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Fusion With Self-Referential Labels: Examining A Behavioral Measure

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FUSION WITH SELF-REFERENTIAL LABELS:

EXAMINING A BEHAVIORAL MEASURE

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ABSTRACT

Individuals with commonly diagnosed psychological disorders often apply self-labels that have a negative effect on behavior. In Acceptance and Commitment Therapy, defusion exercises are designed to de-emphasize the literal interpretation of thoughts (such as self-labels) so that behavior is less controlled by verbal rules and more sensitive to direct interaction with the environment. Although existing self-report measures sensitive to changes in believability are an important step in establishing the utility of defusion interventions, it is also worthwhile to develop behavioral markers of fusion/defusion with self-referential content. The matching-to-sample (MTS) task, commonly used in basic behavioral research, examines the ability of participants to relate different stimuli. Performance on this task can demonstrate whether relating stimuli is disrupted by one's learning history, making it a potentially useful paradigm for assessing cognitive fusion. Results of the current study offer preliminary evidence for the utility of the MTS procedure in detecting disrupted responding when stimulus classes are incompatible with learning history. Participants in the fusion condition made more errors on the self-relevant classes compared to the neutral class, whereas those in the defusion condition showed relatively equal responding regardless of class type. Evidence of enhanced transfer of stimulus functions (facilitated acquisition) was not found in the current study. If the effects are improved and replicated, the MTS task has potential as a behavioral marker of fusion in the context of evaluative self-referential labels.

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INTRODUCTION

The Ties that Bind: Verbal Constructions of Self

Most theories of self-development include, to some extent, the process of applying descriptive and evaluative labels to oneself (Damon & Hart, 1982). For example, according to William James' (1892/1961) theory of self-understanding, an individual's self-concept is composed of "constituents." These include bodily, social, and psychological characteristics (e.g., "overweight," "friendly," "spiritual," "unworthy," "bad"). This process of applying evaluative labels may become maladaptive, particularly when it has a negative effect on one's behavior (Bandura & Cervone, 1983; Beck, 1976; Hayes, Strosahl, & Wilson, 2011, p. 82).

Many of the most commonly diagnosed psychological disorders involve negative self-labels and these labels have been theorized to influence overt behaviors. For example, those diagnosed with an anxiety disorder often describe themselves as awkward and might avoid social situations (Clark & Wells, 1995; Frances & Ross, 2001; Hirsch, Meynen, & Clark, 2004). Likewise, those with depression often have rigid stories about being worthless and unlovable (Beck, Rush, Shaw, & Emery, 1987), and might not fulfill responsibilities or seek close relationships as a result. Even those considered to be mentally healthy engage in self-talk that can have limiting effects on behavior. For example, a child who tells herself she is not athletic may be less likely to pursue opportunities to play sports and engage in other physical activities. Behaving solely in accordance with these self-labels, whether true or false, can be maladaptive.

Cognitive Approach

The role of negative thoughts in psychological distress is widely recognized across various orientations in psychology. Perhaps the most well-known and studied therapeutic approach emphasizing the importance of thoughts is Cognitive Behavioral Therapy (CBT; Beck 2011), which is primarily based on Beck's cognitive theory (Beck et al., 1987).

Research. A large body of research supports the correlation between negative thoughts and poorer outcomes in depression, anxiety, and other disorders (Abramson, Metalsky, & Alloy, 1989; Beck, 1976; Beck, Rush, Shaw, & Emery, 1979; Clark, Beck, & Alford, 1999; Seligman, Abramson, Semmel, & von Baeyer, 1979; Tang, DeRubeis, Beberman, & Pham, 2005). One goal of cognitive research is to identify common patterns of thinking called schemas – cognitive systems of organizing and interpreting information (Beck, 1976). Individuals with depression, for example, develop schemas that propagate as the person readily applies negative attributes to a broad array of variables (Blaney, 1986; Matt, Vázquez, & Campbell, 1992). Along these lines, the "cognitive triad" consists of automatic thoughts or negative attributions regarding the self, the world, and one's future (Beck, 1976). Individuals more readily notice and attend to information that is consistent with existing schemas, and contradictions are modified to fit within a schema (Levy, Lysne, & Underwood, 1995). Moreover, once established, schemas are thought to be resistant to change (Beck, 1976).

Application. Cognitive behavioral treatment involves restructuring schemas by identifying errors in one's automatic thoughts and core beliefs (e.g., I am unlovable). Subsequently, the individual is encouraged to seek refuting evidence to correct these inaccuracies (Beck, 1976; Dozois & Beck, 2011). These techniques directly target the *content* of maladaptive schema and automatic thoughts in an effort to establish more rational core beliefs

and schemas. For example, an individual with a thought about being unlovable might be advised to identify instances in which he has behaved in a manner worthy of love.

Studies supporting the efficacy of Cognitive Therapy (CT) and Cognitive Behavioral Therapy (CBT) are numerous (e.g., Dobson, 1989; Hanrahan, Field, Jones, & Davey, 2013; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Vittengl, Clark, Dunn, & Jarrett, 2007). However, studies examining mechanisms of action have failed to confirm the theory that changes in thoughts cause changes in treatment outcome (see Hollon & Beck, 1994; Longmore & Worrell, 2007). For example, Jarrett and colleagues demonstrated that changes in cognitive content, when observed, were significant but not predictive of changes in depressive symptoms (Jarrett, Vittengl, Doyle, & Clark, 2007).

Additionally, dismantling studies have compared the contributions of various CBT components (cognitive restructuring for negative thoughts/core schemas + behavioral activation versus behavioral activation alone). Such studies have revealed no substantial benefit from adding cognitive components to behavioral activation immediately after treatment or at six-month and two-year follow-up (Gortner, Gollan, Dobson, & Jacobson, 1998; Jacobson et al., 1996). Another dismantling study demonstrated that for individuals with less severe depression, the complete treatment package produced equal improvements compared to behavioral activation alone. However, for individuals with more severe depression, those receiving behavioral activation alone demonstrated larger improvements than those receiving the complete treatment package including both behavioral activation and cognitive interventions (Dimidjian et al., 2006).

Besides the findings disconfirming the necessity of cognitive restructuring components in treatment, evidence is emerging, in some cases, revealing the potential harm of direct attempts to

change cognitive content. Wood and colleagues demonstrated that for individuals reporting low self-esteem, repeating a positive self-statement ("I'm a lovable person") decreased ratings of mood, incentive (how much they wanted to engage in pleasant activities), and self-esteem (Wood, Perunovic, & Lee, 2009).

Contemporary Behavioral Approach

As an alternative, a contextual behavioral approach to the problem focuses on aspects of the individual's context that maintain the negative function of such labels. Acceptance and Commitment Therapy (ACT; Hayes et al., 2012) is one therapeutic approach based in behavior analytic theory. ACT, and its underlying theory (Relational Frame Theory; Hayes, Barnes-Holmes, & Roche, 2001), offers an extension of Skinner's original analysis of verbal behavior and rule-governance (Skinner, 1957, 1966).

Research. The concept of rule-governed behavior (Skinner, 1966; Zettle & Hayes, 1982) affords a useful way of conceptualizing difficulty with negative self-labels. Rule-governed behavior can occur in the absence of shaping via direct consequences (i.e., reinforcement and punishment). Instead, behavior that is governed by rules is shaped primarily by "verbal formulations of events and the relationships among them" (Hayes et al., 2012, p. 52). The term *fusion* is used when actions are primarily dominated by indirect stimulus functions, such as those derived from rules (Hayes et al., 2012, p. 52).

One important characteristic of behavior under the control of verbal rules is that it tends to be relatively insensitive to changes in the environment (Hayes, 1989). Several empirical examinations of this phenomenon have been documented (Catania, Matthews, & Shimoff, 1982; Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986; Matthews, Catania, & Shimoff, 1985; Shimoff, Matthews, & Catania, 1986). To illustrate, Shimoff, Matthews, and Catania (1986)

conducted a study in which participants earned points by pressing computer keys on varying schedules of reinforcement (i.e., pressing either rapidly or slowly was reinforced at different points). Participants who were given instructions to press slowly showed insensitivity to changing contingencies. That is, they continued to press slowly, even when the schedule changed to a schedule in which rapid responding was reinforced. Presses of participants who were not given the "press slowly" rule showed no such insensitivity. Their initial responding was shaped by direct experience with the contingencies and when those contingencies changed, their key pressing also changed. Results demonstrated that participants' verbal rules about button pressing interfered with the influence of changing contingencies on pressing.

A second characteristic of fusion is that under certain conditions, previously neutral words or events may more readily become related, a phenomenon sometimes referred to as "facilitated acquisition" (Adcock et al., 2010; Murrell, Wilson, LaBorde, Drake, & Rogers, 2008; Wilson, 1998). This is similar to the concept of schema in cognitive theory, in that classes of words propagate, adopting common functional properties (e.g., the cognitive triad in individuals diagnosed with depression). Like schemas, classes of words that are fused are relatively robust. That is, research has demonstrated persistence of equivalence classes after five months, even in the absence of additional exposure to the stimuli (Saunders, Wachter, & Spradlin, 1988). Additionally, established classes demonstrate resistance to modification (Garotti, De Souza, De Rose, Molina, & Gil, 2000; Murrell et al., 2008; Pilgrim & Galizio, 1990, 1995).

Application. Interventions coming out of this type of research have focused on ways to lessen the impact of rules without directly changing content. Whereas fusion involves regarding thoughts and rules in a literal manner, the term defusion refers to the disruption of contexts that support fused behavior. In effect, the purpose of defusion interventions is to suspend the literal

interpretation of thoughts by altering conventional uses of language. In more technical terms, defusion "breaks down the tight equivalence classes and dominant verbal relations that establish stimulus functions through verbal means" (Hayes, Strosahl, & Wilson, 1999; p. 74).

To illustrate, fusion with the label "unlovable" will likely elicit aversive feelings, decrease interpersonal approach behavior, and increase interpersonal avoidance. Rules might arise in the form of, "I shouldn't let others get to know the real me because they won't like me," for example. In a clinical setting, the therapist might ask the client to repeat the word "unlovable" very rapidly (a deviation from typical usage of the word) (Hayes et al., 2012, p. 248; Titchener, 1916, p. 425). Likewise, the therapist might ask the client to speak the word using a falsetto voice, or to say the word unnaturally slowly. The expected effect for both of these exercises is for the word to be experienced (albeit temporarily) as an audible sound rather than a true reflection of reality (Blackledge, 2007). Typically, this results in a more flexible relationship with the word. According to ACT theory, once this occurs, clients are freer to notice alternative ways of behaving (e.g., choosing to behave as if they are unlovable by isolating oneself versus choosing to seek meaningful interactions with others; Hayes et al., 2012).

State of the Research on Defusion

Empirical support. Evidence for defusion as a mediator of change in outcome can be found within studies using the larger ACT package as an intervention (Bach & Hayes, 2002; Forman, Chapman, Herbert, Goetter, Yuen, & Moitra, 2012; Hayes, Bissett, et al., 1999; Zettle, Rains, and Hayes, 2011). Defusion exercises have also been effective in reducing the functional properties of negative self-referential thoughts specifically. Masuda, Hayes, Sackett and Twohig (2004) showed that Titchener's (1916) word repetition task was more beneficial than distraction and thought control (i.e., using positive self-talk and breathing exercises) in terms of reducing

the believability and discomfort surrounding negative self-referential thoughts. Masuda, Hayes, Twohig, Drossel, Lillis, and Washio (2009) replicated the finding that rapid repetition of negative self-referential thought reduces accompanying ratings of believability and distress. These two studies examined college students not reporting substantial psychological distress. As is typical of studies along these lines, changes in believability and discomfort were observed without direct attempts to target them. Instead, change in believability is a byproduct of flexible interaction with negative cognition.

Deacon, Fawzy, Lickel, and Wolitzky-Taylor (2011) compared cognitive restructuring and defusion exercises as homework assigned for one week among those with distressing body image-related thoughts. This study extended Masuda's findings in its support of the efficacy of the word repetition defusion exercise. Additionally, it demonstrated the generalization to other words related to the repeated word (i.e., synonymous with fat).

Healy and colleagues (2008) demonstrated the utility of a different defusion exercise – adding the phrase "I'm having the thought that" to self-referential thoughts. Participants rated phrases such as "I am a bad person" in both a fused and defused format, in terms of believability, discomfort, and willingness. Results indicated the addition of the prefix resulted in lower ratings of discomfort, as well as higher ratings of willingness to interact with the statements (i.e., read and think about them).

Examining college students reporting significant psychological distress, Hinton and Gaynor (2010) compared three sessions of cognitive defusion to a waitlist control and to supportive therapy. Those in the defusion condition showed improved self-reported psychological flexibility and self-esteem, decreased negative thinking, and decreased depressive symptoms compared to the waitlist control. Furthermore, the demonstrated effect size was larger

than that of the supportive therapy comparison group. These large effects were observed immediately after treatment, with additional small to moderate gains at one-month follow-up.

Limitations of our knowledge. Although empirical support is emerging for defusion exercises, such studies typically employ self-report indices of fusion and defusion. Generally, using self-report measures in the absence of other methods (e.g., behavioral observation) has several disadvantages. First, using a single method of measurement introduces excessive method bias that can cause inflated error variance (Campbell & Fiske, 1959; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Second, using self-report measures in this particular context may be problematic in that it relies on the verbal processes defusion is designed to disrupt. Defusion researchers have recognized the importance of using behavioral indices of reductions in fusion with self-labels (e.g., Masuda, Feinstein, Wendell, & Sheehan, 2010), but have yet to identify an effective measure.

Potential Behavioral Measures of Fusion and Defusion

There are several behavioral measures of processes related to fusion/defusion that may serve as useful proxies. For example, behavioral approach tasks, such as those employed during exposure therapy, involve repeated measurements of the physical distance between an individual and a feared stimulus (e.g., spider). In the context of avoided self-referential verbal content, however, the stimulus is not an object, rather a word. Another possibility is the carbon dioxide challenge task, requiring individuals to hold their breath or inhale air containing increased concentrations of carbon dioxide. Doing so induces panic-like symptoms, and thus can be considered a marker of experiential avoidance (Gorman et al., 1990). However, this task is only relatively specific to anxiety and panic. Other possibilities include computerized tasks of implicit cognition such as the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al.,

2006), the Implicit Association Test (IAT; Greenwald & Farnham, 2000; Greenwald, McGhee, & Schwartz, 1998), the Go/No-Go Association Task (GNAT; Nosek & Banaji, 2001), and the Matching-to-Sample task (MTS; Sidman, 1971). The MTS task is commonly used in basic behavioral research and is supported by decades of empirical support. Such a task could provide a useful procedural framework for behaviorally assessing fusion with self-labels. That is, it affords the examination of both aspects of fusion discussed earlier: (1) level of sensitivity to direct contingencies, and (2) facilitated acquisition of previously neutral/arbitrary stimuli.

Matching-to-sample is a method used to test equivalence relations (including directly trained and derived relations). When a set of stimuli are said to form an equivalence class, the following standards have been met: (1) reflexivity – the stimulus is correctly matched to itself; (2) symmetry – if stimulus *a* is matched to stimulus *b*, then stimulus *b* should be matched to stimulus *a* without direct training; and (3) transitivity – once "if *a* then *b*," and "if *b* then *c*," are established, without direct training "if *a* then c" is derived (Sidman, 1971; Sidman & Tailby, 1982). Generally, stimulus equivalence can be considered a way of demonstrating the spread of negative stimulus functions, similar to the cognitive concept of schemas.

For meaningful or emotionally salient stimuli, learning histories can disrupt the formation of equivalence classes. To illustrate, Moxon, Keenan, and Hine (1993) found that some participants were less able to form equivalence classes comprised of female names and stereotypically male occupations. Similarly, Watt, Keenan, Barnes, and Cairns (1991) found that participants from England more readily formed equivalence classes containing Catholic names and Protestant symbols than participants from Northern Ireland (presumably due to differences in learning history between the groups).

Several researchers have capitalized on this effect to use MTS procedures in research on processes related to the self. Leslie and colleagues compared the MTS performances of eight clinically anxious and eight non-anxious individuals (Leslie, Tierney, Robinson, Keenan, Watt, & Barnes, 1993). Results showed that only one of the eight anxious participants was able to form the equivalence classes including threatening situations, nonsense syllables, and pleasant adjectives. In contrast, six of eight non-anxious participants correctly formed the classes. In another study, those with mild intellectual disability were trained to pair their own names with the word "able," and a gender-neutral name with the word "slow." Compared to those without intellectual disability, they demonstrated significantly less accurate equivalence responding (Barnes, Lawlor, Smeets, & Roche, 1996). These researchers demonstrated that the results were not due to general lack of ability by requiring all participants to meet preliminary performance standards with arbitrary stimuli.

