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Interrelating Behavioral Measures of Distress Tolerance with Self-Reported Experiential Avoidance

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Abstract

Experiential avoidance and distress intolerance play a central role in novel behavior therapies, yet they appear to overlap considerably the REBT concept of low frustration tolerance. Using baseline data from 100 adult cigarette smokers enrolled in a clinical trial of smoking cessation therapies, the present study evaluated the convergent validity of common questionnaire measures of experiential avoidance (Acceptance and Action Questionnaire; AAQ; Hayes et al. 2004, and Avoidance and Inflexibility Scale; AIS; Gifford et al. 2004) and behavioral measures of distress tolerance (computerized Mirror Tracing Persistence Task; MTPT-C; Strong et al. 2003; computerized Paced Auditory Serial Addition Task; PASAT-C; Lejuez et al. 2003). The distress tolerance measures correlated significantly ($r = .29$) with one another. However, the questionnaire measures of experiential avoidance did not correlate with each other, nor with the behavioral measures. Further research is needed on the validity of measuring experiential avoidance by self-report and of the overlap versus distinctiveness of seemingly similar constructs such as experiential avoidance, distress tolerance, and frustration tolerance.

Keywords

Experiential avoidance; Acceptance; Distress tolerance; Assessment; Cigarette smokers

Introduction

The concept of low frustration tolerance (LFT) has long been implicated in Rational Emotive Behavior Therapy (REBT) as a vulnerability factor for psychological distress and dysfunction. In a recent conceptual and empirical review Rodman et al. (2009), argued that LFT is closely related to distress intolerance and experiential avoidance, variables not generally linked with REBT but rather with Mindfulness-based Cognitive Therapy (e.g., Segal et al. 2002), Acceptance and Commitment Therapy (e.g., Hayes et al. 1999), and other so-called “third wave” behavior therapies (Hayes 2004). Rodman et al. (2009) reviewed research on distress intolerance and experiential avoidance and concluded that incorporation of measures of these variables could greatly benefit REBT research and practice.

Experiential avoidance has been defined as a person’s unwillingness “to remain in contact with particular private experiences” in conjunction with his or her desire to alter these experiences to prevent having aversive thoughts or feelings (Hayes et al. 2004, p. 554). Experiential avoidance has been implicated in an array of clinical pathology (Hayes et al.

1996). Distress intolerance has been defined as the inability to continue pursuing a goal as a result of the associated perceived physical and/or psychological discomfort (Brown et al. 2005). It has been shown to predict poor addiction treatment outcome (e.g., Brandon et al. 2003).

This promising research notwithstanding, more research is needed on the construct validity of measures of these variables. Experiential avoidance has typically been measured via domain-general self-report questionnaires such as the Acceptance and Action Questionnaire (AAQ; Hayes et al. 2004). As with irrational beliefs in REBT (Ellis 2003), exclusive reliance on general questionnaire measures may be problematic in at least two ways. First, it is unclear whether experiential avoidance generalizes across situations and across types of aversive private experience. Does the person who refuses to remain in contact with feelings of anger also show unwillingness to accept sadness? Clearly, the list of possible private experiences people might wish to avoid is long, and no one study is likely to resolve this issue. To take an initial step in this regard this study examined the association of the AAQ with a measure (Avoidance and Inflexibility Scale (AIS); Gifford et al. 2004) of experiential avoidance tightly focused on a specific type of aversive private experience, the thoughts, feelings, and sensations that prompt smokers to smoke a cigarette.

A second concern about self-report questionnaire measures is whether people are able and willing to report validly the characteristic being measured. One way to address this concern is to evaluate the convergent validity of questionnaires with objective behavioral measures. If people state that they are typically willing to accept and experience distress, would behavioral observations indeed show that they persist a long time in the face of emotional or physical discomfort? Distress tolerance has commonly been indexed via behavioral assessments associated with laboratory tasks such as the Paced Auditory Serial Addition Task (PASAT-C; Lejuez et al. 2003) and the Mirror Tracing Performance Task (MTPT; Brandon et al. 2003). Performance on these tasks has proven useful in predicting treatment outcomes, especially in the context of addiction. For instance, residents of a substance abuse treatment program who persisted longer on the behavioral tasks assessing distress tolerance subsequently sustained abstinence longer than did those who persisted less on these laboratory tasks (Daughters et al. 2005).

