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Throughout the history of research, there has been an immense interest regarding gender differences. Not only have variations in gender been observed through various social and physiological factors, but through cognitive factors as well. When reviewing previous research studies, it is evident that gender variations exist even when performing simple memory tasks. In the present study, the experimenter investigated whether implying opposing gender strength would have an effect on recall test performance. It was hypothesized that an individual would be motivated to perform more accurately on a recall test when opposing gender strength implications were introduced. When analyzing the results of the study, however, no significance was found, indicating that gender strength implications have no valid effect on task performance.

Throughout the history of research, there has been an immense interest regarding gender differences. Not only have variations in gender been observed through various social and physiological factors, but through cognitive factors as well. When reviewing previous research studies, it is evident that motivation may be one cognitive factor in which gender similarities and differences exist. Distinctions between each genders application of motivation seem to be particularly interesting when observing the effects that opposing-gender strength implications have on the performance of a specific task.

Historically, research regarding gender differences in memory tasks has failed to display reliable findings (Maccoby & Jacklin, 1974). Recent research, however, has

found significant results, discovering that women tend to have an advantage over men in various memory tasks (Lindholm & Christianson, 1998).

Other studies, however, have demonstrated that women tend to perform worse on memory tasks than men whenever social comparison is introduced (Huguet & Monteil, 1995). In Huguet and Monteil's study, female and male participants took part in a cognitive-perceptual task while anticipating or not social comparisons with other peers. During this study, participants were seated in a room and were instructed to take part in a complex memory test. The control group was told that their scores on the test would remain confidential, while the experimental group was told that their scores on the test would later be posted outside on the bulletin board for others to view. When analyzing the results of their study, Huguet and Monteil's hypothesis was indeed supported. Not only did the experimenters find that individuals self evaluations of their scores can affect how they perform on a task, but that task performance itself can also be affected by gender motivations or norms in social comparison situations. During this study, Huguet and Monteil also discovered that males' performance on memory tasks were enhanced when social comparison was anticipated, while females performed poorer when social comparison was expected to occur.

In a study carried out by Daly, Salters and Burns (1998), gender differences in recall ability were examined. In this study, Daly et al. investigated whether task preference had an effect on a genders task performance. When conducting the study, Daly et al. had young male and female participants read one of three stories, either containing a male protagonist, a female protagonist or a story that contained gender role-reversal characteristics. After reading one of the three stories, participants were asked to

recall as much from the story as they could remember. When analyzing the results from the study, Daly et al. found some very interesting results. The results indicated that most of the participants' scores varied due to the story type differences over individual differences. For example, Daly et al discovered that young male participants performed more accurately on the story containing a male protagonist, whereas young female participants performed more accurately on the story containing a female protagonist and the story in which gender role-reversal characteristics existed. When analyzing the results of Daly et al.'s study, it is evident that task performance may be influenced by an individual's preference of the selected task. Therefore, when looking at previous research implying that women are stronger in their recall capabilities than men, it may be due to the fact that women enjoy recall tasks more than men.

When reviewing gender differences in everyday memory tasks, Herrmann, Crawford and Holdsworth (1992) found some very interesting results. In one of two studies conducted by Herrmann et al., men and women's recall abilities of a shopping list and travel directions were compared. In this study, Herrmann et al. hypothesized that women would be more likely to perform more accurately on the shopping list task, whereas men would be more likely to perform more accurately on the directional task. When analyzing the results of the study, it was found that Herrmann et al.'s hypothesis was supported. Not only did women perform better on the shopping list recall task, but men performed better on the directional recall test as well. Therefore, it is evident that gender recall differences may only be present when introducing social gender norms.

In Herrmann et al.'s second study, male and female oriented labels were added onto the same shopping and directional recall lists. In this study, Herrmann et al. (1992)

produced a set of neutral directions and labeled it as either making a shirt or a workbench, and took a neutral list of words and labeled it as either a shopping or hardware list. By doing this, Herrmann et al. was attempting to see if opposing gender cues would have an effect on a participant's task performance. When analyzing the results of the study, Herrmann et al.'s hypothesis was once again supported. Not only was it found that women participants performed more accurately on the female-oriented recall tasks, but it was also found that male participants performed more accurately on the male-oriented tasks. Therefore, when reviewing this study, it is evident that gender cues may indeed have an effect on participant's task performance due to an individual's motivation and skill level.

