

The Effect of Loneliness on the Perception and Learning of Negative Words

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Abstract

Loneliness is a human experience that is associated with negative emotions and can have an adverse effect on a person's health. Previous research has shown that participants learn negative words more quickly and retain them in memory longer than words with positive or neutral associations. It was hypothesized that individuals who appear to be lonelier would remember negative words better than individuals who are less lonely. The Auditory Affective Verbal Learning Test (AAVLT), which includes positive, negative, and neutral word lists, and the UCLA loneliness scale were used to examine the impact of loneliness on learning emotional words. It was predicted that the recall of negative words, for those who score high on the UCLA scale, would be greatest for the first five words on the negative list, due to enhanced primacy effects (Snyder, Harrison & Shenal, 1998). Results reveal that, in general, recall of the first five negative words was significantly higher than recall of the first five positive and neutral words. Also, participants showed a significant increase in word recall from Trial 1 to Trial 5. A lack of correlation between the UCLA loneliness scores and word lists will be discussed.

Introduction

Loneliness is an emotional state that is experienced by most people at some point in their lives. It can be defined as a negative emotional experience that occurs when “a person's network of social relations is significantly deficient in either quality or quantity” (Peplau & Perlman, 1982, p. 2). This emotional experience “tends to make individuals adopt negative views of their surroundings and lose interest in positive exploration” (Quan, Zhen, Yao, & Zhou, 2014, p. 970). Karabacak and Oztunc (2014) argue that loneliness is not simply an individual's state of being alone, but that the basis of loneliness is “inefficacy of experienced social relations and low level of satisfaction as opposed to intended level of satisfaction from these relations.” The dissatisfaction of loneliness may rise from the difference between “the social relations that individual

lives and the relations he/she wishes to live” (Peplau & Perlman, 1982). Loneliness is a common feeling; however, in severe cases, it may cause various health issues.

Loneliness is an important issue in fields of psychology such as psychology of personality and perceptions, and counseling psychology. The proposed study addresses how emotional valence can affect the verbal learning of lonely people. The topic is relevant to college students, especially freshmen, as they often experience loneliness due to being away from their families and immersed in an unfamiliar environment. Loneliness may negatively affect freshmen’s academic adjustment, which, according to Jansen and van der Meer, will “impair students' academic performance and their engagement with the university” (as quoted in Quan et al., 2014, p. 970). Bekhet and Zauszniewski suggest that this happens as a result of students losing their interest in mastering learning skills (as cited in Quan et al., 2014). Moreover, Quan et al. (2014) cite a study proposing that students’ poor academic adjustment may occur because loneliness reduces their abilities “to regulate themselves to achieve balance in their new academic environment and to meet the new learning requirements of a university” (p. 970). A study by Quan et al. (2014) found that loneliness also negatively affected adjustment by “activating a negative coping style and suppressing a positive coping style” (p. 970). In other words, in order to relieve the effects of stress, a student may adopt a negative copying style that, in the end, will negatively influence the individual’s academic adjustment. The purpose of this study is to assess how well individuals who have different levels of loneliness memorize emotional and neutral words.

A review of existing literature on the topic explains the foundations of the current study. Research shows that feelings of loneliness in individuals are correlated with negative emotions. Thus, loneliness was found to be negatively correlated with happiness (Booth et al., 1992, as cited in Sha’ked & Rokach, 2014). Additionally, loneliness has been linked to such concepts as depression and poor self-concept (McWhirter & McWhirter, 1990). Other studies have showed that loneliness has a direct effect on feelings of depression or suicide (Meltzer et al., 2013). Meltzer et al. state that many studies associate loneliness with mental health problems and show a correlation between loneliness and mental disorders such as depression, anxiety, and phobias. The correlation between loneliness and various negative emotions leads to the prediction that a person with severe loneliness is more likely to experience negative emotions and will therefore be more likely to remember words with negative connotations.