There has not been much research on whether self-rated experiential avoidance correlates with behaviorally assessed distress intolerance. In one recent examination of this issue, Feldner et al. (2006) administered the AAQ to 70 nonclinical participants prior to completing a cold pressor task. As levels of experiential avoidance increased on the AAQ, pain tolerance decreased. Although these results are encouraging with respect to convergence between self report and behavior, they are limited in a couple of ways. First, the study relied on a nonclinical sample, and it is unclear whether results would generalize to a clinical sample. Also, the study addressed physical distress tolerance but not the ability to tolerate psychological distress. Accordingly, in the research reported in this article, we related self-reported experiential avoidance to two behavioral measures of tolerance of psychological distress.

In sum, our research tested the association of self-reported experiential avoidance in general with a situation-specific self-report measure of experiential avoidance and with two behavioral measures of distress intolerance. The study was conducted using baseline data from a randomized trial of group treatments for cigarette smoking cessation.

Method

Participants

For a smoking cessation group treatment trial, cigarette smokers were recruited from Washington DC, Maryland, and northern Virginia through newspaper advertisements, community fliers, public service announcements, advocacy organizations (e.g., American Lung Association), online postings (e.g. www.craigslist.org), and community and university health centers and hospitals. Inclusion criteria were (a) age at least 18 years, (b) regular daily smoker [at least one cigarette per day for past 4 weeks], and (c) desire to quit smoking. Prospective participants were excluded if they were actively suicidal or were not fluent in English.

The current study used baseline data from the 100 participants (49 male, 51 female) who enrolled in the clinical trial and were randomized to a treatment condition. Randomization did not occur until after baseline data collection; therefore, treatment condition could not have influenced the results. Participants ranged in age from 20 to 68 years ($M = 42.85$, $SD = 12.80$) and reported 9–21 years of education ($M = 15.84$, $SD = 2.46$). A majority of participants were Caucasian (65%), whereas about one-quarter were African American (29%), with the remaining participants being Asian American (2%) or other races (3%). About one-tenth of the participants (9%) were of Hispanic ethnicity. Pretreatment daily smoking rates varied widely, from 4 to 60 cigarettes, with an average just under a pack a day ($M = 17.76$, $SD = 8.34$).

Measures

Sample demographics and baseline smoking rate were assessed using brief, face valid questionnaires.

Experiential Avoidance—Experiential avoidance was measured using self-report questionnaires:

Acceptance and Action Questionnaire—There have been two distinct versions of the Acceptance and Action Questionnaire (AAQ: Hayes et al. 2004) used in previous published research, a 16 item version (Bond and Bunce 2003), and a 9 item version (Hayes et al. 2004). We administered a 19 item AAQ that permits scoring either version. That is, it contains 3 items unique to the 9 item AAQ, 6 overlapping items scored on both versions, and 10 items unique to the 16 item AAQ. To maximize comparability with previous research, we report results for both the 9 item version (henceforth “AAQ-9”) and 16-item version (“AAQ-16”). Participants rate each item on a scale of 1 (never true) to 7 (always true) as applied to themselves. High scores represent greater acceptance and willingness, whereas low scores reflect experiential avoidance. Concurrent validity studies of the AAQ have yielded favorable results, in that acceptance is associated with lower fear of emotions, better job performance, better general mental health, and lower likelihood of being diagnosed with depression or an anxiety disorder (for review, see Bond and Bunce 2003).

Confirmatory factor analysis (Bond and Bunce 2003) supported a two factor model for the AAQ: Action (one’s ability to pursue goals despite negative feelings; a sample [reverse-scored] item is “Worries can get in the way of my success”) and Willingness (acceptance of the experience of aversive feelings; a sample item is “It’s OK to feel depressed or anxious”). The two factors are highly intercorrelated, however ($r = .71$; Bond and Bunce 2003), and our predictions for each would be the same, so we elected to use total scores in all analyses. Total scores can range from 16 to 112 for the AAQ-16 and from 9 to 63 for the AAQ-9.

Avoidance and Inflexibility Scale—The second questionnaire measure of experiential avoidance was specifically focused on private experiences relevant to the temptation to smoke cigarettes. The Avoidance and Inflexibility Scale (AIS; Gifford et al. 2004) is a 13-item questionnaire, developed for use as a process measure in a study of Acceptance and Commitment Therapy for smoking cessation. Internal consistency reliability is high, and as predicted, AIS scores mediated the effects of ACT on smoking cessation outcomes (Gifford et al. 2004). AIS items are rated on a 1–5 scale. A sample item is “Sometimes people have thoughts that encourage them to smoke. For example, ‘I need a cigarette!’ or ‘I wish I could have a cigarette now!’ How much are you struggling to control these thoughts?” [response options ranging from “not at all” to “very much”]. We used the total AIS score (possible range 13–65 with higher scores reflecting greater avoidance) in all analyses.

