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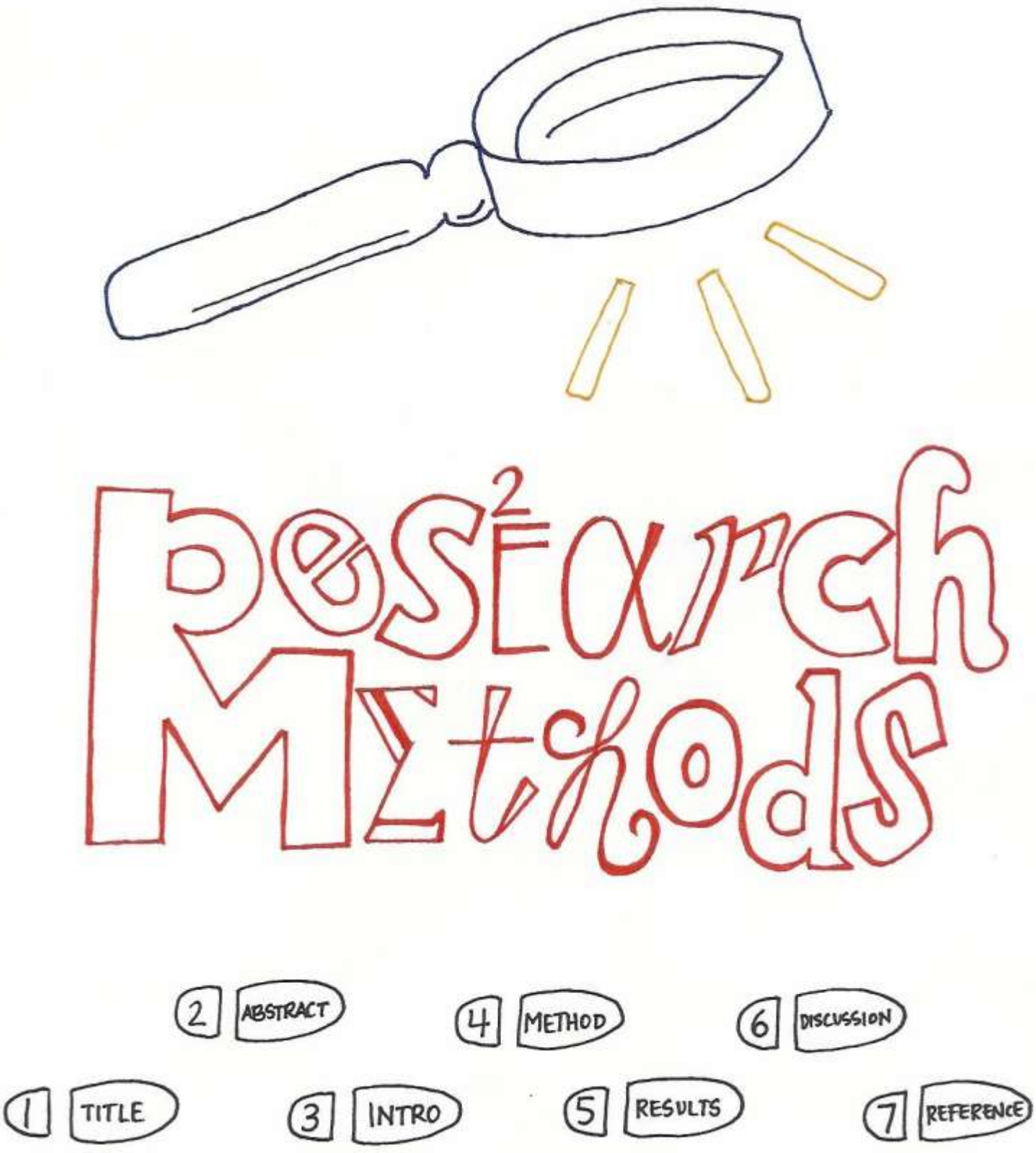


**Spring 2006**
**Cover Design by Anna Zeik**

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## Good-bye PSY300!

We say good-bye to the course number PSY300 with the publication of this fourth issue of the Research Methods Journal. Starting in the fall of 2006, this same course will be known as PSY404, complete with the same thrills of a rollercoaster ride that characterize this course.

I was most impressed with the students in the spring 2006 semester for being particularly good at meeting deadlines. This is very important in a fast-paced course where prompt feedback is key. This class also made a mark by achieving the highest percentage of IRB applications receiving the disposition, "Approves the proposal as submitted" in PSY300 history.

Another notable feature about this semester's class is that nearly half of the students submitted a cover design for this journal. The selection process was exciting right up to the last moment. I believe this reflects the level of enthusiasm and commitment the students had toward their class.

All in all, I very much enjoyed working with the students in PSY300 this semester. I would like to take this opportunity to congratulate them on their hard work and success in this course. I would also like to thank our course tutor, Sarah Torpea for her helpful assistance throughout the semester as well as for serving as main editor for this journal.

Dr. Michiko Nohara-LeClair
Course Professor and Co-Editor of the Journal

Research Methods Journal Vol. 4
Spring 2006


# Media & Self Perception

**Shera Kulow & Candice Menne**

**Lindenwood University**

*There has been previous controversial research pertaining to self perception and the media. This study is an investigation which implies the relationship of the amount of television watched on people's negative self-image. Data was collected from 46 participants (23 men, 23 women) from Lindenwood University, who completed a self-image survey and reported the amount of television hours watched per week. Disproving the presented hypothesis, there was no relation between the amounts of television a subject watched on his/her positive or negative self-image. However, there are many factors that may explain the findings and the need for further research is highlighted.*

For many decades now, people have become more occupied with their appearance. When people think of body image, they think about aspects of physical appearance, attractiveness, and beauty. Images of ideal bodies are everywhere. Female actresses and models are becoming younger, taller, and significantly thinner, whereas the males are becoming taller and more muscularly defined. There is a message being sent out to viewers of television programs and movies about thinness, muscularity, dieting, and beauty. Most often television is portraying an unattainable body image; in return these messages are telling the average person, the viewer, they are in need of adjustment and his/her body is an object to be perfected. Self image is a mental representation of ourselves, which influences our feelings, behaviors, self-esteem, and psychology. People

of society may likely internalize these stereotypes and begin to judge themselves based upon such standards. Many people continuously compare themselves to others, compete for the ideal body, and desire the utmost beauty. The majority of bodies seen on television are out of reach, thus making the audience want it more. There are multiple subliminal messages that television sends that most people do not realize they are being affected by.

There have been many studies focusing on body dissatisfaction, how television influences behaviors and the impact media has on body image, but not strictly on how the amount of television watched might be related to a negative self image while incorporating both genders and multiple ethnic groups. One study primarily compared gender differences in adolescence on body image and body changing strategies, such as losing weight or increasing muscle. This study revealed that girls were more dissatisfied with their bodies than boys and also engaged in more activities with the goal to lose weight, whereas boys were more likely to engage in strategies to increase their muscles (McCabe, Ricciardelli, Mellor, & Ball, 2005). McCabe et al. (2005) also demonstrated that girls reported more perceived messages in the media about weight loss while boys noticed media messages about increasing muscles. While acknowledging the significant gender differences in body dissatisfaction and increase in behaviors to improve ones body image, we are still curious as to what develops such image dissatisfaction and body changing strategies.

Spencer Eth (2002) suggests that "the potential negative impact of the media.... has been a serious concern for several decades" (p. 301). Eth published a commentary on

the relation of television images and psychological symptoms such as stress, aggression, and depression. A survey found that children who watched more than six hours of television each day reported more trauma symptoms and aggressive behaviors (Singer, Slovak, Frierson & York, 1998). Pertaining to the viewing of the television coverage of the September 11th attack, Eth (2002) reports a definite correlation between hours watched and percentage of adults suffering "substantial stress reactions." Due to television's adverse effects, even the American Medical Association (2006) advised that television viewing be limited to no more than one or two hours per day. Knowing how greatly violence and trauma displayed through television is related to stress, aggressiveness and depression, we propose that negative self images are also related to the far-fetched ideal body images shown constantly on television.

Media exposure has been known to affect adolescents and young adults in a negative way (Becker, 2004). Yet, the question is, does it have such an affect that it causes negative self image in adolescents and young adults? It is common to look to television for entertainment, which is what advertiser say is their only purpose. However, too often people see these ideologies on the big screen and use them for guidance or assistance in developing their identities. In the same encoding process, people learn the importance of self-presentation, yet in a distorted fashion. They also begin to believe that with dedication and hard work it is possible to attain their desires and reconfigure their bodies, which likely leads to disappointment and negativity. Subjects in an interview study, indicated that the appearances of characters and values portrayed on television provide a base for identity (Becker). Even the popularity of commercials advertising

exercise equipment is linked to the notion of increasing physical activity to lose weight and diet. Much attention these days is focused on new fad diets and ways to obtain that ideal body. In a study conducted in Fiji, where television was introduced only three years prior, the concept of modifying ones diet gained great popularity (Becker). In the same study there were reports of frequent comments on the admiration of the appearances of television characters, focusing on their thinness and apparel. This supports that watching television increases a desire to emulate characters portrayed on television. If this were true, the possible consequences of constantly viewing such unreachable illusions are; poor self-esteem, body dissatisfaction, eating disorder symptoms and even poor mental and physical health. All these aspects form a negative self-image.

In another study, conducted by Tan and Tan, the researchers hypothesized more television viewing is accompanied by low self-esteem among black more so than white audiences. The results of this study were significant by rejecting the null hypothesis. The researchers found a negative correlation between an African American participant's self-esteem and the amount of television viewing. The problem with this study is the content of the media in which blacks had constant exposure to white-oriented television programs. The effects of the television programs on self-image could change if there was more exposure of black media, such as Black Entertainment Television (BET), Family Matters, etc. Also the entire sample population of African Americans may not have had a television as a form of media to influence their perception of themselves. During the era in which this study was conducted, African Americans were viewed as low social status, which is likely to have skewed their perception of themselves in a negative manner.