In a study conducted by Merwin and Wilson (2005), all participants were trained in two conditions: me-good and me-bad. Training resulted in equivalence classes incorporating (1) self-referring terms (i.e., me, myself, I), (2) nonsense words, and (3) either negative adjectives (i.e., unworthy, flawed, inadequate) or positive adjectives (i.e., whole, desirable, perfect). Results showed that participants reporting low self-esteem and high psychological distress performed significantly less accurately on the me-good condition than those reporting high self-esteem and low distress. There were no differences between groups on the formation of the me-bad class. The obtained results are consistent with the theoretical model of fusion. That is, when participants made more errors on trials requiring sensitivity to current contingencies, their learning histories prevented them from doing so in many cases.

In another recent study, Adcock and colleagues (2010) attempted to selectively increase the level of fusion by asking participants to respond to questions about their academic performance. For those with a lower GPA, fusion with self-relevant stimuli like "fail" or "stupid" should be enhanced subsequent to this task. Results showed that students with a lower GPA made fewer errors than high GPA students on an MTS task that required them to relate failure words and arbitrary symbols. In this context, equivalence class acquisition was facilitated only for classes including emotionally salient, personally relevant stimuli.

MTS has been used to demonstrate both disrupted self-relevant class formation and enhanced acquisition. Difficulty with equivalence class formation may occur when the self-relevant stimuli are incongruent with the participants' history of self-thoughts (e.g., classes with "able" for people with learning disabilities). Additionally, facilitated acquisition may occur when self-relevant stimuli are congruent with the participants' history of self-thoughts (e.g., classes with "fail" for people at academic risk). It remains untested whether or not defusion interventions can mitigate or eliminate these effects.

The Current Study

The current study was designed as a partial replication, extension, and integration of the Merwin and Wilson (2005) and Adcock et al. (2010) studies. We attempted to (1) experimentally manipulate the level of fusion/defusion experienced by participants prior to the MTS task, (2) examine the presence or absence of disruptions in relating self-referential stimuli with positively valenced stimuli, and (3) examine the degree to which facilitated acquisition occurs in response to contextual manipulations. In other words, we attempted to model both the inflexibility of self-relevant terms, as well as the spread of negative stimulus functions to arbitrary stimuli via relational learning. We offered the following hypotheses:

1. Self-reported changes in believability, comfort, and willingness: After engaging in a defusion exercise, participant ratings of believability will decrease, and ratings of comfort and willingness will increase; after engaging in a task designed to increase fusion, participant ratings of believability will increase, and ratings of comfort and willingness will decrease.

2. Inflexibility of self-relevant inconsistent stimuli: Compared to those engaging in a defusion exercise, participants fused with self-relevant labels will exhibit less accurate responding (i.e., percent correct) and poorer fluency (i.e., total number correct divided by total latency) when trained to form equivalence classes with nonsense words, a self-referring term (i.e., "me"), and positive adjectives.

3. Facilitated acquisition: Compared to those engaging in a defusion exercise, participants fused with self-relevant labels will more readily acquire relations between the negative label and relatively neutral stimuli. That is, they will demonstrate higher accuracy and greater fluency for the class of stimuli containing the emotionally salient stimulus.

METHODS

Participants and Setting

Participants were undergraduate students enrolled at a large southeastern public university. Recruitment occurred through class announcement as well as the university's online recruiting system. Consenting individuals received 1.5 hours of course credit/extra credit for their participation.

The obtained sample was 65.7% female, with a mean age of 19.56 (*SD* = 1.54). In terms of ethnicity, 69.4% were Caucasian, 25.0% African American, 2.8% Hispanic/Latino and 2.8% Asian/Asian American. In terms of year in college, 55.6% were freshmen, 22.2% were sophomores, 12.0% were juniors, and 10.2% were seniors.

Participants completed tasks in a group setting (approximately 3-15 participants per group) in a computer laboratory with partitions between stations. They completed computerized self-report measures using the browser based Qualtrics (www.qualtrics.com) survey system and data were stored on a secured server. The remaining experimental procedures were programmed in Visual Basic 2008 Professional Edition. This program directly transferred participant responses to a Microsoft Access database.

Materials

Demographic Questionnaire. A demographic information form was used to gather general demographic information including gender, age, and ethnicity. See Appendix A.

Depression Anxiety Stress Scales-Short Form (DASS-21). The 21-item short form of the Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995) assessed psychological distress in three domains: depression, anxiety, and stress. Respondents rate the extent to which they have experienced various symptoms over the past week, with responses ranging from 0 = "not at all" to 3 = "very much/most of the time." Scores within each subscale are summed and doubled to obtain three total scores. Scores of 14, 10, and 19, respectively, indicate moderate levels of distress on each subscale. Factor analytic investigations support the three factors in both clinical and non-clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry & Crawford, 2005). Psychometric properties of this instrument have been examined via multiple studies that have generally supported a three-factor solution (Antony et al., 1998; Osman, Wong, Bagge, Freedenthal, Gutierrez, & Lozano, 2012). See Appendix B. In the current sample, internal consistency for each of the factors was within the acceptable range (Depression $\alpha = .83$; Anxiety $\alpha = .81$; Stress $\alpha = .85$).

Rosenberg Self-Esteem Scale (RSES). The Rosenberg Self-Esteem Scale assessed global self-esteem. The RSES consists of 10 items rated on a 4-point Likert-type scale ranging from 3 = "strongly agree" to 0 = "strongly disagree." Half of the items are worded such that they require reverse scoring before summing scores. Higher total scores indicate higher global self-esteem and a score below 15 indicates "low self-esteem." A recent study examining the utility of the RSES in a large nonclinical adult sample revealed adequate internal consistency reliability as well as item convergent and discriminant validity (Sinclair, Blais, Gansler, Sandberg, Bistis, & LoCicero, 2010). See Appendix C. In the current sample, internal consistency was within the acceptable range ($\alpha = .89$).

Cognitive Fusion Questionnaire (CFQ). The Cognitive Fusion Questionnaire (Gillanders et al., 2014) assessed the degree of cognitive fusion pre- and post-test. The CFQ consists of 13 items rated on a 7-point Likert-type scale, with 1 = "never true" and 7 = "always true." Higher scores indicate a higher degree of cognitive fusion. In multiple samples examined in Gillanders' original psychometric study, internal consistency alphas ranged from .85 to .89. In a community sample, the mean score was 41.53 (*SD* = 11.57), whereas in a mixed mental health sample, the mean score was 60.76 (*SD* = 12.51). The CFQ exhibits good construct validity, as evidenced by significant correlations with frequency of automatic thoughts. Additionally, this measure demonstrated sensitivity to treatment, as evidenced by statistically significant decreases in scores before and after ACT-based stress management treatment (Gillanders et al., 2014). See Appendix D. In the current sample, internal consistency was within the acceptable range (α = .77).

Visual Analogue Scales (VAS). Participants rated their self-identified labels on several aspects. At four time points during the procedure, participants were presented with the stimulus at the top of the screen, and asked the following: (1) "How comfortable is this to you?" (2) "How believable (true) is this to you?" (3) "How willing are you to think about this?" The three rating scales range from 0 (extremely uncomfortable; extremely unbelievable; and extremely unwilling) to 100 (extremely comfortable; extremely believable; and extremely willing). At the onset, each slider was placed at the halfway point and participants were instructed to drag it along three scales, presented on different screens. The computer program converted the position of each slider into a value between 0 and 100.

Video. To facilitate emotional connection with the concept of self-criticism, participants viewed a 3-minute video. The video consists of a series of photographs of hand-written self-

critical statements (e.g., “I’m not good enough”) and instrumental background music. The video has been shown to induce a significant decrease in self-reported positive affect and a slight but significant increase in ratings of subjective distress (Flynn, 2012).

Matching-to-sample task (MTS). As described in the introduction, a matching-to-sample procedure was administered during this experiment to train a series of conditional discriminations and test for derived equivalence relations. The standard MTS method for training participants to form equivalence classes is as follows: Several trials are presented on a computer screen, each with one sample stimulus and three answer options below it as comparison stimuli (Green & Saunders, 1998). The specific stimuli used for the sample and comparison options vary depending on the type of trial presented. For each trial, the participant chooses one option and is given feedback whether the choice is correct or incorrect.

Stimuli are typically coded as A1, A2, A3; B1, B2, B3; C1, C2, C3 (where A1, B1, and C1 form an equivalence class, etc.). During the first phase, A stimuli are presented as sample stimuli whereas B stimuli are presented as comparison stimuli (in the presence of A1, choosing B1 is reinforced with “correct”). Once the predetermined criterion is met (89%) for number correct on block 1, the next block is presented during which A stimuli are presented as samples and C stimuli are presented as comparison stimuli. Subsequent to meeting the 89% criterion for this block, a mixed training block is presented including all of the relations trained up to this point. Once the 89% criterion for this block is met, a testing phase is presented to measure the symmetry property (B = A, C = A). Finally, another testing phase is presented to determine if the equivalence classes have been formed (B = C, C = B). The purpose of the testing phases is to measure derived relational responding (relating stimuli in the absence of direct training). No feedback is given during testing phases.

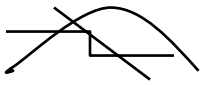
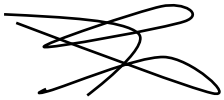
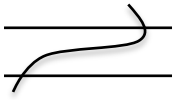
For this particular MTS task, training was designed to result in the formation of three 3-member equivalence classes (Table 1). Nonsense words comprised the A terms, evaluative self-referential stimuli (i.e., ideographic positive and negative adjectives) plus a relatively neutral adjective comprised the B terms, while self- and other-referents comprised the C terms (i.e., me, others, it). Another MTS task was designed to result in the formation of three 3-member classes including three words and six arbitrary symbols (Table 2). All participants received both phases: "inconsistent stimuli" and "facilitated acquisition" with phase order randomly allocated.

Table 1. *Stimuli for the "inconsistent stimuli" phase*

	Inconsistent Stimuli Phase		
	1	2	3
A	cug	zid	jek
B	positive adjective	negative adjective	yellow
C	me	others	it

Note. Nonsense words were randomized for each participant.

Table 2. *Stimuli for the "facilitated acquisition" phase.*

	Facilitated Acquisition Phase		
	1	2	3
D			
E	negative adjective	green	purple
F			

Note. Arbitrary symbols that are D terms were randomized for each participant.

Experimental Conditions

Participants were randomly assigned to one of two conditions. Rationales and instructions for each condition follow.

Fusion Condition. For the purpose of this study, in order to increase the likelihood of participants' fusion with self-referential stimuli, an induction was designed incorporating categorical and evaluative prompts. According to ACT theory, engaging in problem-solving, categorization, and evaluation is associated with increased fusion (Hayes et al., 2012, p. 264; Wilson, Hayes, Gregg, & Zettle, 2001, p. 221). In this preparation, encouraging participants to figure out why they possess a particular quality was expected to increase the degree to which the label is processed in terms of problem-solving. Phrases such as "what kinds of problems" were expected to promote thinking in categorical terms, while words such as "better" and "should" were expected to promote thinking in evaluative terms (Wilson & DuFrene, 2012, p. 88).

Instructions: *We are interested in how people describe negative aspects of themselves. Some sources suggest that a way to manage negative thoughts is to figure out why you think there is something wrong. Figuring out the reasons why you don't like something about yourself can help you figure out what you need to change. The following exercise will help to illustrate this point.*

Please write for 5 minutes about the negative characteristic you identified.
Use the following questions to guide your response. It is okay if you do not write in grammatically correct or perfectly formed sentences. The important thing is to keep writing for the allotted time and to be as thorough and detailed as possible.
1. Write about how the negative label you chose describes you as a person.
2. How long have you been this way?
3. What kinds of problems has it caused in your life?
4. With regard to this quality, how do you measure up compared to other people? Think of someone who is better than you in terms of this quality. What makes this person better?
5. With regard to this quality, describe what you should be doing, but aren't.
6. Describe any attempts you've made to change this quality. Have you tried hard enough?

Defusion Condition. In order to decrease the likelihood of participants' fusion with self-referential stimuli, an induction was designed to dismantle the literal interpretation of negative self-labels. According to research in this area, providing both a rationale and an experiential

exercise is more effective than providing a rationale alone, in terms of reducing believability (Masuda, Feinstein, Wendell, & Sheehan, 2010). As such, the following instructions include a brief rationale and experiential exercise, followed by a series of prompts designed to emphasize the verbal processes underlying self-labeling.

Instructions: *We are interested in how people describe negative aspects of themselves. Often, people take self-labels very literally, believing that they are absolutely true. In fact, labels are just words that may or may not reflect reality. Words can have the effect of causing distress, even though they are actually only words. To illustrate, read this word to yourself: MILK. What do you think of when you see this word? Perhaps the words white, creamy, and cold come to mind. Click next to continue this exercise.*

Now try typing the word MILK over and over again 20 times below as rapidly as possible. Don't worry about making errors.

Did you notice that the word seemed to lose its meaning after a while? You can use this strategy applied to other words too, like the negative self-label you chose before. Sometimes recognizing that the label is just a word helps to deal with negative thoughts. The following exercises serve to illustrate that point.

1. Type the following sentence: I'm having the thought that I'm _____. (fill in the blank with your label)
2. How many letters does your label contain? _____
3. How many consonants does your label contain? _____
4. How many vowels does your label contain? _____
5. Type your label backwards (for example, stupid becomes diputs). _____
6. Type your label in all CAPS _____
7. Try to picture a visual image of the word in your mind. Can you make the image larger and smaller? Can you picture the image in cursive writing? Give it a try now.
8. Can you think of words that rhyme with your label? If not, make up some imaginary words that rhyme with it and type them out.
9. With the time remaining, simply type your label as many times as you can. Don't worry about making errors, just type as quickly as possible.

Procedure

Those who agreed to participate in the study signed consent forms (Appendix E) and were given the opportunity to ask questions. Participants completed the self-report measures presented on a computer. Once they completed the measures, they watched a three-minute video designed to facilitate emotional connection with the concept of self-criticism. Next, a prompt

delivered by the computer program required participants to identify a negative quality about themselves that is most bothersome. Finally, the following instructions appeared on the computer screen:

Fill in the blank with ONE word to identify this negative quality:
1. Something I least like about myself is that I am _____.

Now fill in the blank with ONE word that exemplifies the OPPOSITE of that negative quality (a POSITIVE label):
2. I wish I was _____, but I'm not.

The positive and negative words were used as personally identified, self-referential stimuli by the MTS program. Participants rated believability, discomfort, and willingness for both labels, using visual analog scales (i.e., they were asked to use a mouse to slide a marker along a line with two anchor points for each). Subsequently, they wrote for five minutes about one of the two topics, depending on the condition to which they were randomly assigned. A countdown of time remaining was visible to the participant during this phase, and only one prompt was visible per screen. Prior to engaging in this task, the following general instructions appeared:

You will now be asked to complete a five-minute writing exercise. During the exercise, please read the instructions on the screen and write your responses in the box below. The exercise is spread across multiple pages and you can move back and forth between the pages by using the next and back buttons. Please be sure to follow the instructions and complete each page of the exercise. The exercise will end automatically after five minutes and it is not possible to finish early. Please keep working for the entire time. When you are ready click continue.

After completing the writing exercise, participants again rated the labels in terms of discomfort, believability, and willingness. Next, participants viewed the following instructions to complete the MTS task:

When this task begins, images will appear on the computer screen. One image will appear at the upper middle of the screen, and three additional images will appear at the lower left, lower middle, and lower right of the screen. Your task is to choose the correct image from among those in the lower portion of your screen. In this task you will choose just one image on each trial. To

do this, simply click on whichever of the three lower images you believe to be correct. During some parts of the task you will be given feedback after your selections and during other parts you won't receive any feedback. However, there is always one correct answer. The more accurate you are, the less time this task will take. Please ask the experimenter if you have any questions. When you are ready click continue.