Lonely people tend to be biased in their perceptions, as they usually pay attention to negative aspects of life more than any other. This inclination affects their perception of self and others. Miller, Perlman, and Brehm (2007) point out that “perceptions of the self in relation to others are central to all social-cognitive models of loneliness” (as cited in Fen-Fang & Reis, 2009, p. 221). Fen-Fang and Reis (2009) claim that several studies provide evidence that lonely people tend to perceive others negatively (p. 221). This negativity of perception of self and others can be related to interpersonal characteristics like shyness, social anxiety, and lack of communication skills (Fen-Fang & Reis, 2009, p. 221). However, research by Wittenberg and Reis has shown that “even after controlling for social skills, there was still a substantial correlation between loneliness and negativity in social perception” (as cited in Fen-Fang

& Reis, 2009, p. 222). In short, regardless of one's personal social skills, loneliness is associated with negative perceptions of others.

Killeen (1998) argues that loneliness is only related to negative concepts, although it is hard to define whether "the correlational concepts cause the loneliness, or are an effect of it" (p. 766). He researched the literature and found out that most research and discussion relates loneliness to other rather negative phenomena, including depression,¹ shyness,² anxiety,³ anger and tension,⁴ self-blame and self-devaluation,⁵ and other negative psychological states. Killeen (1998) also mentions that loneliness is correlated with psychological impairments and suicide. This tendency may be a result of the lonely person's lack of close relationships and social support.

A verbal learning study on people with different levels of loneliness can give insight into their emotional inclination. Loneliness may affect memory. That is, people with high levels on the loneliness scale may tend to remember more emotional and negative events. Nostalgia is a concept related to memory of emotional events and can be defined as "a sentimental longing or wistful affection for the past" ("Nostalgia," 1998, p. 1266). Studies show "evidence for a link between a discrete negative affective state—loneliness—and nostalgia" (Wildschut, Sedikides, Arndt, & Routledge, 2006, p. 982). Wildschut et al. (2006) state that negative mood and loneliness elicit feelings of nostalgia due to a possibility that "nostalgia may serve to counteract negative mood and loneliness" (p. 982). This shows that loneliness has an effect on perception and memory of emotional events. The study by Wildschut et al. (2006) reveals that nostalgia occurs "in response to negative mood and the discrete affective state of loneliness" (p.975). Thus, negative mood and loneliness can trigger emotional memories.

The current study hypothesizes that individuals who obtain high and moderate scores on the UCLA loneliness scale will remember negative words better than individuals with low scores. As a main effect, a small interaction was predicted. However, a significant difference was expected in verbal learning between individuals with high scores and individuals with low scores on the loneliness scale. In addition, it

¹ Killeen (1998), citing Foxall, M.J., Barron, C.R., Von Dollen, K., Shull, K.A., & Jones, P.A. (1994), Low-vision elders: living arrangements, loneliness and social support, *Journal of Gerontological Nursing*, 20(8), 6-14; Katona, C.L.E. (1994), Approaches to the management of depression in old age, *Gerontology*, 40(Suppl.1), 5-9; McWhirter, B.T. (1990), Loneliness: A review of current literature, with implications for counselling and research, *Journal of Counselling and Development*, 68, 417-422; Roscoe, B., & Skomski, G.G. (1989), Loneliness amongst late adolescents, *Adolescence*, 24(96), 947-955.

² Killeen (1998), citing Carr, M., & Schellenbach, C. (1993), Reflective monitoring in lonely adolescents, *Adolescence*, 28(111), 737-745; Kalliopuska, M. & Laitinen, M. (1991), Loneliness related to self-concept, *Psychological Reports* 69, 27-34; Kraus, L.A., Davis, M.H., Bazzini, D., Church, M., & Kirchman, C.M. (1993), Personal and social influences on loneliness: the mediating effect of social provisions, *Social Psychology Quarterly* 56(1), 37-53.

³ Killeen (1998), citing Kraus et al., 1993; McWhirter, 1990; Roscoe & Skomski, 1989; Ryan, M.C., & Patterson, J. (1987), Loneliness in the elderly, *Journal of Gerontological Nursing*, 13(5), 6-12.; Sears, D.O., Peplau, L.A., & Taylor, S.E. (1991), *Social Psychology*. Prentice Hall, London.

⁴ Killeen (1998), citing Loucks S. (1980), Loneliness, affect and self-concept: Construct validity of the Bradley loneliness scale, *Journal of Personality Assessment* 44(2), 142-147.