Recent research has explored the notion that motivation plays a significant role on task performance when implying opposing-gender strength. According to Colley, Ball, Kirby, Harvey and Vingelen (2002), gender-related motivation can not only be displayed through intellectual ability tests but through common memory lists as well. In the Colley et al. study, participants were observed to see whether instructions that implied opposing-gender strength would have a negative effect on participants' recall performance abilities. When the study was conducted, participants were divided into one of three groups and were either given (1) instructions that indicated better recall performance by men, (2) instructions that indicated better recall performance by women, or (3) a neutral version that contained no gender information. After receiving the instructions, participants were to then take part in a 16 word recall test, in which they had 45 seconds to attempt to memorize as many words as possible. Although Colley et al. hypothesized that participants who were given instructions implying opposing-gender strength would

perform worse than those who received a neutral version, their findings were contradictory. In fact, Colley et al. found that when no other gender implications existed, both men and women performed more accurately on the recall test when told that the task favored the opposite sex.

When conducting my own research based on gender motivation, I decided to replicate part of the Herrmann et al. (1992) and the Colley et al. (2002) studies. Not only did I utilize the same recall test that was applied in Herrmann and Colley's studies, but I also adapted the time limits in which they used for the recall test. My study was more similar to Colley's study, however, due to the fact that I chose to use a similar instruction format implying opposing gender strength. Although my study followed the same format as Herrmann and Colley's studies, my hypothesis significantly varied. While Herrmann et al. and Colley et al. hypothesized that participants would be motivated to perform more accurately on tasks identifiable with their own gender, I had a different theory. In my study, I hypothesized that participants who were read an instruction sheet implying better performance by the opposing sex would be motivated to perform more accurately on the provided recall test than participants who received no specific gender information.

Method

Participants

In order to conduct the proposed study, college level students from Lindenwood University were recruited using the Human Subject Pool. The Human Subject Pool is a means through which students enrolled in entry level Psychology, Sociology and Anthropology classes are recruited in order to gain extra credit points in their classes. Students enrolled in these classes are only allowed to participate in the same experiment

once, allowing a researcher's subject matter to remain consistent and un-biased. A total of 79 students participated in this study, with 40 participants being in the experimental group and 39 participants being in the control group. Fifty-two women and twenty-seven men participated in the study.

Materials

The chief component utilized in this study was a provided recall test containing 16 words (see Appendix A). Some of the additional materials that were used in the experiment ranged from writing utensils, a stop watch and informational documents. The room in which the study was conducted was located on Lindenwood University campus in Young Hall, room 105A. The room itself was adequately lighted and consisted of a computer desk with a network computer, 2 chairs, 1 desk and a rolling stand containing a television set.

Procedure

For the experiment, participants were recruited through the Lindenwood Human Subject Pool. Each participant arrived at their specified time on the days of October 16, 21, 23, 28, 30 and November 4 in Young Hall, room 105A. Before conducting the study, two copies of an informed consent form (see Appendix B) were distributed to the participant to read and sign, allowing him/her to personally retain one copy while also allowing the researcher to have a copy for reference as well. An anonymous questionnaire (see Appendix C) was then given to the participant in order to inquire about his/her gender, grade level and English comprehension level. After completion, the experimenter then read aloud one of two instruction versions, either stating (1) that men/women perform better than the opposing sex on recall tests (see Appendix D & E) or

(2) that no gender differences exist when looking at recall test performance (see Appendix F). The instruction sheets also notified the participant that he/she was to take part in a 45 second recall test consisting of 16 neutral words (Herrmann et al., 1992). After the participant fully understood the given instructions, the experimenter then handed him/her the recall test and started the timer. When the 45 seconds passed, the experimenter removed the list and gave the participant a blank sheet of paper while asking him/her to record as many words from the list in a 2 minute period. After completion, the experimenter took the participant's sheet and thoroughly debriefed the participant while giving him/her a feedback letter (see Appendix G) containing contact information of experimenter. The participant was then thanked for his/her time, and was told to contact the experimenter if any questions or inquiries about the study existed.

