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Empirical Research

Measuring the effect of cognitive defusion using the Implicit Relational Assessment Procedure: An experimental analysis with a highly socially anxious sample

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ABSTRACT

The current study tested the validity of the Implicit Relational Assessment Procedure (IRAP) as a tool for clinical assessment. Twenty-four students with high social anxiety were randomly assigned to either cognitive defusion or control conditions. Participants completed a self-report measure of the believability of anxiety-related thoughts and the Anxiety IRAP before and after the interventions. Significant decreases in response latency on the IRAP for both consistent and inconsistent trials were found only in participants in the cognitive defusion condition. We suggest that narrow and inflexible responding (i.e., fusion) interferes with behavioral fluency in both consistent and inconsistent blocks of the implicit measure, and thus a defusion intervention reduced response latencies in both types of blocks. In the control condition, however, we found a reduction in response latencies only for the inconsistent blocks, due to practice that occurred in the absence of a floor effect. The self-report believability measure, which produced effects for both the defusion and control conditions, showed a larger effect size for the control condition. Our results suggest that future studies that seek to analyze the impact of defusion interventions, and the psychological processes involved, employ a range of measures such as the IRAP, with a particular focus on separating out the effects of the therapeutic intervention from possible practice effects.

1. Introduction

Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) is one of the most representative and empirically supported therapies of the so-called contextual therapies (Hayes, 2004; Ruiz, 2010). Cognitive defusion strategies are one set of techniques used in ACT, and recent experimental evidence supports the importance of the role of cognitive defusion in an ACT-based clinical context (Ruiz, 2010). Cognitive defusion—roughly conceptualized as changing the literal meaning and behavior-regulatory functions of private events in order to promote psychological flexibility—is expected to enhance value-guided exposure and behavioral willingness/committed action (Arch & Craske, 2008).

1.1. Empirical evidence for cognitive defusion and its limitations

Several studies have investigated the effects of specific cognitive defusion techniques on negative self-referential thoughts (e.g., Healy et al., 2008; Masuda, Hayes, Sackett, & Twohig, 2004; Masuda, et al., 2009, 2010). One study examined the effects of the commonly used cognitive defusion technique, *word repeating*, which is the rapid vocal repetition of a one-word version of a negative private event (Masuda et al., 2010). In this study, the post-intervention mean average believability score of the self-referential negative thought was significantly reduced in the cognitive defusion group compared to the control group. Another study investigated whether the duration of one-word thought repetition systematically altered the impact of this defusion strategy (Masuda et al., 2009). The reduction in emotional discomfort was found to "bottom out" after 3–10 s of rapid repetition, whereas the maximum reduction of believability occurred after 20–30 s. Masuda et al. (2009) suggested that emotional discomfort and believability may be distinctive functional aspects of private events; thus, focusing exclusively on the emotional discomfort aspect may be too narrow a view to treat the myriad associated cognitive problems. Therefore, in practice, it is important to continue defusion exercises until believability scores decline.

Although a self-reported believability measure seems to be the primary assessment methodology for capturing the functional aspects of private events, findings on the effects of cognitive defusion on believability scores have not been consistent. For example, Healy et al. (2008) showed that the believability score for

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a control group was significantly reduced following an "intervention", but such an effect was not found in the cognitive defusion condition. The exclusive reliance on self-report measures may limit the findings in the literature on psychotherapy processes (Kishita & Shimada, 2011). Therefore, behavioral or observational measures may provide a more demanding assessment of the purported processes by which the therapy works (e.g., Gutiérrez-Martínez, Luciano-Soriano, Rodríguez-Valverde, & Fink, 2004). For this reason, it seems important to use behavioral methodologies to re-examine at least some of the findings of previous cognitive defusion studies.

1.2. The Implicit Relational Assessment Procedure and cognitive defusion

Recently, interest in using behavioral methodologies to assess the effects of the techniques used in ACT continues to rise. Some studies have reported the utility of several behavioral methodologies, such as the cold pressor task (Keogh, Bond, Hanmer, & Tilston, 2005) and the high workload task (Kishita & Shimada, 2011), as protocols for assessing the processes of change in ACT. These experimental tasks are all based on procedures that have been developed and advanced in non-behavior-analytic areas of scientific research. The Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010) is a more recent behavioral methodology that shares common theoretical roots with ACT, a modern behavior-analytic account of human language and cognition, Relational Frame Theory (Hayes, Barnes-Holmes, & Roche, 2001).

