PRELIMINARY FINDINGS ON THE EFFECTS OF SELF-REFERRING AND EVALUATIVE STIMULI ON STIMULUS EQUIVALENCE CLASS FORMATION

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Thirty-two subjects completed 2 stimulus equivalence tasks using a matching-to-sample paradigm. One task involved direct reinforcement of conditional discriminations designed to produce derived relations between self-referring stimuli (e.g., me, myself, I) and positive evaluation words (e.g., whole, desirable, perfect). The other task was designed to produce derived relations between self-referring stimuli and negative evaluation words (e.g., unworthy, flawed, inadequate). Performance on each task was recorded via response latency and percent correct. Prior to completion of the equivalence tasks, subjects completed 2 self-report measures: the Outcome Questionnaire-45 (OQ-45) and the Rosenberg Self-Esteem Scale (RSE). Subjects were divided into groups based on their OQ-45 score (high or low distress) and RSE score (high or low self-esteem). Significant differences in percent correct were found between both the OQ-45 groups and the RSE groups. Subjects who reported high distress and a negative sense of self made significantly more errors on the tests for equivalence for the task that required matching self-referential stimuli with positive evaluation words.

Stimulus Equivalence
Murray Sidman conducted the first systematic investigation of stimulus equivalence in 1971. In this well-cited study, an individual with a learning disability was taught to identify pictures of objects given the spoken words. He was then taught to identify the written words given the spoken words. Without any additional training, the individual matched the pictures to the written words and the written words to the pictures. That is, he derived relations among the stimuli in the absence of direct reinforcement for the specific choices, responding to the stimuli as if they were equivalent. Sidman referred to this behavioral phenomenon as

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stimulus equivalence and identified response features that indicated that a stimulus equivalence class had been formed (i.e., reflexivity, symmetry, and transitivity) (Sidman, 1990). Subsequent studies have supported Sidman's observations of stimulus equivalence. Specifically, studies have repeatedly demonstrated that when an individual is taught a series of related conditional discriminations (e.g., choose A₁ in the presence of B₁, choose A₁ in the presence of C₁), he/she often derives additional relations that were not explicitly taught (e.g., choosing B₁ in the presence of C₁ and C₁ in the presence of B₁). Research has demonstrated that children as young as 17 months engage in simple relating and by 23 months they demonstrate all the necessary response features of stimulus equivalence (Lipkens, Hayes, & Hayes, 1993).

Investigations of stimulus equivalence have focused primarily on identifying the conditions that reliably produce equivalence (Sidman, 1990; Sidman & Tailby, 1982) and examining central features of stimulus equivalence classes. This research has demonstrated resurgence of previously established equivalence relations (Wilson & Hayes, 1996), transfer of a variety of psychological functions among class members (Dougher, Augustson, Markham, Greenway, & Wulfert, 1994; Dymond & Barnes, 1994; Roche & Barnes, 1997), differences in acquisition between language-able and language disabled populations (Devany, Hayes, & Nelson, 1986), that equivalence classes can include stimuli of various modalities (DeGrandpre, Bickel, & Higgins, 1992), and that classes can be brought under contextual control (Kohlenberg, Hayes, & Hayes, 1991; Steele & Hayes, 1991). Among recent studies, derived relations other than equivalence have also been reliably demonstrated (Dymond & Barnes, 1995: Steele & Hayes, 1991).