After a brief familiarization task, the first phase presented training designed to result in the formation of three, 3-member equivalence classes: A1 = B1 = C1; A2 = B2 = C2; and A3 = B3 = C3. See Tables 3 and 4.

Table 3.

Number of Trials and Response Criteria for Each Block

	Block	Trials	Criterion
1	Train A-B	18	16/18 (89%)
2	Train A-C	18	16/18 (89%)
3	Mixed Train A-B and A-C	36	32/36 (89%)
4	Test B-A and C-A	18	16/18 (89%)
5	Test B-C and C-B	18	16/18 (89%)
6	Train D-E	18	16/18 (89%)
7	Train D-F	18	16/18 (89%)
8	Mixed Train D-E and D-F	36	32/36 (89%)
9	Test E-D and F-D	18	16/18 (89%)
10	Test E-F and F-E	18	16/18 (89%)

Table 4.

Trained and Tested Relationships by Block

	Block	Trained Relationships	Tested Relationships
1	Train A-B	A1-B1 A2-B2 A3-B3	
2	Train A-C	A1-C1 A2-C2 A3-C3	
3	Mixed Train A-B and A-C	A1-B1 A1-C1 A2-B2 A2-C2 A3-B3 A3-C3	
4	Test B-A and C-A		B1-A1 C1-A1 B2-A2 C2-A2 B3-A3 C3-A3
5	Test B-C and C-B		B1-C1 C1-B1 B2-C2 C2-B2 B3-C3 C3-B3
6	Train D-E	D1-E1 D2-E2 D3-E3	
7	Train D-F	D1-F1 D2-F2 D3-F3	
8	Mixed Train D-E and D-F	D1-E1 D1-F1 D2-E2 D2-F2 D3-E3 D3-F3	
9	Test E-D and F-D		E1-D1 F1-D1 E2-D2 F2-D2 E3-D3 F3-D3
10	Test E-F and F-E		E1-F1 F1-E1 E2-F2 F2-E2 E3-F3 F3-E3

After the completion of testing for Phase 1 (either "inconsistent stimuli" or "facilitated acquisition" depending on the phase order to which they were randomly assigned), participants again rated the labels in terms of believability, willingness, and comfort, then were prompted to take a short break (less than one minute). Then participants underwent training and testing for Phase 2. Once the MTS procedure was complete, participants once again rated level of discomfort, believability, and willingness for each of the labels. The final task was to complete the CFQ again in Qualtrics.

Upon the completion of the study, participants were allowed to ask questions and reviewed a debriefing form with the experimenter (Appendix F). A sequential depiction of the experimental procedures is presented in Table 5.

Table 5.

Procedure Outline

1. Self-Report Measures (DASS, RSES, CFQ)
2. Video/Generate Self-Labels
3. Visual Analogue Ratings of Self-Labels
4. Experimental Condition (random assignment to Defusion or Fusion)
5. Visual Analogue Ratings of Self-Labels
6. Match-to-Sample Task – Phase 1
7. Visual Analogue Ratings of Self-Labels
8. Match-to-Sample Task – Phase 2
9. Visual Analogue Ratings of Self-Labels
10. Self-Report Measure (CFQ)

Data Analytic Strategy

All analyses were performed using SPSS version 22. A series of 2 x 2 ANOVAs examined potential effects of phase order as well as the effect of the fusion and defusion interventions. Additionally, a series of 2 (condition) x 4 (time) mixed ANOVAs examined potential changes in self-reported ratings of positive and negative self-labels across the four time points (i.e., pre-intervention, post-intervention, mid-MTS, and post MTS). Further, a series of 2 (condition) x 3 (stimulus class type) mixed ANOVAs addressed the hypothesized effects on

MTS accuracy and fluency (both inconsistent stimuli and facilitated acquisition phases). Since potential differential performance was of primary interest, only the interactions, and not main effects, were examined. Since the current study is exploratory, in all cases, post hoc analyses were used to further examine the effects (including those interactions that were not statistically significant).

RESULTS

Prior to analyses, the data were examined for the presence of missing values and univariate/multivariate outliers. There were no missing values. Two cases were identified as univariate outliers based on having a z-score greater than 3.29 ($p < .001$, two-tailed test); however upon closer examination, these cases were flagged due to high scores on the measure of psychological distress. In this case, since the majority of students endorsed very low psychological distress, students who reported higher levels were identified as outliers. Because those experiencing psychological distress are theoretically more likely to experience fusion with self-referential stimuli, these cases were retained. No participants in either condition exhibited a multivariate outlier pattern of responding, as measured with a Mahalanobis distance critical value of 22.458 ($p = .001$).

A total of eight cases were removed from the pool of 116 participants for different reasons, however. Five participants did not complete the MTS procedure (three from the fusion condition; two from the defusion condition). Unless participants met a preset criterion performance of 89% on each block, the software cycled them through the block again. These five participants did not meet the criterion after approximately one hour. Three additional cases were removed (two from the fusion condition; one from the defusion condition) due to providing adjectives that were not antonyms (i.e., “athletic vs. individual,” “didthiswrong vs. athletic,” “closer vs. relationship”). This resulted in a total sample size of 108 with 54 participants in each condition.

Assumptions

Analyses were executed to determine if the statistical assumptions of ANOVA were met. For the defusion condition, scores on inconsistent class fluency were not normally distributed according to the Shapiro-Wilk test of normality ($SW = .931$; $p = .004$). Additionally, for both conditions, scores on all three subtests of the DASS (i.e., depression, anxiety, stress) were not normally distributed and positively skewed (i.e., most participants endorsed very low levels of psychological distress). ANOVA is considered to be sufficiently robust with sample sizes over 30 (Schmider, Ziegler, Danay, Beyer, & Bühner, 2010; Tabachnick & Fidell, 2007).

The assumption of homogeneity of intercorrelations was not met for some analyses, and significant Box's M statistics ($p < .001$) are identified within the descriptions of each individual analysis. However, it should be noted that when sample sizes are equal, ANOVA is considered to be robust to violations of this assumption as well (Tabachnick & Fidell, 2007).

Likewise, the assumption of homogeneity of variance (according to the Levene's test statistic) was violated on a number of analyses ($p < .05$) and these are also identified within the descriptions of each individual analysis. Statisticians generally agree that ANOVA is reasonably robust to violations of this assumption as long as the sizes of the groups are similar (Tabachnick & Fidell, 2007).

Pre-Existing Differences

Pearson chi-square tests examined potential differences between groups on categorical demographic variables. No group differences were found for gender, $\chi^2(1, N = 108) = .370$, $p = .543$, race/ethnicity, $\chi^2(3, N = 108) = 2.82$, $p = .421$, or year in school, $\chi^2(3, N = 108) = 3.58$, $p = .310$. These results should be interpreted with caution since there were cells with fewer than five participants for two race/ethnicity categories (Hispanic and Asian) and

one year classification category (juniors in the fusion condition). A one-way ANOVA revealed no statistically significant age differences between groups, $F(1, 105) = .215$, $p = .644$.

A series of one-way ANOVAs analyzed potential pre-existing differences between groups for psychological distress (DASS), self-esteem (RSES), cognitive fusion (CFQ), and visual analogue ratings of positive and negative labels (believability, comfort, and willingness). No significant differences between groups were detected on mean self-report questionnaire scores. On the self-reported ratings of adjectives, at time 1 (pre-intervention) participants in the defusion group rated the negative adjective as more believable ($M = 76.28$; $SD = 19.33$) than those in the fusion group ($M = 65.54$; $SD = 23.31$), $F(1, 106) = 6.793$, $p = .010$, $d = .50$. Also, participants in the defusion condition endorsed higher willingness to think about the negative word ($M = 65.63$; $SD = 24.23$) at time 1 compared to those in the fusion group ($M = 54.46$; $SD = 26.38$), $F(1, 106) = 5.248$, $p = .024$, $d = .44$. See Table 6.

Table 6.

Check for Pre-existing Differences between Groups

Measure	*Mean*		*SD*		*F*	*P*
	Fusion	***Defusion***	***Fusion***	***Defusion***		
Depression Anxiety Stress Scale- depression subscale	5.04	6.67	5.85	6.86	1.764	.187
Depression Anxiety Stress Scale- anxiety subscale	5.48	6.48	6.78	7.25	.549	.461
Depression Anxiety Stress Scale- stress subscale	10.89	10.85	8.26	9.39	.000	.983
Rosenburg Self Esteem Scale Total	22.39	21.67	4.88	5.05	.572	.451
Cognitive Fusion Questionnaire Total	45.52	45.39	10.34	11.21	.004	.950
Positive Label Believability	43.35	45.69	20.88	24.62	.282	.596
Negative Label Believability	65.54	76.28	23.31	19.33	6.793	.010*
Positive Label Comfort	52.52	50.11	24.59	22.96	.277	.600
Negative Label Comfort	39.00	44.07	27.74	31.31	.795	.375
Positive Label Willingness	68.85	68.48	20.01	26.13	.007	.934
Negative Label Willingness	54.46	65.63	26.38	24.23	5.248	.024*

Manipulation Check

A series of 2 (phase type) x 2 (phase order) mixed ANOVAs assessed the effects of MTS phase order on overall accuracy (i.e., number correct on equivalence test phase) and fluency (i.e., number correct per minute on equivalence test phase). No significant order effects were detected for accuracy, $F(1, 104) = 0.046$, $p = .831$, $\eta_{partial}^2 < .001$, or fluency, $F(1, 104) = 1.615$, $p = .207$, $\eta_{partial}^2 = .015$.

Prior to examining the hypotheses, additional analyses examined whether the fusion and defusion interventions functioned as expected according to self-reported ratings of believability. In other words, we expected believability ratings to decrease for the defusion group and increase for the fusion group. Contrary to what we expected, the fusion group average rating decreased slightly from pre-intervention (M = 65.54; SD = 23.31) to post-intervention (M = 59.61; SD = 27.88), a reduction of 5.9 points. According to a paired samples t-test from time 1 to time 2, although this change approached statistical significance it did not exceed the critical value, $t(53) = 1.923$, $p = .060$, $d = .23$. The defusion group average rating also decreased from pre-intervention (M = 76.28; SD = 19.33) to post-intervention (M = 60.83; SD = 25.16), a reduction of 15.4 points, which was consistent with expectations. According to a paired samples t-test from time 1 to time 2, this was a statistically significant reduction, $t(53) = 3.984$, $p < .001$, $d = .69$.

A 2 (condition) x 2 (time) mixed ANOVA assessed if there was a significant interaction regarding differential rates of reduction in believability ratings pre- to post-intervention. This analysis revealed a nearly statistically significant interaction effect, $F(1, 106) = 3.70$, $p = .057$, $\eta_{partial}^2 = .034$. That is, the reduction for the defusion group was numerically larger than the reduction for the fusion group, and this difference almost reached statistical significance. Post hoc ANOVAs were run to further explore this effect. At time point 1, immediately prior to the intervention, there was a statistically significant difference between groups on average believability ratings, $F(1, 106) = 6.793$, $p = .010$, $d = .50$. The mean believability rating for participants in the fusion condition was 65.54 (SD = 23.31) and the mean rating for defusion participants was 76.28 (SD = 19.33). At time point 2 immediately following the intervention, however, there was no statistically significant difference between groups on average believability ratings, $F(1, 106) = .057$, $p = .811$, $d = .05$. This initial difference reflects a failure of the

randomization process and will be addressed in the discussion section with regard to its impact on interpretation.

Self-Reported Ratings

With regard to self-reported ratings of positive and negative labels, the data were analyzed based on time even though some participants completed the inconsistent stimuli MTS phase first and some completed the facilitated acquisition MTS phase first. There is no theoretical reason to suspect type of MTS phase would impact ratings differentially. Further, no statistically significant order effects emerged with regard to MTS accuracy or fluency. Therefore, self-reported ratings of labels are presented chronologically.

Negative labels. There were no interaction effects detected on ratings of self-identified negative labels. That is, the changes over time on the ratings of these factors did not differ as a function of condition.

The negative believability model produced a violation of the sphericity assumption, $\chi^2(5) = 14.26$, $p = .014$, $\varepsilon = .953$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom (Pallant, 2010). There was no significant interaction in terms of believability, $F(2.860, 303) = 1.711$, $p = .167$, $\eta_{partial}^2 = .016$, and no main effect for condition, $F(1, 106) = 2.566$, $p = .112$, $\eta_{partial}^2 = .024$. There was a main effect for time, $F(2.860, 303) = 16.992$, $p < .001$, $\eta_{partial}^2 = .138$, and pairwise comparisons revealed statistically significant differences between time point 1 ($M = 70.90$; $SE = 2.06$) and each of the other time points (T2 $M = 60.22$; $SE = 2.56$; T3 $M = 56.05$; $SE = 2.38$; T4 $M = 53.57$; $SE = 2.59$). See Figure 1.

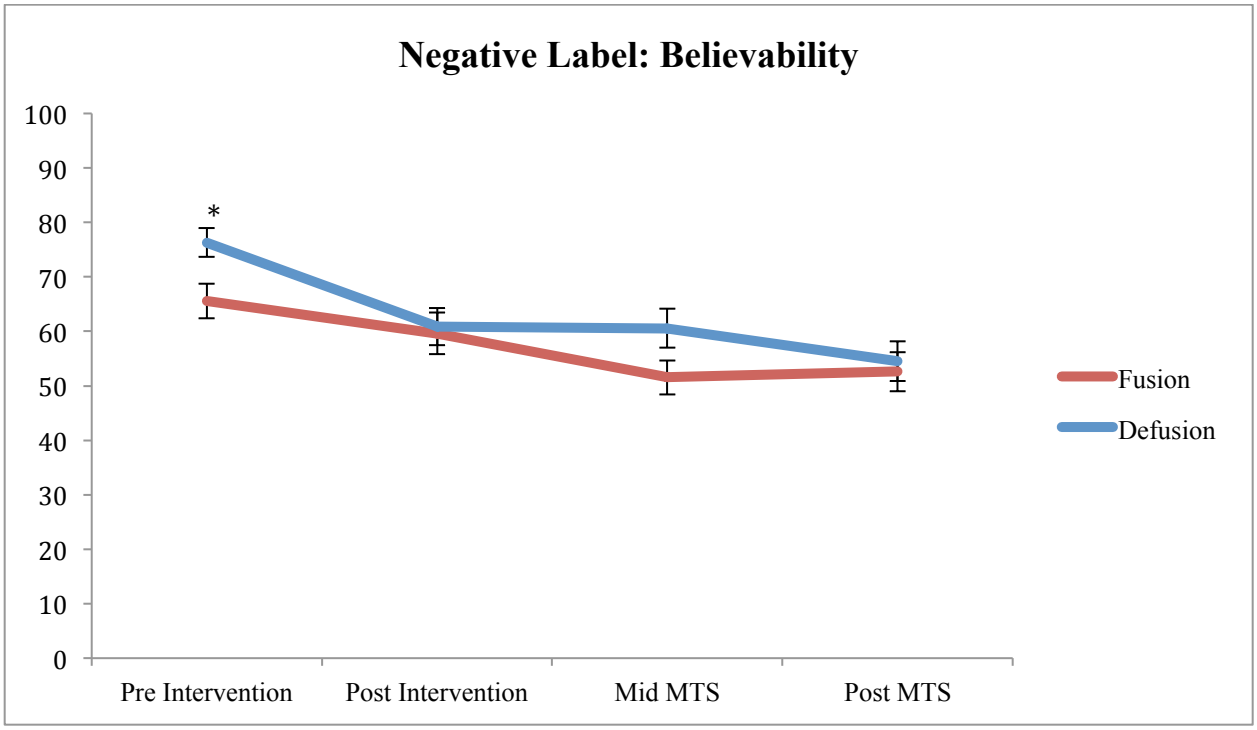


Figure 1. Mean self-reported ratings of believability for the negative self-label across four time points. Error bars represent standard error of the mean. *$p < .05$.

Second, the negative label comfort model also produced a violation of the sphericity assumption, $\chi^2(5) = 47.68$, $p < .001$, $\varepsilon = .782$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was no significant interaction in terms of comfort, $F(2.345, 249) = 1.924$, $p = .140$, $\eta_{partial}^2 = .018$, and no main effects for time, $F(2.345, 249) = 1.961$, $p = .135$, $\eta_{partial}^2 = .018$ or for condition, $F(1, 106) = 1.057$, $p = .306$, $\eta_{partial}^2 = .010$. See Figure 2.

