Therapist perceptions and delivery of interoceptive exposure for panic disorder

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ABSTRACT

Interoceptive exposure (IE) is widely regarded as an essential procedure in the cognitive-behavioral treatment of panic disorder (PD). However, treatment manuals differ substantially in their prescribed delivery of IE, and little research exists to inform the optimal manner of its implementation. The present study examined therapists' perceptions and delivery of IE for PD. Results revealed substantial variability in how clinicians provide IE. In contrast to the prolonged and intense manner in which exposure techniques are traditionally applied, many therapists reported delivering a low dose of IE accompanied by controlled breathing strategies. Concerns about the potential adverse effects of IE were common despite the fact that participants reported the actual occurrence of negative outcomes of IE in their own practice to be extremely infrequent. It is possible that some therapists deliver IE in a cautious manner in an attempt to minimize the perceived risks associated with this treatment.

1. Introduction

Methodologically rigorous clinical trials have demonstrated the efficacy of numerous cognitive behavioral therapy (CBT) approaches to the treatment of panic disorder (PD) with or without agoraphobia (e.g., Barlow, Gorman, Shear, & Woods, 2000; Clark et al., 1994; Gloster et al., 2011). These treatments target the fear of panic itself by providing corrective information intended to disconfirm maladaptive beliefs regarding the dangerousness of panic-related internal and external cues. In particular, direct exposure to feared arousal-related body sensations, also known as interoceptive exposure (IE), is considered an essential component of effective CBT for PD (Craske & Barlow, 2007). By engaging in sensation-induction tasks such as hyperventilation or spinning in a chair, clients with PD learn that panic-related bodily sensations such as heart palpitations and dizziness are harmless and tolerable (Antony, Lidley, Less, & Swinson, 2006; Schmidt & Trakowski, 2004). Indeed, reduction in the fear of fear appears to mediate improvement in CBT (Smits, Powers, Cho, & Telch, 2004).

Whereas most evidence-based CBT approaches for anxiety disorders such as obsessive–compulsive disorder, post-traumatic stress disorder, and specific phobias primarily emphasize exposure-based techniques (e.g., Foa et al., 1999, 2005; Ollendick et al., 2009), CBT treatments for PD often utilize a variety of therapeutic procedures. For example, Barlow and Craske's (2007) empirically supported panic control treatment includes cognitive reappraisal techniques and diaphragmatic breathing skills in addition to in vivo exposure and IE, and symptom-induction exercises are not introduced until the final stages of treatment. Clients following this approach complete a pre-specified number of IE trials (e.g., 3 min-long trials of hyperventilation), each of which is followed by the use of cognitive and controlled breathing strategies and a rest period of sufficient length to allow anxiety symptoms to subside. This method of delivering of IE differs markedly from the typical implementation of exposure therapy for other anxiety disorders in which trials are conducted in a prolonged manner without concurrent arousal-reduction strategies and continue until the client's anxiety has habituated (e.g., Abramowitz, Deacon, & Whiteside, 2010). In contrast to panic control treatment, other effective CBT treatment packages for PD minimize or omit cognitive and controlled breathing techniques and emphasize the prolonged and intense delivery of IE (e.g., Arntz, 2002; Otto et al., 2009; Telch et al., 1993).

Although a large body of research supports the overall efficacy of CBT treatment packages for PD that include IE (McHugh, Smits, & Otto, 2009), little empirical guidance exists to clarify the optimal delivery of IE. Few dismantling studies have examined CBT for PD; one exception was reported by Schmidt et al. (2000) who found that removal of controlled breathing did not detract from overall treatment outcomes. Investigations of variations in the delivery of IE itself have yielded inconsistent findings, with one study demonstrating an advantage of concurrent cognitive reappraisal (Carter,

Marin, & Murrell, 1999) and two others failing to do so (Deacon et al., 2012; Smits et al., 2008). Deacon et al. (2012) also found that the efficacy of IE was not enhanced by the addition of controlled breathing strategies. In summary, there is scientific consensus that IE is an important ingredient in effective CBT for PD (American Psychiatric Association, 2009) but existing research provides little empirical guidance to inform the manner in which IE is best delivered. As a result, there may be substantial variation among therapists in the application of this procedure, and this variation is likely influenced by factors other than research evidence.