Inclusion of Meaningful Stimuli

Most investigations of stimulus equivalence have used arbitrary stimuli. However, some investigators have turned their attention to the impact of stimuli that are emotionally salient, clinically relevant, or socially loaded on equivalence class formation (e.g., Barnes, Lawlor, Smeets, & Roche, 1996; Leslie, Tierney, Robinson, Keenan, Watt, & Barnes, 1993; Moxon, Keenan, & Hine, 1993). In general, this research indicates that the inclusion of "meaningful" stimuli delays or inhibits the formation of stimulus equivalence classes (e.g., Plaud, 1998) and that this effect appears to result from subjects' specific preexperimental learning histories. For example, Leslie et al. (1993) compared the performance of clinically anxious subjects to the performance of nonanxious subjects on a stimulus equivalence task. Conditional discrimination training was provided, using a matching-to-sample procedure, which should result in the subjects deriving a relation between pleasant state adjectives (e.g., "relaxed") and anxiety provoking situations (e.g., "public speaking"). Results indicated that 7 of the 8 clinically anxious subjects were unable to form the equivalence classes, compared to only 2 of the 8 nonanxious subjects. A similar study by Plaud (1995) reported that the acquisition of
equivalence relations was delayed when the classes contained fearful (i.e., snake related) stimuli compared to those that contained nonfearful (i.e., flower) stimuli. Plaud (1995) also found that a subject's performance was predictable given his/her verbal report of fear of snakes.

Social Categorization and Self-Concept

A few studies examining the impact of meaningful stimuli have suggested that stimulus equivalence may be relevant to social categorization and an individual's self-concept. Watt, Keenan, Barnes, and Cairns (1991) compared the performance of English Protestant subjects to subjects from Northern Ireland. Subjects received training that should result in an equivalence relation between Catholic names and Protestant symbols. Results indicated that subjects from Northern Ireland were less able to derive the relations than the English Protestant subjects. The authors attributed this difference in performance to the Northern Ireland subjects' preexperimental learning history that does not support an equivalence relation between Catholic names and Protestant symbols. No such history would have been present for the English subjects. Likewise, in a study of gender identity Moxon et al. (1993) found that subjects had more difficulty forming equivalence classes when the classes included female names and stereotypic male occupations. The findings suggested that the use of stimuli that are deemed to be nonequivalent in the social-verbal community has a negative impact on the derivation of equivalence relations within which these stimuli are meant to participate experimentally.

Barnes et al. (1996) examined the relationship between self-concept and stimulus equivalence more directly. They compared the performance of subjects with mental retardation to the performance of non-mentally retarded individuals on both an arbitrary equivalence task and a socially loaded equivalence task. Discrimination training in the socially loaded condition yielded two 3-member equivalence classes. One class included the subject's own name, a nonsense syllable, and the word "able." The other equivalence class included a generic name (i.e., "Val Jones"), a nonsense syllable, and the word "slow." Although the two groups performed equally well on the arbitrary condition, individuals with mental retardation made significantly more mistakes on the socially loaded task than the non-mentally retarded subjects. In other words, subjects with mental retardation found it more difficult to derive an equivalence relation between their own names and the word "able" than non-mentally retarded individuals. The authors of this study hypothesized that the preexperimental histories of the subjects with mental retardation in which "self" was equivalent to "slow" conflicted with the experimental contingencies and thus impaired the formation of equivalence relations between "self" and "able."

The Current Study

Many authors have argued that thoughts about the self impact in
significant ways upon behavior. Behaviorally oriented psychologists, in particular, have been interested in the role of self-knowledge in the control and prediction of one’s behavior for some time (Skinner, 1974) and the literature on equivalence, described above, appears to suggest a useful methodology with which to examine the ways in which self-concept comes to have behavior regulatory functions.

Although the current study is similar to that conducted by Barnes et al. (1996), it differs in some important ways. In the current study, the designated equivalence classes were comprised of generic self-referential and evaluative words. In addition, rather than using one-word stimuli, the study used 3-word self-referential and evaluative stimuli sets. This is because researchers have suggested that the meaning of words is impacted by the presence of other words that act as contextual cues (Kohlenberg et al., 1991). The current study also included a measure of subjects’ relevant preexperimental learning histories. Such measures are often missing from stimulus equivalence studies. Based on theoretical and empirical work in this area, it was expected that subjects who reported a negative-self concept and/or high distress would have more difficulty forming equivalence relations between self-referential stimuli and positive evaluation words than the positive-self, low distress subjects.