If as we hypothesized, the amount of hours a person spends watching television is directly correlated to their self image, then we can safely conclude that television has a negative effect on self-perception. Thus, we predicted that the more hours a person watches television will affect their self-image to be negatively influenced by television. The effects of the media have been studied extensively and many researchers have come to opposing conclusions. The purpose of this study is to reexamine the findings of these studies. Many researchers have found a negative effect of the media on self-image but have not tested a combined participant sample population consisting of males, females, and different ethnicities. In this study we wish to reexamine the findings of previous studies. The fact that television has become more influential in today's society, may also have a more negative influence on a person's self-image.

## Method

### *Participants*

In order to determine the accuracy of the hypothesis the experimenters asked 46 participants to complete a study, 23 men and 23 women undergraduate students who participated in the study on their own free will. Two female researchers randomly approached potential participants at the Lindenwood campus, on the third floor in the commons area of the Spellman Center. The participants recruited were from different ethnicity, were either juniors or senior standing, and attended Lindenwood University.

### *Materials*

In the study a questionnaire was used to assess how much a person watches television (Appendix A) and a survey examined the self-confidence about their self-

image (Appendix B). The experimenters provided a table, chair, questionnaire, survey, and pen in order for the participant to complete the study as comfortable as possible.

*Recruitment*. Upon each approach the researchers followed the steps of a recruitment script (Appendix C) that was read to the student. First the potential participants were politely asked if they had a few minutes to participate in a brief study. If the participants agreed to participate, then they were read the following description; "In this study, you will be asked to complete two tasks. First, you will be given a short questionnaire designed to assess your self-perception. Then, you will be asked by the experimenter to respond to questions pertaining to your television preferences. The entire procedure should take no more than 15 minutes of your time". If the participant was still willing to continue he/she was asked to read and sign the provided Informed Consent Form.

*Informed Consent Form*. The Informed Consent Form enlisted the possibility of some participants that may experience personal discomfort and sensitivity. It also explained how the participants could leave at any time throughout the study without penalty and it form was used as permission to take the data from their questionnaire and survey and apply it to the final data as a whole. Every participant volunteered knowing the only compensation was the gratitude of the researchers for taking the time to participate in the study.

*Survey*. The participants were asked to be seated in a provided chair and table then given instructions to provide a clear understanding pertaining to the tasks that were to follow. The participant was then asked to complete a short survey containing 24

questions about how he/she perceived himself/herself. Then the participant was asked not to contemplate answers for too long, because the first instinctive answer was preferred and to answer every question in complete honesty for valid results.

*Questionnaire*. After the participant completed the questionnaire the researcher began Part II of the study by asking him/her the interview questions pertaining to television preferences, which were listed in the instructions. The survey enlisted the three questions the participant was going to be asked in the interview. The first question asked by a researcher was "What are your favorite television shows and/or stations that you prefer to watch?" the second question asked, "What is the duration for each show/station watched?" and the final question asked the participant to "Estimate the amount of times per week you spend watching each specific show/station?". After the participants read the instructions and fully understood the procedure, they were given the questionnaire.

*Feedback Letter*. Participants were then debriefed, about the nature of the study and given a feedback form. The feedback form included purpose of the study and the contact information in order for participants to obtain the results at the competition of the study.

## Results

In order to figure out if the media has any relationship on a person's self-perception, the experimenters used the Pearson Correlation and a one tailed test. The SPSS program was used to analyze the data to determine whether there is a relationship between self-perception and the amount of television viewed. The data rejects the null

hypothesis by stating there is no significance between the amount of television watched and a person's self-perception; therefore there is no statistical significant difference between the data sets. The results revealed that the two variables were virtually unrelated (r =.009). All of the data was calculated from the participants' results. In order to calculate the data on the questionnaire, the Likert Scale was used and the answers were assigned to a certain value. Each questions was assigned a number depending on the strength of their self-perception (-2-highly negative, -1-negative, 0-neutral, 1-positive, 2-highly positive). Also any participants who circled any dissatisfactory with their body (Appendix A- Question 23) received a -1 for each. To calculate the amount of television the participants watched, the experimenters added all of the hours mentioned and then applied the results to the sample population.

## Discussion

There are multiple reasons on why we may have had to fail to reject the null hypothesis. Some of the reasoning behind why there is no significance between the two sets of data is many people may not be fully truthful while answering the questionnaire. They may want to fool themselves in believing that they have more confidence in themselves instead of accepting how they truly feel about themselves and/or they may be rushed and not paying close attention to how the questions were written. The participants may not have fully understood the questions and may have felt forced to answer questions falsely or quickly, both which are likely factors to impair the data. The participants could have also felt better or worse on the day they conducted the

questionnaire. Many people could have a lot of intrinsic variation throughout their days, such as not feeling well, unattractive, and attractive, etc.

In order to increase the power of the study, there needs to be an increase in the sample population. The future experimenters should reconsider using self-report and possibly have the participants view a short clip of a movie that portrays ideal body images. After viewing the clip then the experimenters would then hand the participants the questionnaire in order to get the most accurate and immediate results. This suggestion mentioned above would serve a better tool enabling for more accurate research.

## References

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## Appendix A

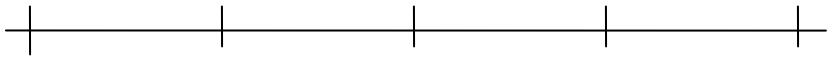
# Questionnaire

SUBJECT ID NUMBER: _____ (Assigned by Researcher)

1) Are you: Male Female

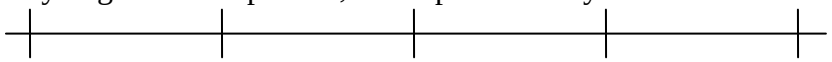
2) Are you: Freshman Sophomore Junior Senior

3) How often do you agree when you receive a compliment?



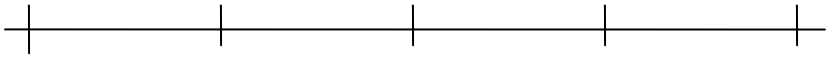
Never Rarely Sometimes Often Always

4) If you gained five pounds, how upset would you feel?



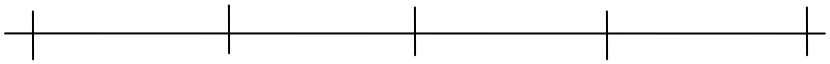
Not at all Not very Slightly Very Extremely

5) How guilty do you feel after eating excessively?



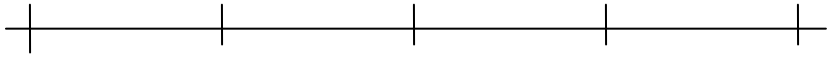
Not at all Not very Slightly Very Extremely

6) How close do you think your body is to the ideal image?



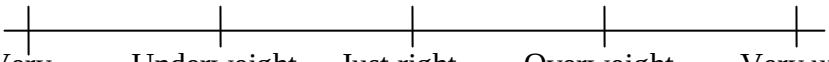
Not at all Not very Slightly Very Extremely

7) How important is it to you to achieve your ideal weight goals?



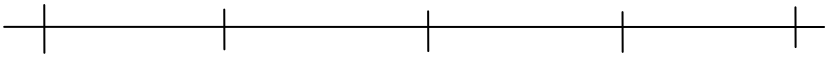
Not at all Not very Slightly Very Extremely

8) How do you feel about your weight?



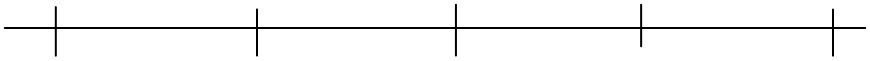
Very underweight | Underweight | Just right | Overweight | Very underweight

9) How often do you feel pressure to lose weight?



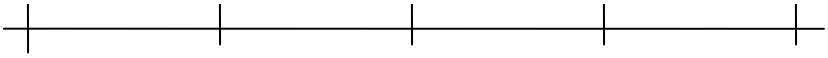
Never | Rarely | Sometimes | Often | Always

10) How often are you terrified about being overweight?



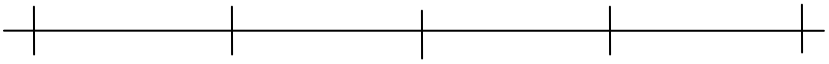
Never | Rarely | Sometimes | Often | Always

11) How often are you aware of the caloric content of the food you eat?



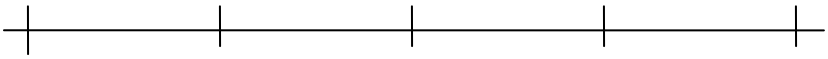
Never | Rarely | Sometimes | Often | Always

12) How often do you exercise strictly to burn calories and/or to build muscle mass?



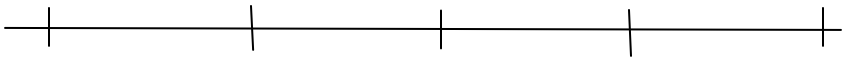
Never | Rarely | Sometimes | Often | Always

13) How often do you engage in dieting behavior?



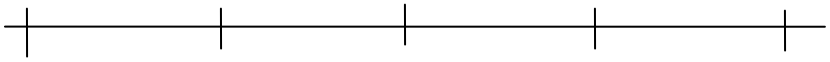
Never | Rarely | Sometimes | Often | Always

14) How confident do you feel in social situations?



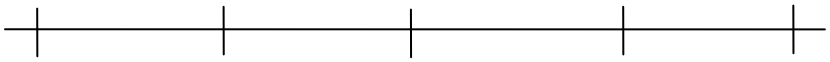
Not at all | Not very | Slightly | Very | Extremely

15) How confident do you feel about revealing your body in front of your partner?