Exposure therapy is associated with a host of negative beliefs among therapists including the perception that it is unethical, harmful, intolerable, and poses a risk management problem (Deacon et al., in press; Olatunji, Deacon, & Abramowitz, 2009). Deacon and Farrell (in press) hypothesized that negative beliefs about exposure therapy affect the manner in which therapists deliver this treatment to anxious clients. Concerns about safety and tolerability might prompt well-meaning clinicians to provide exposure in a less-than-intense manner (e.g., with concurrent use of arousal-reduction strategies) in order to minimize its perceived risks (Farrell, Deacon, Kemp, Dixon, & Sy, in press). Prolonged and intense IE may be seen by some therapists as unacceptably aversive and unsafe owing to the perceived dangers of high anxiety itself (e.g., decompensation, loss of consciousness). Relative to the use of in vivo and imaginal exposure techniques for other anxiety disorders, the implementation of IE for PD may be particularly susceptible to therapist reservations about exposure. IE is the least used exposure-based technique (Freiheit, Vye, Swan, & Cady, 2004; Hipol & Deacon, in press) and was rated as the least ethical, acceptable, and helpful form of exposure in a survey of university students and psychotherapy outpatients (Richard & Gloster, 2007).

Despite its established efficacy, exposure-based CBT for PD does not work for all clients and many individuals experience a fluctuating course of residual panic symptoms following treatment (Brown & Barlow, 1995). It is possible that variations in the implementation of this treatment are associated with differential client outcomes. In particular, the delivery of IE in a cautious manner by therapists concerned with its potential adverse effects may produce less beneficial outcomes than the confident delivery of IE in a prolonged and intense manner. As a first step in investigating this possibility it is necessary to understand how therapists deliver IE and the factors associated with their style of delivery. Accordingly, the present study examined perceptions and style of delivery of IE among therapists who use this procedure in the treatment of clients with PD. Given the inconsistency with which CBT treatment packages implement IE and the lack of clear scientific guidance for its optimal delivery, it was hypothesized that therapists would vary considerably in their style of delivering IE as well as the extent to which they endorse various risks associated with this treatment.

2. Method

2.1. Participants and procedure

Therapists with practice listings on the Anxiety Disorders Association of America's "Find a Therapist" online directory (http://www.adaa.org/netforum/findatherapist) were sent an email invitation to participate in a web-based survey on the use of IE. A total of 727 emails were sent to association members. Of these, 62 were returned due to delivery failure. A total of 117 therapists initiated the survey; 98 individuals reported using IE in the treatment of clients with PD and remained eligible to complete the survey. After removing 32 cases due to incomplete data, the final sample consisted of 66 therapists who completed all survey items. The final sample comprised 9.9% of all valid email contacts. This figure likely underestimates the true response rate as therapists who do not use IE for PD, of which there are many, may have elected not to initiate the survey.

The mean age of the sample was 47.3 years ($SD = 10.1$) and 34 participants (51.5%) were men. Ethnicity was not assessed. Therapists reported a mean of 16.1 ($SD = 9.5$) years of experience as a licensed mental health service provider. The majority of respondents ($n = 52$) were doctoral-level psychologists; additional participants reported earning a terminal master's degree ($n = 9$), MD ($n = 2$), or other degree ($n = 3$). Respondents reported having used IE to treat an average of approximately 99.2 PD clients ($SD = 150.7$; median = 50; range = 3–1000).

2.2. Measure

The Interoceptive Exposure Survey was constructed for the present study to assess therapists' perceptions and delivery of IE. Respondents began by providing demographic information. The next section contained several questions concerning the manner in which therapists deliver IE. One question assessed the use of rest periods between IE trials. Respondents were asked,

> "We are interested in the typical amount of time you allow clients to rest between consecutive trials of an IE exercise. At one extreme, therapists do not allow clients to take any break between trials and continue the exercise in a prolonged, uninterrupted manner; at the other extreme, therapists allow their clients to rest between each trial until their anxiety has decreased entirely. When conducting IE with panic disorder clients, how would you characterize the manner in which you use rest periods between trials?"