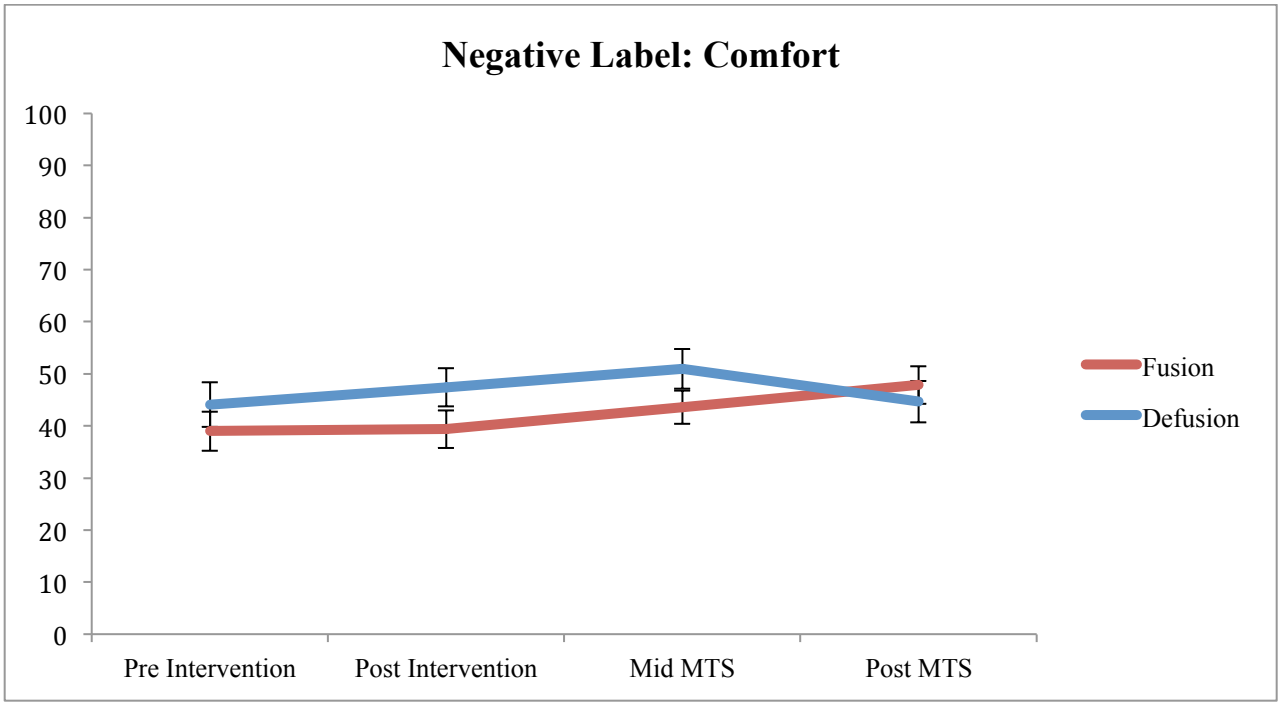


Figure 2. Mean self-reported ratings of comfort for the negative self-label across four time points. Error bars represent standard error of the mean.

Third, the negative label willingness model also produced a violation of the sphericity assumption, $\chi^2(5) = 55.85$, $p < .001$, $\varepsilon = .736$. Since the estimated epsilon value is less than .75 (a larger deviation from sphericity), the more conservative Greenhouse-Geisser correction was applied to adjust the degrees of freedom. There was no significant interaction in terms of willingness $F(2.208, 234) = 1.286$, $p = .279$, $\eta_{partial}^2 = .012$ and no main effect for time, $F(2.208, 234) = 2.447$, $p = .083$, $\eta_{partial}^2 = .023$. There was a trending main effect for condition on willingness ratings $F(1, 106) = 3.847$, $p = .052$, $\eta_{partial}^2 = .035$. Those in the defusion group indicated higher willingness ($M = 60.19$; $SE = 2.86$) to think about the negative label compared to those in the fusion condition ($M = 52.26$; $SE = 2.86$) but this difference did not reach statistical significance. See Figure 3.

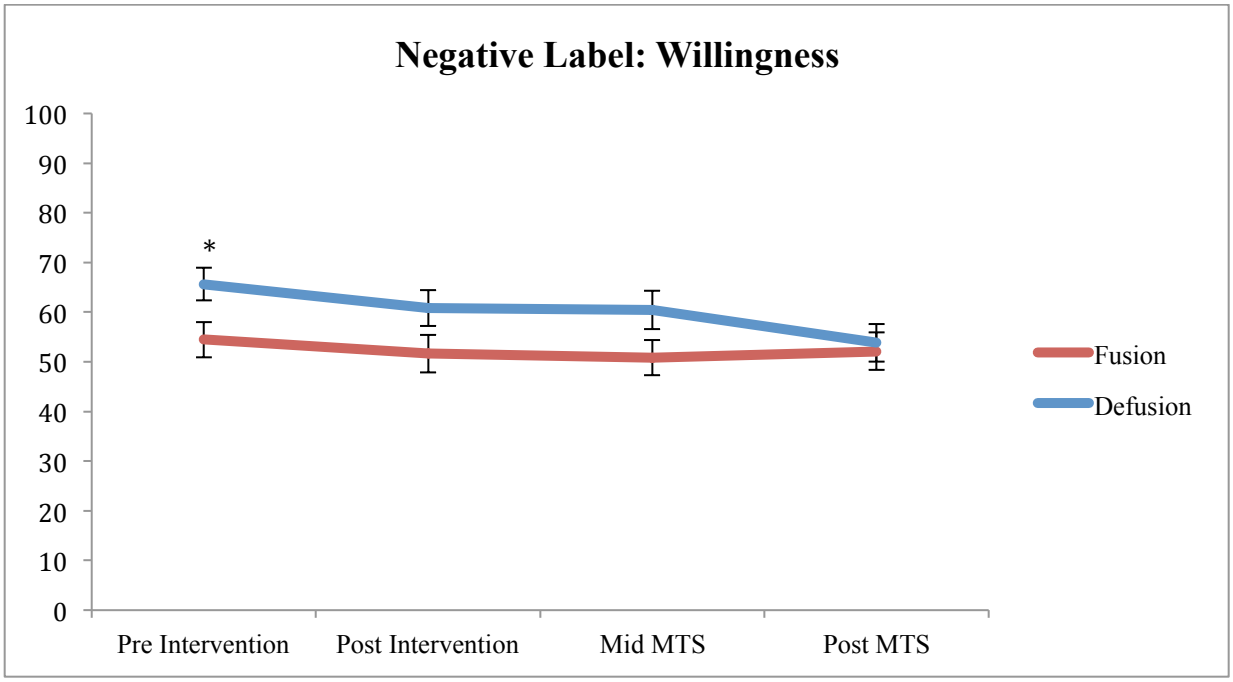


Figure 3. Mean self-reported ratings of willingness for the negative self-label across four time points. Error bars represent standard error of the mean. *$p < .05$.

Positive labels. No interaction effects were detected on believability or comfort ratings of self-identified positive labels. That is, the changes over time on the self-reported ratings of these factors did not differ as a function of condition. There was a significant interaction effect for willingness.

The positive label believability model produced a violation of the sphericity assumption, $\chi^2(5) = 29.31$, $p < .001$, $\varepsilon = .863$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was no significant interaction in terms of believability, $F(2.59, 274) = 2.317$, $p = .085$, $\eta_{partial}^2 = .021$, and no main effect for condition, $F(1, 106) = .381$, $p = .538$, $\eta_{partial}^2 = .004$. There was, however, a significant main effect for time, $F(2.59, 274) = 38.107$, $p < .001$, $\eta_{partial}^2 = .264$. Pairwise comparisons revealed statistically significant increases from time 1 ($M = 44.52$; $SE = 2.20$) to time 2 ($M =$

53.03; *SE* = 2.51) and time 2 to time 3 (*M* = 60.79; *SE* = 2.42), but no significant increase from time 3 to time 4 (*M* = 64.91; *SE* = 2.38). See Figure 4.

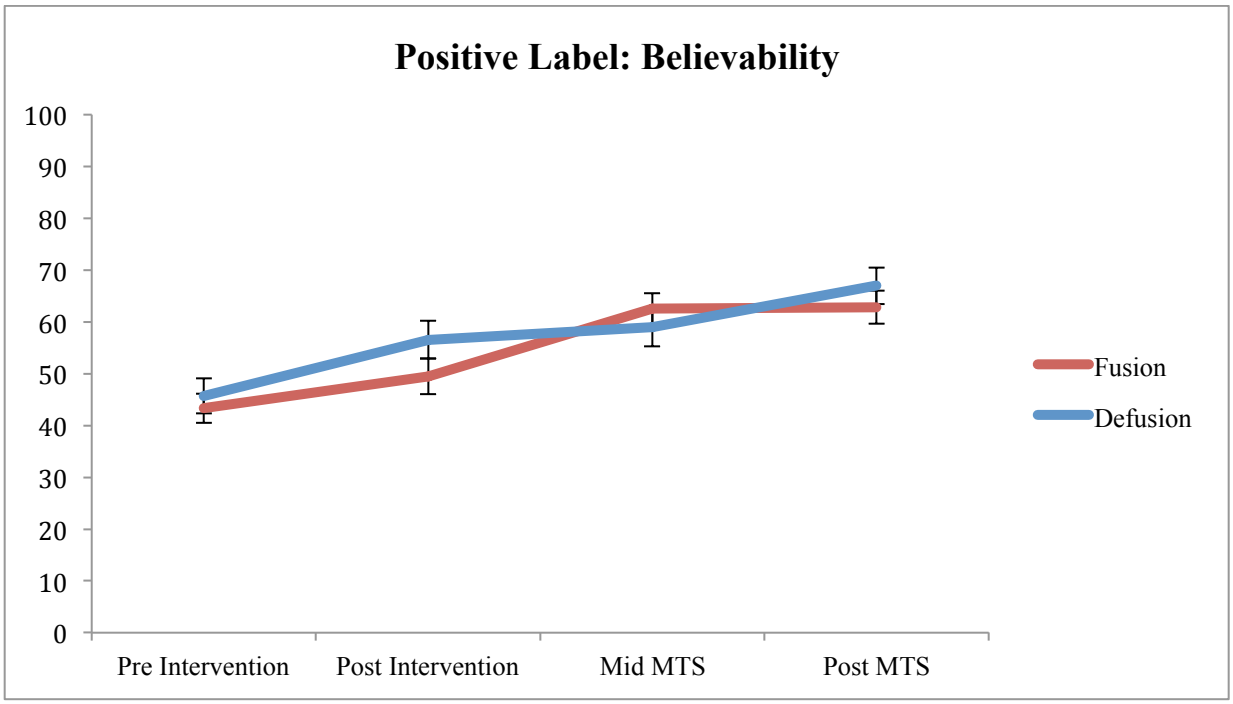


Figure 4. Mean self-reported ratings of believability for the positive self-label across four time points. Error bars represent standard error of the mean.

The positive label comfort model also produced a violation of the sphericity assumption, $\chi^2(5) = 30.59$, $p < .001$, $\varepsilon = .872$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was no significant interaction in terms of comfort $F(2.615, 277) = 2.220$, $p = .095$, $\eta_{partial}^2 = .021$, and no main effect for condition, $F(1, 106) = .120$, $p = .729$, $\eta_{partial}^2 = .001$. There was, however, a significant main effect for time, $F(2.615, 277) = 40.938$, $p < .001$, $\eta_{partial}^2 = .279$. Pairwise comparisons revealed statistically significant increases from time 1 (*M* = 51.32; *SE* = 2.30) to time 2 (*M* = 60.54; *SE* = 2.28) and time 2 to time 3 (*M* =68.17; *SE* = 2.00), but no significant increase from time 3 to time 4 (*M* = 70.99; *SE* = 1.99). See Figure 5.

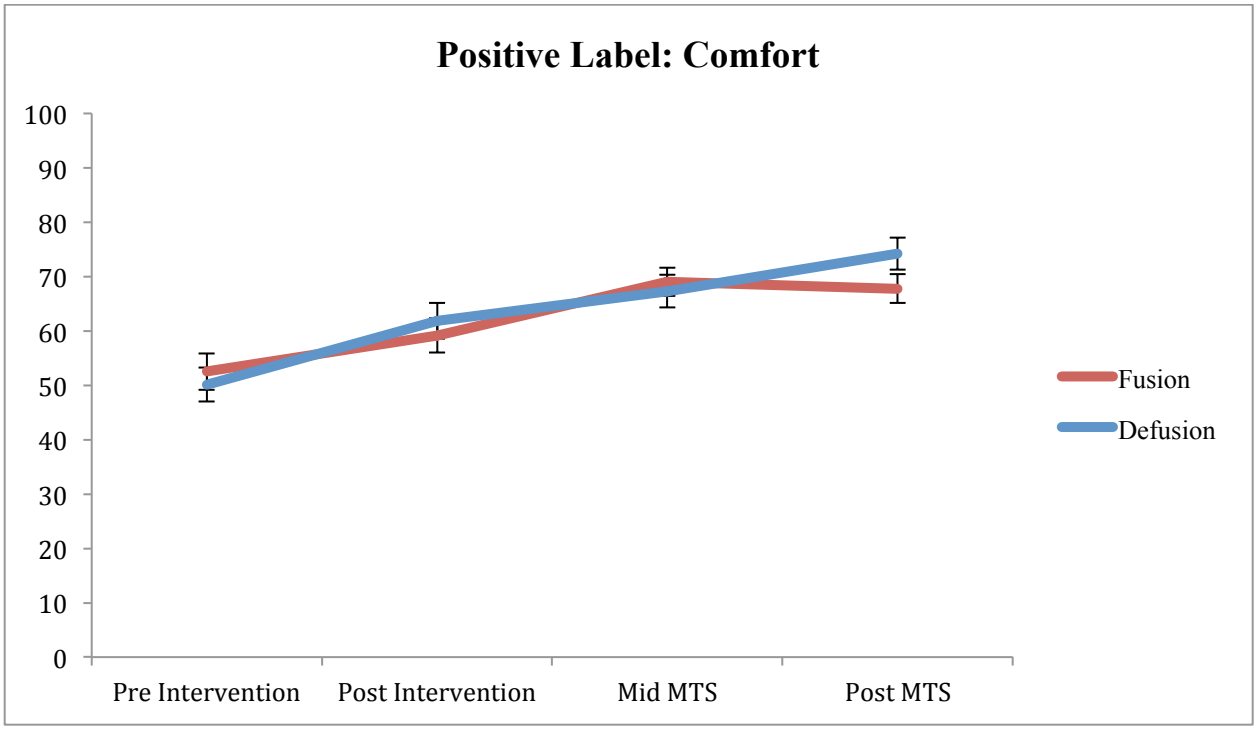


Figure 5. Mean self-reported ratings of comfort for the positive self-label across four time points. Error bars represent standard error of the mean.

The positive label willingness model also produced a violation of the sphericity assumption, $\chi^2(5) = 37.77$, $p < .001$, $\varepsilon = .850$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was a significant interaction effect for ratings of willingness $F(2.549, 270) = 3.066$, $p = .036$, $\eta_{partial}^2 = .028$. A series of post hoc one-way ANOVAs revealed no statistically significant differences between conditions at time 1, $F(1, 106) = .007$, $p = .934$, $d = .02$, time 2, $F(1, 106) = 1.138$, $p = .288$, $d = .21$, or time 3, $F(1, 106) = .061$, $p = .805$, $d = .05$. However at time point 4, the defusion group rated willingness significantly higher ($M = 79.11$; $SD = 20.32$) than the fusion group ($M = 70.57$; $SD = 20.83$), $F(1, 106) = 4.648$, $p = .033$, $d = .42$. See Figure 6.