⁵ Killeen (1998), citing Jackson, J., & Cochran, S.D. (1991), Loneliness and psychological distress, *The Journal of Psychology*, 125(3), 257-262.

was expected that the results of the study would be influenced by primacy and recency effects. The primacy effect occurs when the first items presented in a list are remembered better than those presented later in the list. An individual is also likely to remember words at the end of the list more than words in the middle, and this is called the recency effect. For example, in a list of fifteen words, a person is more likely to remember the first and last five words than the five words in the middle. Significantly more primacy effect was expected for the negative word list based on prior research. The results were also expected to show a trial effect, as a person would get better at recalling with each trial. Thus, several effects on verbal learning were expected to occur.

Methods

Participants

Participants included sixty undergraduate students of Methodist University. Among the participants, age varied from seventeen to forty. The participants' ethnicity and their socio-economic status were unknown. The majority of the students were recruited in the psychology classes in which they were enrolled. They received extra course credit for participation in the study. Before the study began, the participants signed an informed consent form.⁶

Apparatus

Loneliness level was measured by the participant's score obtained on the UCLA loneliness scale.⁷ The name of the scale derives from the University of California at Los Angeles (UCLA). The scale was published in 1978 by Russell, Peplau, and Ferguson and has been revised twice. This scale includes twenty items, and participants rate each item as O ("I often feel this way"), S ("I sometimes feel this way"), R ("I rarely feel this way"), and N ("I never feel this way") (Russell et al., 1978). To score the results, each rating receives a certain number of points. Thus, all Os receive 3 points, all Ss receive 2 points, all Rs receive 1 point, and all Ns receive 0 points. The higher the score is, the higher the participant's level of loneliness.

The Auditory Affective Verbal Learning Test (AAVLT) is a verbal memory test that was developed by Snyder and Harrison in 1997 as an alternate form of the affectively neutral Rey Auditory Verbal Learning Test (RAVLT) (Snyder, Harrison & Shenal, 1998). Rey developed the RAVLT in the 1940s, and the test became well-known and widely used for evaluating verbal learning and memory. The standard RAVLT contains a list of fifteen neutral words that are read out loud to a participant. The participant needs to repeat all the words that he or she remembers. To create an affective version of the RAVL Test, Snyder, Harrison, and Shenal used an index of word norms to create lists of positive and negative words (Snyder et al., 1998). For the purpose of this study, only the first five trials of the lists⁸ were given. Data sheets were used to record participant's data.

⁶ See Appendix A

⁷ See Appendix B

⁸ See Appendix C

The study was held in a psychology lab with one desk, a chair for the participant, and a chair for the researcher. The materials used for this study included a pen; an informed consent form; a laptop computer; speakers; a list of specified order of AAVLT versions; data sheets for the AAVLT for neutral, positive or negative words; and a sheet with the UCLA loneliness scale. Before a participant arrived, all materials were removed from the desk. Words were prerecorded by male and female speakers.

Design

The present study used a three (negative, positive and neutral words) by three (beginning, middle, and end of the words list) by three (high, moderate, and low loneliness) analysis of variance (ANOVA) without repeated measures.

The first independent variable in this experiment is the type of words on the word list. Each list presents one type of words, either negative, positive, or neutral words. All of these variables are true variables, that is, variables that are manipulated by a researcher. The three levels are between-subject variables.

The second independent variable represents primacy and recency effects. This variable has three levels, represented by the first five words, middle five words, and last five words of each list. The three levels are within-subject true variables.

The third independent variable is loneliness. The three levels of the variable represent low, moderate, and high scores on the loneliness scale. All three levels are within-subject true variables.

The dependent variable is the number of words recalled by the participants. The measured scores are based on how many words a participant recalled in total, recalled in each trial, and recalled in different parts of each list. It will be accessed by the scoring criteria for the AAVLT.

Procedure

After greeting the participant, a researcher went over the informed consent form⁹ and then asked the participant to sign it. The experimenter kept the last page of the informed consent form for confidentiality and for her records. Then the experimenter played Ludwig van Beethoven's "Für Elise" from a laptop that was connected to the speakers so the participant could adjust volume. For all participants, the same procedure was used to conduct this experiment. The experimenter read instructions from the original RAVLT on Trial 1:

I am going to read you a list of words. Please listen carefully. When I stop, you are to say back as many words as you can remember. Say the words in any order you remember. Just try to remember as many as you can. (Snyder et al., 1998, p. 254)

After that, the experimenter played an AAVLT audio from the laptop.