Responses were provided on a 100-point scale ranging from 0 ("Extended breaks between trials until anxiety decreases entirely") to 100 ("No rest period, consecutive uninterrupted trials"). Therapists were also asked to specify the average number of seconds they allowed clients to rest between IE trials.

An additional question assessed the manner in which therapists choose the number of IE trials to be used. Respondents were asked,

> "We are interested in how you typically structure a session of IE with your clients. On one extreme, therapists ask their clients to complete a prespecified number of trials per session (e.g., 3 one-minute trials); at the other extreme, therapists ask their clients to continue participating in an unlimited number of consecutive trials until their anxiety has habituated. When conducting IE with panic disorder clients, how would you characterize the manner in which you typically structure IE sessions?"

Responses were provided on a 100-point scale ranging from 0 ("Small, pre-specified number of trials") to 100 ("Unlimited number of trials until habituation"). A follow-up question asked therapists to specify the average number of minutes per IE session PD clients spent engaged in IE exercises (not including between-trial rest periods, controlled breathing, etc.).

The next section assessed respondents' concurrent use of cognitive reappraisal techniques and controlled breathing strategies with IE. For each strategy, participants were asked to indicate whether or not they used it, the extent to which they believed it enhances the efficacy of IE on a 0 ("Not at all") to 100 ("Extremely") scale, and to select from a list reasons for using it (if applicable), including (a) "it facilitates habituation," (b) "it facilitates cognitive change (i.e., corrects catastrophic threat appraisals)," (c) "it increases self-efficacy in tolerating the distress associated with anxiety-related body sensations," and (d) "it makes IE more acceptable and less aversive to clients."

The next section of the survey assessed therapists' concerns about negative outcomes associated with delivery of IE in a prolonged and intense manner. Respondents were asked to imagine a case in which a therapist asked a client with PD to hyperventilate for 30 consecutive minute-long trials with a 15-s rest period between trials and no concurrent use of diaphragmatic breathing or other arousal-reduction strategies. On a 100-point scale ranging from 0% ("Not at all likely") to 100% ("Extremely"), respondents were asked to rate the likelihood that the following negative outcomes would occur: (a) "the client would pass out/lose consciousness," (b) "the client's anxiety would become so high that he or she would decompensate during the session," (c) "the client would prematurely stop the exposure," (d) "the client would drop out of therapy," and (e) "following the IE exercise, the client's panic disorder symptoms would worsen."

Lastly, respondents indicated the number of PD cases from their own clinical practice for which various negative outcomes had occurred during IE, including (a) passing out/loss of consciousness, (b) vomiting, (c) heart attack, (d) stroke, (e) seizure, (f) permanent psychosis, (g) dropping out of therapy because IE exercises were too aversive, (h) being sued by the client for malpractice, and (i) death. A copy of this measure is available upon request of the first author.

3. Results

3.1. Style of delivering IE

As hypothesized, therapists varied considerably in the extent to which they permitted clients to rest for purposes of anxiety reduction between IE trials ($M = 58.3$, $SD = 22.8$, range = 0–100). A Kolmogorov–Smirnov test indicated that the distribution of scores on this variable was not significantly different from a normal distribution, $z(66) = 1.03$, $p = .24$. The average length of time therapists reported for between-trial rest was 181.3 s ($SD = 186.6$). Whereas 9 (13.6%) therapists did not permit any time for rest between trials, 14 (21.2%) therapists used rest periods of at least 5 min duration.

Therapists also varied markedly in the extent to which they delivered IE using a small, pre-specified number of trials vs. an unlimited number of trials until habituation ($M = 37.7$, $SD = 27.2$, range = 0–90). A Kolmogorov–Smirnov test revealed that the distribution of scores on this variable was not significantly different from a normal distribution, $z(66) = 1.27$, $p = .08$. The average total duration of IE exercises during therapy sessions was 17.6 min ($SD = 11.5$). Eleven therapists (16.7%) averaged 5 or fewer minutes of IE exercises per IE session; 15 therapists (22.7%) averaged 30 min or more per session.