Method

Participants
Participants were 45 undergraduate students (31 female, 14 male). Participants’ ages ranged from 18-23 years with a mean age of 19. All participants were volunteers who received extra credit in a psychology course for their participation. Of the 45 participants, 13 did not successfully complete the experiment. They cycled through the conditional discrimination training three times without achieving 100% accuracy in the intermittent feedback phase. These participants were excluded from the analysis. Of the 32 participants who completed the experiment, 23 were female and 9 were male.

Materials and Experimental Design
An automated matching-to-sample preparation, presented on a PC-type computer, was used to train a series of related conditional discriminations and test for derived equivalence relations (see the Procedure section). Matching-to-sample tasks were programmed in Microsoft Visual Basic 6. All subject instruction, training, testing, and data recording were performed on the computer.

Stimuli. The use of evaluative stimuli was manipulated through the ‘A’ terms. In both of the experimental conditions, the A₁ stimuli were positively evaluative (e.g., whole, desirable, perfect), the A₂ stimuli were negatively evaluative (e.g., unworthy, flawed, inadequate), and the A₃ stimuli were of neutral evaluation (e.g., yellow, green, purple). The use of self-referents was manipulated through the ‘C’ terms and varied according
to the experimental condition. In Condition 1, the C₁ stimuli were self-referential (e.g., me, myself, I) and the C₂ stimuli were other-referential (e.g., she, her, hers). In Condition 2, the C₁ and C₂ stimuli were reversed. Thus, in Condition 2, the C₁ stimuli were other-referential (e.g., she) and the C₂ stimuli were self-referential (e.g., me). In both experimental conditions, the other-referential stimuli were the opposite gender of the participant (e.g., females received "he, him, his"). This was to decrease the probability that a subject would identify him/herself with stimuli that were intended to be other-referent. Both experimental conditions also included other-referential stimuli that were gender neutral (C₃ stimuli). C₃ stimuli were pronouns such as they and them. In both experimental conditions the 'A' and 'C' stimuli were three-word sets and the 'B' stimuli were single-word nonsense syllables (e.g., Fob).

*Equivalence classes and experimental conditions.* Each experimental condition provided training designed to result in the formation of three 3-member equivalence classes. All equivalence classes were comprised of an evaluative stimulus (e.g., whole, desirable, perfect), a nonsense syllable (e.g., Fob), and a pronoun stimulus (me, myself, I). The primary difference between the two conditions was the reversal of the C₁ and C₂ stimuli. As a result of the reversal, it was possible to examine the formation of both me-good (Condition 1) and me-bad (Condition 2) relations.

In Condition 1 (me-good condition), subjects received training that resulted in an equivalence relation between self-referential stimuli (e.g., me) and positive evaluation words (e.g., desirable). Thus, target equivalence relations for Condition 1 were positive-self, negative-other, and neutral evaluation-neutral referent. In Condition 2 (me-bad condition) subjects were provided with a training history that resulted in self-referential stimuli (e.g., me) equivalent to negative words (e.g., flawed). Thus, target equivalence relations for Condition 2 were negative-self, positive-other, and neutral evaluation-neutral referent.

All participants received both conditions and the computer program randomly determined the order in which subjects received the conditions. Thus, some of the subjects received Condition 1 (me-good) first followed by Condition 2 (me-bad), while the remaining subjects were exposed to the conditions in the reverse order. See Tables 1 and 2 for the stimuli and classes used in each condition.

<table>
<thead>
<tr>
<th>Class 1</th>
<th>A₁</th>
<th>Whole</th>
<th>Desirable</th>
<th>B₁</th>
<th>Fob</th>
<th>C₁</th>
<th>Me</th>
<th>Myself</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>A₂</td>
<td>Unworthy</td>
<td>Flawed</td>
<td>B₂</td>
<td>Gid</td>
<td>C₂</td>
<td>He (She)</td>
<td>Him (Her)</td>
<td>His (Hers)</td>
</tr>
<tr>
<td>Class 3</td>
<td>A₃</td>
<td>Yellow</td>
<td>Green</td>
<td>B₃</td>
<td>Puk</td>
<td>C₃</td>
<td>They</td>
<td>Them</td>
<td>Theirs</td>
</tr>
</tbody>
</table>
Table 2