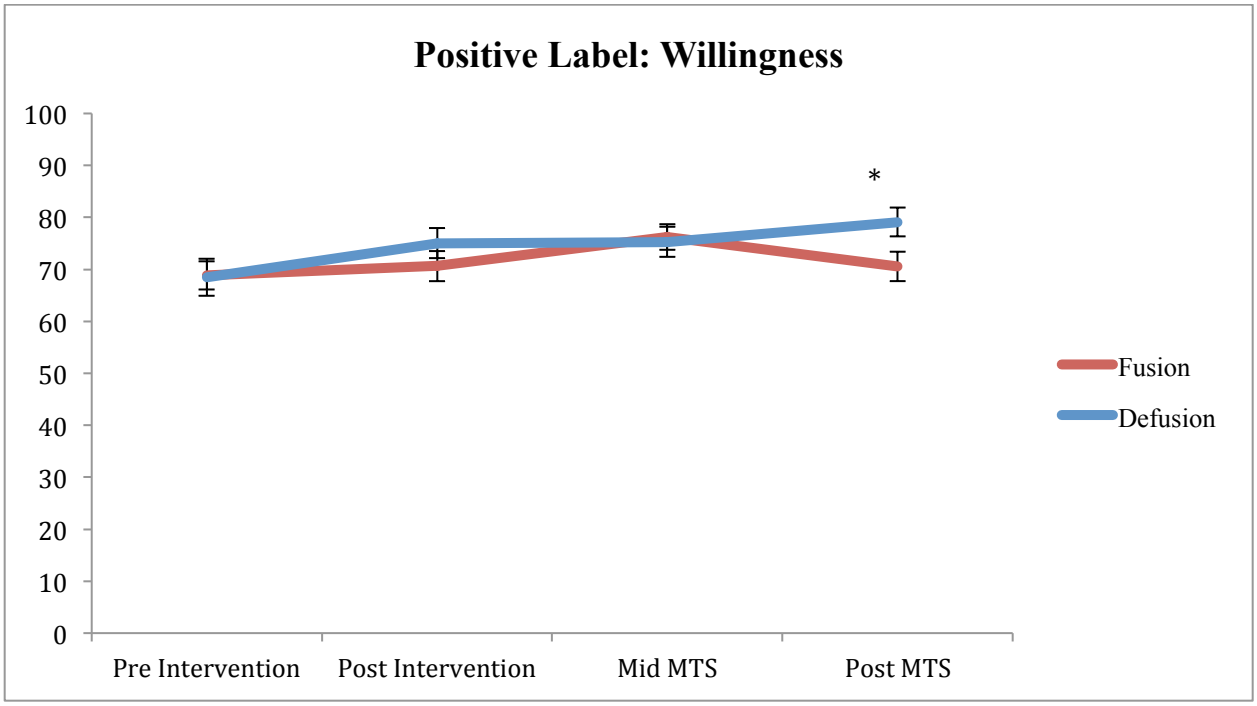


Figure 6. Mean self-reported ratings of willingness for the positive self-label across four time points. Error bars represent standard error of the mean. *$p < .05$.

Inconsistent Stimuli Match-to-Sample

Differential performance by class type. To examine whether there was differential performance between groups depending on specific class type (i.e., self-referential or neutral), 2 (condition) x 3 (stimulus classes) mixed between-within ANOVAs were conducted.

Accuracy. Accuracy was calculated as the number correct per class type in testing block 5 (see Table 3); that is, the phase in which equivalence was tested for inconsistent stimuli. During this block, there were 18 trials total with six trials per class type. In the accuracy ANOVA model, not all assumptions were met. A significant Box's M ($p < .001$) suggests heterogeneity of intercorrelations. Additionally, Levene's statistics on both self-relevant classes indicate inequality of error variances (me-good $p = .001$; others-bad $p < .001$). However, since the sample sizes are equal ($n = 54$), the analysis was considered sufficiently robust to violations of both assumptions (Tabachnick & Fidell, 2007).

With sphericity assumed, the ANOVA revealed a significant interaction, $F(2, 212) = 3.094$, $p = .047$, $\eta_{partial}^2 = .028$. However, it was necessary to adjust for sphericity because the model violated this assumption, $\chi^2(2) = 35.27$, $p < .001$, $\varepsilon = .795$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. Once this correction was applied, the alpha value exceeded the cutoff value of $p = .05$, $F(1.59, 169) = 3.094$, $p = .059$, $\eta_{partial}^2 = .028$. Given the small effect size, the analysis was slightly underpowered (observed $\beta = .526$).

A series of one-way ANOVAs were conducted to further examine this nearly significant interaction effect. There was a statistically significant difference between groups on average accuracy in both self-relevant classes: For the me-positive class, defusion participants responded more accurately ($M = 5.69$; $SD = 1.03$) than the fusion participants ($M = 5.13$; $SD = 1.77$), $F(1, 106) = 3.984$, $p = .049$, $d = .30$; likewise for the others-negative class, defusion participants responded more accurately ($M = 5.69$; $SD = .91$) than the fusion participants ($M = 4.96$; $SD = 1.82$), $F(1, 106) = 6.799$, $p = .010$, $d = .51$. There was not a statistically significant difference between participants in the defusion ($M = 5.78$; $SD = .904$) and fusion ($M = 5.63$; $SD = 1.07$) groups on average number correct for the neutral class, $F(1, 106) = .604$, $p = .439$, $d = .15$. See Figure 7.

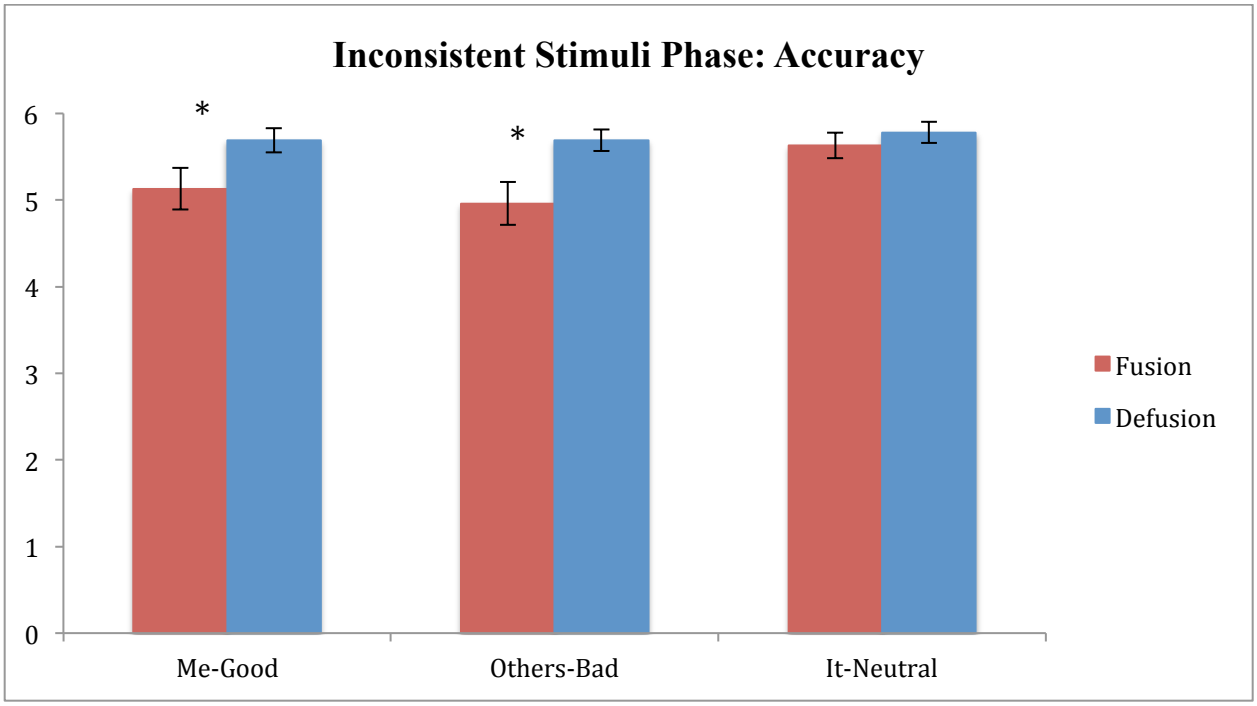


Figure 7. Mean number correct on inconsistent stimuli phase for each class type (i.e., two self-relevant and one neutral). Error bars represent standard error of the mean. *$p < .05$.

Fluency. Fluency was calculated as the average number correct per minute for each class type in the 5th testing block (see Table 3); that is, the phase in which equivalence was tested. In the fluency ANOVA model, all assumptions were met with the exception of Levene's statistics on self-relevant classes (me-good $p = .003$; others-bad $p = .015$). There was no significant interaction effect for fluency $F(2, 212) = 2.248$, $p = .108$, $\eta_{partial}^2 = .021$.

Post hoc one-way ANOVAs revealed a statistically significant difference between groups on the others-bad class, $F(1, 106) = 9.366$, $p = .003$, $d = .59$, with the defusion participants responding more fluently ($M = 28.26$; $SD = 8.99$) than the fusion participants, ($M = 22.00$; $SD = 12.05$). Although the difference between groups on the me-good class was not statistically significant, $F(1, 106) = 3.10$, $p = .081$, $d = .34$, the trend was in the expected direction, with defusion participants responding slightly more fluently ($M = 31.64$; $SD = 10.87$) than the fusion

participants (M = 27.09; SD = 15.57). There was not a statistically significant difference between participants in the defusion (M = 30.55; SD = 9.56) and fusion (M = 28.67; SD = 11.47) groups for the neutral class, $F(1, 106) = .861$, $p = .356$, $d = .18$. See Figure 8.

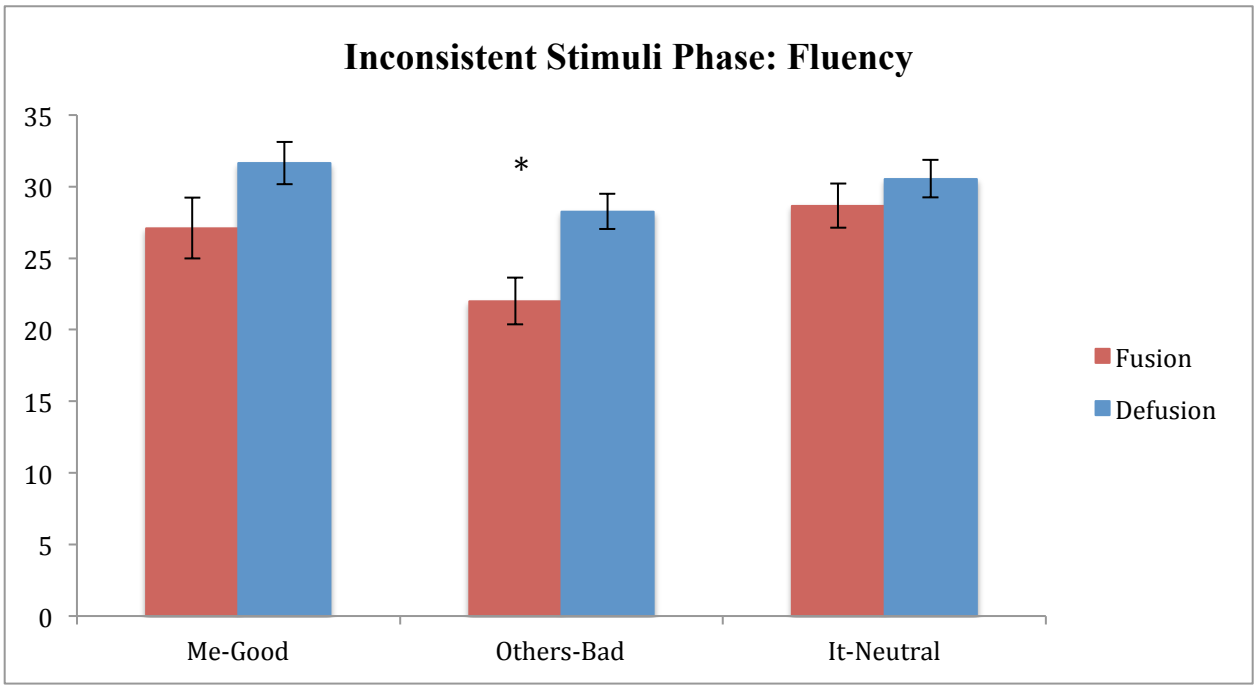


Figure 8. Mean fluency on inconsistent stimuli phase for each class type (i.e., two self-relevant and one neutral). Error bars represent standard error of the mean. *$p < .05$.

Facilitated Acquisition Match-to-Sample

Differential performance by class type. For the facilitated acquisition phase, to examine whether there was differential performance between groups depending on specific class type (i.e., self-referential or neutral), 2 (condition) x 3 (stimulus classes) mixed between-within ANOVAs were conducted.

Accuracy. Accuracy was calculated as the number correct per class type in testing block 10 (see Table 3); that is, the phase in which equivalence was tested for facilitated acquisition. During this block, there were 18 trials total with six trials per class type. In the accuracy ANOVA model, several assumptions were not met. A significant Box's M ($p < .001$) suggests

heterogeneity of intercorrelations. Additionally, Levene's statistics on one of the neutral classes indicates inequality of error variances ($p < .001$). However, since the sample sizes are equal ($n = 54$), the analysis is considered to be relatively robust to violations of both assumptions (Tabachnick & Fidell, 2007). Additionally, the sphericity assumption was violated in this model, $\chi^2(2) = 12.82$, $p = .002$, $\varepsilon = .920$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was no significant interaction effect $F(1.84, 195) = 1.882$, $p = .158$, $\eta_{partial}^2 = .017$.

Post hoc one-way ANOVAs revealed a statistically significant difference between groups on one of the neutral classes, $F(1, 106) = 6.101$, $p = .015$, $d = .48$, with the defusion participants responding more accurately ($M = 5.89$; $SD = .572$) than the fusion participants, ($M = 5.44$; $SD = 1.19$). There was not a statistically significant difference between participants in the defusion ($M = 5.78$; $SD = .90$) and fusion ($M = 5.63$, $SD = 1.07$) groups on average number correct for the class containing the negative label, $F(1, 106) = .604$, $p = .439$, $d = .15$. Likewise, there was not a statistically significant difference between participants in the defusion ($M = 5.67$; $SD = .847$) and fusion ($M = 5.61$; $SD = .787$) groups on average number correct for the other neutral class, $F(1, 106) = .125$, $p = .725$, $d = .07$. See Figure 9.

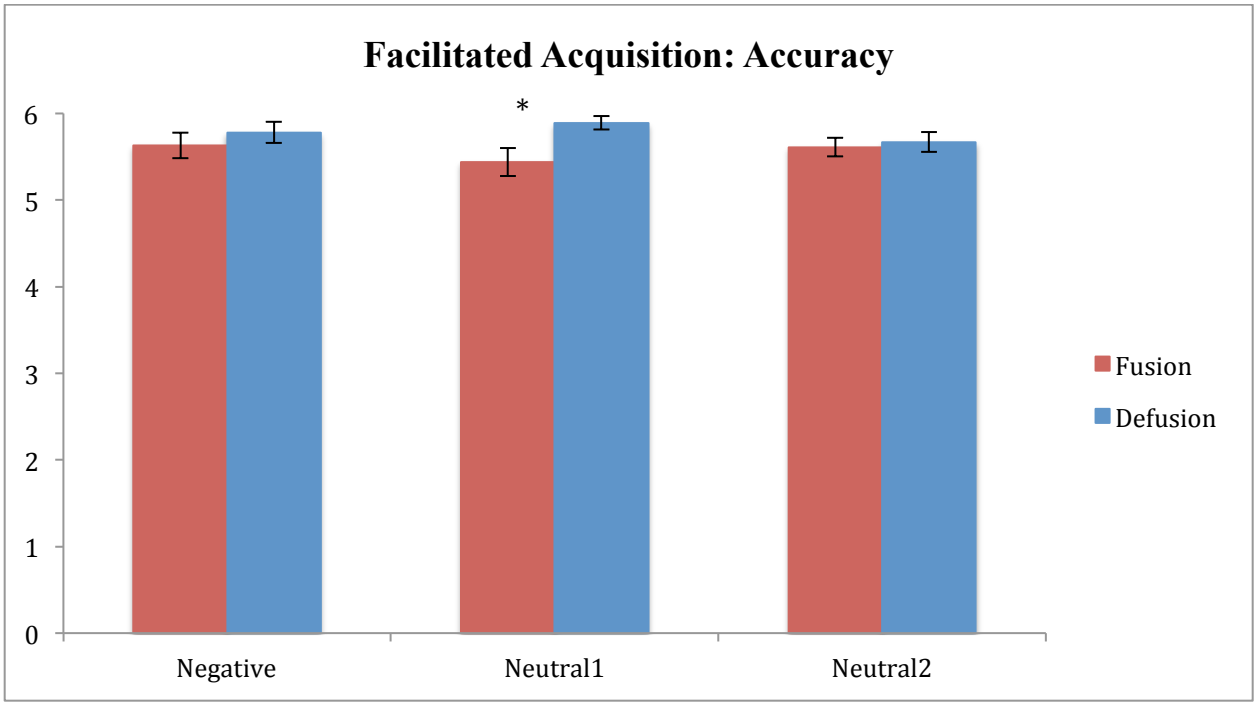


Figure 9. Mean number correct on facilitated acquisition phase for each class type (i.e., one self-relevant and two neutral). Error bars represent standard error of the mean. *$p < .05$).