3.2. Concurrent use of cognitive and controlled breathing strategies with IE

The vast majority of respondents ($n = 62$; 93.9%) reported concurrent use of cognitive reappraisal techniques before, during, or after IE trials. The full sample estimated that cognitive reappraisal techniques moderately enhance the efficacy of IE ($M = 47.9$, $SD = 28.8$). The percentage of therapists who endorsed various reasons for using cognitive reappraisal techniques in IE was as follows: (a) facilitates cognitive change (91.9%), increases self-efficacy (71.0%), makes IE more acceptable and less aversive (56.5%), and facilitates habituation (17.7%).

Twenty-seven participants (40.9%) reported instructing clients in controlled breathing strategies before, during, or after IE trials. The full sample estimated that controlled breathing techniques mildly enhance the efficacy of IE ($M = 24.6$, $SD = 31.4$). Endorsement of various reasons for using controlled breathing techniques in

Table 1
Perceived likelihood (percent chance) of negative outcomes resulting from prolonged and intense interoceptive exposure in the treatment of panic disorder.

Negative outcome	M	SD
The client would prematurely stop the exposure	54.9	28.0
The client would drop out of therapy	37.1	26.8
The client's anxiety would become so high that he or she would decompensate during the session	22.4	26.5
Following the IE exercise, the client's symptoms would worsen	17.9	20.6
The client would pass out/lose consciousness	17.3	24.7

IE was as follows: increases self-efficacy (70.4%), makes IE more acceptable and less aversive (70.4%), facilitates cognitive change (33.3%), and facilitates habituation (25.9%).

Compared to cognitive reappraisal techniques, controlled breathing strategies were rated as less effective in enhancing the efficacy of IE, $t(65) = 4.84$, $p < .001$, $d = .77$. Therapists who used controlled breathing strategies reported them to be moderately beneficial in enhancing the efficacy of IE ($M = 51.5$, $SD = 31.6$), whereas clinicians who did not use controlled breathing strategies described them as an unhelpful IE augmentation strategy ($M = 5.9$, $SD = 11.6$). This difference was statistically significant, $t(64) = 8.26$, $p < .001$, $d = 1.91$.

3.3. Therapist concerns about negative outcomes with IE

Table 1 presents descriptive statistics for the five negative outcomes associated with the case vignette depicting a PD client undergoing intense and prolonged hyperventilation. Participants reported that the client would be moderately likely to stop the exposure and somewhat less likely to drop out of therapy. Decompensation, symptom exacerbation, and loss of consciousness were rated as having between a 15% and 25% chance of occurrence. A total negative consequences score was calculated by summing responses to the five items described above. Scores on this index were normally distributed ($z[66] = 0.70$, $p = .71$) around a mean of 149.5 ($SD = 100.5$), indicating substantial between-subjects variability in concerns about negative consequences associated with IE.

3.4. Therapist characteristics as predictors of concerns about negative outcomes with IE

A hierarchical regression was conducted to explore therapist characteristics associated with concerns about negative outcomes related to the delivery of IE depicted in the case vignette. Predictors of the total negative consequences score were entered in three blocks. In the first block, therapist demographic characteristics were simultaneously entered, including age, sex, number of years as a licensed professional, and number of PD clients treated with IE. In the second block, three variables assessing the manner in which clinicians deliver IE were simultaneously entered, including use of between-trial rest periods, number of exposure trials, and use of controlled breathing strategies (coded as used = 1 and not used = 2). Use of cognitive reappraisal techniques was not entered as a predictor given the restricted range of this variable. In the third block, ratings of the extent to which cognitive reappraisal and controlled breathing strategies enhance the efficacy of IE were simultaneously entered. In this manner, it was possible to determine the incremental variance in concerns about negative consequences associated with IE explained by therapist demographic factors, style of IE delivery, and beliefs about the efficacy of cognitive reappraisal and controlled breathing techniques as IE augmentation strategies.

Table 2
Therapist characteristics as predictors of perceived likelihood of negative outcomes resulting from prolonged and intense interoceptive exposure in the treatment of panic disorder.