Results

In my study, I hypothesized that participants who were read an instruction sheet implying better performance by the opposing sex would be motivated to perform more accurately on the provided recall test than participants who received no specific gender information. Therefore, in order to analyze my results, an independent samples t-test was utilized. When comparing the experimental and the control group's results, it was found that no significance existed, and I therefore failed to reject the null hypothesis. I also analyzed men and women participant's results separately in order to determine if gender differences exist in task performance when opposing gender strength implications are introduced. When analyzing those results, it was found that no significance existed, and I therefore failed to reject the null hypothesis in those two situations as well. When comparing the combined experimental ($M = 9.62$; $SD = 2.192$) and control ($M = 9.13$;

SD = 2.494) group's results, it was found that $t_{(77)} = .941$, $p>.05$. When analyzing women participant's results separately, the experimental (M = 9.81; SD = 2.209) and control (M = 9.65; SD = 2.279) group's results found that $t_{(50)} = .247$, $p>.05$. When analyzing men participant's results separately, the experimental (M = 9.29; SD = 2.199) and control (M = 8.08; SD = 2.660) group's results found that $t_{(25)} = .291$, $p>.05$.

Discussion

When reviewing the results of my study, it is evident that my study did not find significance, even when analyzing male and female participants' results separately. Therefore, it can be assumed that opposing gender strength implications may not have an effect on task performance, at least when taking part in a recall test. Due to this, there is no evidence backing the notion that motivation plays a factor in participants recall ability when implying opposing gender strength. Although this was somewhat disappointing, it is pleasant to know that opposing gender strength implications may not have an effect on today's society.

When comparing the means of the two groups in the study, it was very interesting to see how close the two mean test scores were. The mean test scores were even closer when analyzing female participants' results. This seems to correspond with Lindholm and Christianson's (1998) findings, stating that women tend to be stronger in their memory capabilities than men. These findings also may be due to Daly et al.'s (1998) results, implying that women may perform more accurately on recall tests due to the fact that they enjoy taking part in recall activities over men. Although these results go along with certain studies, they seem to contradict others as well. For example, these results seem to go against Huguet and Monteil's (1995) study due to the fact that women

performed more accurately on the recall test when told that males have stronger recall abilities. Therefore, it does not seem as if social comparison hindered their results, and in fact, may have increased it.

When analyzing the mean test scores for male participants, however, the mean scores seemed to vary significantly more than the other two tested conditions. Although there was no significance when analyzing the male scores separately, this could have been due to the lack of male participants who took part in the study. While I had an abundance of female participants (n=52) take part in the study, I had very few male participants (n=27) involved in the study. When attempting to analyze men in the experimental condition seemed to perform more accurately than men in the neutral condition, it is evident that Huguet and Monteil's (1995) findings may have an explanation. For example, Huguet and Monteil found that men tend to do better in social comparison situations. Therefore, it seems that men may be more competitive than women in situations where they are being compared to another group of individuals.

When looking back, it is evident that several things could have been altered to possibly find significance in my study. The first thing I would have changed is the way participants received the instruction sheet. When conducting the study, I read the instruction sheet aloud to each participant, possibly altering my voice each time it was read. In order to prevent this, I should have recorded the instructions on a tape recorder to play to the participant. I believe that could have eliminated some error in the study. Another thing I would have changed in the study is the time limit for recalling the words from the list. Instead of using two minutes for participants to write down the words that they remembered, I should have created a three-minute limit in which they could stop at

any time throughout. This would have allowed me to record the time in which each participant chose to end the test, hopefully showing that those in the experimental condition were motivated to spend more time on the test than those in the control condition.

References

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Appendix A

RECALL TEST

(Adapted from 1992 Herrmann Study)

1. Salt
2. Dye
3. Wax
4. Spatula
5. Brush
6. Hose
7. Oil
8. Chips
9. Glue
10. Nuts
11. Water
12. Gum
13. Seeds
14. Charcoal
15. Mop
16. Detergent

Appendix B

INFORMED CONSENT FORM

I, _____ (print name), understand that I will be taking part in a research project that requires me to complete a short questionnaire inquiring about my gender, grade level and English fluency, and will participate in a timed recall test. To the best of my knowledge, I do not have any anxiety issues whenever dealing with the stress of timed tests. I also understand that I should be able to complete this project within 10 minutes. I am aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete the study. I understand that the information obtained from my responses will be analyzed only as part of aggregate data and that all identifying information will be absent from the data in order to ensure anonymity. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher(s) involved to my satisfaction. Finally, I verify that I am at least 18 years of age and am legally able to give consent or that I am under the age of 18 but have on file with the HSP office, a completed parental consent form that allows me to give consent as a minor.