The IRAP is a computer-based task that asks participants to confirm or deny a specific belief or attitude directly by responding to a relation between a sample stimulus and a target term. Response-contingent feedback is presented that is consistent with particular response biases across some blocks of trials and inconsistent with those biases across other blocks of trials. In general, the targeted response biases are deemed to be coordinated with and opposed to previously established verbal relations. The fundamental hypothesis is that responses should be quicker and more accurate for the consistent rather than the inconsistent trials (Barnes-Holmes et al., 2010). This basic IRAP effect has been replicated across studies, especially in the area of social prejudice such as racial bias (e.g., Barnes-Holmes, Murphy, Barnes-Holmes, & Stewart, 2010). Previous research has shown that the IRAP is not easily faked (McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007) and produces effects that clearly diverge from those obtained from explicit measures when targeting socially sensitive beliefs (Power, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009). Recently, several studies have reported its utility as a tool for clinical assessment (e.g., Carpenter, Martinez, Vadhan, Barnes-Holmes, & Nunes, 2012; Dawson et al., 2009; Hooper, Villatte, Neofotistou, & McHugh, 2010). The results of previous studies in the clinical arena are encouraging. However, to further test the validity of the IRAP as a tool for clinical assessment, "micro-studies" targeting specific components of ACT processes and comparing a self-reported measure with the IRAP in the measurement of specific experimental manipulations would be useful.

1.3. Purpose of the current study

The purpose of the current study was to investigate the effect of a cognitive defusion intervention on a sample with high social anxiety using the IRAP and a self-report measure of believability of anxiety-related thoughts as process variables. The processes of change (i.e., change in process variables) hardly matter if change itself does not occur; thus, examining outcomes is important. Therefore, we employed a willingness measure and a public speaking task as outcome variables to examine behavioral changes when the feared private events are present. To test the validity of the IRAP as a tool for clinical assessment, we focused on word repeating, a cognitive defusion technique commonly used in previous experimental studies (Masuda et al., 2004, 2009, 2010). The major difference between the present study and those of Masuda et al. is that they used a negative self-referential thought identified by each participant during the cognitive defusion exercise and believability measurement (i.e., each participant had a different target negative private event), whereas the current study used a negative anxiety-related thought identified by the experimenter. This was partly for methodological reasons: since the current study aimed primarily to compare the utility of the IRAP against a self-report believability measure, we needed to consolidate the verbal stimuli used in the IRAP and the self-report measure. To facilitate defusion in the later word repeating exercise, we first employed an exercise drawn from Luciano et al. (2011). This exercise was intended to promote the experience of discriminating on-going behaviors (i.e., thoughts and feelings) and to clarify that the "anxiety" targeted in the later word repeating exercise contained the thoughts of each participant.

1.4. Hypothesis of the current study

Through natural language interactions, verbally able humans are likely to learn that anxiety is something negative and threatening, and thus to be avoided. In other words, such verbal relations are more likely to be reinforced in the context of literality for protracted periods. One of the main procedural characteristics of the IRAP is that it is a computer-based task consisting of two types of blocks of trials—consistent and inconsistent. For the consistent blocks, participants must respond quickly and accurately in ways that are consistent with their pre-experimentally established verbal relations. For example, when the sample stimulus "anxiety" is presented with a target stimulus such as "aversive" and two response options ("same" and "opposite"), the correct response during the consistent blocks would be to select "same." Meanwhile, when "anxiety" is presented with "pleasant," the correct response option would be "opposite." In contrast, during inconsistent blocks, the orthogonal response pattern is required (e.g., when "anxiety" is presented with "pleasant," the correct response option would be "similar").

In many previous studies that have employed the IRAP as a measure, the difference in response latencies between consistent and inconsistent blocks of trials has been taken as the primary metric in assessing the stimulus control being targeted by the procedure. In the current study, this simple approach seemed inappropriate for the following reason. When stimuli relevant to social anxiety are presented in an IRAP, these may increase the likelihood of narrow and inflexible responding (i.e., fusion with those stimuli). As such, the anxiety-related stimuli may produce derived relational responding that interferes with quick and accurate responding in *both* consistent and inconsistent blocks on the IRAP. Thus a defusion intervention may be expected to reduce response latencies in both types of blocks and not just the inconsistent blocks. In contrast, if participants are not exposed to a defusion intervention we might expect to see a relatively small reduction in response latencies for the inconsistent blocks, due to a simple practice effect (see McKenna et al., 2007), but little evidence of a reduction for the consistent blocks (because there has been no substantive reduction in anxiety responses to the stimuli presented in the IRAP). It is important to note that when participants are exposed to an IRAP they are required to complete blocks of practice trials until they reach some pre-defined mastery criteria. As a result, it seems likely that response latencies during the consistent test trials may be subject to a floor effect emerging