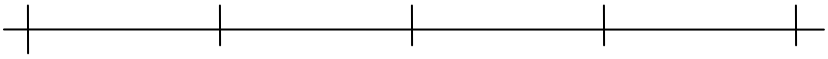
Not at all Not very Slightly Very Extremely N/A

16) The opposite sex would describe you as:



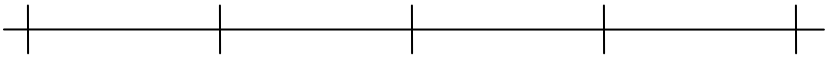
Very unattractive Unattractive Just right Attractive Very attractive

17) How positive do you feel when you choose an outfit to wear?



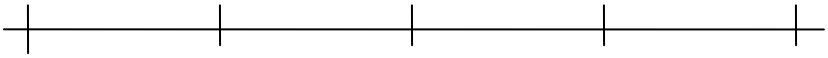
Not at all Not very Slightly Very Extremely

18) How confident do you feel when approached by the opposite sex?



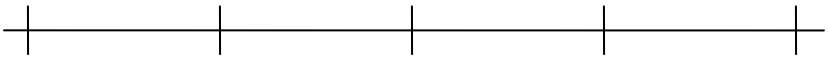
Not at all Not very Slightly Very Extremely

19) How comfortable do you feel when you are engaged in sexual activity?



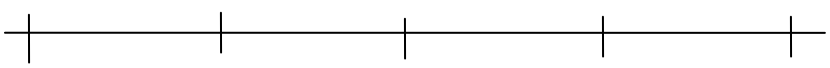
Not at all Not very Slightly Very Extremely N/A

20) How often do you use tobacco products, such as cigarettes to control your weight?



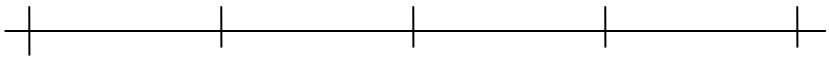
Never Rarely Sometimes Often Always N/A

21) How satisfied are you when you look in the mirror?



Not at all Not very Slightly Very Extremely

22) How often are you teased about your appearance?



Never Rarely Sometimes Often Always

23) Circle all that apply, I am dissatisfied with my:

A. abdomen
B. muscle tone
C. body weight
D. overall appearance
E. arms
F. chest
G. hips
H. butt
I. legs

## Appendix B

## Self-Report Interview Survey and Questions

Participant Code Number: _____ Date: _____ Exper. Int.: _____

| *Television Shows/Stations* | *# of times watched per week* | *Length of show: One Hour* | *Length of show: Half hour* |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| 13. | | | |
| 14. | | | |
| 15. | | | |

Questions:

1. What are your favorite television shows?

2. What is the duration for each show/station watched, 30 minutes long or 1 hour long?

3. Estimate the amount of time per week you spend watching each specific show/station.

## Appendix C

## Recruitment Script

Each potential subject will be asked:

- "Do you have a few minutes to participant in a brief study?"

If they agree to participate in the study, then they will be read the following description:

- In this study, you will be asked to complete two tasks. First, you will be given a short questionnaire designed to assess your self-perception. Then, you will be asked by the experimenter to respond to questions pertaining to your television preferences. The entire procedure should take no more than 15 minutes of your time.

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# Investigation into the Perception of Beauty

**Elysa Priester & Heather Krafft**

**Lindenwood University**

*The possibility of a connection between the sense of smell and the perception of beauty was investigated. Twenty-two participants were sorted into three different groups: group 1 (no stimulus), group 2 (negative stimulus), and group 3 (positive stimulus). The research procedure consisted of participants filling out a quick survey before and after the experiment to evaluate mood. Each individual was then asked to rate the attractiveness of the ten models. The hypothesis was that smell would have an impact on perception, a negative impact associated with a negative smell, a positive impact associated with a positive smell. No statistical significance was found in the research to support the hypothesis, however there was an unplanned statistical significance found with mood alteration and participating in this experiment. There was an indication that with a larger number of participants different results might have occurred.*

Research evidence reveals that mood, emotion, and behavior are indeed influenced by olfactory stimuli. Prior studies used performance tasks such as memory retrieval and problem solving to gain perspective on the influences of odor (Zoladz & Raudenbush, 2005). Zoladz and Raudenbush (2005) produced evidence that behavior is affected by odor. It was found that the most powerful way for the participants to receive the stimuli was orthonasally, or through the nose. Through a series of tasks completed by participants, it was found that peppermint increased vigor and jasmine reduced fatigue

(2005). In a study conducted by Field et al. (2004) empirical evidence was consistent with prior studies indicating that lavender increased relaxation and reduced depressive feelings. Some concern about these effects rests on the question to whether the odor affected the individual aesthetically or bio-chemically. What information is perceived through our sense of smell?

Cupchick, Phillips, and Truong (2005) conducted a study and found that responses to odors can be spontaneous or as a result of association. The sense of smell is a mechanism to warn of danger, such as inconsumable food or noxious fumes (Cupchick, Phillips & Truong, 2005). It is also the mechanism by which pheromones are detected and possibly attract sexual partners (Furlow,1996). The bad odor will be perceived as a warning and motivate an avoidant response in almost everyone, whereas pleasant odor such as cologne is interpreted subjectively. The pleasant odor of essential oils have however been shown to consistently produce similar effects in positive response (Moss, Cook, Wesnes & Duckett, 2002).

Odor influences our cognitions. The way we think or feel will have an effect on our behavior. Therefore, the hypothesis is that smell will directly affect the behavior of participants involved in a rating task regarding beauty. Varied olfactory stimuli will cause a deviation in the assessment of beauty. Participants exposed to the odor of a rotten egg while rating the attractiveness of a stranger should present low scores. The stimulus is a warning and if perceived as such should bring about an aversive reaction. The mood state of the participant while exposed to bad odor will be negative as indicated by low scoring

of reasonably attractive people. The perception of 'beauty' is distorted due to somatic discomfort and biochemical reaction.

Conversely, the odor of vanilla is expected to increase the scores given by participants while assessing attractiveness. Vanilla is used in this experiment because it is an essential oil, and should produce a pleasant atmosphere more consistently than a manufactured fragrance. Processing the odor will enhance positive mood states causing the participants to 'see' beauty more readily.

Beauty is difficult to gauge, for each individual's preference is highly subjective. Experimenters have a third group of participants as a control. This group serves as a guideline for scores of attractiveness as it will not receive exposure to olfactory stimuli. Scores from the experimental groups will be compared to the scores from the control to detect any significant effects.

The investigators are looking to see whether or not behavior will be affected by stimulating olfactory senses. The underlying assumption of the study is that our psychological state is influenced by our physical environment. Information gathered through our senses is assimilated into our reality, our perception of the world. Changes in the environment therefore change our perceptions and should, in some way, affect our behavior. Specific questions under investigation are to which type of stimuli is more powerful, negative (odor) or positive (fragrance) in influence. Can aversive stimuli affect our mood, opinion, and dealings with others? Is an opinion or perception of others enhanced when accompanied with pleasant fragrance? Or perhaps no evidence will be

found to support the idea that the sense of smell is a significant contributor to our perception of the world and others.

## Method

### *Participants*

Participants for the study included 22 undergraduate students attending Lindenwood University. Students were recruited through the LU Human Subject Pool and each received one bonus point towards a respective course as compensation. Ages of participants ranged from18 to 45, with a mean age of 21.95 and consisted of eight men and 14 women. Of the 22 students, three groups were established using random assignment. Eight participants including six women and two men were assigned to Group 1 and received no stimuli in order to represent the control group. Eight participants including six women and two men were assigned to Group 2 and received aversive stimuli, ammonium sulfide. And, six participants including two women and four men were assigned to Group 3 and received pleasant stimuli, vanilla.

Ten adults from the general population were used as models and photographed for materials needed to complete a rating task. Investigators personally recruited five men and five women ranging in age from 18 to 45 to be representative of the typical physical appearance of strangers we encounter daily. Images were obtained with consent to be used solely for the study, and then destroyed. Models received no compensation.

### *Materials*

Ten photograph albums containing ten 4x6 snapshots were used in conjunction with a response sheet. Each photograph was intended to be from the shoulders up and

against a solid, dark colored background with the person smiling (Appendix A). The film was processed into color prints, and each print was individually placed in a slot in the 4x6 album. Photographs were ordered identically in every photo book alternating man and woman. The number associated with the photograph corresponded to the number on the response sheet where participants rated the attractive qualities of the model.

A pre-task survey was developed to assess age, sex, and general mood of each participant. Potential risk of allergic reaction was also addressed in this survey (Appendix B).

A post-task survey was administered in order to again assess general mood, and also physical well-being (Appendix C). This survey was also used to give the participant an opportunity to report a noticeable aroma. All surveys and response sheets filled out by participants were coded with a three digit number so that paperwork could be grouped together following the trials. The codes were in no way associated with the names or identities of the participants.

Two rooms were used for each trial. The first room was an unaffected "waiting" room. The waiting room was large enough to accommodate ten people comfortably and contained one large table and chairs to be used by participants. It was amply lit, and of a comfortable temperature. The second room used was a classroom. This room was amply lit and had at approximately thirty desks for the participants and one desk with two chairs for the investigators. Temperature of the room was comfortable. Windows were present in the classroom as well.

Substances used as stimuli to create aroma were vanilla extract for the fragrance and ammonium sulfide (stink bombs) for the odor. The vanilla extract was heated for fifteen minutes in order to increase the intensity of the aroma in the classroom. The ammonium sulfide vial was cracked just before the participants entry to the classroom because its intensity is strongest initially then is dissipates on its own.

Pens and all forms used by participants and investigators were supplied by the investigators.