Distress Tolerance—Distress tolerance was measured using two computerized behavioral tasks:

Paced Auditory Serial Addition Task—The Paced Auditory Serial Addition Task (PASAT-C; Lejuez et al. 2003) is a behavioral measure of persistence, in which the participant performs serial addition of numbers presented one at a time on a computer monitor. Participants are asked to add the most recent number presented to the previous one and to use the computer mouse to click on the correct answer from the numbers shown on the bottom of the screen. After clicking on the sum, the participant is asked to ignore the sum and to continue adding the number that is shown by the computer to the next number presented. A point is awarded for every correct answer, and an aversive “explosion” sound effect is played in response to every incorrect answer. The task includes three rounds of increasing difficulty (i.e., the latencies between numbers presented decreased and the length of the round increased). Unlike rounds 1–2, the participant was given the option to “quit” the task at any time during level 3 (the most difficult round). Similar to previous research using this task, a modest monetary incentive was offered at the beginning of the task (two dollars for each round in which the participant obtained a score of 30 or higher). Participants were told to try their best on each round since their score would determine if they earned this monetary incentive although the specific score they needed to attain (30) was not divulged prior to the start of the task. The time (in seconds) it took for the participant to quit the task in round 3 was the behavioral index of persistence (or distress tolerance) as a continuous measure. The maximum score possible is 420 (seconds), as the third round ends after 7 min. Participants are not told of this time limit in advance. We also used the PASAT-C in some analyses as a dichotomous measure (completed the entire 420 s versus quit early). PASAT-C scores have been related to borderline personality disorder diagnosis (Gratz et al. 2006) and to the length of time smokers (Brown et al. 2002), illicit drug abusers (Daughters et al. 2005), or gamblers (Daughters et al. 2005) had remained abstinent during prior quit attempts.

Negative Affect Reactivity to the PASAT-C—To determine whether the PASAT-C indeed induced distress, negative affect was measured both prior to and during (after round two of three rounds) the PASAT-C using the negative affect scale of the state version of the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988). This scale included 10 adjectives (upset, distressed, afraid, nervous, jittery, hostile, irritable, guilty, ashamed, scared) rated on a 1 (not at all) to 5 (extremely) Likert scale, which were summed to derive a state negative affect indicator.

Mirror Tracing Persistence Task—The second behavioral assessment, the computerized Mirror Tracing Persistence Task (MTPT-C; Strong et al. 2003) likewise evaluates tolerance of distress. Instead of summing numbers, participants were asked to

trace three figures presented on the computer screen in sequential order using the computer mouse. The participants were told that the cursor on the screen moves in the opposite direction of the mouse. For example, to move the cursor up, the participant must move the mouse down. If the participant moved the mouse too slow, stopped moving the mouse, or moved the mouse off of the figure presented, a loud buzzer sounded and the cursor brought the participant back to the beginning of the figure to start over. The program moved onto the next figure once the participant correctly traced it or after 60 s had passed without a successful tracing. The figures became progressively more difficult over the course of the three rounds. Similar to the PASAT-C, the participant had the option to quit on the third figure (unlike the first two) by hitting any button on the keyboard, and the time (in seconds) it took for the participant to quit the task in round 3 was the behavioral index of persistence (or distress tolerance) as a continuous measure. Unlike the PASAT-C, there was no time limit for round 3, so the participants had the opportunity to persist as long as possible on this task. As with the PASAT-C, a modest monetary incentive was offered at the beginning of the MTPT-C (two dollars for each figure completion in under 10 s in rounds 1–2 and two dollars for round 3 if they persisted for 420 s or longer). The participants were told to try their best on each round since their performance would determine if they earned the monetary incentive although the specific criteria were not divulged prior to the start of the task.

Scores on the MTPT-C were significantly lower in a substance abuse treatment sample among those with diagnoses of borderline personality disorder (Bornovalova et al. 2006). Scores on an earlier version of this task showed significantly better performance by nonsmokers than smokers (Quinn et al. 1996), and in a longitudinal study a positive correlation between task persistence and subsequent success in maintaining abstinence from smoking (Brandon et al. 2003).

Mood Reactivity to MTPT-C—To determine whether the MTPT-C induced distress, dysphoria was measured, both prior to and after the MTPT-C, using a four-item self-report scale. Irritability, frustration, anxiety, and difficulty concentrating were each rated on a 100-point Likert scale (0 = none; 100 = extreme). Because anxiety, frustration, difficulty concentrating, and irritability are believed to be indicators of psychological distress and have been shown to be highly intercorrelated (Brown et al. 2002), these variables were summed to create the dysphoria measure.

