

Effects of chronic non-clinical depression on the use of positive and negative words in language contexts

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Abstract

The purpose of this study was to investigate the effects of chronic non-clinical depression (ChD) on the use of ambiguous and unambiguous emotional words in language contexts. Participants with ChD and normal non-depressed (ND) participants' responses to positive and negative stimulus words on a free association word test were compared using the Hyperspace Analogue to Language (HAL) model of memory's context density metric, a measure of the range of contexts in which a word is used in language. ChD participants generated negative words that were used in more restricted contexts than ND participants. However, ND and ChD participants used positive words in a similar range of contexts. The results suggest that people with ChD tend to use negative words that are probably more negative in connotation, yet they are not impaired with respect to using words in contexts where positive words are required.

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1. Introduction

The objective of this study is to investigate the range of contexts in which people with a particular type of depression, chronic non-clinical depression (ChD) use emotional words. Individuals with ChD regularly suffer from at least some of the prominent symptoms of depression (e.g., depressed mood, poor appetite, insomnia, apathy, feelings of guilt or worthlessness). These symptoms are chronic, in that they have persisted for many years. However, individuals with ChD are typically able to cope with their symptoms on a consistent basis (DSM IV, 1994; Oatley, 1992) and are not significantly impaired in social functioning; they are able to maintain relationships and work (Oatley, 1992).

1.1. *The range of contexts*

The range of contexts in which emotional words are used depends on how they are represented in memory. Prior researchers have proposed that the semantic representation for any word depends in part on the nature and number of different contexts in which the word occurs. As the number of words with which a given word co-occurs in context increases, so does the number

of contexts in which the word is understood (Burgess & Lund, 2000). Words that are used more frequently are more easily accessed from memory, or can be said to have increased accessibility in relation to less frequently used words (Matthews & Southall, 1991).

Emotional words found in a broad range of contexts are more frequently used in language, and are typically positive (Burgess, 1998; Matlin & Stang, 1978). Emotional words found in a narrow range of contexts are more obscure in language, and are typically negative in connotation (although there are many more negative than positive words in the English dictionary) (Matlin & Stang, 1978). As we explore the types of words that ChD and ND participants generate in a free association task, we expect that the more frequently used words will be more ambiguous, and, that words with a positive connotation will be more ambiguous than negative words.

1.2. *The relation of ChD to the range of contexts*

The operational definition of ChD suggests that people with ChD are usually able to follow guidelines of socially acceptable speaking. For example, positive words are used to describe a rather broad range of situations. In contrast, negative words are used sparingly

and are replaced with euphemisms whenever possible (Matlin & Stang, 1978). Furthermore, it has been found that one who usually speaks in a socially acceptable fashion has increased accessibility to positive terms from memory (Matlin & Stang, 1978). Hence, it is possible that ND individuals and individuals with ChD do not differ with respect to the range of contexts in which they use positive words.

On the other hand, prior research has shown that people with depression have greater recollection of negative than positive words (Gotlib & Krasnoperova, 1998). However, the extent to which, if any, the greater recollection of negative words impairs the range of contexts in which positive words are used is unknown. For example, it could be that people with ChD are not impaired by a lack of positive expression, but have an excess of negative expression. Moreover, Gotlib and Krasnoperova (1998) have shown that people with depression tend to interpret events more negatively. It is uncertain, however, whether the words they use to describe the events are in fact more negative or used in a narrower range of contexts. Therefore, the effects of ChD on the range of linguistic contexts in which both positive and negative words are used will be investigated.

2. Method

2.1. Participants

Participants were 45 psychology undergraduates from the University of California, Riverside, and ranged in age from 18 to 41 years and spoke English as their dominant language. Ten of the participants were assigned to a ChD group while the remaining 35 participants were assigned to a normal control group (see below for criteria). One of the ChD participants had been previously diagnosed with non-clinical depression and was currently treating it with medication. No other participants had been diagnosed with a mental illness.