<table>
<thead>
<tr>
<th>Stimuli and Classes for Condition 2 (Me-Bad)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Class 3</td>
</tr>
</tbody>
</table>

Procedure

Before beginning the computer portion of the experiment, all participants completed the Rosenberg Self-Esteem Scale (RSE) and the Outcome Questionnaire (OQ-45). Both measures have been found to be reliable and valid for the purposes of this study. The RSE has been shown to be a valid measure of how an individual views him or herself (Lorr & Wunderlich, 1986). It is highly reliable (Robins, Hendin, & Trzesniewski, 2001) and scores on the RSE are correlated with a number of self-esteem related constructs (e.g., popularity, confidence, peer ratings) (Reynolds, 1988; Savin-Williams & Janquish, 1981). The OQ-45 has demonstrated good psychometric properties in college age samples (Lambert, Hansen, Umphress, Lunnen, Okishu, Burlingame, & Reisinger, 2001). It assesses symptoms of anxiety and depression and yields an overall score reflecting general level of distress.

Upon completion of the self-report measures, participants were taken to a computer. The program used a matching-to-sample format to train and test equivalence. For each task the sample stimulus appeared at the top of the screen. Three comparison stimuli appeared on the screen below the sample stimulus. The order in which sample stimuli and comparison stimuli were presented was randomized. Before the experiment began, subjects were given a sample item that served to familiarize subjects with the matching-to-sample paradigm. The computer program proceeded as follows.

HELLO
Thank you for taking part in this experiment of human learning. Your instructions are very simple. You have to match one of the three words (or groups of words), which are displayed in the middle of the screen with one word (or group of words) displayed on the upper half of the screen. Press the SPACEBAR and I will show you an example to start with.

Once the spacebar was pressed, the following appeared on the screen:

YOU

JEP PIV YOM
Use the mouse to choose between these three nonsense syllables. Your initial choice will of course be a guess. Select one and see what happens.

If the subject chose correctly, the word “CORRECT!” was displayed on the screen for 2 s. If the subject chose an incorrect response, the word “INCORRECT” appeared on the screen. This task continued until the subject selected the correct answer. Words used in the familiarization task were not used in the actual experiment. After the familiarization task, the following instructions appeared on the screen:

WELL DONE!
To begin the experiment select the word “CONTINUE.”
At the beginning I will tell you if you made the correct response. As the experiment continues I will tell you less often.

At this time, the first experimental condition began. During the first phase of the experimental condition, subjects were taught a series of related conditional discriminations. For example, subjects were trained to select B1 given the sample stimulus A1 and the comparison stimuli array B1, B2, and B3. Training was designed to result in the formation of 3 three-member equivalence classes: A1 B1 C1; A2 B2 C2; A3 B3 C3. The following equivalence relations were directly trained: A1 = B1, A2 = B2, A3 = B3, B1 = C1, B2 = C2, B3 = C3. During initial training, subjects received correct/incorrect feedback on 100% of the trials. After the successful completion of this phase of training (responding correctly to each of the tasks four times), subjects began the intermittent feedback phase of training. In this phase all the tasks were presented randomly two more times and feedback was provided on 50% of the trials. If a subject responded incorrectly on any of the trials during the intermittent feedback phase, he/she cycled back through training with continuous feedback. Subjects were permitted to cycle through training three times. If a subject was still unable to achieve 100% accuracy on the intermittent feedback phase after three cycles of training, the program terminated and the subject was thanked for his/her participation. If the subject successfully completed the training phase of the experiment, he/she was tested for the following derived relations: A1 = C1, A2 = C2, A3 = C3, C1 = A1, C2 = A2, C3 = A3. Each relation was tested 12 times. There was no feedback provided during the testing phase of the experiment. For each trial, response latency (defined as the time elapsed from stimulus presentation to subject response) and accuracy data were collected. Before the testing phase began, the following instructions appeared on the screen:

Great Job!
You will not receive feedback for the remainder of the experiment.
Work as quickly as you can without making mistakes.