Procedure

Prospective participants were screened by telephone to determine potential eligibility. If callers appeared to be eligible for the treatment trial, they were scheduled for an individual pre-treatment assessment. At the beginning of the pre-treatment assessment, a trained masters or doctoral student completed written informed consent with the participant. Participants completed the experiential avoidance questionnaires as well as others not relevant to this report. Then the assessor provided standardized instructions for the first computer task (PASAT-C). If the participant was unfamiliar with the use of a computer and a mouse, the assessor reviewed the use of both until the participant felt comfortable beginning the tasks. When the PASAT-C was completed, the assessor gave standardized instructions for the MTPT-C. During the computerized tasks, the assessor checked to make sure the participant was continuing the tasks as instructed, but otherwise offered no feedback, coaching, or encouragement.

Results

Mood Effects of Distress Tolerance Tasks

The logic of considering persistence on the MTPT-C and the PASAT-C to reflect distress tolerance requires that the tasks actually induce distress in participants. To evaluate this assumption, we conducted dependent *t*-tests of two mood ratings associated with each task. Prior to the MTPT-C, dysphoria scores averaged 86.71 ($SD = 89.19$), whereas after the MTPT-C was completed, dysphoria had significantly increased ($M = 119.54$, $SD = 104.23$), $t(98) = 5.71$, $p < .001$ (all inferential statistical tests reported in this article were two-tailed), effect size $r = .50$ (Rosnow and Rosenthal 2002). Similarly, state negative affect sums increased from before the PASAT-C ($M = 13.65$, $SD = 4.56$) to after completing two rounds of it ($M = 15.45$, $SD = 5.64$), $t(99) = 3.69$, $p < .001$, effect size $r = .35$.

Experiential Avoidance and Distress Tolerance

Descriptive statistics for the experiential avoidance and distress tolerance variables appear in Table 1. AIS scores in our sample ($M = 48.47$, $SD = 8.04$) were about one-half standard deviation higher than in a recent study of highly nicotine dependent smokers ($M = 42.89$, $SD = 10.62$; Murray 2007), suggesting elevated levels of avoidance among our participants.

Intercorrelations of the measures appear in Table 2. All correlations are in the expected direction (negative correlations were expected for each measure with the AIS, as it is keyed in the direction of higher scores reflecting greater avoidance, whereas on the other measures higher scores indicate greater acceptance or distress tolerance). As might be expected, the two overlapping versions of the AAQ were highly positively correlated with one another ($r = .88$, $p < .001$), and each version showed essentially the same relations with other measures.

The two behavioral measures of distress tolerance (PASAT-C, MTPT-C) correlated significantly positively with one another, with a medium effect size ($r = .29$, $p < .01$). However, the associations between experiential avoidance questionnaires (AIS, AAQ), and between questionnaires and behavioral task performance were nonsignificant.

The distribution of scores on the PASAT-C was truncated by a ceiling effect in that 45% (PASAT-C) of participants achieved maximal scores by persisting throughout the task. We therefore supplemented correlational analysis with group comparisons on experiential avoidance, the groups being defined by whether or not participants completed the PASAT-C. PASAT-C completers ($n = 45$, $M = 37.89$, $SD = 6.55$) did not differ significantly from non-completers ($n = 54$, $M = 36.72$, $SD = 6.51$) on the AAQ-9, $t(97) = 0.88$, $p > .3$ or the AAQ 16 (completers $M = 71.38$, $SD = 9.65$ versus non-completers $M = 69.30$, $SD = 9.21$), $t(97) = 1.10$, $p > .2$. Likewise, PASAT-C completers ($M = 48.09$, $SD = 9.11$) did not differ significantly from non-completers ($M = 48.80$, $SD = 7.09$) on the AIS, $t(97) = 0.43$, $p > .6$.

Discussion

Experiential avoidance plays a crucial role in the conceptualization of psychopathology and psychotherapeutic improvement underlying Acceptance and Commitment Therapy (ACT; Hayes et al. 1999). Low experiential avoidance should in principle be closely related to the ability and willingness to tolerate distress and persist on valued behavioral tasks. Each of these constructs, in turn, is quite compatible with the REBT emphasis on frustration tolerance as a mentally healthy attribute. Patients who become able to stand setbacks, difficulties, and distress while continuing to pursue their fundamental goals would be seen as having achieved a very favorable outcome in REBT. Therefore, as noted by Rodman et

al. (2009), the burgeoning research on experiential avoidance and distress tolerance is relevant to research and practice in REBT.