### *Procedure*

Trials were conducted on three separate days at approximately noon on each day. Participants were randomly assigned to one of three groups: Group 1 (control group), Group 2 (negative stimuli), and Group 3 (positive stimuli). Upon arrival, the participants were greeted by one investigator in the waiting room where they were asked to fill out an informed consent form and the pre-task survey. Any participants with a risk to allergies were excused from the remainder of the trial. Simultaneously a second investigator in the classroom set up the desks with photo books and pens, leaving empty desks between participants' seats and prepared the olfactory stimuli. After all pre-task surveys were completed each participant received a response sheet and instructions as to how to complete the rating task as follows:

"You will now be going into a different room across the hall where you will complete a rating task. We would like you to rate each individual's physical attractiveness on a scale of 1-10, 1 being the lowest score and 10 being the highest. Write the rating on the response sheet provided making sure that the number of the photo

corresponds to the number on the response sheet. For example, the score for photo one should be written in the blank next to #1 on the response sheet. Please assess each photo individually, do not rank them. Please do not compare the photos to each other; several photos may have the same score. We ask that you refrain from speaking to the other participants while completing the task. When you have finished, please turn in your response sheet and pick up a post-task survey. Make sure that all forms that you complete have the same three digit code in the upper left-hand corner. Fill out the survey, turn it in and please be seated until all participants are finished for a debriefing."

The group was then dismissed to the classroom.

Windows and doors of the experimental room were kept closed to prevent the odor or fragrance from escaping. The groups were given the same directions, and completed the task in the same room. Only the experimental condition of aroma was manipulated. Group 1 received no additional stimuli and represents our control group. The average scores on the response sheets by Group 1 were used as the norm by which the scores of Group 2 and Group 3 were compared.

Participants were debriefed as a group following the task. It was at this time that they were informed of the objectives of this study. Feedback letters were distributed also stating these objectives as well as inviting the participants to the results of the study. Contact information for investigators was included in the feedback letters. Investigators addressed any concerns and questions raised by participants. Investigators requested that details and objectives of the study remain undisclosed to others until completion of all trails. Participants were then thanked for their participation and excused.

Lastly, investigators returned to the classroom and opened the windows to direct air flow outside. The fragrances dissipated in approximately ten minutes. The door to the experimental was opened after the air was properly circulated.

## Results

Analysis using a one-way ANOVA with type of stimuli as the independent variable indicated no statistical significance, $F(2,9) = 1.624$, $p > .05$. Experimenters fail to reject the null hypotheses. There was no statistical significance found between smell and perception, yet it was found that most of the photographs were rated overall higher with absolutely no stimulus $F(9,18) = 10.536$, $p < .001$. A one-way MANOVA indicated a statistical significant main effect of moods $F(1,19) = 5.563$, $p = .029$. Moods of the participants were depressed as a result of participating in the study but not as a result of type of stimuli. Participants were asked if they were experiencing any particular feelings at the time of the experiment, and 54.5% answered yes. Participants were also asked if any feelings of distress or discomfort were present. The results showed 4.5% suffered from hangover, 31.8% were hungry, 13.6% were experiencing cold like symptoms, 13.6% marked other, and 36.4% had no distress.

## Discussion

The research hypothesis of this experiment, odor will affect mood and rating of attractiveness, was not supported by the data. These results are inconsistent with prior research. However, results reveal that the procedure of the experiment did produce an unexpected mood change. The mood scores of the participants were generally lower overall following completion on the task, regardless of the type of stimuli.

One limitation associated with rejection of the hypothesis is the participants. Results were approaching significance; with a larger number of participants there would be more data for analysis, possibly providing support for the initial hypothesis. Additionally, the participant groups should be more varied demographically. Recruitment outside of the Human Subject Pool would offer different age, attitude, and social status ranges. The assignment of participants to experimental groups was based upon participant sign-up. A more appropriate way to assign participants would be random assignment by experimenters, giving investigators better control over group dynamics.

Photographs used in the project should have been identical in background, closeness, clothes, and facial expressions. Also, more ethnic diversity should have been used to account for the general population. Increasing the number of photographs would yield more useable data in addition to increasing the exposure time to the stimuli. The subjective nature of attractiveness needs to be better researched and defined in order to keep the photographs similar in this characteristic.

The unexpected depression in mood due to procedure must be addressed. Any change not accounted for by stimuli creates unreliable results. In future studies, the evaluation of attractiveness may require only opposite-sex photographs. In this study, men reported discomfort from 'judging' other men.

It is possible that olfactory stimuli will produce no results related to rating attractiveness based on a photograph independent of sample size. The use of vanilla could be modified to use an essential oil with previous positive results. Investigation further into the role of our senses as providers of environmental information would prove useful.

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## Appendix A

## Sample Photo

## Appendix B

## Survey (Pre-Task)

Please answer each of the following questions.

Sex_____

Age_____

Do you have any food allergies that you are aware of? (please circle) Yes No
If so, please explain.

On a scale of 1 to 10 (10 being the highest, 1 being the lowest), how would you rate your mood? _____

## Appendix C

## Survey (Post-Task)

After completion of the task please rate your mood using the scale of 1 to 10 (10 being the highest, 1 being the lowest) _____

While performing the task, was there any particular feeling you were having? _____

Please explain.

Before performing in the experiment were you experiencing any of the following:
(Please check all that apply)

Hangover_____ Hunger_____ Flu____

Physical ailments____ Cold like symptoms____

Other (please explain) _____

Did you at any time notice a distinct smell of some kind?

If so, please rate the pleasantness of smell on a scale of 1 to 10 (10 being the highest, 1 being the lowest) _____

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# Moods and Their Effects

**Leaha Sharpe**

**Lindenwood University**

*The purpose of this project is to find out whether positive or negative moods will carry over into an experiment with a simple fill in the blank statement, which states, "When it comes down to it, people are basically _____". Participants used in this study consisted of 50 undergraduate student volunteers from Lindenwood University. The participant was asked to answer the previous statement and then to fill in a questionnaire regarding the current and normal moods of the individual. Statistically, there was no significant correlation between the statement and the current mood of the participant. It is concluded that participants answered either positively or negatively for reasons other than the participant's current mood.*

When participating in different types of interactions, people realize that their moods have the ability to make other individuals' moods change in order to feel similar to the mood of their own. Why is that? It is most likely that people do not have any intent to carry over their negative or upsetting moods into other situations, but does it happen? The problem under investigation in this experiment is to determine whether or not individuals carry over their moods and emotions from one experience to another situation.

Sometimes, people do not even realize how or if their mood affects others. Moreover, if it does have an effect, it could be a negative influence if they are in a bad

mood or mindset. "A number of conceptualizations of mood and emotions have been applied to help explain their influences on decisions" (Schwarz, 2000, as cited in Magnan, 2005, 1). It is true that every individual experiences both negative and positive affects in his or her lives. These affects can then influence the daily lives of others by disrupting their positive moods and by possibly casting a negative state of mind over to another individual. Positive affect is the presence of emotions such as excitement, joy and happiness, whereas negative affect is the existence of aversive emotions such as feeling depressed, anger or sadness. These affects can result in making the wrong decisions in important situations; therefore, carrying over negative moods can be hazardous to individuals.

There are numerous consequences that could result from the decisions that people make, therefore, individuals should not carry over negative moods into other circumstances in order to make clear, rational decisions. For example, Loewenstein and Lerner (2003), (as cited in Magnan, 2005, 1) describe two different types of affective influences that seem to play a role in a person's decision-making including immediate and expected emotions. When a person makes a decision based on immediate emotions, they take into account the emotions experienced at the time the decision was made. When a person makes a decision based on expected emotions, they attempt to predict the emotional consequences associated with each course of action (Meilers & McGraw, 2001).

Magnan (2005) stated that mood might have influence on a situation but only to a certain extent, the extent to which the mood itself is interpreted. Then why do

individuals interpret moods in such ways? It is difficult for people to avoid the obvious moods of an individual when the mood is just coming off and creating a dark cloud over everything in sight.

Positive and negative moods also have affects, not only on our decisions but also on the processing of information that we take in as humans. "Behavioral decision making research has provided extensive documentation that framing normatively equivalent information in positive versus negative ways, so-called valence-based framing, may systematically affect the decisions or actions decision makers take" (Kaufmann & Kuvaas, 2004, 60). In general, it is true that positive moods or emotions are associated with more effective and less biased processing of information than negative mood.

The purpose of this project was to find out whether positive or negative mindsets or moods would carry over into an experiment with an easy fill in the blank statement, "When it comes down to it, people are basically _____". By reviewing a questionnaire, the experimenter would be able to find out small details of what has been occurring in the lives of the participants and thereby judge whether or not their recent situations have had an effect on their mood that perhaps carried over into the experiment.

The experimenter hypothesized that participants would answer this statement, "When it comes down to it, people are basically _____," based on the recent mood and events that had occurred in the participants' lives. More specifically, the experimenter believed the majority of students who answered the statement negatively, such as evil, jealous or deceiving, etc., would have had some experience recently that had

brought on this negativity. The experimenter was predicting that the same would be true for positive answers, where students who answer the statement positively would have recently experienced something that has brought on this positivism.

The experimenter was interested in testing this experiment because she would like to see if certain events have more of an effect on the participant's answers and whether or not they carried over from one situation to another. If people were to know the results from this study they may then realize that bad moods carry over into other life situations. They could also then change their mood for the better to help make clearer decisions and also be able to process information much healthier.

The participants were provided with a small sheet of paper with only one statement written on it. They were asked to fill in the blank with the first initial thought that came to mind. The participants would then be provided with a short questionnaire. The questions consisted of items such as asking about how they are feeling at the current time and what has happened recently in his or her life that possibly could have affected his or her moods during the experiment. Also, on the questionnaire were issues concerning the participant's normal mood to see if there was a difference in the participant's current and normal moods and if that mood could have then had an effect on the answer to the statement, "When it comes down to it, people are basically _____".

## Method

### *Participants*

Fifty undergraduate Lindenwood University students volunteered and participated in the experiment regarding current moods in relation to recent experiences. Thirty-four participants were male and sixteen participants were female. All of the students were recruited as volunteers for this experiment. The experimenter recruited participants by means of requesting students in the experimenter's classes as well as in the computer labs to participate in the experiment.

### *Materials*

In this study, the experimenter used the following materials. A pen was provided for the participants so that they were able to fill out all of the information that was required of them; such as the informed consent and a questionnaire (see Appendix A). The experimenter also needed a pen in order to sign the informed consent of each participant. Also provided for the participant was a small piece of paper with, "When it comes down to it, people are basically ____" written on it (see Appendix B). A questionnaire was also used in this study in order to determine the participant's current and normal moods as well as why the participant answered the statement the way he or she did.

