearly indicates that clients should be warned about the potential negative consequences of neutralization, and should be encouraged to promptly discontinue their use of any anxiety-control strategies *that are intended to prevent feared events*, lest they promote misattributions of safety (Salkovskis et al., 1996). Likewise, clients should be instructed to stop utilizing anxiety-control strategies that are likely to foster complete cognitive avoidance of feared stimuli, as such avoidance strategies may prevent emotional processing and/or extinction learning. Accordingly, it is essential for clinicians to conduct a detailed functional assessment of anxiety-control strategies when treating clinically anxious individuals. This crucial step helps to ensure that therapists understand their clients'/patients' intentions in performing these behaviours, as well as their explanation for why they have successfully averted feared catastrophes in the past.[1]

Future Directions

A major obstacle to further progress in this area is the current lack of operational definitions for the primary constructs of interest. For example, descriptions of "neutralization" have varied widely from "attempts to put matters right" (Rachman, 1976) to "any voluntary, effortful cognitive or behavioral act that is directed at removing, preventing, or attenuating a thought or the associated discomfort" (Freeston & Ladouceur, 1997). Similar ambiguity exists for the concepts of "safety-seeking behavior" and "distraction" (see Rodriguez & Craske, 1993, for a detailed discussion of this issue). Consequently, different studies have used different methods to examine the effects of various coping strategies, making it extremely difficult to compare findings across these investigations (Antony et al., 2001). Therefore, the first priority for researchers in this area should be to establish widely-accepted operational definitions for these constructs, in order to facilitate cross-study comparisons and to promote the generation of new and testable theories. Furthermore, it is important that definitions of these constructs do not include reference to their effects on exposure, lest they rely on circular reasoning. Instead, the operational definitions for these anxiety-control strategies should focus primarily on the form and function of these acts (Thwaites & Freeston, 2005).

In addition, future studies should place a greater emphasis on measuring the long-term effects of anxiety-neutralizing behavior. There is a grave lack of longitudinal research in this area, which is surprising, given the theorized importance of long-term maladaptive consequences associated with anxiety-control strategies. Similarly, future investigations would benefit from attempts to maximize the ecological validity of their experimental manipulations. In order to translate research findings into practical advice for clients, it will be essential to study the effects of anxiety-control strategies that are actually used by clinically anxious individuals. Lastly, the

development of standardized protocols for studying these behaviors would greatly facilitate the comparison of results across studies (Rose & McGlynn, 1997).

Once these goals have been achieved, several other questions can be tackled. For example, what are the primary mechanisms through which anxiety-neutralizing behaviors exert their disruptive effects (e.g., interference with anxious arousal and/or emotional processing, maintenance of low self-efficacy beliefs, misattributions of safety, etc.)? Likewise, what are the cognitive and neurological mechanisms involved where anxiety-control strategies *improve* the outcome of exposure treatment (e.g., increased self-efficacy, decreased harm expectancy, activation of NMDA receptors)? Is it necessary to fully activate "fear structures" during exposure (e.g., to induce anxious hyperarousal in clients) in order to modify catastrophic beliefs and achieve lasting fear reduction? (How) does the use of anxiety-neutralizing behavior affect subsequent fear predictions? Do clients' moods influence their choice of anxiety-control strategy and/or their interpretation of exposure treatment outcomes? Are anxiety-control strategies more disruptive when used to counter hypothetical fears (such as those frequently encountered in OCD and health anxiety)? Can universally adaptive coping strategies (e.g., rationalization?) be identified and taught to clients? All of these questions are ripe for investigation, and progress in each of these areas should help to bridge the gaps between theory, research and clinical practice.

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Footnotes

[1] Also, see Powers et al. (in press) for a detailed discussion of the importance of assessing clients' attributions of treatment success.