Research in this vein will progress more rapidly if the measurement methods utilized are high in construct validity. An obstacle to research progress on the REBT concept of irrational beliefs has been the uncertain construct validity of belief measures (for a review, see Terjesen et al. 2009). Accordingly, we tested the convergent validity of two versions (9 and 16-item, respectively) of a self-report experiential avoidance measure, the Acceptance and Action Questionnaire (AAQ; Hayes et al. 2004), in relation to a more situationally specific (to temptation to smoke cigarettes) experiential avoidance measure, the Avoidance and Inflexibility Scale (AIS; Gifford et al. 2004) as well as two behavioral measures of distress tolerance. AAQ results were quite similar across the two versions of the test, but the AAQ was not significantly correlated with any of the other three measures, nor was the AIS questionnaire with the behavioral measures.

On the face of it, our results reflect unfavorably on the construct validity of the AAQ, but several qualifiers need to be considered. First, our sample consisted of adult cigarette smokers interested in quitting smoking. It would be useful to replicate this study in non-clinical and other types of clinical samples before drawing definitive conclusions about the measures. Second, the lack of association with the AIS may not reflect lack of validity per se, but rather actual situation specificity of experiential avoidance. The AAQ may provide a useful general measure of the avoidance of aversive private experiences, but there may still be a considerable extent of specificity, such that avoidance of physical pain, for example, may not correlate highly with avoidance of sadness and disappointment, or with unwillingness to tolerate cigarette craving without smoking. Hayes et al. (2004), in presenting the initial validation research on the AAQ, acknowledged this very issue in cautioning therapy researchers against assuming that the scale would necessarily be the ideal process measure for studies of ACT in the treatment of a specific condition. Whether a general measure or a more specific avoidance measure is preferable will likely depend on the research or clinical purpose of the assessment.

Relatedly, the REBT concept of low frustration tolerance might also for some purposes be best assessed with more specific measures. Dryden (1999) addressed this issue in developing a proposed taxonomy of “non-ego disturbance” including among others categories of emotion intolerance, pain intolerance, and inaction intolerance (need to take action, even if impulsively). More recently Harrington (2007), elaborated a testable multidimensional model of frustration intolerance that could serve as a guide for future REBT research on both general and specific aspects of this concept.

Perhaps more troubling than the lack of convergence between a general and a specific questionnaire measure of experiential avoidance is the lack of association between either questionnaire measure and the behavioral measures of distress tolerance. These null correlations cannot be accounted for by ceiling effects on distress tolerance, as group comparisons on experiential avoidance questionnaire scores between PASAT-C completers and non-completers were also nonsignificant.

Results might have been more impressive if behavioral persistence and distress tolerance had been tested on more than one occasion. One of the clearest lessons gleaned from the person—situation debate in personality psychology was the desirability of aggregating behavioral assessments across multiple occasions to bolster reliability (Epstein 1979; Kenrick and Funder 1988).

Nevertheless, even the single-occasion distress tolerance measures (MTPT-C, PASAT-C) cannot be dismissed altogether. Participants showed significant shifts in the direction of

increased distress on each task, bolstering the interpretation of persistence on them as reflecting distress tolerance. Also, performance on the two tasks showed significant convergent validity in this study. Finally, each behavioral measure has related to important external criteria in previous research. Therefore, the lack of association between experiential avoidance questionnaires and behavioral indices of distress tolerance shown in our study needs to be taken seriously.

Further research will be needed to determine whether these results are replicable and whether they are better interpreted as indicative of weak measurement validity or of subtle distinctions between the constructs of experiential avoidance and distress tolerance. Results of such research will carry important implications for use of these measures in research and clinical practice.

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Table 1

Descriptive statistics

Measure	Minimum	Maximum	Mean	SD
1. AIS	21	65	48.47	8.04
2. AAQ-9	25	51	37.25	6.52
3. AAQ-16	52	99	70.24	9.42
3. MTPT-C	0.08	934.97	207.09	19.88
4. PASAT-C	2.00	420.00	250.74	178.32

N = 99 except for PASAT-C (*N* = 100) due to missing data. AIS = Avoidance and Inflexibility Scale, AAQ = Acceptance and Action Questionnaire (9 and 16 item versions), MTPT-C = computerized Mirror Tracing Persistence Task (seconds of persistence on third round, with no time limit), PASAT-C = computerized Paced Auditory Serial Addition Task (seconds of persistence on third round, up to 420 s)

Table 2
Intercorrelations among experiential avoidance and distress tolerance measures

	1	2	3	4	5
1. AIS					
2. AAQ 9	-.06				
3. AAQ 16	-.09	.88***			
4. MTPT-C	-.07	.11	.08		
5. PASAT-C	-.06	.16	.12	.29**	

N = 99 [98 for correlations of MTPT-C with questionnaires].
** $p < .01$,
*** $p < .001$