2.2. Materials

Depression measures. The first ten rating items on the Beck Depression Inventory (BDI II) (1996) and a depression questionnaire concerned with assessing long-term aspects of depression and social functioning were used to separate ChD and non-depressed (ND) individuals into experimental groups. Social functionality of ChD persons was assessed on the basis that participants gave a rating of either “only slightly” or “somewhat” on the depression questionnaire item “do you feel that your ability to function socially, at work, or at school has been at all impaired by feelings of depression, sadness, or guilt?”

The chronic element of ChD was determined if the participant scored higher than 16 points on the combined items from the BDI II (1996) and the depression questionnaire, and indicated any two or more of the following on the depression questionnaire: (1) his or her life experiences were somewhat more problematic than that of his or her peers, (2) he or she felt depressed more often than not, (3) he or she has felt depressed for one or more months. The depression questionnaire and its scoring directions are available at <http://locutus.ucr.edu/Exps/depression/depQuest.html>. All of the items used on the BDI II (1996) were scored according to the total number of rating points the participant scored for all items (scores per item range from 0 to 3 with 3 as the most depressed rating possible).

Word association test. The word association test contained a positive and a negative stimulus word and seven non-emotional distracted stimulus words. The positive and negative words were selected from the Heise emotional word norms (1965) ranked for affective connotation. There were two forms of the word association test, only differing in the stimulus words used. The positive stimulus words were *heart* and *flower*, and the negative stimulus words were *disease* and *crime*. Three stimulus words were presented per page with ten response spaces listed under each word.

Context usage measure. A metric from the Hyperspace Analogue to Language (HAL) semantic memory model was used in this experiment to calculate the range of linguistic contexts in which a word is used (Burgess & Lund, 2000). The HAL model can be used to compute a variety of metrics in a semantic space with words. For example, *cat* and *dog* are closer in the space than *frog* and *dog*. This distance metric has been used to simulate semantic priming experiments with normals (Lund, Burgess, & Audet, 1996) and brain damaged patients (Buchanan, Burgess, & Lund, 1996). The distance metric seems to reflect the distance that activation spreads in memory between words of varying relatedness.

Each word's meaning vector is comprised of a large set (70,000 or 140,000) word co-occurrences. In this experiment we used all co-occurrences that occurred prior to a word in a 10-word window (70,000 co-occurrence set). If a particular word, for example, *cat*, does not occur with any other words in the 10-word window in which the co-occurrences are computed over the course of the 320 million word corpus, then *cat* would have a context density of 0%. Most words tend to co-occur with 5–20% of the other words.

This context density metric has been used less often than the distance metric, however it has proven most useful in measuring word contextuality. One example of this was an investigation of a number of hypotheses generated from the context-availability model of Schwanenflugel and Shoben (1983). HAL's context density metric was able to confirm one hypothesis and

rule out another about the retrievability of abstract and concrete words from memory (Audet & Burgess, 1999). In the current paper, the context density metric was used to assess the range of contexts in which participants' responses on the word association test occurred.

2.3. Procedure

Participants were provided with a package of measures that were completed in the following order: word association test, BDI II (1996) and the depression questionnaire (the depression questionnaire and the BDI II were counterbalanced). Participants returned the completed measures directly to the experimenter within two days.

Context densities were derived using the HAL model for the participants' word responses to the positive and negative stimulus words. The participants' responses were also rated for ambiguity; word responses received a "0" for being unambiguous, a "1" for being metonymic (ambiguous words with related meanings; e.g., tank, shower), and a "2" for being polysemous (ambiguous words with unrelated meanings; e.g., bank, can).

2.4. Design

There were two 2×2 experimental designs. In the first design, depression level corresponded to the between subjects factor while word valence corresponded to the within subjects factor. The dependent measure was the context density scores for the response words.

In the second design, the between and within subjects factors were the same as in the first design, however the dependent measure was the ambiguity score (0–2) for the response words.