Fluency. Fluency was calculated as the average number correct per minute for each class type in testing block 10 (see Table 3); that is, the phase in which equivalence was tested. In the fluency ANOVA model, all assumptions were met with the exception of sphericity, $\chi^2(2) = 16.16$, $p < .001$, $\varepsilon = .897$. Since the estimated epsilon value is greater than .75, the Huynh-Feldt correction was applied to adjust the degrees of freedom. There was a significant interaction effect for fluency, $F(1.79, 190) = 4.708$, $p = .013$, $\eta_{partial}^2 = .043$.

Contrary to what was hypothesized, post hoc ANOVAs revealed no significant difference for the self-relevant class (i.e., the class containing the negative label), $F(1, 106) = .230$, $p = .633$, $d = .09$. Differences approached statistical significance for the neutral classes, $F(1, 106) = 3.663$, $p = .058$, $d = 37$; and $F(1, 106) = 2.983$, $p = .087$, $d = .33$. See Figure 10.

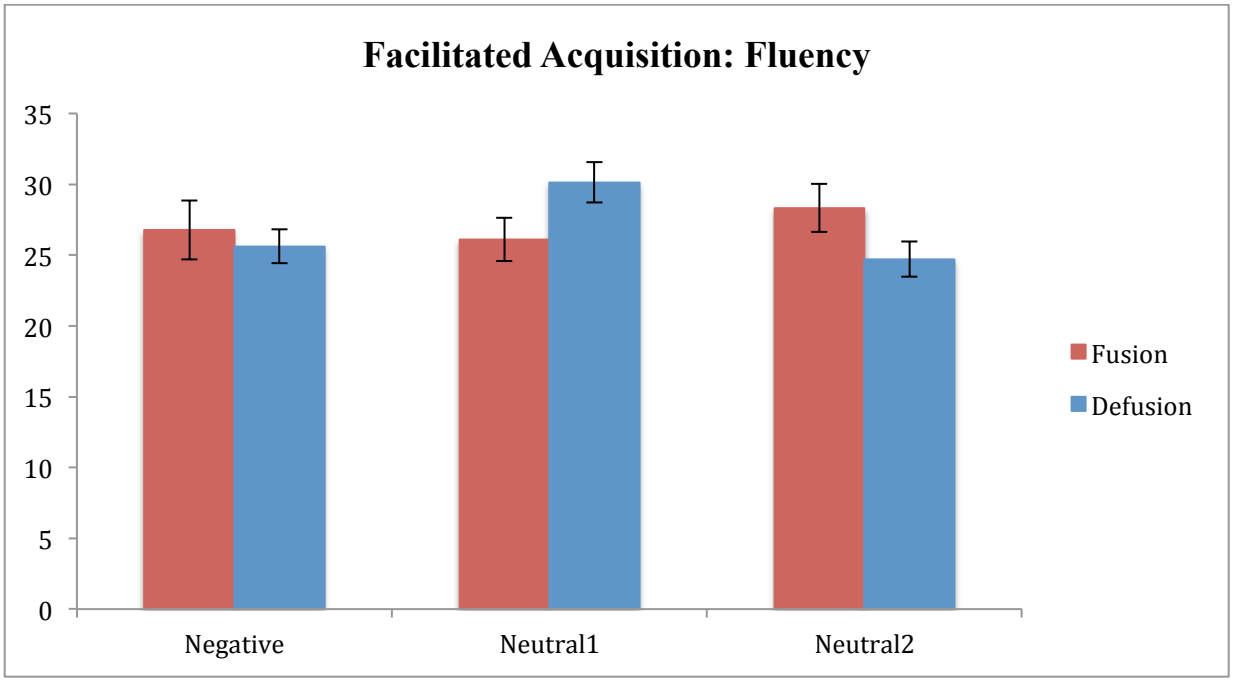


Figure 10. Mean fluency on facilitated acquisition phase for each class type (i.e., one self-relevant and two neutral). Error bars represent standard error of the mean.

DISCUSSION

The current study investigated whether the MTS task could be used as a behavioral measure of fusion with verbal rules. It was designed as a partial replication and extension of two studies examining MTS for this purpose (Adcock et al., 2010; Merwin & Wilson, 2005). Furthermore, this study integrated the Adcock and Merwin studies by attempting to model both the inflexibility of self-relevant terms, as well as the spread of negative stimulus functions to arbitrary stimuli via relational learning. Additional features of the study included an attempt to experimentally manipulate fusion and defusion, as well as the inclusion of personally relevant adjectives chosen by individual participants.

Experimental Manipulation

Defusion intervention. In the current study, the defusion manipulation caused a statistically significant decrease in believability ratings. This finding is consistent with previous studies showing a decrease in believability following defusion exercises (Deacon et al., 2011; Masuda et al., 2004; Masuda et al., 2009). Other studies have primarily used spoken repetition of a distressing label (Masuda et al., 2004; Masuda et al., 2009; Masuda et al., 2010), or the inclusion of the phrase "I'm having the thought that" before the self-relevant negative statement (Healy et al., 2009). The current study incorporated both of these techniques and added additional components (e.g., instruction to type the label backwards, and imagine the label as a visual image becoming larger and smaller). Another difference is that the current preparation was computerized whereas most other studies involved the experimenter leading participants through the defusion rationale and exercise (e.g., Masuda et al., 2010). Moreover, while some previous

studies used brief defusion interventions (e.g., Masuda et al., 2004), others lasted considerably longer, from 90 minutes (Deacon et al., 2011) up to three, 1-hour weekly sessions (Hinton & Gaynor, 2010). In the current study, because instructions are read from the computer and responses are typed into the computer, the delivery of the instructions is standardized and the compliance of response to the instructions is readily verified. If replicated, this defusion preparation provides a very brief (five minutes), easily replicable tool for examining defusion in the laboratory.

Fusion intervention. In order to more thoroughly examine fusion and defusion in the laboratory, we need reliable means of altering levels of fusion. The defusion intervention was based on the theoretical rationale underlying the process of defusion, clinical procedures aimed at lessening fusion, and incorporated techniques that have demonstrated efficacy in previous studies (e.g., Healy et al., 2008; Masuda et al., 2004). The fusion intervention was less straightforward to create. Clinicians are rarely in need of techniques that function to increase rule-governed behavior and cognitive fusion, thus we did not have a stock of clinical interventions to modify. Further, no previous published studies were available to inform designing such an intervention. As such, it was necessary to design the fusion intervention based on theoretically proposed contexts that support increased fusion.

The fusion intervention in the current study did not produce the intended increase in self-reported believability, but it did maintain the level of believability that was reported pre-intervention. No previous published study has attempted to directly increase the degree of fusion/believability and measure it in this way. When examining defusion experimentally, other studies have used comparison groups that were absent defusion components, but did not attempt to increase fusion. Hinton and Gaynor (2010) found differential ratings compared to a waitlist

control. Masuda and colleagues (2010) used a distraction control (participants read an excerpt about Stonehenge or focused on a picture of geometric shapes with the instruction to avoid thinking about the self-referential label). Adcock and colleagues (2010) used an academic questionnaire to make stimuli related to failure more salient. Although the questionnaire was likely to have increased fusion, the design did not include a measure of self-reported believability before and after. The intervention employed by the current study was based on theoretically proposed conditions that promote fusion, including comparison and evaluation (Hayes et al., 2012, p. 264). These theoretical connections between evaluative language and fusion/psychological distress have not yet been the subject of rigorous empirical examination.

It is worth noting that prior to selecting the negative self-label, and prior to both the fusion and defusion interventions, participants watched a video containing images of handwritten negative self-evaluations (see methods). It is possible that watching the video increased fusion with negative self-evaluations prior to participants selecting a label for use in the experiment. If this were so, it is possible that the fusion intervention did not increase fusion because fusion was already at high levels.

Even if the video increased fusion, modifying the fusion intervention might result in more detectable differential experiences between conditions. One possible modification would be to add prompts to increase the likelihood of sense making and evaluation, since these are theoretically proposed conditions that should increase fusion (Hayes et al., 2012, p. 264). For example, instructions might include, "What caused you to become this way?" "What would people do if they truly knew this about you?" "What will it cost in the future if you don't change?" These modifications might provide a context in which participants experience and report an increase in the believability of the self-label.

Another strategy for generating more effective fusion-promoting interventions would be to investigate the effect of various prompts using a separate interview-style preparation. Interviewing participants individually would allow a clinically experienced experimenter to tailor the prompts to the participant's particular difficulties. This interviewing study could also involve collecting periodic, moment-to-moment ratings of believability for the purpose of identifying which prompts have an impact on believability. Such a procedure might generate more meaningful, salient prompts, which in turn, could be translated into the computerized preparation and replicated.

Manipulation check. Because the fusion manipulation did not function as intended according to the self-reported ratings of believability, it is important to consider the implications regarding interpretation of MTS performance. That is, for interpretation of MTS performance to be meaningful, the groups would need to experience differential degrees of fusion immediately prior to the task. At pre-intervention, the believability ratings of those in the defusion condition were statistically higher than those in the fusion condition due to a failure of randomization. At post-intervention, immediately preceding the MTS task, the mean believability ratings for the two groups were equal. The analyses showed however, that the believability ratings decreased significantly in the defusion group, but not in the fusion group. For this reason, we consider interpretation of MTS performance to be appropriate.

Besides the failure of randomization, one procedural component that may have contributed to this obscurity was the video. As mentioned in the previous section, if fusion was already high because of the video, we cannot necessarily expect the fusion intervention to increase believability beyond that. The design of the current manipulation check does not allow us to parse the effects of the video from those of the intervention. The difficulty here is that we

wanted to set a context in which choosing a salient label was more likely. Participants coming to the laboratory may not be emotionally connected to distressing thoughts at that moment. We intended the video to facilitate connection with self-criticism, but it may have also induced fusion, which rendered the manipulation check difficult to interpret. To address this issue in future studies, participants could select and rate a negative label, then watch the video and rate the label again. They could also be offered the opportunity to choose a different label after the video if something more intense or bothersome arises. If so, they would be prompted to rate this new label. Setting up the manipulation check in this way would allow us to more thoroughly examine the effects of the video, and determine if the interventions produce differential degrees of fusion.

Another difficulty regarding the manipulation check pertains to the criterion upon which we base the interventions' validity. Self-reported believability may only imperfectly encompass what we mean by fusion. It is conceivable that a person may endorse a self-relevant thought as believable/true, but still behave in ways that are not dictated solely by derived stimulus functions. For example, a person may experience thoughts about being socially awkward and consider this to be extremely believable/true, yet recognize that the thought is not helpful in bringing him closer to his value in developing friendships. If he engages in interactions with friends despite experiencing true thoughts about being awkward, we would not consider him to be fused with the thought. As such, we must be careful not to draw strong conclusions about whether the interventions worked based solely on believability ratings.

Self-Reported Ratings

We hypothesized that after engaging in a defusion exercise, participant ratings of positive and negative self-labels would decrease in believability, and increase in comfort and willingness.

After engaging in a task designed to increase fusion, participant ratings were hypothesized to increase in believability, and decrease in comfort and willingness.

Negative labels. Ratings did not differ as a function of condition, as evidenced by the lack of statistically significant interaction effects on all aspects measured (i.e., believability, comfort, and willingness). Believability ratings decreased for participants in both groups over the course of the experiment. Given that both groups reported decreases, this could be an artifact due, in part, to demand characteristics. Instruction sets for both conditions included a rationale justifying the use of the techniques. For the fusion condition, the instructions indicated, "*Some sources suggest that a way to manage negative thoughts is to figure out why you think there is something wrong."* The defusion instructions stated, "*Sometimes recognizing that the label is just a word helps to deal with negative thoughts*." It is possible that participants responded in such a way that was consistent with their interpretation of the study's purpose. That is, if based on the instructions, participants thought the purpose of the study was to decrease ratings of how believable/true their negative labels were, this may account for the finding that both groups reported decreases over the course of the experiment. We included the rationale for defusion in the current study because previous studies have demonstrated the importance of including both a rationale and experiential component (Masuda et al., 2004). We included the rationale for the fusion condition in an attempt to control for it as a confounding variable. In the future, researchers could consider modifying the instructions to include less information about what is expected, while still providing a basic rationale. For example, the defusion instructions could be, "*recognizing the label is simply a thought can change one's relationship with the word*" and the fusion instructions could be omitted or state, "*trying to figure out why you think something is wrong can change your perception of the situation*."

There was no change in ratings of comfort across time for either condition. This is inconsistent with previous studies reporting increases in self-rated comfort after defusion interventions (e.g., Healy et al., 2008; Masuda et al., 2004; Masuda et al., 2009). However, as noted in a number of articles (e.g., Healy et al., 2008; Masuda et al., 2004), increasing comfort is not necessarily the aim of defusion interventions; rather it is sometimes an unintended side effect. Healy and colleagues noted the difficulty of making predictions about comfort within an ACT framework. They speculated that when willingness to interact with a particular stimulus occurs, it is possible that comfort might actually decrease due to the increased contact with the stimulus. Since the current design does not allow us to determine how willingness and comfort interact on an individual level, additional research is required. Single-case designs would be useful in investigating such questions since it would allow for the examination of individual changes in ratings of comfort and willingness in response to various interventions.

A trending main effect suggested participants in the defusion group rated willingness to think about the negative label slightly higher overall compared to those in the fusion group. Because there was no statistically significant interaction however, ratings of willingness were not differentially impacted by the interventions. While Healy and colleagues (2008) found evidence of increased willingness after defusing self-statements, this was the only published study examining willingness in this context. The length of the current defusion intervention, while sufficiently long to produce decreases in believability, may need to be longer to produce changes in comfort and willingness. Future research could examine different iterations with varying length to test this hypothesis. Additionally, future research could examine potential behavioral markers of willingness (Mullen, Quebedeaux, Greene, Hebert, & Sandoz, 2013).

Positive labels. To our knowledge, no previous studies have compared ratings of words that are opposite to words they have self-identified (e.g., rating "smart" when the individual chose the word "stupid" to characterize himself). However, we expected that since the positive label is the antonym of a label that has aversive functions, it too would generate some degree of discomfort and unwillingness. Theoretically, if the derived stimulus functions of the word are disrupted by a defusion intervention, ratings of believability should decrease whether the stimulus is positive or negative. Likewise, ratings of willingness should increase, regardless of the valence of the stimulus (and comfort may or may not increase). Alternatively, fused participants should be more influenced by the derived stimulus functions of the verbal stimuli, rating the words in a more literal manner. On the positive adjective, fused participants would be expected to rate believability higher, but willingness lower than defused participants. We did not find this pattern of results in the current study.

There was no statistically significant interaction effect for either believability or comfort. Ratings of believability and comfort increased over time for both groups. Again, this pattern of responding may have been due to demand characteristics. That is, if based on the instructions, participants thought the purpose of the study was to increase ratings of how believable and comfortable the positive labels were, this may account for the finding that both groups reported increases over the course of the experiment.

A statistically significant interaction effect was detected on ratings of willingness with positive labels. More specifically, there were no statistically significant group differences in ratings of willingness before or after the interventions or mid-way through the MTS task. However after the MTS task was complete, willingness ratings decreased for those in the fusion condition whereas ratings increased for those in the defusion condition, producing a statistically

significant difference between groups. While this is consistent with the hypothesis, in the absence of a similar trend involving the negative label, it is unclear why willingness would increase only for the positive label.

To our knowledge, the only other published study that examined positive self-statements was conducted by Healy and colleagues (2008). In this study, both positive and negative self-statements were included to determine the relative impact of a defusion intervention on ratings of believability, comfort, and willingness. However, these positive self-statements were general (e.g., "I am whole") rather than self-identified antonyms of negative labels. In Healy and colleagues' study, while ratings changed in the expected direction for the negative self-statements, there was no change in ratings for the positive self-statements. The researchers concluded that the defusion effect occurred with only stimuli that evoked a negative emotional experience. Again, in the current study, since the positive antonym presumably involved a negative emotional experience (since it was directly related to the negative word), we would not necessarily anticipate similar results.