The setting for the experiment consisted of an informal atmosphere with a desk, and one chair for each the participant and the experimenter. The setting varied for many participants. However, all participants took part in the study in a classroom setting, but not necessarily the same one. The rooms all had sufficient lighting. However, the rooms

may have had some minor distractions to the participants due to people coming in and out of the room for the mere factor that it was shared with professors and their students. The experimenter also had a watch in order to tell the time of each experiment and to make sure we were staying in the time range listed in the recruitment description.

### *Procedure*

When the participant came in, the experimenter invited him or her to sit down in a chair in front of the desk. The experimenter was seated on the other side of the desk with all of the necessary paperwork and materials at hand. The experimenter then handed the participant two informed consent forms, one of which the participant kept and the other which the experimenter kept for her own record. After the participant had signed the form, the experimenter asked him or her to fill out the following statement, "When it comes down to it, people are basically _____", with the first thing that came to the participant's mind.

Then the experimenter provided a questionnaire for the participant to answer with questions concerning the current and normal moods of the participant. The questionnaire was a short seven-question survey of questions regarding how the participant was feeling at the time of the experiment as well as how the participant would rate their normal mood on a scale from 1-10 (1 being extremely depressed or upset and 10 being extremely happy). After the participant completed the questionnaire, the experimenter debriefed the participant and handed out a feedback letter with a contact number.

## Results

A chi-square analysis was conducted on SPSS to show whether participants' responses to the statement, "When it comes down to it, people are basically _____", correlated significantly with the current mood of the participant. Results from the chi-square test indicated that it is approaching significance with a value of p = .073. The statistical notation of the chi-square was $\chi^2_{(49)} = 5.225$. The experimenter found that 52% of participants experienced emotional or physical pain recently, but an even higher percentage of participants (78%) experienced joy or happiness in the past couple of days prior to the experiment. According to the findings, 84% of the participants that volunteered for this study stated that he or she were currently dealing with stress in their lives. Perhaps this may have had an impact on the large amount of negative answers to the statement, "When it comes down to it, people are basically _____".

One of the questions on the questionnaire asked if the participant had experienced any sort of emotional or physical pain recently and 60% of participants who answered yes also had a positive answer to the statement, whereas only 44% of participants who answered no to the same question had a negative answer to the statement (see Figure 1).

**FIGURE 1. Response type by whether or not subjects experienced emotional or physical pain recently**

Response Type

| Experienced any emotional or physical pain recently? | Positive | Negative | Totals |
|---|---|---|---|
| YES | 14 (60%) | 12 (44%) | 26 (52%) |
| NO | 9 (40%) | 15 (56%) | 24 (48%) |
| Totals | 23 (46%) | 27 (54%) | 50 |

Similarly, 82% of participants with a positive answer stated that they had experienced joy and happiness recently and only 74% of participants who answered no agreed that they had not experienced any sort of joy or positivism recently (see Figure 2).

**FIGURE 2. Response type by whether or not subjects experienced joy or happiness recently**

Response Type

| Experience any joy or happiness recently? | Positive | Negative | Totals |
|---|---|---|---|
| YES | 19 (82%) | 20 (74%) | 39 (78%) |
| NO | 4 (18%) | 7 (26%) | 11 (22%) |
| Totals | 23 (46%) | 27 (54%) | 50 |

Lastly, 83% of participants who answered the statement with a positive answer stated they were currently dealing with stress in their lives while 88% of participants who answered the statement negatively agreed to currently dealing with stress (see Figure 3).

**FIGURE 3. Response type by whether or not subjects are currently dealing with stress in life**

Response Type

| Currently dealing with stress in life? | Positive | Negative | Total |
|---|---|---|---|
| YES | 18 (78%) | 24 (88%) | 42 (84%) |
| NO | 5 (22%) | 3 (12%) | 8 (16%) |
| Totals | 23 (46%) | 27 (54%) | 50 |

In addition, the participants were asked to rate what his or her normal mood was on a scale of 1-10 using the same scale (1 being extremely depressed or upset and 10 being extremely happy). Statistics show that 95% of participants who answered the

statement positively, normally rate themselves as positive people (see Figure 4). On the other hand, 92% of participants who answered the statement negatively, normally rate themselves as positive (see Figure 5).

**FIGURE 4. Response type by subject's current mood**

Response Type

| Current Mood | Positive | Negative | Totals |
|---|---|---|---|
| Unhappy | 0 (0%) | 4 (15%) | 4 (8%) |
| Neutral | 4 (17%) | 4 (15%) | 8 (16%) |
| Happy | 19 (83%) | 19 (70%) | 38 (76%) |
| Totals | 23 (46%) | 27 (54%) | 50 |

**FIGURE 5. Response type by subject's normal mood**

Response Type

| Normal Mood | Positive | Negative | Totals |
|---|---|---|---|
| Unhappy | 0 (0%) | 1 (4%) | 1 (2%) |
| Neutral | 1 (4%) | 1 (4%) | 2 (4%) |
| Happy | 22 (96%) | 25 (92%) | 47 (94%) |
| Totals | 23 (46%) | 27 (54%) | 50 |

## Discussion

This experiment did not lend support to what was predicted by the hypothesis. Statistically it was not significant that participant's current moods have any effect on a simple fill in the blank statement. However, the statistics showed that the correlation was approaching significance. The hypothesis stated that the current moods of individuals would be reflected from the answer to the statement, "When it comes down to it, people are basically _____". The hypothesis was proven to be approaching significance but not quite there yet, because 76% of participants confirmed that they were currently in a positive mood, however, only 46% answered the statement positively. Perhaps with more participants, this experiment could retain more accurate results.

The vast majority of participants rated themselves normally with a positive outlook or mood, even though 54% of participants answered the question negatively. This is similar to Jundt (2002) findings that stated, "High levels of positive affect result in shallower thinking and lead to decisions that rely more on simple, heuristic-based information processing, such as those found with judgmental biases. It is also believed that high levels of negativity, result in more in-depth, systematic thinking" (1). Perhaps, since the experimenter asked the participants to answer the statement with the first initial thought that came to the participant's mind, they may have not had time to think about what they truly believed, but rather just a superficial thought.

The timing of the experiment could have had an impact on the participant's moods due to the fact that the majority of the research took place directly after Spring break. This extraneous variable could have changed some participant's moods to be

more positive and perhaps less stressed. This variable could have had an effect on making the participant's recent moods more positive due to a week free of homework and exams.

One of the limitations of this study was the number of participants recruited. Unfortunately, with only fifty participants, all being students from Lindenwood University, the experimenter was not able to get a clear representation of the population. In addition, perhaps the experimenter could have had a different statement that would have gotten students to think more about moods and not merely the participant's opinions concerning other individuals.

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## Author Note

Leaha Sharpe, undergraduate student at Lindenwood University.

I would like to thank Dr. Christopher Scribner for providing me with inspiration for the basis of this research project.

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## Appendix A

## Questionnaire

1. Are you a…
   Male Female

2. How would you rate your current mood?
   (1 being extremely depressed or upset and 10 being extremely happy)
   1 2 3 4 5 6 7 8 9 10

3. Have you experienced any sort of emotional or physical pain or sorrow in the past couple of days?
   Yes No

   Can you explain more?
   _____
   _____
   _____

4. Have you experienced any sort of joy or happiness in the past couple of days?
   Yes No

   Can you explain more? _____
   _____
   _____

5. Are you currently dealing with stress in your life?
   Yes No

   If so, why? _____
   _____
   _____

6. Why did you answer the statement concerning humans the way that you did?
   _____
   _____
   _____

7. How would you normally rate your mood on the same scale of 1-10?
   1 2 3 4 5 6 7 8 9 10

## Appendix B

## Test Statement

ID #:

When it comes down to it, people are basically _____.

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# Effects of Chocolate on a Person's Immediate Mood

**Aaron Tighe & Katherine Hannemann**

**Lindenwood University**

*The following presents a study of chocolate and its effect on a person's immediate mood. Prior research has suggested that chocolate affects a person biologically through neurotransmitters in the brain which can lead to an elevation in a person's mood. Our study hopes to take this evidence a step further and discover if chocolate can alter one's mood immediately, or if the chemicals in chocolate are released gradually, taking longer to affect a person's mood. The participants were mainly recruited through the Human Subject Pool at Lindenwood University and were administered two surveys: one before a treat was consumed, and one following consumption. Our results however, did not support our hypothesis suggesting that chocolate's mood elevating characteristics take time and that the variability of a person's mood is quite extensive.*

The following study involves an examination of the effects that chocolate might have on a person's immediate mood. We have all heard of chocolate referred to as an aphrodisiac or the "happy candy," but how does one validate such conjectures other than simply noting that a tasty treat makes a person happy? Current research suggests that the sugar in chocolate helps stimulate the production of serotonin, a chemical in our brain. With more serotonin comes relaxation, calmness and feelings of pleasure and euphoria. That must be why we like it so much (Romaniw, 2006). It has also been suggested that Chocolate has a chemical similar to adrenaline and a little caffeine. Together, this causes

a slight raise in heart rate and blood pressure (Romaniw, 2006). Perhaps this is what some describe as the 'mental lift' they feel after eating chocolate.

So it seems possible that such a 'mental lift' might be beneficial for a person suffering from stress at work, or a person that opts for a piece of chocolate to prepare him or herself for an important speech. Also, Covaleski (2004) states that Chocolate can affect the brain by causing the release of certain neurotransmitters. Neurotransmitters are the molecules that transmit signals between neurons. The amounts of particular neurotransmitters we have at any given time can have a great impact on our mood. Covaleski (2004) goes on to assert that chocolate includes the neurotransmitter, phenylethylamine: "This so-called 'chocolate amphetamine' causes changes in blood pressure and blood-sugar levels leading to feelings of excitement and alertness" (p. 1). And Andrew Drewnowski of the University of Michigan (2005) states that eating chocolate causes the brain to produce natural opiates, which dull pain and increase a feeling of well-being.