3. Results

3.1. Reliability and the depression measures

The responses to the first ten items of the BDI II (1996) correlated with the depression questionnaire, $r = .79$, $p < .01$. This is within the range typically found in other research (Impara and Plake, 1998).

3.2. Word association test

The average number of positive and negative word association test responses for the ChD group was 8.00 and 7.1, respectively, while the ND group averaged 7.71 positive responses, and 7.91 negative responses. A main effect for word valence with respect to ambiguity rating was found, $F(1, 43) = 10.33$, $p < .003$; positive words were more ambiguous than negative words. No differences between ChD and ND persons were found in the

ambiguity of responses, $F(1, 43) = 0.59$, $p > .05$. A marginal word valence \times depression level interaction was found, $F(1, 43) = 3.45$, $p = .07$. ChD participants generated negative words that were used in a more constrained set of contexts (7.8% or 5460) than ND participants (11.5% or 8050). However, there was no difference between ND (12.8% or 8960) and ChD (12.9% or 9030) participants on the number of contexts generated for positive words. A main effect for word valence was found with respect to context, $F(1, 43) = 9.76$, $p < .04$. Positive words were used in a broader range of contexts than negative words.

4. Discussion

4.1. Ambiguity

Positive words were more ambiguous than negative words. This finding supports prior research that positive words are more frequently used in language and frequent words are more ambiguous than infrequent words (Burgess, 1998; Matlin & Stang, 1978). ChD and ND participants did not differ with respect to the use of ambiguity in their responses. Since it was also found that the ChD and ND groups did not differ in their use of positive words but the ChD group did use negative words in a narrower range of contexts, it is implied that the ambiguity of a negative word does not necessarily increase or decrease in ambiguity as the word becomes more positive or negative in connotation. Rather, the general classification of word valence (positive or negative) might be the more determining factor in the ambiguity of emotional words.

4.2. Context

Positive words were used in a broader range contexts than negative words. This result is consistent with the earlier finding that positive words tend to be more frequent in language, and also provides evidence that HAL's context density metric is a valid measure of the contextual span of emotional words used in language (Burgess, 1998; Matlin & Stang, 1978).

The two participant groups did not differ in their use of positive words in context. However, individuals with ChD generated negative responses that are used in a narrower range of contexts. Since the use of words increasing in negative connotation decrease in social acceptability, and are thus used in fewer contexts, it follows that participants with ChD tend to use negative words that are more negative in connotation than do ND participants (Matlin & Stang, 1978).

In contrast, the ChD and ND groups used positive words in a similar range of contexts. This result suggests that the connotations of the positive words that people

with ChD use are not very different from those of the positive words used by ND people. It can be concluded that people with ChD do not suffer from a lack of ability to use positive words, and that having an excess of negative schemas or tending to use negative words that are more negative in connotation does not impair the range of linguistic contexts in which they use positive words.

The rules of social etiquette facilitate the use of positive words in language and inhibit the use of negative words (Matlin & Stang, 1978). The current results suggest that these rules of social etiquette may be internalized as part of the memory system that regulates the use of emotional words in language. Specifically, in people with ChD, this system is restricting the use of more negatively connotated terms. However, the system facilitates the use of positive words in both groups in that no differences in the range of contexts in which positive words are used is found. It would be useful to discover if this more restricted range of contexts with the negatively connotated items translates directly into inhibition for this class of items in a priming task.

A limitation of this study is that anxiety was not assessed. In previous research when the effects of anxiety were partialled out, greater negative biases were found in the explicit memory of people with depression (Bradely, Mogg, & Williams, 1994). It is possible that anxiety could have reduced the effects of ChD on the contextual use of negative words.

This study has provided insight into the way people with ChD use emotional words in language. The HAL model of memory's context density metric has shown promise in its ability to distinguish the use of emotional words in the language of individuals with ChD.

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