The specified order of word list versions was used to assure that no subsequent participants received the same condition. Thus, if the first participant received the neutral version, the next one received the negative version, and the one after received

⁹ See Appendix A

the positive version. Twenty participants received the neutral version, twenty participants received the positive version, and twenty participants received the negative version. A voice on the audio read the lists at about one word per second. For female participants, the voice was female, and for male participants, it was male.

After the audio was stopped, the participant started recalling words. When the person no longer recalled any more words, or a maximum of 3 minutes had passed, the next trial began (Snyder et al., 1998). The participant's responses were recorded on a data sheet.¹⁰ The researcher put an identification mark on the data sheet for better organizing the data; for example, "A" would be used instead of a participant's name.

Trial 1 was followed by Trial 2, in which a researcher gave these instructions from the RAVLT:

Now I'm going to read the same list again. When I stop again, I want you to tell me as many words as you can remember, including words you said the first time. It doesn't matter what order you say them. Just say as many words as you can remember whether or not you said them before. (Snyder et al., 1998)

The researcher continued the same procedure until five trials were completed.

Following the AAVLT, the participant was given the UCLA loneliness scale. These instructions were provided: "Indicate how often each of the statements below is descriptive of you." All the researchers had the same script in order to provide the same guidelines to all participants. The participant was given unlimited time to complete the scale. After the participant completed the task, the researcher debriefed him or her about the purpose of the study.

Results

The three-way ANOVA without repeated measures was performed using these variables: emotional valence of words (negative, positive, and neutral), word place on list (beginning, middle, and end), and level of loneliness (high, moderate, and low). Analysis of variance shows a significant effect of word type by list (LIST) (positive, negative, and neutral) and place or position on list (PLACE) (first five words, middle five words, last five words). The value of significance is <0.001 . No intersection of the loneliness scores with the recall of negative words was found.

Results from the four-way ANOVA without repeated measures were analyzed using the following variables: emotional valence of words (negative, positive, and neutral), word place on list (beginning, middle, and end of the list of words), level of loneliness (high, moderate, and low), and trial (first through fifth). Analysis of variance shows a significant effect of word type by list (LIST) (positive, negative, and neutral), place or position on list (PLACE) (first five words, middle five words, last five words), and trial (TRIAL) (first through fifth).¹¹ The value of significance is <0.001 . Results show that the primacy effect played a great role in the recall of negative words, as well

¹⁰ See Appendix C

¹¹ See Appendix D

as in the overall recall of all three word type lists. No significant intersection of the loneliness scores with the recall of negative words was found.

Post hoc analysis (Tukey's HSD) showed that recall of neutral words (list 3) was better than recall of emotional words (lists 1 and 2) [$F(2,855) = 9.82, p < 0.001$].¹² Post hoc analysis (Tukey's HSD) also demonstrated that the first five words were recalled better than other words on the lists [$F(2,855) = 50.36, p < 0.001$].¹³ Post hoc analysis (Tukey's HSD) showed a consistent effect of trial [$F(4,855) = 104.84, p < 0.001$].¹⁴ All conditions significantly increased from Trial 1 to Trial 5. Recall of negative words (list 2) was significantly higher for the first five words than for other words, which can be explained by primacy effect [$F(4,855) = 12.95, p < 0.001$].¹⁵ The neutral list also had an effect.

Discussion

The results support the original study by Snyder et al. (1998), titled “The Affective Auditory Verbal Learning Test Hypothesis.” Thus, an overall recall score for the first five words was much better than for the words later on the list due to the primacy effect. The primacy effect was highest for the negative words list. The recall score increased with every trial. Nevertheless, the main hypothesis was not supported in this study. It was originally hypothesized that individuals who obtained high scores on the loneliness scale would remember negative words better than individuals with low scores. However, no significant correlation was found between loneliness scores and word recall scores.