Inconsistent Stimuli Match-to-Sample

We provided training in this phase to result in three equivalence classes including (1) the word "me," the positive label, and a nonsense word; (2) the word "others," the negative label, and a nonsense word; and (3) the word "it," the word "yellow," and a nonsense word. We hypothesized that a differential pattern of responding would emerge between the fusion and defusion conditions when presented with stimuli that were inconsistent with pre-existing relations (i.e., consistent = me + negative label; inconsistent = me + positive label). Within groups, we expected fusion participants to perform worse on self-referential stimulus classes, and we expected defusion participants to perform equally well regardless of stimulus type.

Comparing between groups, we hypothesized that fusion participants would make more errors on self-referential stimulus classes than defusion participants.

The current data yielded a nearly statistically significant interaction effect (small effect size) in which the fusion participants made more errors on the self-relevant classes compared to the neutral class, whereas the defusion group showed relatively equal responding regardless of class type. This pattern of responding is consistent with what we expected. Fusion participants made more errors on tests for equivalence when classes were self-referential and inconsistent with previous learning history. Defusion participants demonstrated increased sensitivity to contingencies as evidenced by fewer errors, even when stimuli pairs were inconsistent with previous learning history.

Although this difference approached statistical significance, the difference in mean number correct was relatively small and not likely to be clinically significant. Of six trials within each class, the mean number correct on the me-good class was 5.7 (*SD* = 1.03) for defusion participants and 5.1 (*SD* = 1.77) for fusion participants. However, we would not necessarily expect clinically significant differences in a sample reporting relatively low distress and self-esteem. In the current sample 12.0% reported moderate depression, 21.4% reported moderate anxiety, 14.7% reported moderate stress, and 5.6% reported low self-esteem according to suggested cutoff scores for the DASS and RSES. Merwin and Wilson's (2008) study found that participants reporting high distress and low self-esteem made significantly more errors on trials similar to those used in the current study. Future studies should select for individuals reporting higher distress and lower self-esteem to directly compare the performance of clinical and non-clinical samples.

The fluency data (number correct per minute) did not yield a statistically significant interaction. However, a statistically significant difference emerged on the "others-bad" class, such that fusion condition participants responded less fluently on this class compared to defusion condition participants. The difference between groups on the "me-good" class approached significance, while the difference between groups on the neutral class was not significant. This pattern trended in the expected direction. Fusion participants performed somewhat worse on classes containing self-referential stimuli, but no different on the class containing neutral stimuli. When self-referential stimuli were presented, fused participants were not as sensitive to contingencies in the task. Compared to the analysis examining accuracy, the main difference with this analysis is that it incorporates the latency data to measure how quickly and accurately participants responded. In the future, more stringent controls should be placed on the time allotted to make a response so that excessively long latencies will be counted as incorrect. For example, incorporating a limited hold causes the stimuli to disappear after a specified length of time (e.g., two seconds). An added benefit of placing a limited hold is that it makes responding more difficult, which increases the overall error rate and produces increased variability in responses. Since the error rates were low using the current preparation, increased variability in the dependent variable would make detecting potential effects more likely.

Facilitated Acquisition Match-to-Sample

For the facilitated acquisition phase, we attempted to model the spread of negative stimulus functions to arbitrary stimuli via relational learning. We provided training to result in three equivalence classes including (1) the negative label and two arbitrary symbols, (2) a neutral adjective and two arbitrary symbols, and (3) another neutral adjective and two arbitrary symbols. We hypothesized that for the fusion participants only, a difference would emerge between self-

referential and neutral classes (i.e., fusion participants would produce more accurate and more fluent responding on the self-referential classes compared to the neutral class).

The current data did not support this hypothesis with regard to accuracy or fluency. Although relatively few studies have examined facilitated acquisition, it has been shown within the context of several presenting problems. In Wilson's (1998) experiment, participants addicted to alcohol made fewer errors on alcohol-related classes compared to classes with disease-related words or nature-related words. In Murrell et al. (2008), distressed parents demonstrated differential facilitated acquisition to emotionally salient parenting words. Likewise, in Adcock and colleagues' (2010) study, only lower GPA students showed the facilitated acquisition effect in the context of words related to failure. Since participants in the current study reported relatively low levels of psychological distress, this may partially account for difficulties detecting an effect. Researchers examining facilitated acquisition in the future could select for participants higher in distress, and those more likely to be influenced by self-referential verbal stimuli. Additionally, if participants choose a self-label that they initially rate as lower than 50/100 in terms of believability, they should be asked to choose a label that is more believable/uncomfortable (Masuda et al., 2010). As with the inconsistent stimuli phase, low overall error rates made detecting potential effects more difficult. Therefore, incorporating a limited hold for this phase may be beneficial as well.

Future Directions

The design of the current study allowed us to examine whether participants can respond to a set of contingencies that were presumably inconsistent with their learning histories (i.e., relating "me" with an antonym of the self-referential negative label). It does not allow us to examine how fluidly they are able to respond to changing contingencies. One way to examine

flexibility with contingencies is to incorporate changing criteria such that relating "me" with the negative label is reinforced at times, and at other times relating it with the positive label is reinforced. Once responding is established with one relation, the researcher could switch the contingency and count the number of trials it takes for the participant to respond correctly to the new contingency. Such a procedure may more closely approximate everyday situations in which contexts commonly change.

Many clients who present for treatment presumably demonstrate rigidity with regard to self-referential stimuli (Swann, 2011). Whether the presenting problem is depression, anxiety, interpersonal conflict, or substance abuse, the person is likely to engage in evaluative self-talk about who they are and whether they are capable of changing their behavior (e.g., Beck, Rush, Shaw, & Emery, 1987; Clark & Wells, 1995; Orth & Robins, 2013). Individuals whose behavior is largely organized by verbally constructed representations of themselves are less sensitive to changes in context (Hayes et al., 2012). In terms of treatment development, it would be useful for researchers to know if defusion interventions are functioning to increase sensitivity to context in a therapeutic setting, and further, whether these sensitivities translate to out-of-session behaviors. For example, is the client's behavior sensitive to shaping by moment-to-moment interactions with the therapist? Is the client's behavior sensitive to shaping by direct consequences from his environment? Do these in-session changes improve out-of-session interpersonal or professional functioning, for example? The current study took a first step in demonstrating the disruption of previously derived relations by promoting receptiveness to current contingencies. Such findings, if examined further and replicated, may have important clinical implications to the extent that they demonstrate flexibility with self-referential stimuli and increased sensitivity to clinical interactions, experiential exercises, and out-of-session activities.

Fusing with self-referential stimuli and rigid rule following is only maladaptive to the extent that it limits engagement with valued activities (e.g., I can't open up to my partner because I'm flawed and unlovable; Wilson & Murrell, 2004). According to ACT, adaptive responding sometimes involves psychological flexibility, or "the ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior when doing so serves valued ends" (Hayes, Strosahl, Bunting, Twohig, & Wilson, 2004, p. 5). In terms of self-relevant thoughts, it follows that adaptive responding may involve the ability to recognize the process of self-criticism in the present moment, to choose whether to behave in accordance with rules or not, and to be receptive to potential sources of reinforcement in one's environment (Törneke, 2010). If an MTS protocol is used to measure cognitive flexibility with self-relevant stimuli, future research should link this behavior to values-consistent behaviors. For example, if we observe defusion participants in their daily lives, are they taking better care of themselves even in the presence of self-deprecating thoughts? Are they interacting with loved ones in meaningful ways despite self-rules directing otherwise? Future studies could incorporate a behavior monitoring follow-up in which participants report the frequency of certain values-oriented behaviors. For example, researchers could periodically survey participants over the course of two months following the MTS task; subsequently, they could determine if MTS performance is predictive of values-consistent behavior. Of particular interest would be behaviors that are inconsistent with self-rules and consistent with personal values.

Conclusion

The self-fusion MTS task is still in a beginning phase of development. Results of the current study offer preliminary evidence for the utility of the MTS procedure in detecting fusion with self-referential stimuli. Taken together, the findings should be interpreted with caution since

the overall number of analyses that we ran increased the risk of Type I error. Likewise, several of the effects approached, but did not reach statistical significance. Given the exploratory nature of the current study, and the relative novelty of its design, the risk of Type II error should also be given due attention. It is our opinion that the current findings justify continued investigation in this area. If the effects are replicated, the MTS task has potential as a behavioral marker of fusion in the context of evaluative self-referential labels.

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LIST OF APPENDICES

APPENDIX A: DEMOGRAPHIC SURVEY

Demographic Survey

1. What is your age? _____ years

2. What is your gender? Male Female

3. What is your racial/ ethnic identity?
   (a) White / Caucasian
   (b) African / African-American
   (c) Hispanic / Latino
   (d) Asian / Asian-American
   (e) Alaskan / Pacific Islander
   (f) Multi-racial
   (g) Other _____

4. What is your current year in school?
   (a) Freshman
   (b) Sophomore
   (c) Junior
   (d) Senior
   (e) Graduate Student

APPENDIX B: DEPRESSION ANXIETY STRESS SCALE – SHORT FORM

DASS-21

Choose the number indicating how much the statement applied to you over the past week.

0 = Did not apply to me at all
1 = Applied to me to some degree, or some of the time
2 = Applied to me to a considerable degree, or a good part of the time
3 = Applied to me very much, or most of the time

____ 1. I found it hard to wind down.

____ 2. I was aware of dryness in my mouth.

____ 3. I couldn't seem to experience any positive feeling at all.

____ 4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion).

____ 5. I found it difficult to work up the initiative to do things.

____ 6. I tended to over-react to situations.

____ 7. I experienced trembling (e.g., in the hands).

____ 8. I felt that I was using a lot of nervous energy.

____ 9. I was worried about situations in which I might panic and make a fool of myself.

____ 10. I felt that I had nothing to look forward to.

____ 11. I found myself getting agitated.

____ 12. I found it difficult to relax.

____ 13. I felt down-hearted and blue.

____ 14. I was intolerant of anything that kept me from getting on with what I was doing.

____ 15. I felt I was close to panic.

____ 16. I was unable to become enthusiastic about anything.

____ 17. I felt I wasn't worth much as a person.

____ 18. I felt that I was rather touchy.

____ 19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat).

____ 20. I felt scared without any good reason.

____ 21. I felt that life was meaningless.

APPENDIX C: ROSENBERG SELF-ESTEEM SCALE

RSES

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle SA. If you agree with the statement, circle A. If you disagree, circle D. If you strongly disagree, circle SD.

1. On the whole, I am satisfied with myself. SA A D SD

2. At times, I think I am no good at all. SA A D SD

3. I feel that I have a number of good qualities. SA A D SD

4. I am able to do things as well as most other people. SA A D SD

5. I feel I do not have much to be proud of. SA A D SD

6. I certainly feel useless at times. SA A D SD

7. I feel that I'm a person of worth, at least on an equal plane with others. SA A D SD

8. I wish I could have more respect for myself. SA A D SD

9. All in all, I am inclined to feel that I am a failure. SA A D SD

10. I take a positive attitude toward myself. SA A D SD

APPENDIX D: COGNITIVE FUSION QUESTIONNAIRE

CFQ13

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
Never true	**Very seldom true**	**Seldom true**	**Sometimes true**	**Frequently true**	**Almost always true**	**Always true**

1. My thoughts cause me distress or emotional pain	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2. I get so caught up in my thoughts that I am unable to do the things that I most want to do	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3. Even when I am having distressing thoughts, I know that they may become less important eventually	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4. I over-analyze situations to the point where it's unhelpful to me	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5. I struggle with my thoughts	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6. Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7. I get upset with myself for having certain thoughts	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8. I need to control the thoughts that come into my head	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9. I find it easy to view my thoughts from a different perspective	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10. I tend to get very entangled in my thoughts	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11. I tend to react very strongly to my thoughts	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12. It's possible for me to have negative thoughts about myself and still know that I am an OK person	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	**1**	**2**	**3**	**4**	**5**	**6**	**7**

APPENDIX E: CONSENT FORM

Consent to Participate in an Experimental Study

Title: Fusion with Self-Referential Labels: Examining a Behavioral Measure

Investigator
Lindsay W. Schnetzer
Department of Psychology
Peabody Building
The University of Mississippi
(662)610-4967

Description
We are interested in investigating ways of decreasing the negative impact of self-critical thoughts. In this study, we will be examining various types of tasks and observing the effects on the degree to which self-critical thoughts are rated as believable. More specifically, we will be asking you to complete surveys about general mental health and the extent to which you believe certain thoughts. Next, you will be asked to view a brief video, identify a negative aspect of yourself, and subsequently, to engage in a task involving writing about yourself. Finally, you'll be asked to engage in a computerized categorization task. This experiment will take approximately 1.5 hours to complete, and as such you will receive 1.5 hours of experimental credit for your participation in this study.

Risks and Benefits
Since you will be asked to identify and write about an aspect of yourself that you consider to be negative, you may experience negative emotions during this study. You will receive 1.5 hours of experimental credit for your participation in this study. We expect this study to contribute to our understanding of the ways people think about themselves.

Confidentiality
Your name and/or other identifying information will not be associated with your questionnaire responses, or your performance on the tasks. We will link your questionnaire responses using a random participant number that will not be connected to your identity in any way.

Right to Withdraw
You do not have to take part in this study and may withdraw from the study at any time without penalty. Whether or not you choose to participate or to withdraw will not affect your standing with the Psychology Department, or with the University. It will also not cause you to lose any benefits to which you are entitled. Earned experimental credits will be given based on your initial participation in the study. The researchers may terminate your participation in the study without regard to your consent and for any reason, such as protecting your safety and protecting the integrity of the research data. If the researcher terminates your participation, you will be given full credit for the study.

Student Participants in Investigators' Classes. Special human research subject protections apply where there is any possibility of coercion – such as for students in classes of investigators. Investigators can recruit from their classes but only by providing information on availability of

studies. They can encourage you to participate, but they cannot exert any coercive pressure for you to do so. Therefore, if you experience any coercion from your instructor, you should contact the IRB via phone (662-915-7482) or email (irb@olemiss.edu) and report the specific form of coercion. You will remain anonymous in an investigation.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protection obligations required by state and federal law and University policies. If you have any questions, concerns, or reports regarding your rights as a participant in research, please contact the IRB at (662) 915-7482.

Statement of Consent

I have read the above information. I have been given a copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study.

APPENDIX F: DEBRIEFING FORM

Debriefing Form

Thank you sincerely for your participation. Research shows that self-criticism and comparison with others is a very common occurrence. In this study we are seeking ways to help those who become stuck in self-criticism. We appreciate your willingness to participate in research that will hopefully inform interventions to help people who are critical of themselves. If you are experiencing distress for which you would like to seek help, please inform the primary investigator (lschnetz@go.olemiss.edu) or call one of the counseling services listed below: Psychological Services Center, University of Mississippi: (662) 915-7385; University Counseling Center: (662) 915-3784.

VITA

Lindsay Wilson Schnetzer, M.A.

Education

Doctor of Philosophy (anticipated) June 2011 – August 2015
University of Mississippi; Oxford, MS
Clinical Psychology
Dissertation: Fusion with Self-Referential Labels: Examining a Behavioral Measure

Master of Arts August 2008 – May 2011
University of Mississippi; Oxford, MS
Clinical Psychology
Thesis: Meaning in Life, Depression, and Alcohol Use in a College Sample

Bachelor of Arts August 1999 – December 2003
Franklin & Marshall College; Lancaster, PA
Major: Psychology

Clinical Experience

Pre-Doctoral Intern in Clinical Psychology June 2014 – present
VA Maine Healthcare System; Augusta, ME (APA Accredited; 1 year)

Health Psychology (Rotation: 6/2014-6/2015)
Supervisor: Helen Smart-Perille, Psy.D.

- Provide brief assessment and individual psychotherapy for veterans with various presenting concerns (e.g., cancer, weight management, diabetes management, ALS, multiple sclerosis, recovery from physical injury)
- Consult with members of multidisciplinary teams to deliver patient-centered coordinated care
- Co-facilitate weight management classes (MOVE!) and smoking cessation classes
- Utilize telehealth technology to facilitate treatment for individuals at remote locations
- Evaluate veterans being psychologically assessed for medical treatment adherence

Integrated Primary Care (Rotation: 6/2014-10/2014)
Supervisor: Erica England, Ph.D.