Measure and Step	ΔR^2	B	SE B	β	t
Step 1: Therapist demographics	.07				
Age		3.92	2.57	.39	1.53
Gender		−15.20	26.46	−.08	−.57
Years of experience		−1.94	2.80	−.18	−.69
# PD clients seen using IE		−.07	.09	−.11	−.86
Step 2: Manner of IE delivery	.13*				
Use of rest periods		1.00	.54	.23	1.86
Number of trials		−.11	.45	−.03	−.24
Use of CB strategies		−61.40	25.18	−.30	−2.44*
Step 3: Beliefs about augmentation strategies	.10*				
CR enhances IE efficacy		.72	.43	.21	1.67
CB enhances IE efficacy		1.10	.53	.34	2.06*

Note: IE, interoceptive exposure; PD, panic disorder; CB, controlled breathing; CR, cognitive restructuring.
* $p < .05$.

Table 3
Actual occurrence of negative outcomes resulting from interoceptive exposure in participants' treatment of clients with panic disorder.

Negative outcome	Number of occurrences	Base rate (%)
The client found IE too aversive and dropped out of therapy	89	1.4
The client vomited during IE	7	0.1
The client passed out/lost consciousness during IE	2	0.03
The client had a seizure during IE	2	0.03
The client had a heart attack during IE	0	0
The client had a stroke during IE	0	0
The client became permanently psychotic during IE	0	0
The client sued you for malpractice	0	0
The client died during IE	0	0

Table 2 presents results of the hierarchical linear regression analysis. Therapist demographic characteristics entered in the first step explained a non-significant portion of the variance in negative consequences composite scores, $F(4, 61) = 1.18$, $p = .33$. The addition of variables assessing style of IE delivery in the second step explained significant variance in negative consequence ratings, $F(3, 58) = 3.10$, $p = .03$. Use of controlled breathing strategies was a significant, unique predictor of concerns about negative outcomes, $\beta = −.30$, $p = .02$. Lastly, in the third step variables assessing beliefs about the power of cognitive reappraisal and controlled breathing in enhancing the efficacy of IE explained significant, additional variance in negative concerns composite scores, $F(2, 56) = 4.13$, $p = .02$. In the final step, only beliefs about the efficacy of controlled breathing strategies in enhancing the efficacy of IE was a significant, unique predictor of the outcome measure, $\beta = .34$, $p = .04$. The overall regression explained 30.3% of the variance in total negative consequences scores.

3.5. Actual occurrence of negative outcomes with IE

Participants reported using IE with an approximate total of 6545 clients with PD. Therapists indicated the number of cases from their clinical practice in which clients had experienced a variety of negative outcomes during IE. Negative outcomes were estimated to have occurred in 100 cases (1.5% of all cases). The total number of occurrences of each negative outcome was divided by the total number of clients seen in order to calculate the risk of each negative outcome associated with IE. Table 3 presents these findings. The most commonly reported negative outcome was client attrition due to the aversiveness of IE (frequency = 1.4%). All other outcomes had a base rate of <0.1%. Therapists did not report any instances in which clients had a heart attack, stroke, became psychotic, sued the therapist, or died during IE.

One or more negative outcomes during IE were reported by 35 (53.0%) participants. We explored the association between the occurrence of negative outcomes and therapists' style of IE delivery, including use of between-trial rest periods, length of rest periods, number of IE trials, duration of IE exercises, and use of controlled breathing strategies. Only one significant association emerged: participants who reported one or more negative outcomes were more likely than those who did not to permit clients to rest for purposes of anxiety reduction between IE trials, $t(64) = 2.01$, $p = .05$, $d = .49$. Notably, total negative consequences scores for the case vignette did not differ significantly between participants who reported one

or more negative outcomes ($M = 164.57$, $SD = 105.62$) and those who did not ($M = 132.58$, $SD = 93.09$), $t(64) = 1.30$, $p = .20$, $d = 32$.

4. Discussion

This study examined IE implementation style and concerns about IE's adverse effects in a sample of practicing clinicians recruited from the Anxiety Disorders Association of America. As hypothesized, therapists varied substantially in their delivery of this procedure. Numerous practitioners employed lengthy rest periods between IE trials whereas others delivered consecutive IE trials in an uninterrupted manner. Some therapists delivered a brief dose of IE via a small, pre-specified number of trials whereas others provided IE exercises for 30 min or more per session using habituation of anxiety as the discontinuation criterion. A bimodal distribution was evident in the use of controlled breathing in the context of IE. Approximately 40% of therapists reported using controlled breathing strategies concurrently with IE and described them as moderately useful in improving self-efficacy, the acceptability and tolerability of IE, and the overall efficacy of this treatment. Conversely, approximately 60% of therapists did not use controlled breathing strategies and reported them to have virtually no beneficial effect on the efficacy of IE. The marked variability observed in therapists' delivery of IE in this study mirrors the inconsistent manner in which CBT treatment packages for PD have prescribed the delivery of this technique.