After the completion of testing for one condition, participants immediately
began training and testing for the remaining condition. Training and testing in the second-presented condition proceeded in exactly the same manner as the first. After the completion of the second-presented condition, subjects were thanked for their participation and debriefed.

Results

For the total sample of 45 subjects, scores on the RSE ranged from 10 to 28 ($M = 17.7$). Higher scores on the RSE represent lower "self-esteem" or a more negative verbal construction of self. Scores on the OQ-45 ranged from 21 to 103 ($M = 52.40$). Higher scores on the OQ-45 indicate more distress. The 32 participants who completed the experiment had a mean score of 17.2 on the RSE and a mean of 47.5 on the OQ-45. The range and median of these measures was the same for the 32 subjects who completed the experiment as it was for the total sample of 45 subjects.

There was considerable individual variability in equivalence responding (see Table 3 for mean and standard deviation of groups). Percent correct for the me-good condition ranged from 22.23% to 100% with a mean of 71.84%. Percent correct for the me-bad condition ranged from 28.87% to 100% with a mean of 85.65%.

Statistical analyses. A median split was performed to divide the subjects into two RSE groups: those who reported a generally positive verbal construction of self (RSE < 17.00) and those who reported a generally negative verbal construction of self (RSE > 17.00). A median split was also performed on the OQ-45, classifying subjects as either high distress (OQ-45 > 45.00) or low distress (OQ-45 < 45.00). Of the 45 subjects, 23 reported both a negative-self construction and high distress. Sixteen subjects reported both a positive-self construction and high distress. Of the 45 subjects, 6 were mixed reporters (i.e., reporting a positive-self construction and high distress or a negative-self construction and low distress). Of the 32 who completed the experiment, 16 reported high distress and negative-self, 12 reported low distress and positive-self, and 4 were mixed reporters.

Two separate Mann-Whitney $U$s were used to examine the significance of RSE and OQ-45 group differences. The Mann-Whitney was used in lieu of the analysis of variance due to non-normality and considerable within group variability that would have resulted in a less powerful test of group differences had the ANOVA been used. Percent correct and latency served as the dependent variables.

A significant difference in percent correct on the me-good condition was found between the RSE groups, Mann Whitney $U = 74.5, p = .044$. Subjects who reported a more positive verbal construction of self were significantly more accurate on the me-good condition than negative-self reporters. There was no difference between the RSE groups in latency on the me-good condition or for either dependent variable on the me-bad condition.

There was a significant difference between the distress groups in
percent correct on the me-good condition, Mann Whitney $U = 75.5$, $p = .047$. Subjects who reported low distress performed more accurately on this condition than those who reported high distress. There was no difference between the distress groups in latency on the me-good condition or for either dependent variable on the me-bad condition. See Table 3 for descriptive data on percent correct in each condition. See Figure 1 for a graphical depiction of group differences.

Table 3

<table>
<thead>
<tr>
<th>Condition</th>
<th>RSE Group</th>
<th>Mean</th>
<th>SD</th>
<th>OQ-45 Group</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me-Good</td>
<td>Positive-self</td>
<td>78.9*</td>
<td>25.9</td>
<td>Low distress</td>
<td>78.3*</td>
<td>27.8</td>
</tr>
<tr>
<td></td>
<td>Negative-self</td>
<td>61.4*</td>
<td>28.8</td>
<td>High distress</td>
<td>60.9*</td>
<td>27.1</td>
</tr>
<tr>
<td>Me-Bad</td>
<td>Positive-self</td>
<td>81.9</td>
<td>26.5</td>
<td>Low distress</td>
<td>82.5</td>
<td>27.6</td>
</tr>
<tr>
<td></td>
<td>Negative-self</td>
<td>84.0</td>
<td>19.2</td>
<td>High distress</td>
<td>83.4</td>
<td>19.7</td>
</tr>
</tbody>
</table>

* $p < .05$

Figure 1. Percent correct in each condition by RSE and OQ-45 group.