_____ Date: _____

(Signature of participant)

Chelsea Schumacher Date: **10/30/08**

(Signature of researcher obtaining consent)

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Appendix C

QUESTIONNAIRE

SUBJECT ID NUMBER: _____ (Assigned by Researcher)

1) Gender: MALE FEMALE

2) Grade Level: FRESHMAN SOPHOMORE JUNIOR SENIOR OTHER

3) Overall, how comfortable do you consider yourself to be with the English language (with 1 being least comfortable to 5 being most comfortable)?

1 2 3 4 5

Appendix D

INSTRUCTION SHEET (#1 – Male oriented)

TO BE READ ALOUD TO PARTICIPANT

Thank you for your participation in this recall study. As you may know, recall is a common method used in order to measure certain memory capabilities. Although there are different variations when dealing with recall, a method known as free recall will be applied today in which no recall clues will be given. Free recall has been chosen for use in this study order to observe certain gender variations that exist when utilizing this method. Thus far, it has been found that men tend to be stronger in their free recall capabilities than women.

In this study, you will be shown a list of 16 items which may be recalled in any order. When you begin, the experimenter will give you the list in which you will have 45 seconds to memorize as many of the words as you can. When the 45 seconds has passed, the experimenter will then give you a blank sheet of paper in which you will have 2 minutes to write down all of the words that you remembered from the previous list.

Appendix E

INSTRUCTION SHEET (#2 – Female oriented)

TO BE READ ALOUD TO PARTICIPANT

Thank you for your participation in this recall study. As you may know, recall is a common method used in order to measure certain memory capabilities. Although there are different variations when dealing with recall, a method known as free recall will be applied today in which no recall clues will be given. Free recall has been chosen for use in this study in order to observe certain gender variations that exist when utilizing this method. Thus far, it has been found that women tend to be stronger in their free recall capabilities than men.

In this study, you will be shown a list of 16 items which may be recalled in any order. When you begin, the experimenter will give you the list in which you will have 45 seconds to memorize as many of the words as you can. When the 45 seconds has passed, the experimenter will then give you a blank sheet of paper in which you will have 2 minutes to write down all of the words that you remembered from the previous list.

Appendix F

INSTRUCTION SHEET (#3 - Neutral)

TO BE READ ALOUD TO PARTICIPANT

Thank you for your participation in this recall study. As you may know, recall is a common method used in order to measure certain memory capabilities. Although there are different variations when dealing with recall, a method known as free recall will be applied today in which no recall clues will be given. Free recall has been chosen for use in this study order to observe certain gender variations that exist when utilizing this method. Thus far, it has been found that no sex difference exists in free recall capabilities.

In this study, you will be shown a list of 16 items which may be recalled in any order. When you begin, the experimenter will give you the list in which you will have 45 seconds to memorize as many of the words as you can. When the 45 seconds has passed, the experimenter will then give you a blank sheet of paper in which you will have 2 minutes to write down all of the words that you remembered from the previous list.

Appendix G

FEEDBACK LETTER

Thank you for participating in my study. The given questionnaire was used in order to gain some basic demographic information on all participants, including an individual's gender, class level and English fluency. The given recall test was utilized in order to attempt to identify whether implied gender strength had an effect on an individual's overall test performance. In this study, the hypothesis that I was interested in was the notion that participants who were read an instruction sheet indicating better performance by the opposing gender in recall tests would be motivated to perform more accurately on the provided recall test. Due to this hypothesis, deception was utilized in my study in order to determine whether implied gender strength would have an effect on the opposing gender's recall ability.

Please note that I am not interested in your individual results; rather, I am only interested in the results of a large group of participants, of which you are now a part of. No identifying information about you will be associated with any of the findings.

If you have any questions or concerns regarding any portion of this study, please do not hesitate to bring them up now or in the future. My contact information is found at the bottom of this letter. If you are interested in obtaining a summary of the findings of this study at a later date, please contact me and I will make it available to you at the completion of this project.

Thank you again for your valuable contribution to this study.

Sincerely,

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