The present findings indicate that many therapists emphasize the delivery of IE in a manner that differs markedly from the typical implementation of exposure tasks in exposure-based CBT protocols for other anxiety disorders (e.g., Antony & Swinson, 2000; Foa & Rothbaum, 1998; Kozak & Foa, 1997). No direct empirical evidence exists to support the use of controlled breathing strategies in CBT for PD. A dismantling study demonstrated that controlled breathing did not contribute to the efficacy of CBT for PD (Schmidt et al., 2000). An additional component analysis found that controlled breathing did not enhance the efficacy of IE, increase self-efficacy, or improve treatment acceptability or tolerability (Deacon et al., 2012). If research does not support the use of controlled breathing strategies in the context of IE, why do many clinicians use them and endorse their beneficial effects? In the absence of evidence supporting the utility of moderating the dose of exposure therapy provided to clients with PD, why is IE often delivered in a unique manner characterized by a small, pre-specified number of exposure trials and lengthy between-trial rest periods?

It is likely that many therapists' delivery of IE is influenced by the popularity of Barlow and Craske's (2007) empirically supported panic control treatment protocol which prescribes the low-dose delivery of IE with concurrent use of controlled breathing skills. In

the absence of evidence on the relative efficacy of intensive versus low-dose IE for PD (cf. Deacon et al., under review), practitioners' delivery of this therapy may simply reflect preference for a particular treatment protocol. Alternatively, concerns about adverse effects associated with IE may help explain why this treatment is often delivered in a cautious manner. As hypothesized, therapists in the present study varied considerably in the perceived likelihood of negative outcomes caused by IE. Practitioners reported that prolonged and intense hyperventilation, as described in a case vignette, risked causing treatment refusal, attrition, decompensation, symptom exacerbation, and a loss of consciousness. Each of these outcomes was rated as having a >15% chance of occurrence. Notably, therapists who used controlled breathing strategies and believed them to be effective in enhancing the efficacy of IE were especially likely to report negative outcomes as likely. The present findings suggest that IE is perceived as a risky treatment, even among experienced therapists who reported having provided it to an average of approximately 100 clients with PD. Further, therapists who emphasize the concurrent use of controlled breathing strategies appear particularly concerned about the safety and tolerability of IE.

In contrast to the relatively high perceived likelihood of adverse effects in the IE case vignette, the base rate of actual negative outcomes reported by the sample was extremely low. Practitioners indicated that only 1.4% of their clients with PD dropped out of therapy due to the aversiveness of IE. The frequency of other adverse effects ranged from negligible (e.g., vomiting, loss of consciousness) to non-existent (e.g., heart attack, psychosis, litigation). These figures should be viewed as approximations as they are the product of retrospective recall and are subject to memory inaccuracy. Nevertheless, the present study complements the existing literature on exposure-based CBT protocols for PD (e.g., Barlow et al., 2000) in demonstrating that this treatment approach is not associated with uniquely high rates of attrition, symptom exacerbation, or catastrophic medical outcomes. The safety and tolerability of IE has also been demonstrated in CBT protocols that emphasize delivery of this procedure in a prolonged and intense manner similar to that described in the case vignette (e.g., Deacon et al., 2012, under review; Otto et al., 2009). Lastly, clients who participate in CBT for PD rate IE as highly useful despite lower ratings for likeability (Cox, Fergus, & Swinson, 1994). Taken together, these observations might be expected to reassure practitioners that IE is acceptably safe and tolerable. However, the present study found a striking disconnect between therapists' relatively high endorsement of concerns about negative outcomes in the case vignette and the exceptionally low base rate of actual adverse effects from their own clinical practice. Why might clinicians who deliver IE express concern about negative outcomes that rarely if ever occur in their own clients?