Visual inspection. Visual inspection of the data at the level of individual subject revealed four characteristic patterns of responding. The two majority groups identified visually were confirmed via the statistical analyses.

Of the 32 subjects who completed training and testing for both conditions:

1. 8 subjects performed equally well on both conditions. They demonstrated high accuracy and relatively equal latencies for all stimuli across both conditions.
2. 3 subjects appeared to choose the positive stimulus in the presence of the self-referential stimuli regardless of training.
(3) 15 subjects demonstrated poorer performance on the me-good condition as evidenced by longer latencies and/or more errors.

(4) 4 subjects demonstrated poorer performance (i.e., less accuracy or longer response time) on the negative stimulus irrespective of the condition.

There were 2 subjects with performances that did not conform to any of the characteristic patterns. One of these subjects demonstrated low accuracy on equivalence tests that required matching of other-referential stimuli with negative evaluation words. This subject demonstrated high accuracy when matching self-referential stimuli to negative evaluation words. The performance of the other subject had no discernable pattern; this subject appeared to be responding randomly.

Discussion

The results of this study provide additional support for the finding that equivalence class acquisition is impacted by the inclusion of stimuli that are emotionally salient (e.g., Leslie, et al. 1993; Plaud, 1995, 1998; Watt et al., 1991). The findings are also consistent with previous studies that have examined social roles and self-concept via stimulus equivalence (e.g., Barnes et al., 1996; Moxon et al., 1993). This study expands existing literature, using more general self-referents and evaluation words, examining subjects' performance in two loaded equivalence tasks, and using relevant pretest measures rather than assuming a particular preexperimental history. In general, this study found a subject's ability to form equivalence classes comprised of self-referring and evaluative stimuli was impacted by his/her preexisting verbal construction of self (i.e., reported "self-esteem") and reported distress level. The fact that group differences were found for both the RSE groups and the OQ-45 groups supports the assertion that what we think and feel about ourselves is related to distress and/or problems in living (e.g., Hirsch, Clark, Matthews, & Williams, 2003; Hope, Rapee, & Heimberg, 1990; Pietromonaco & Markus, 1985; Pincus & Morley, 2001; Rector, Zindel, & Gemar, 1998). The low number of mixed reporters also suggests this.

The patterns of responding revealed via visual inspection appear to correspond with subjects' reported distress level and verbal self-construction. The first major response pattern consisted of quick and accurate responding to all stimuli in both conditions. These subjects responded consistent with their experimental training history. Rather than particular preestablished verbal functions dominating responding, subjects responded to current contingencies. This type of responding is what we would expect if arbitrary stimuli were used. The majority of subjects with this response pattern (63%) reported low distress and a positive self-construction. When subjects that reported either low distress or positive-self are included, the percentage increases to 88%.

A smaller group of low distress, positive-self subjects chose the positive stimulus in the presence of the self-referential stimuli in both
conditions, despite training. These subjects appeared to be insensitive to information that contradicted the relations they previously derived between self-referents and positive stimuli. This smaller group was not expected, however, it is of interest theoretically. More research is needed to determine what contextual factors facilitate this type of inflexibility among low-distress, high-esteem subjects.

The second major response pattern consisted of significantly more errors in the condition that required subjects to generate an equivalency relation between self-referents and positive stimuli. The majority of these subjects (57%) reported high distress and a negative-self. When subjects who reported either high distress or a more negative-self are included, the percentage increases to 71%. It is hypothesized that the inaccuracy demonstrated by these subjects in the me-good condition is the result of subjects' preexperimental history of relating self to negative. Rather than responding in accordance with the experimental training, these subjects responded consistent with their preestablished relations.