The reason for such results might be that the participants were college students who attend the same small university as the researchers: familiarity with the researchers and the chance of seeing them around the campus might have affected the participants' self-reports on the loneliness scale. Also, the wording of the UCLA scale—such as “It is difficult for me to make friends,” which emphasizes deficiency in socio-emotional skills—might have affected the participants' reports as they attempted to appear socially skillful. Other factors that might have had an influence on students' reports on loneliness are that significant numbers of the participants were international students and students affiliated with the military. Military-affiliated students are used to adapting to new conditions, which decreases the probability of their experiencing loneliness. International students develop resistance to loneliness due to being away from their homes.

Despite all these possible reasons for the outcomes of the study with respect to loneliness, the most influential factor is that loneliness is a broad concept. The definition presented in the introduction tends to simplify the concept of loneliness, which in reality encompasses nuances and shades that differ from person to person. For example, one person may experience the state of loneliness over a continuous period and express resulting symptoms of depression while another person may just

¹² See Appendix E, Graph 1

¹³ See Appendix E, Graph 2

¹⁴ See Appendix E, Graph 3

¹⁵ See Appendix E, Graph 4

feel lonely at a particular moment in time. The study did not take into account the complexity of the concept of loneliness, and the way to improve the design in further studies would be to narrow the concept. One suggestion is to study related mental states that are easier to define, such as grief.

Nina R. Jakoby (2012) defines grief as the emotional response to loss. It is a more straightforward emotional experience than loneliness, and researchers will find it easier to distinguish participants with high and low levels of grief. Several researchers state that grief is associated with negative emotions. According to Jakoby, one observer asserts that grief is associated with negative conditions such as “physiological stress, poor health, and an increased risk of mortality, depression, or drug consumption, which often implies a need for psychiatric intervention or medical help,”¹⁶ and others define grief as a negative emotion.¹⁷ Because grief is related to negative emotions, it can be hypothesized that people with high levels of grief will remember negative words better than they recall positive and neutral words. Different tests can be used for measurement of grief, such as the Texas Revised Inventory of Grief (TRIG) or the Traumatic Grief Inventory (TGI).

In conclusion, the main hypothesis was not supported in the study, and there was no difference between individuals with high and low scores on the loneliness scale in the recall of negative words. The possible explanation for such an outcome is the breadth of loneliness as a phenomenon. Nevertheless, the researcher observed a strong primacy effect of negative words. The suggestion for future research is to explore different negative mental states related to loneliness and their effect on learning of negative words.

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¹⁶ Jakoby, 2012, p. 680, quoting Archer, J. (1999). *The nature of grief: The evolution and psychology reactions to loss*. London, UK, and New York, NY: Routledge.

¹⁷ Jakoby, 2012, p. 682, citing Charmaz, K., & Milligan, M.J. (2006). Grief. *Handbook of the sociology of emotions*, J.E. Stets & J. H. Turner (Eds.), pp. 516-538. New York, NY: Springer.

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Appendix A: Informed Consent Form

Verbal Learning Study

1. Purpose of the study: The purpose of this research is to study verbal learning.
2. Procedure / Conditions of Participation: You will be asked to listen to a list of words and recall them later. The list of words will be repeated 5 times, and you will be asked to recall the words after each time. After that, you will be asked to complete a personality test.
3. Anonymity of Participants and Confidentiality: The information you will share with us if you participate in this study will be kept completely confidential and anonymous.
4. Discomforts and Risks: There are no risks associated with this research. If you experience any discomforts, please let the researcher know
5. Benefits and Compensation of the Study: Your participation will help to advance knowledge in the area of how we learn words. You will also receive extra credit for a particular class.
6. Freedom to Withdraw: You are free to withdraw your participation at any time without penalty. You may also skip any part of the study at no penalty.
7. Contact Information for Questions: If you have any questions about your rights as a research subject or you feel you have been placed at risk you may contact the Methodist University Institutional Review Board (IRB) by mail at Methodist University, Institutional Review Board, by phone at (910) 630-7418, or by e-mail at irb@methodist.edu.

Researcher's Name

E-mail

By signing below, you freely consent to participate in the study.