Results of this study are consistent with the hypothesis that negative beliefs about the harmful effects of exposure cause therapists to deliver this treatment in a cautious manner (Deacon & Farrell, in press). Clinicians concerned with the risk of physical or mental catastrophes caused by IE might attempt to reduce the intensity of their clients' anxiety symptoms by providing a small number of brief exposure trials separated by lengthy rest periods. Controlled breathing strategies might be employed in an effort to increase clients' ability to tolerate a procedure perceived as highly aversive (Farrell et al., in press). From this perspective, the delivery of IE in a cautious manner in order to minimize the probability of negative outcomes constitutes a *therapist safety behavior*. Cognitive-behavioral theorists (Clark, 1999; Salkovskis, 1991) have suggested that safety behaviors play an important role in explaining why inaccurate threat beliefs do not self-correct in the face of repeated disconfirmatory evidence. One possible mechanism for this effect is that the non-occurrence of negative outcomes may be misattributed to the use of safety behaviors. In the context of CBT

for PD, therapists who deliver IE in a cautious manner are likely to discover that their clients do not lose consciousness, decompensate, or drop out of treatment. Although the base rate of adverse effects in the present sample suggests that these consequences are extremely unlikely, therapists concerned with the dangers of IE may erroneously conclude that their judicious delivery style was responsible for the non-occurrence of these negative outcomes. In this manner, concerns about the harmful consequences of delivering IE in a prolonged and intense manner may be maintained or even reinforced.

Findings from this study should be considered in the context of several limitations. The response rate was relatively low and study participants may not be representative of the general population of therapists who provide IE. Given that IE appears to be the least-used exposure-based anxiety treatment technique (Freiheit, Vye, Swan, & Cady, 2004; Hipol & Deacon, in press), the population of IE providers might be relatively small itself. We cannot rule out the possibility of a self-selection bias in which therapists who had experienced adverse effects with IE were less likely to participate in this study. Our use of a cross-sectional design cannot establish causal relationships between therapist perceptions and delivery of IE. The Interoceptive Exposure Survey has unknown psychometric properties and does not directly measure actual therapist behavior. Analyses of individual items from this measure were based on the questionable assumption of their construct validity. Lastly, the present study focused exclusively on IE for PD did not examine perceptions and delivery of IE in the treatment of other disorders for which it is sometimes used such as hypochondriasis (Abramowitz & Braddock, 2011), post-traumatic stress disorder (Wald & Taylor, 2007), social phobia (Antony & Swinson, 2008), irritable bowel syndrome (Craske et al., 2011), and substance use disorders (Otto, Powers, & Fischmann, 2005).

In summary, the present study demonstrated that therapists vary markedly in their style of delivering IE. This variability parallels the inconsistent manner in which CBT manuals for PD (e.g., Barlow & Craske, 2007; Otto et al., 2009) prescribe the implementation of IE. Unlike the delivery of exposure tasks in empirically supported exposure-based CBT protocols such as exposure and response prevention for obsessive–compulsive disorder (Kozak & Foa, 1997) and prolonged exposure for post-traumatic stress disorder (Foa & Rothbaum, 1998), IE for PD is often provided in a less-than-intense manner characterized by a small number of brief exposure trials, lengthy rest periods between trials, and concurrent use of controlled breathing strategies. The notable level of concern about the possible adverse effects of prolonged and intense delivery of IE in this sample of experienced IE practitioners suggests that this treatment may be provided with extra caution in order to minimize its perceived risks. If the cautious delivery of IE by therapists concerned with its adverse effects is not associated with worse outcomes in clients with PD, findings from this study may ultimately prove to be of little consequence. Conversely, if the confident implementation of IE in a prolonged and intense manner produces better outcomes, efforts to disseminate this treatment may benefit from prescribing the delivery of IE for PD in a less cautious manner and targeting inaccurate therapist concerns about the perceived dangers of this exposure-based approach. Research from our group has found that (a) therapist reservations about exposure can be measured in a reliable and valid manner with the Therapist Beliefs about Exposure Scale (Deacon et al., in press), (b) therapist reservations about exposure therapy cause its cautious delivery (Farrell et al., in press) and (c) prolonged and intensive IE is more effective than low-dose IE in reducing anxiety sensitivity (Deacon et al., under review). Future research should address the relationship between therapist reservations about IE, delivery style, and client outcomes.

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