One of the British Broadcasting Company's topics in Science and Nature offers suggestions on how chocolate makes you happy: Chocolate contains a natural love drug (Small, 2001). Tryptophan is a chemical that the brain uses to make a neurotransmitter called serotonin. High levels of serotonin can produce feelings of elation, even ecstasy, hence the name of the designer drug that also enhances the brain's level of serotonin (Why chocolate makes us feel good 2006). Whether it be serotonin, tryptophan, opioids, or other neurotransmitters, it is has been suggested time and time again that chocolate biologically affects its consumer. For some reason, eating chocolate often puts a smile on

one's face. But our question is, how long does it take for the chemicals in chocolate to react with a person's brain in order for the person to reach this so-called euphoria?

Prior research has obviously shown that chocolate has a biological effect on the brain and a person's mood, but little evidence suggests an immediate change in a person's disposition. In our study we hypothesized that a person's mood might be immediately altered by consuming a piece of chocolate. We offered a pre-chocolate survey to the participant to gauge their initial mood. Following the survey, the participant was given a small portion of chocolate to consume within five minutes, and then received a post-chocolate survey to ascertain if their mood was significantly enhanced. The order the surveys were counterbalanced to avoid order effect and another non-chocolate candy was also administered to participants as a control variable. If our hypothesis had been supported, the guilt of eating chocolate might be overshadowed by its therapeutic or mood enhancing effects.

## Method

### *Participants*

Our participants consisted of volunteers from the Human Subject Pool at Lindenwood University and some acquaintances known by the researchers. We had a total of 22 participants, with eight being acquainted with the researchers, and 14 from the Human Subject Pool. Ages ranged from 18 to 48. We recruited the participants from the HSP with a small description of our study explaining the use of candy and surveys. After completing our study, those students were then rewarded with extra credit in one of their introductory social science courses. The majority of our participants resides in the St.

Charles County area in Missouri and were mainly undergraduates. In our experiment, we did not require the participants to provide information regarding their current residence with the assumption that the results gained from our study were for the most part universally biological, and hence are not related to the social or ethnic background of the participant. The small amount of participants that were acquainted with the researchers, were used to increase the sample size and to create a pool of participants that were not solely students. These participants were males and females living in the St. Charles, Missouri area.

### *Materials*

The materials used consisted of purchased Hershey's Kisses® and Starburst® fruit chews. Writing utensils were also supplied to participants if necessary in order to complete our two short surveys. Both surveys (see Appendices A and B) were designed to gauge the participant's immediate mood. Both of the surveys were essentially the same, but worded differently in an attempt to keep the participants interested by avoiding the administration of the same survey twice. The use of Starburst® pieces in this experiment was used to create a control group, therefore avoiding the placebo effect. Also, in order to avoid order effect, The order of each survey was counterbalanced as follows: Survey A → chocolate → Survey B; Survey B → chocolate → Survey A; Survey A → Starburst → Survey B; Survey B → Starburst → Survey A. Participants were randomly assigned to one of the preceding groups in order to collect our data.

*Procedure*

The study began by informing each participant of his or her right to provide consent or choose not to participate in the study. The participants were then instructed by the researcher to fill out a small survey regarding their mood. Following the survey, the participant either received a Hershey's Kiss® or a Starburst® fruit chew. The participants were then given five minutes to consume their treat. Following the consumption of the treat, the participants were asked to fill out another survey similar to the first, but not the same, to gauge their "post-treat" mood.

If the participants receiving chocolate showed significant increases in mood in comparison with those receiving starburst, then the data would support our hypothesis; this however, was not the case. The surveys were in an agree/disagree format with four options (strongly agree, agree, disagree, or strongly disagree) we scored positively or negatively according to the wording of the question. For example, if a question read "I feel like my life is on the right track," we scored the participant with a 4 for strongly agree, 3 for agree, 2 for disagree, or 1 for strongly disagree. If a question was worded negatively such as "When I get into a dark mood, nothing can make me laugh," the scoring was reversed. Also, each survey had a different number of questions, so our data was represented as percentages in which we took the participant's total score and divided it by the total number of questions for each survey. Following the procedure, the participants received a feedback letter stating the purpose of our study.

## Results

It may be true that chocolate has a positive effect on a person's mood, but according to our research, there is little evidence to support our hypothesis that chocolate affects a person's immediate mood. We analyzed our data using the Statistical Package for the Social Sciences (SPSS) and used an independent t-test to quantify our results. According to our data, the only significance our experiment was able to uncover, was that participants scored significantly higher on survey A in comparison with survey B. This is also taking into account the counterbalancing of the order of each survey. Out of all the participants surveyed, only three scored higher on the B survey, and three had equivalent scores on both surveys.

The majority of the participants' scores fell between -.02 to .07, and this remained constant regardless of the sequence of the surveys administered, or which treat the participants received. This might suggest that the treat and survey sequence we assigned to the participants did not matter, or the survey results were in regard to and affected by the present mood and outlook of each participant.

## Discussion

The majority of our data showed no significant difference in the effects of the two different treats the subjects were given between surveys. We thought the score difference between the two surveys had something to do with the participants growing tired of answering survey questions which may have been the cause of some negative difference scores. However out of all twenty-two subjects, only three participants had higher percentage scores on their B-survey than their A-survey. There were three other

participants whose percentage scores were the same on both surveys. Otherwise, every participant other than these six scored a higher percentage score on the A-survey regardless of what treat they ate or in what sequence their surveys were given.

Chocolate contains many ingredients and since we used a Hershey's Kiss, there can only be so much of each ingredient in the bite-size treat. One issue that came up while conducting the experiment was the amount of chocolate we were testing on the chocolate-eating participants. It is possible that to realistically test our hypothesis, we would need to supply a larger piece or amount of chocolate to the participant we were testing; and also the starburst for that matter. If we were to increase the amount of the chemicals being tested in chocolate by supplying a larger amount of chocolate to the participants, we would need to do the same for those who were given starburst, so as to equal the treat variable. This was one of our limitations. For those intending on conducting similar studies, we would suggest that the researcher use greater amounts of the treats in order to obtain accurate results with a greater significance.

The majority of the participants who participated in our study were Lindenwood University students. The times in which the study was available for students to participate were right around lunch time during the business week, varying between the hours of 11:00 a.m. and 1:30 p.m. This time caused many of our subjects to be in a rush as they took our study. Some of the students also were rushing to get to a class on time. Therefore, the participants may not have spent an adequate amount of time to reflect on each question on the surveys. Maybe chocolate takes more than a few minutes to have

any effect on a person's mood chemically; it is possible that the subjects' moods were elevated after they left our experiment but by then it was too late for us to test their mood.

Another limitation was that since many of our subjects were recruited from the Human Subject Pool, they were participating in our study to receive bonus points in their various classes. Since they receive these bonus points without being required to complete the experiment, they could have simply signed their names and left, leaving us with no data. Many of these students might not have a high level of interest in our experiment but just came in to receive bonus points. Therefore, some of their survey answers could have been thoughtless or skewed.

As experimenters, we have no control over the mood a person might be in when they take part in our study. Therefore, the chemicals in a small piece of chocolate might not be powerful enough to actually increase or elevate a person's mood. To enhance this experiment, one might research the amount of each ingredient in chocolate (and also in starburst) to see how much of each is needed to have a mood-changing effect on a person. Also, one might schedule their participants to come in for a greater amount of time than the experimenter needs so there is adequate time for the study taking place, and then there would be no reason for the participant to be in a hurry. Further research may also be necessary to find the amount of time that the ingredients in chocolate take for any chemical changes to have an effect.

The final limitation is in regards to the number of questions on each of the survey. Survey A had 13 questions, while survey B only had 10. What is most interesting about this limitation is the fact that the majority of our participants actually scored higher on the

survey with more questions. This leads us to suggest that the wording of survey A was significantly more positive than that of survey B. The answers could also be affected by the personality of the subjects. We as experimenters do not have control over these variables, especially since the participants come in voluntarily and for a short period of time. Overall, we found no significant data to support our original hypothesis.

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## Appendix A

### Survey A

Please place an X on the line you feel most closely resembles your own belief.

1. I feel like my life is on the right track
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

2. I am proud of who I am
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

3. When I get into a dark mood nothing can make me laugh
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

4. I often have a smile on my face.
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

5. I have a long list of things I feel grateful for
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

6. I often feel worthless
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

7. On the whole, I am satisfied with myself
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

8. My relationships with other people are fulfilling
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

9. I often don't have reason to be thankful
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

10. I know things are going to continue to get better
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

11. I like myself
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

12. Sometimes I find myself in a bad mood for no reason and I can't shake it.
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

13. I laugh often
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

## Appendix B

## Survey B

Please Place an X on the line you feel most closely resembles your own belief.