Participant's Name PRINTED

Signature

Date

Extra Credit Information:

Course

Course Professor

Appendix B: The UCLA Scale and Scoring

Scale:

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

C indicates "I often feel this way"

S indicates "I sometimes feel this way"

R indicates "I rarely feel this way"

N indicates "I never feel this way"

- | | | | | |
|---|---|---|---|---|
| 1. I am unhappy doing so many things alone | O | S | R | N |
| 2. I have nobody to talk to | O | S | R | N |
| 3. I cannot tolerate being so alone | O | S | R | N |
| 4. I lack companionship | O | S | R | N |
| 5. I feel as if nobody really understands me | O | S | R | N |
| 6. I find myself waiting for people to call or write | O | S | R | N |
| 7. There is no one I can turn to | O | S | R | N |
| 8. I am no longer close to anyone | O | S | R | N |
| 9. My interests and ideas are not shared by those around me | O | S | R | N |
| 10. I feel left out | O | S | R | N |
| 11. I feel completely alone | O | S | R | N |
| 12. I am unable to reach out and communicate with those around me | O | S | R | N |
| 13. My social relationships are superficial | O | S | R | N |
| 14. I feel starved for company | O | S | R | N |
| 15. No one really knows me well | O | S | R | N |
| 16. I feel isolated from others | O | S | R | N |
| 17. I am unhappy being so withdrawn | O | S | R | N |
| 18. It is difficult for me to make friends | O | S | R | N |
| 19. I feel shut out and excluded by others | O | S | R | N |
| 20. People are around me but not with me | O | S | R | N |

Scoring:

Make all O's =3, all S's =2, all R's =1, and all N's =0. Keep scoring continuous.

Appendix C: Scoring Datasheets for the AAVLT

Neutral Words List

Drum	Drum	Drum	Drum	Drum
Curtain	Curtain	Curtain	Curtain	Curtain
Bell	Bell	Bell	Bell	Bell
Coffee	Coffee	Coffee	Coffee	Coffee
School	School	School	School	School
Parent	Parent	Parent	Parent	Parent
Moon	Moon	Moon	Moon	Moon
Garden	Garden	Garden	Garden	Garden
Hat	Hat	Hat	Hat	Hat
Farmer	Farmer	Farmer	Farmer	Farmer
Nose	Nose	Nose	Nose	Nose
Turkey	Turkey	Turkey	Turkey	Turkey
Color	Color	Color	Color	Color
House	House	House	House	House
River	River	River	River	River

Negative Words List

Morgue	Morgue	Morgue	Morgue	Morgue
Murder	Murder	Murder	Murder	Murder
Kill	Kill	Kill	Kill	Kill
Pimple	Pimple	Pimple	Pimple	Pimple
Gun	Gun	Gun	Gun	Gun
Greedy	Greedy	Greedy	Greedy	Greedy
Lice	Lice	Lice	Lice	Lice
Measles	Measles	Measles	Measles	Measles
Slay	Slay	Slay	Slay	Slay
Deface	Deface	Deface	Deface	Deface
Cruel	Cruel	Cruel	Cruel	Cruel
Failing	Failing	Failing	Failing	Failing
Hate	Hate	Hate	Hate	Hate
Acne	Acne	Acne	Acne	Acne
Grave	Grave	Grave	Grave	Grave

Positive Words List

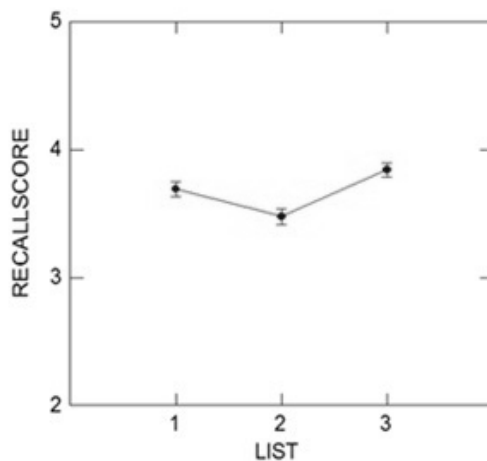
Smile	Smile	Smile	Smile	Smile
Freedom	Freedom	Freedom	Freedom	Freedom
Cheerful	Cheerful	Cheerful	Cheerful	Cheerful
Friend	Friend	Friend	Friend	Friend
Music	Music	Music	Music	Music
Joy	Joy	Joy	Joy	Joy
Happy	Happy	Happy	Happy	Happy
Wisdom	Wisdom	Wisdom	Wisdom	Wisdom
Blossom	Blossom	Blossom	Blossom	Blossom
Laugh	Laugh	Laugh	Laugh	Laugh
Beauty	Beauty	Beauty	Beauty	Beauty
Peace	Peace	Peace	Peace	Peace
Sunset	Sunset	Sunset	Sunset	Sunset
Garden	Garden	Garden	Garden	Garden
Beach	Beach	Beach	Beach	Beach