A subgroup of high-distress, negative-self subjects demonstrated disfluency with the negative stimulus irrespective of the condition. It seems these subjects were less sensitive to contingencies that would facilitate accurate responding when negative evaluation words were present.

There was a substantial group of subjects who were unable to complete the conditional discrimination training. This was not expected because college students served as the sample and studies have consistently demonstrated that language-able humans are proficient at forming equivalence classes given the appropriate training. However, subjects' inability to complete training is of interest and may represent a high level of inflexibility. This interpretation is suggested by the following: (1) The majority of the subjects (62%) who did not complete training reported high distress and a negative-self construction and (2) the 2 high-distress, low-esteem subjects who began with the me-bad condition were able to complete the training and testing for that condition but were unable to complete the me-good training and testing.

Clinical implications. Derived relational responding research has the potential to greatly enhance our understanding of how words (both public and private) acquire psychological functions and how cognitive constructs (e.g., categories, beliefs, schemas) affect behavior. Such knowledge has important clinical implications and the impact of this research can already be seen in some new-wave behavior therapies (e.g., Acceptance and Commitment Therapy).

Results of the current study are particularly relevant for clinical interventions. Clients typically present for therapy when they are extremely distressed. They often report negative emotions/cognitions about the situation they find themselves in, their ability to make changes, and more broadly, about themselves. This study found that individuals who reported a negative-self construction or high distress made significantly more errors when deriving a relation between self and positive evaluation words. These same subjects were able to derive the relation between
self-referents and negative evaluation words with little trouble. These findings suggest that high-distress, negative-self individuals may engage in the same ineffective strategies despite contingencies that should maintain more adaptive repertoires of behavior. Results also indicate that these individuals may be more responsive to stimulus events that are consistent with preestablished relations (me = bad). This study suggests the need for strategies that disrupt previously derived relations in a way that provides for more flexible responding and facilitates contact with current contingencies. These types of interventions are being used in some therapies, such as Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999). ACT is an intervention specifically based on an operant theory of derived stimulus relations (i.e., see Hayes, Barnes-Holmes, & Roche, 2001 for a comprehensive discussion of Relational Frame Theory). Thus far, empirical support for ACT is promising (e.g., Bach & Hayes, 2002; Bond & Bunce, 2000; Orsillo, Roemer, & Barlow, 2003; Zettle & Hayes, 1986), suggesting the applied implications of derived relational responding merits further investigation.

Limitations and considerations. This study represents a preliminary effort to examine the relational framing of self-referential stimuli. It demonstrates the utility of stimulus equivalence, and more broadly, Relational Frame Theory, in examining how “self-concept” organizes behavior. However, there are limitations that should be addressed in future studies. First, in comparison to other studies of stimulus equivalence, overall response accuracy was somewhat low. This may be remedied by increasing the number of training trials or by using a more in-depth familiarization task. Alternatively, a low mean accuracy may simply be the product of the considerable variability that existed in individual responding on loaded equivalence tasks.

Second, this study consisted of two loaded conditions. There was no arbitrary condition to compare to the loaded conditions. Including an arbitrary condition would provide a baseline of subjects’ capacity to form equivalence relations, eliminating variance attributable to individual differences in ability to form equivalence classes.

Third, stimuli chosen for the tasks should be examined closely and matched on all relevant dimensions. It is possible, although not probable, that some extraneous feature of the stimuli is responsible for the findings.

In summary, the current study investigated how stimulus equivalence classes are impacted by the inclusion of self-referential and evaluative stimuli. Results indicated that subjects’ performances differed according to their reported distress level and self-esteem. Subjects with high distress and a more negative-self made significantly more errors when deriving a relation between self-referential stimuli and positive evaluation words. This finding has important clinical implications, however, before any solid conclusions can be drawn, some concerns need be addressed. Future research in this area may include examining (a) how context may be manipulated to alter the parameters of class formation (b) what
interventions successfully impact preestablished relations that interfere with the formation of new equivalency relations and (c) how contact with current contingencies can be facilitated to generate more effective response repertoires.

References