- Provided consultation for behavioral health concerns and functioned as part of a multidisciplinary team

- Served veterans with a range of psychological disorders and health-related behavioral difficulties
- Received same-day referrals from medical professionals and triaged presenting problems
- Used brief screening tools for initial assessment and to monitor progress
- Provided time-limited evidence-based psychotherapy using cognitive-behavioral and acceptance-based approaches
- Developed and implemented an Acceptance & Commitment Therapy-based behavior change workshop for veterans in the primary care setting
- Co-facilitated group therapies: cognitive behavior therapy (CBT) for anger and cognitive behavior therapy for women experiencing insomnia (CBTi)

Neuropsychology (Rotation: 11/2014-2/2015)
Supervisor: Christine Ramsay, Ph.D.

- Conducted neuropsychological evaluations and write integrated reports
- Co-facilitated group cognitive rehabilitation for individuals diagnosed with PTSD, TBI, and neurodegenerative conditions

Posttraumatic Stress Disorder Intensive Outpatient Program (Rotation: 3/2015-6/2015)
Supervisor: Jerold Hambright, Ph.D.

- Conduct psychosocial and diagnostic assessments to determine eligibility for program
- Facilitate group psychotherapy based in Acceptance and Commitment Therapy
- Provide individual, acceptance-based psychotherapy for Veterans with military trauma

Contract Assessor July 2013 – August 2013
Psychological Assessment Clinic, University of Mississippi
Supervisor: Scott Gustafson, Ph.D.

- Conducted psychological evaluations including cognitive, achievement, attention, and personality testing
- Wrote integrated reports and provided feedback regarding findings

Verification Specialist July 2013 – August 2013
Office of Student Disability Services, University of Mississippi
Supervisor: Scott Gustafson, Ph.D.

- Conducted brief interviews with university students to determine need for academic accommodation
- Examined psychological evaluations and communicated with other professionals to verify eligibility for services

Practicum Student Mental Health Therapist June 2012 – July 2013
Communicare Community Mental Health Center, Oxford, MS
Supervisor: Dixie Church, M.A., CMHT

- Completed comprehensive intake assessments and wrote integrated reports
- Provided individual psychotherapy to adults, adolescents, and children with a wide variety of psychological disorders
- Provided group psychotherapy for women with varied clinical presentations

- Employed cognitive-behavioral and acceptance-based interventions
- Engaged in consultation with psychiatrists, social workers, and case managers

Practicum Student Geriatric Mental Health Therapist October 2011 – June 2012
Region IV Community Mental Health, Corinth, MS
Supervisor: Kelly Wilson, Ph.D.

- Conducted brief mental status examinations
- Provided individual psychotherapy for older adults with comorbid medical and psychological conditions
- Engaged in consultation with other healthcare professionals including physicians, nurses, social workers, and recreation therapists

Practicum Student Behavioral Consultant/Therapist July 2010 – June 2011
North Mississippi Regional Center, Oxford, MS
Supervisor: Scott Bethay, Ph.D.

- Completed comprehensive assessments and integrated reports pertaining to intellectual disabilities, ADHD, and Autism Spectrum Disorders
- Delivered feedback to clients and families including education on diagnoses and explanation of service eligibility
- Conducted functional assessments and designed behavior programs
- Co-led group psychotherapy for male clients with mild intellectual disability
- Provided individual psychotherapy for clients with mild to moderate intellectual disability
- Collaborated with a multi-disciplinary team to provide comprehensive, integrated services

Graduate Student Therapist June 2009 – May 2014
Psychological Services Center, University of Mississippi
Supervisors: Scott Gustafson, Ph.D., Alan Gross, Ph.D., Kelly Wilson, Ph.D., Todd Smitherman, Ph.D., and Stefan Schulenberg, Ph.D.

- Conducted intake assessments and completed reports
- Delivered evidence-based individual psychotherapy to university students and community members with a variety of clinical presentations
- Employed behavioral, cognitive-behavioral, and acceptance & mindfulness based interventions
- Co-led a mindfulness-based group for university students and community members

Research Experience

Research Supervisor/Mentor May 2013-June 2013
Ronald E. McNair Post-Baccalaureate Achievement Program, University of Mississippi
Supervisor: Karen Kellum, Ph.D.

- Coordinated applied research project with undergraduate McNair Scholar
- Provided written and verbal feedback to facilitate supervisee's understanding of research

design, data analytic strategies, and ethical concepts
- Supervised the design, implementation, data analysis, and presentation of a project to improve reading fluency and comprehension in children from an underserved population

Principle Investigator, Doctoral Dissertation September 2011-April 2014
Center for Contextual Psychology, University of Mississippi
Dissertation Committee Chair: Kelly Wilson, Ph.D.
- Conducted pilot studies to determine an effective experimental preparation
- Designed and implemented dissertation project examining ways of influencing and measuring struggle with self-critical thoughts
- Trained and supervised undergraduate research assistants on the protocol
- Defended dissertation and presented findings at a national conference

Graduate Research Assistant February 2011 – May 2014
Center for Contextual Psychology, University of Mississippi
Supervisor: Kelly Wilson, Ph.D.
- Assisted in the execution of research projects pertaining to behavior analysis and functional contextualism
- Coded and analyzed videos of therapy interactions
- Mentored and trained undergraduate research assistants
- Delivered oral presentations to faculty, graduate and undergraduate students

Principle Investigator, Master's Thesis August 2009 – February 2011
Assessment and Meaning in Life Laboratory, University of Mississippi
Thesis Committee Chair: Stefan Schulenberg, Ph.D.
- Designed and implemented thesis project examining correlations among alcohol use, depression and perceived life meaning in university students
- Published findings in a peer-reviewed journal and presented the project at a national conference

Graduate Research Assistant August 2008 – February 2011
Assessment and Meaning in Life Laboratory, University of Mississippi
Supervisor: Stefan Schulenberg, Ph.D.
- Assisted in the execution of research projects pertaining to perceived meaning, life satisfaction, and psychopathology
- Managed laboratory functions including orchestrating data collection, entry, and analysis
- Trained undergraduate research assistants in laboratory procedures

Teaching Experience

Undergraduate Courses:

Instructor of Record, Learning	Fall 2013
Instructor of Record, Developmental Psychology	Spring 2012
Teaching Assistant, Stress in the Modern World	Spring 2012
Instructor of Record, Developmental Psychology	Fall 2011

Teaching Assistant, Stress in the Modern World — Fall 2011

Graduate Courses:
Teaching Assistant, Conditioning and Learning — Fall 2013
Teaching Assistant, Conditioning and Learning — Fall 2011
Teaching Assistant, Personality Assessment — Spring 2010
Teaching Assistant, Cognitive Assessment — Fall 2009

Professional Activities & Service

Symposium chair – Coping with Stress in the Modern World, at the Association for Contextual Behavioral Science, Tenth World Conference, Washington, DC.
Guest reviewer – Journal of Substance Use, 2012
Ad hoc editor – "Bullying" and "Intellectual & Developmental Disabilities" book chapters in *Foundations of Behavioral, Social, and Clinical Assessment of Children, Sixth Edition,* (2014) by Jerome Sattler
Committee member – Clinical Colloquium at the Eighteenth World Congress on Viktor Frankl's Logotherapy, Spring - Summer 2011
Student Representative – Clinical and Experimental Psychology Faculty Meetings, Fall 2010 - Spring 2011
Volunteer – Out of the Darkness Community Walk at the University of Mississippi for the American Foundation for Suicide Prevention, Fall 2010; Fall 2011

Publications

Peer-reviewed:

Young, J., Berkout, O., **Schnetzer, L.,** Heiden, L., Damon, J., Hight, T., & Ebesutani, C. (under review). *The relationship between loneliness, anxiety, and depression in children and adolescents.*

Schnetzer, L. W., Schulenberg, S. E., & Buchanan, E. M. (2013). Differential associations among alcohol use, depression, and perceived life meaning in male and female college students. *Journal of Substance Use, 18*, 311-319. doi:10.3109/14659891.2012.661026

Bethay, J. S., Wilson, K. G., **Schnetzer, L. W.,** Nassar, S. L., & Bordieri, M. J. (2013). A controlled pilot evaluation of acceptance and commitment training for intellectual disability staff. *Mindfulness, 4,* 113-121. doi: 10.1007/s12671-012-0103-8

Schulenberg, S. E., **Schnetzer, L. W.,** & Buchanan, E. M. (2011). The Purpose in Life test-Short Form (PIL-SF): Development and psychometric support. *Journal of Happiness Studies, 12,* 861-876. doi: 10.1007/s10902-010-9231-9

Schulenberg, S. E., **Schnetzer, L. W.,** Winters, M. R., & Hutzell, R. R. (2010). Meaning-centered couples therapy: Logotherapy and intimate relationships. *Journal of Contemporary Psychotherapy,* 40, 95-102.

Other:

Flynn, M. K., **Schnetzer, L. W.,** & Wilson, K. G. (in press). Acceptance and commitment therapy for addiction. In C. Grønlund & S. Rasmussen. *Anthology of acceptance and commitment therapy.* Copenhagen, Denmark: Frydenlund. (Chapter will be published in Danish)

Wilson, K. G., **Schnetzer, L. W.,** Flynn, M. K., & Kurz, A. K (2012). Acceptance and commitment therapy for addiction. In S. Hayes & M. Levin (Eds.), *Mindfulness and acceptance for addictive behaviors: Applying contextual CBT to substance abuse and behavioral addictions* (pp. 27-68). Oakland, CA: New Harbinger.

Schnetzer, L. W. (2011). A measure of interest to logotherapy researchers: The Purpose in Life test – Short Form. *The International Forum for Logotherapy, 34(1),* 56-57.

Campbell, S. W., **Schnetzer, L. W.,** & Gentry, J. A. (2010). Recent publications of interest to logotherapists. *The International Forum for Logotherapy, 33(2),* 122-127.

Schnetzer, L. W. (2010). A measure of interest to logotherapy researchers: The Purpose in Life test. *The International Forum for Logotherapy, 33(2),* 120-121.

Schnetzer, L. W. (2010). Movies of interest to logotherapists. *The International Forum for Logotherapy, 33(1),* 53-55.

Schulenberg, S. E., & **Schnetzer, L. W.** (2009). [Untitled review of the DVD *James Bugental: Live Case Consultation*]. *Journal of Contemporary Psychotherapy, 39,* 209-210.

Schnetzer, L. W. (2009). Movies of interest to logotherapists. *The International Forum for Logotherapy, 32(2)*, 118 - 120.

Schnetzer, L. W. (2009). Movies of interest to logotherapists. *The International Forum for Logotherapy, 32(1)*, 50-52.

Conference Presentations

Schnetzer, L. W., Bordieri, M. J., Kellum, K. K., & Wilson, K. G. (2014, June). Fusion with self-referential stimuli: Examining a behavioral measure. Paper presented at the Association for Contextual Behavioral Science, Twelfth World Conference, Minneapolis, MN.

Schnetzer, L. W., Kellum, K. K., Wilson, K. G., & MacArthur, A. (2014, April). *Changing the function of self-critical words.* Poster presented at the First Annual UM Conference on Psychological Science, University, MS.

Schnetzer, L. W., Wilson, K. G., & Kellum, K. K. (2013, May). Fusion with self-referential stimuli: Examining an implicit behavioral measure. Paper presented at the Association for Behavior Analysis International, Thirty-ninth Annual Convention, Minneapolis, MN.

Schnetzer, L. W., Wilson, K. G., & Kellum, K. K. (2012, July). How do I look?: Perspective taking and social anxiety. Presented at the Association for Contextual Behavioral Science, Tenth World Conference, Washington, DC.

Schnetzer, L. W., Flynn, M. K., Wilson, K. G., & Kellum, K. K. (2012, July). Coping with stress in the modern world: Prevalence of maladaptive and adaptive coping strategies. Data presented at the Association for Contextual Behavioral Science, Tenth World Conference, Washington, DC.

Schnetzer, L. W., Flynn, M. K., Wilson, K. G., & Kellum, K. K. (2012, May). Coping with stress: Strategies employed by college students. Data presented at the association for Behavior Analysis International, Thirty-eighth Annual Convention, Seattle, WA.

Lucas, N. Kurz, S., Flynn, M. K., **Schnetzer, L. W.,** Slater, R. M., Wilson, K. G., & Kellum, K. K. (2012, May). Stress in the modern world: An acceptance and commitment therapy-based approach to dealing with college stressors. Data presented at the Association for Behavior Analysis International, Thirty-eighth Annual Convention, Seattle, WA.

Schnetzer, L. W., Flynn, M. K., Whiteman, K., Kellum, K. K., Wilson, K. G. Coding core ACT processes in the hexaflex functional dimensional experiential interview (HFDEI). Data presented at the Association for Contextual Behavioral Science, Ninth World Conference, Parma, Italy.

Schnetzer, L. W., & Schulenberg, S. E. (2011, June). Meaning in life: Depression and alcohol use in a college sample. Paper presented at the Eighteenth World Congress on Viktor Frankl's Logotherapy, Dallas, TX.

Berkout, O. V., **Schnetzer, L. W.,** Heiden, L., Hight, T. L., Damon, J. D., & Young, J. N. (2010, November). *Relationship between loneliness and psychopathology in a large sample of children and adolescents.* Poster presented at the Association for Behavioral and Cognitive Therapies 44th Annual Convention, San Francisco, CA.

Schnetzer, L. W., Schulenberg, S. E., & Buchanan, E. M. (2010, August). *The Purpose in Life test – Short Form (PIL-SF): Development and psychometric support.* Poster presented at the American Psychological Association 118th Annual Convention, San Diego, CA.

Schnetzer, L. W., Schulenberg, S. E., Winters, M. R., & Hutzell, R. R. (2009, June). Meaning-centered couples therapy: Logotherapy and intimate relationships. Paper presented at the Seventeenth World Congress on Viktor Frankl's Logotherapy, Dallas, TX.

Workshops and Trainings

Co-Facilitator, Acceptance and Commitment Therapy Case Conceptualization, conducted by Wilson, K. G., **Schnetzer, L. W.,** Whiteman, K., Kurz, A. S., & Berkout, O. V. at the annual meeting of the Association for Contextual Behavioral Science in Washington, DC, July 2012

Co-Facilitator, Mindfulness and Values Interviewing in Acceptance and Commitment Therapy, conducted by Wilson, K. G., **Schnetzer, L. W.,** Flynn, M. K., Bordieri, M. J., Nassar, S. L., & Whiteman, K. at the annual meeting of the Association for Contextual Behavioral Science in Parma, Italy, July 2011

Co-Facilitator, Treating Addiction with Co-Occurring Anxiety and Depression, conducted by Wilson, K. G., **Schnetzer, L. W.,** Flynn, M. K., Bordieri, M., Nassar, S. L., & Whiteman, K. at the annual meeting of the Association for Contextual Behavioral Science in Parma, Italy, July 2011

Co-Facilitator, Stress Management for North Mississippi Regional Center Staff, conducted by Bethay, J. S., Slater, R. M., & **Schnetzer, L. W.**, at North Mississippi Regional Center in Oxford, MS, March 2011

Co-Facilitator, The Diving Bell and the Butterfly: Viewing and Discussing a Movie of Interest to Logotherapists, conducted by **Schnetzer, L. W.,** Luchkiw, T. K., & Schulenberg, S. E., at the Seventeenth World Congress on Viktor Frankl's Logotherapy in Dallas, TX, June 2009

Co-Facilitator, Motivational Interviewing: The Basics, conducted by Young, J. N., Luebbe, A., Trent, L. R., **Schnetzer, L. W.,** Jackson, MS, March 2009

Honors and Awards

University of Mississippi Dissertation Fellowship Award, 2013
Society for the Advancement of Behavior Analysis Student Presenter Grant, 2013
University of Mississippi Liberal Arts Graduate Student Achievement Award, 2011
Viktor Frankl Institute of Logotherapy Graduate Student Research Award, 2011
John and Lillian Wolfe Graduate Student Achievement Award, 2011
Franklin & Marshall Hackman Research Scholar, 2002
Franklin & Marshall Diamond Scholar, 2001-2003
Franklin & Marshall Presidential Scholar, 1999-2003

Membership in Professional Associations

American Psychological Association, Division 38 Health Psychology
Association for Behavior Analysis International
Association for Contextual Behavioral Science