1. I feel like my life is in an upward trend
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

2. I don't laugh much
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

3. Stress isn't hard for me to overcome
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

4. I don't offer much to those around me
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

5. I am proud to be the person I am
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

6. When I'm in a bad mood, it's hard to make me laugh
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

7. Things probably won't ever get better
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

8. I do not benefit much from my relationships with other people
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

9. I hate it when people tell me to smile more
   ___ Strongly Agree
   ___ Agree
   ___ Disagree
   ___ Strongly Disagree

10. How happy do you feel you are relative to other people?
   ___ Much Less Happy
   ___ A Little Less Happy
   ___ A Little More Happy
   ___ Much More Happy

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# Effects on Mood by Various Spectrums of Light from Eyeglasses

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*This research paper investigates whether various spectrums of light can have an effect on mood. Eyeglasses of red or blue lenses were used to alter spectrum of light in this study. Participants in this study were male and female students from Lindenwood University ranging in age from 18 to 26. The research procedure consisted of a 10-minute questionnaire, interview and a perception test that will measure visual disability, mood, and bias to colors. The data collected from the three mood perception tests will be quantified and compared with one another to find if red spectrum of light influences a person's mood. The result of this study will prove valuable to learning, working, and commercial environments and prove the answers to the myth that life is better looking through rose-colored glasses.*

The effect of various spectrums light on mood has been a curiosity of scientists ever since Sir Isaac Newton discovered and identified the color spectrum of light in 1666 (Van Wagner, 2006). In today's society, a majority of people want to achieve high performance levels. Human behaviors and performances are influenced by many ways; such as temperature, atmospheric pressure, time of day, as well as the person's state of mood. Researchers have found that various changes in environment color have proven to influence mood in various ways (Kutchma, 2003). Therefore, a wide range of research

was conducted through various experiments that strive to identify those altering factors, which play a role in both performance and mood. If you could identify what effect different colors have on mood is the main intent of this research project. Research that has ranged from the testing of lighting in work areas, to the color of paint used in buildings. This experiment will focus more on an individual's mood rather than the environment. By using sunglasses that induce a different spectrum of light and investigating whether a change in mood was present. Use of questionnaires, perception tests and personal interviews will be the data collected; the methods incorporated to support or disprove our hypothesis. We hypothesize that a red color of light will enhance the mood of the individual to be more optimistic and able to communicate better. According to the three interior color schemes on the mood and performance of workers study conducted by Kwallek in 1997, Woodson, Lewis, and Sales; investigates environments people move into and whether that affects the mood and performance of workers. This experiment will use the information collected by Kathie Engelbrecht, on the Impact of Color on Learning. In her experiment conducted in 2003 theorized that we have evolutionary response to certain colors. Being able to empirically distinguish whether the color has had a mood altering effect is the main goal of the researcher. Before and after the introduction each participant answered the following: interviews, tests, and questionnaires of the color stimuli to help the researcher make this determination.

The purpose of this study is to find out if the red spectrum of light produced by the red lenses can produce a better mood or optimism. Other studies have found that positive moods, attitudes and feelings will provide more success and better quality of life. The common term "looking at life through rose-colored glasses" is the phrase that sparked the interests of this study. It implies an optimistic view of the world. Why is the optimistic view implied with the rose-colored glasses? Another point of interest is the fact that United States Navel ships utilize red lights in all their areas below deck. Investigation of the reasoning behind their choice to use the red light will further support our findings in this study. Another point of interest is how the color red used in everyday life. Stop signs, exit signs, caution and warning signs are all red. Could red draw your attention more than other colors? Why does red draw more attention? Could the reason red is so noticeable is because it makes people more aware and put them in a better mood? Red is the same color of blood, when people see blood they may have the natural instinctual reaction to perform in a better way in order to survive. Maybe the fact that being in a better mood allows better chances to survive.

## Method

### *Participants*

Our participants recruited for this experiment will be undergraduate students at Lindenwood University and that are a part of the Human Subject Pool. Sex, race, age and ethical background are not considered in this experiment subjects will be asked if they have any visual disabilities study is based on visual stimulation, these participants

can still participant but their data will be discarded. In our study, the human subject pool was used, yet this is not a requirement in order to replicate this study. We are studying the change in mood so we should actually have a wide variety of participants to have represented our study. Our participants were recruited by using the Form B where they can sign up for the time to participate in the study.

### *Materials*

The materials used in this experiment were two different types of questionnaires so that not everyone had the same questions in the same order. Pens for both the subjects and the experimenters, pictures that are used for the perception test, recording journal for the observer, informed consent forms for the observer and a copy for the subject, a feedback letter which will be given to the subject at the end of the experiment, recruitment schedules for the experimenter and the subjects, and glasses with clear-blue- and red lenses. The room used will consist of chairs, a table in a quiet area where the experiment will be conducted.

### *Procedure*

A recruitment sheet was posted for participants to sign up for, once the schedule is checked the participants will receive a phone call 24 hours before their scheduled time. Upon arrival participants will be given two consent forms one for them to sign and given to the observers while the other is for their own records. The participant will fill out a questionnaire that will ask 10 questions that will determine their favorite color, rating of mood, visual disabilities, personality, and emotion. The questions will help us determine

if the participant's mood will be altered by the various colors. Next pictures and words will be verbally stated and shown to the subjects; the observer will be recording the subject's responses and body language to the cards shown. After the second questionnaire is finished, a feedback letter will be issued along with a detailed explanation of what the participant has helped the experimenters to accomplish.

## Results

This experiment us a t-test to identify any significant findings and what effects different colors have on a persons mood. A statistical analysis showed that the red spectrum of light increases from 43% positive responses in the questionnaire to 53% positive responses in the visual perception test with the introduction of the red spectrum lenses, and 64% positive responses with the last verbal exam (see Table 1).

**TABLE 1. Subjects' responses to type of questionnaire by color of lenses worn**

| | Questionnaire | Visual | Verbal |
|---|---|---|---|
| Control | 60.8% | 59.2% | 63.3% |
| RED | 46.6% | 53% | 61% |
| BLUE | 66.2% | 64.5% | 65% |

This increase in positive response supports the initial hypothesis that red spectrum of light improves mood. In the control groups the levels of positive responses stayed

similar through out all the tests. The blue spectrum of light also did not show a significant change. The degree of freedom is 2, with a variance of 2. The ANOVA result was 28 at a .05 alpha level which led the research to reject the null hypothesis. The analyzed data supports the hypothesis that red spectrums of light by sunglasses improve the mood and perception of a person.

## Discussion

Colors have proven to influence human behavior (Kutchma, 2003), (but what did we find). Possible limitations of this study are low number of participants. If a wider range of a sample population was used a more significant, reliable study could be conducted. Ideally, we would have liked to see a consistent number of people with varying moods in both stimuli groups as well as the control groups. Having a high number people with good moods, bad moods, and indifferent moods in each group of stimuli would be ideal to get an accurate reading of whether mood affected by the change in the spectrum of light by the eyeglasses. The use of a standardized mood and perception test would provide data that would present more reliable and accurate data that could be easily quantifiable. An example of a standardized scale of mood measure is the DASS (Depression, Anxiety, and Stress Scale), which was used in other mood, color experiments (Kutchma, 2003). Another issue, which could be improved on in respect to the procedure, is to control the environment more. Having a consistent way to conduct a study so outside forces have no effect on findings would be desirable. Although there was a consistent theme of a controlled environment, there could be room for

improvement. When scientists strive to investigate the sensitive subject of perception, mood, or the mind precise attention applied, so that the experiment does not affect the participant in the study. Mood, perception, and the mind are all aspects of psychology that are not easily quantifiable, or influenced by the participant and experimenter. Providing an environment that allows the participant to convey what they think, feel, and perceive in an uninhibited manner is the ultimate goal of research scientists in the psychological world. Until these abstract areas in psychology are uncovered, the constant struggle to perfect this sort of environment will be the main limitation of all research experiments.

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# Glasses and Facial Recognition

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*This study investigates whether glasses on a face reduce the accuracy with which people recognize that face. Forty-eight Lindenwood University undergraduates with a mean age of 20.25 years participated in this study. Two series of pictures were shown to the participants. The first contained pictures of models with and without glasses, and the second contained only pictures of models without glasses. The participants were asked to identify pictures of models in the second series who had also been in the first. A t-test revealed that participants recognized more pictures of models whom they initially viewed without glasses and fewer pictures of models whom they initially viewed with glasses. It was concluded that glasses are a distraction that interferes with recognition.*

The inaccuracy of eyewitness testimony is a topic that has accumulated much study. Memory is impressionable (Loftus, 2003). Much research has been done revealing that the principle factor influencing the opinion of a juror who is considering eyewitness reliability is the level of confidence the witness expresses, whether the witness is actually accurate or not; however, most of the time, self-confidence of witnesses is a weak marker of their accuracy (Krug & Weaver, 2005). Growing evidence tells us that eyewitness misidentifications from photo spreads and lineups cause more wrongful convictions of innocent people than do all other causes combined (Wells & Bradfield, 1999).

Studies have been conducted to ascertain the effects of things such as duration of exposure (Memon, Hope, & Bull, 2003), age, weapon presence, and violence on eyewitness accuracy (Wagstaff, MacVeigh, Boston, Scott, Brunas-Wagstaff, & Cole, 2003).

Memon et al. (2003) conducted a study on the effect of exposure duration on eyewitness accuracy. Their study was done with two groups, one group exposed to the target for 45 seconds, and another group exposed to the target for 12 seconds. It was found that participants in the longer exposure situation were more accurate than the participants in the shorter exposure situation (Memon et al., 2003).

In a study done by Wagstaff et al. (2003) which examined the effects of age, weapon presence, and violence on eyewitness accuracy, the only significance found was that the accuracy of recalling hair color was predicted by level of violence. The more violent the crime, the more likely the witness was to accurately recall hair color (Wagstaff et al., 2003).

This study was conducted in order to provide information on the effects of glasses, a potentially distracting facial accessory, on eyewitness accuracy. This research was done because of its relevance to the inaccuracy of eyewitness testimony and the importance of eyewitness testimony in the judicial system. I proposed that glasses on a face would inhibit the accuracy with which people would recognize that face. Participants in this study were shown two series of pictures and asked to identify any pictures in the second set which contained the same models they saw in the first set. In this study, it was anticipated that if participants viewed pictures of some models with

glasses and some models without glasses, then, in a second series of pictures in which all models had no glasses, the participants would recognize more models they had initially seen without glasses than models they had initially seen with glasses.

## Method

### *Participants*

There were 48 participants in this study. There were 20 male participants and 28 female participants. The minimum and maximum ages of the male participants were 18 and 62 years of age (*M* age = 21.40 years). The minimum and maximum ages of the female participants were 18 and 25 years of age (*M* age = 19.43 years). The mean age of all of the participants was 20.25 years. All of the participants were undergraduate college students attending Lindenwood University. Forty-six of the 48 participants were recruited through Lindenwood University's Human Subject Pool; Human Subject Pool participants are enrolled in a social science general education course at Lindenwood University and earn one bonus point toward their grade in that general education course for their participation. There were two female participants who were not in Lindenwood University's Human Subject Pool; these participants were undergraduate students at Lindenwood University who were acquaintances of the researcher and volunteered to participate in the study.