Appendix D: Analysis of Variance Table

Source	Sum of Squares	df	Mean-Square	F-ratio	P
List	20.231	2	10.116	9.824	<0.001
Place	103.696	2	51.848	50.355	0.001
Trial	431.783	4	107.946	104.837	0.001
List*Trial	53.29	4	13.322	12.939	0.001
List*Place	7.483	8	0.0935	0.908	0.509
Place*Trial	34.857	8	4.357	4.232	0.001
List*Place*Trial	47.991	16	2.999	2.913	0.001
Error	880.353	885	1.03		

Appendix E: Graphs of Least Squares Means

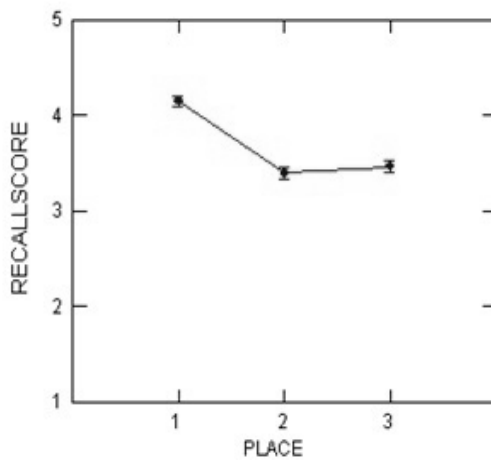
Graph 1. Recall for the Words Lists



Lists:

1. Positive
2. Negative
3. Neutral

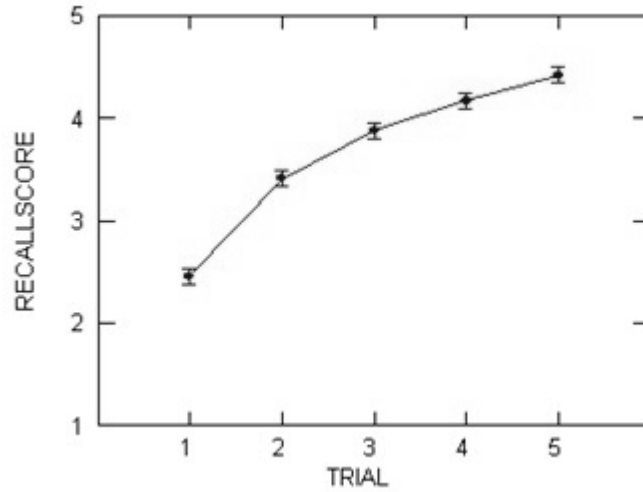
Graph 2. Recall for the Place of Words



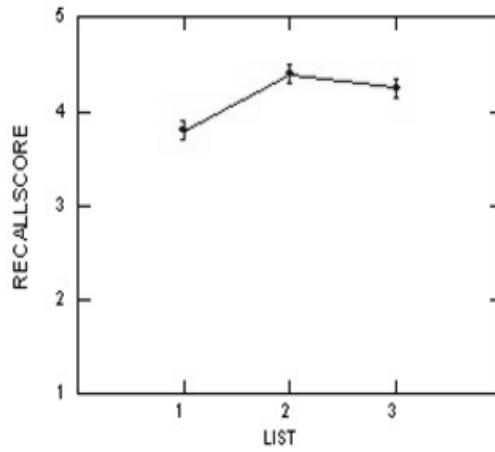
Place:

1. First five words
2. Middle five words
3. Last five words

Graph 3. Recall for the Trials



Graph 4. Recall for the First Five Words



Lists:

1. Positive
2. Negative
3. Neutral