### *Materials*

The study was conducted in a room with a desk, a table, and four chairs. The pictures were shown to the participants via the researcher flipping the pictures in a binder, one after another. There was a clock in the room with a second hand which the

researcher used in order to show each of the initial eight pictures for two seconds at a time.

The initial set of eight pictures consisted of four filler pictures of male models, two with glasses and two without, and four target pictures of female models, two with glasses and two without. The four female target models were each photographed with and without glasses, but each participant only viewed one version of each model in the initial set of eight pictures. The study was counterbalanced with the use of eight different groups (there were six participants in each group), and half of the participants (four of the groups) viewed models A and C without glasses and models B and D with glasses, while the other half viewed the reverse. A Latin Square design was used to come up with the order the target pictures were to be presented in; this led to the use of eight different groups (four different orders of presentation and two different glasses conditions [the condition of models A and C without glasses and models B and D with glasses and the reverse condition]).

The pictures were all the same type of headshot taken in front of the same background with each model facing forward. All of the models in the study were Caucasian. In the initial set of eight pictures there were three middle-aged female target models, one teenaged female target model, three middle-aged male filler models, and one teenaged male filler model. Two of the middle-aged male filler models did not wear glasses, one middle-aged male filler model did wear glasses, and the teenaged male filler model also wore glasses. The 16 non-target female models (those that, along with the four target models, would be in the pictures that would comprise the set of 20 viewed

after the initial eight) consisted of three young adults and 13 middle-aged adults. None of the models, target or not, wore glasses in the second set of pictures (the set of 20). All of the models were friends and acquaintances of the researcher who volunteered to model for the study.

The four female target models each had three different pictures taken of them: one picture with glasses wearing one outfit, one picture without glasses wearing another outfit, and another picture without glasses wearing yet another outfit. Of each of the four target models, the third picture, the one without glasses that would be seen in the second round of pictures (the round of 20 pictures), was taken with a different facial expression than were the other two target pictures, the two that would be viewed (only one per participant) in the initial eight.

### *Procedure*

Each participant was asked to fill out a questionnaire with questions regarding his or her age, his or her sex, and how accurate the participant thought he or she was at recognizing faces. (See Appendix A for a copy of this initial questionnaire).

After each participant filled out the questionnaire, the participant was told that he or she would be shown eight pictures for two seconds each, and then he or she would be shown a series of twenty pictures, which may or may not include pictures of the models in the initial eight pictures, and be asked to tell the researcher, when looking at each picture, if it was of one of the people in the initial series of pictures. Each participant was told that if the second set of pictures did include pictures of any of the models in the initial set, the models in the second set of pictures might have different clothing and/or

different facial expressions. (See Appendix B for an example of a picture used). After the participant was informed of this portion of the procedure, he or she was then shown the initial set of eight pictures (four target pictures and four fillers); each picture was shown for two seconds at a time, one right after the other.

Then, the participant was reminded of the next part of the procedure and asked to tell the researcher if each of the following 20 pictures were of any of the same people shown in the initial series of eight. The participant was then shown the series of 20 pictures, which included pictures of the four female target models and 16 other female filler models; all of these pictures were of models without glasses.

Each time the participant identified a model (correctly or falsely) as being one from the initial set, it was recorded by the researcher. After this was finished, the participant was asked if he or she knew any of the people in any of the pictures; no one did. Then, the participant was given another questionnaire with two questions, one asking if the participant wears glasses and another asking if the participant had ever worn glasses in the past. (See Appendix C for a copy of the closing questionnaire). Then the participant was debriefed.

## Results

The hypothesis that glasses on a face would inhibit the accuracy with which people would recognize that face was supported. Of the four target models in the study, each participant initially viewed two target models with glasses and two target models without glasses. A dependent *t*-test revealed that the participants significantly recognized

more models they initially viewed without glasses ($M$ = 1.58) than models they initially viewed with glasses ($M$ = .98), $t(47) = 4.567$, $p < .001$.

An independent t-test was conducted to determine whether participants who had experience wearing glasses recognized the models they had seen with glasses more often than participants who had never worn glasses. The t-test revealed no significant difference between the two groups of people. It showed that participants who had never worn glasses themselves recognized a mean of .96 models out of a possible two, and participants who wear or had previously worn glasses recognized a mean of 1.00 out of a possible two, $t(46) = -.182$, $p > .05$.

A dependent *t*-test showed that there was a significantly larger percentage of correct recognitions ($M$ = .656) than false identifications ($M$ = .220), $t(47) = 10.520$, $p < .001$. Prior to computation, these data were converted into percentages due to unequal numbers of target and filler models; there were four female target models and 16 female filler models in the second series of pictures (the series in which the participants were to identify the target models). Approximately 66% of the target models were recognized and approximately 22% of the filler models were falsely identified.

A correlation between the data (converted to percentages) on how many models were correctly recognized ($M$ = .65) and the data (converted to percentages) on how accurate participants assumed they were at recognizing faces ($M$ = .68) showed a Pearson $r$ of -.225. Since the actual accuracy of the participants was lower than their assumed accuracy, the negative relationship reveals that the participants were less accurate than they thought they would be.

## Discussion

The fact that the participants in this study correctly identified more pictures of models that were without glasses in the initial series and fewer pictures of models that had glasses in the initial series leads me to believe that glasses are a facial accessory that draws people's attention away from the face and therefore, makes a face with glasses more difficult to recognize than a face without glasses.

No difference was found between the number of models correctly recognized by participants who had never worn glasses and by participants who did wear glasses or had worn them in the past. This supports my conclusion that glasses are a distraction, and it shows that people who have had experience wearing glasses themselves are just as distracted by glasses as people who have never worn glasses. I examined these variables because I thought there might be a chance that people who wear or have worn glasses would think (due to comments heard by many, such as, "gee, you look so different without your glasses on") that glasses draw attention away from the face and so would consciously pay more attention to faces of people with glasses. The *t*-test revealed that I was incorrect, and people who have had experience wearing glasses seem to be just as distracted as people who have not.

The ecological validity of the study is questionable, because, in the real world, people are viewed in many environments that are very different. People are observed from different angles, from different distances, within different contexts, and for different lengths of time, etc.

The major contribution of this research is to provide information on glasses affecting facial recognition. It is a topic that needs to be researched further in order to find out if it is likely that these results do, indeed, describe the entire population. The legal system in the United States often utilizes eyewitness testimony in its cases. Protecting the wrongly accused is as important as convicting the guilty, and the more that is known about eyewitness testimony, the better the wrongly accused can be protected.

A similar study conducted with the pictures viewed on a computer (with the initial eight pictures set to automatically change at a set interval), with no possible distraction of pages flipping, would probably provide more accurate results. (I attempted to run the experiment with a computer, however, due to a software limitation that prevented the computer from showing the pictures, the experiment was run by the experimenter flipping the pictures in a binder.) It would also be beneficial to conduct such a study with a wider age range of participants and with both male and female target models, models of a wider age range, and models of different races. Such a study would require many more participants but could provide very interesting and potentially useful information.

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## Appendix A

## Initial Questionnaire

SUBJECT ID NUMBER: _____ (Assigned by Researcher)

1) Are you male or female? Please circle one: MALE FEMALE

2) How old are you? Please write your age here: _____

3) On a scale from one to ten, one being not at all accurate and ten being very accurate, how accurate do you think you are at recognizing faces? Please circle one:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| NOT AT ALL ACCURATE | | QUITE INACCURATE | | | MODERATELY ACCURATE | | | QUITE ACCURATE | | COMPLETELY ACCURATE |

## Appendix B

## Sample Picture

## Appendix C

## Closing Questionnaire

SUBJECT ID NUMBER: _____ (Assigned by Researcher)

4) Do you wear glasses? Please circle one: YES NO

5) Have you worn glasses in the past? Please circle one: YES NO

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# Memory Task: Gender Differences in Verbal and Spatial Memory Ability

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*Memory can be broken down into two components: verbal and spatial memories. Verbal memory involves reading, writing, vocabulary and comprehension of texts. Spatial memory, on the other hand, involves the ability to read maps, rotate geometric figures in space, and understand diagrams. Women are thought to have better verbal memories than men, whereas men seem to have better spatial abilities than women. We recruited 28 participants from the Human Subject Pool in order to test this hypothesis. We found that this is not true when we gave the participants memory tasks; there are more differences within a certain gender than differences between the two genders. On the other hand, when participants filled out the questionnaires regarding their memories men did prefer spatial tasks, whereas women leaned towards the verbal tasks.*

Gender differences exist from the time we are newborns. Boys are simply raised differently than girls, and girls are raised differently than boys. Boys are associated with the color blue, trucks, and being tough. Girls are associated with pink, dolls, and emotions. Although more can be said of gender differences and all its forms, we were especially curious about gender differences regarding memory. Consequently, we designed an experiment to investigate how memory differs, particularly verbal and spatial memory, between men and women.

Knowing how men and women filter information better can help in high school and college settings. If men have better spatial memory, then they can be given diagrams and/or maps to help with the texts to be read for a class. For women, who are said to have a verbal memory, written instructions can be given, instead of diagrams, to help them to understand schoolwork better.

Many studies have been conducted on gender and the memory differences between the two (Beckman, M., 2005; Caplan, Darby, & Lipman, 1995; Fichner-Rathus, Nevid, & Rathus, 2005; Geiger & Litwiller, 2005; Zinser, Palmer, & Miller, 2004). In order to better understand past research, spatial memory is associated with the ability to place objects mentally, rotate geometric figures in one's head, and the ability to understand diagrams. Conversely, verbal memory reflects one's ability to comprehend sentences in a textbook and the ability to spell words correctly when learning vocabulary.

Geiger and Litwiller (2005) conducted a study on gender differences and memory in the field of science. The study involved fifteen men and forty-eight women who were tested on their verbal and spatial memory abilities. The first session consisted of the verbal working memory span test. The participants were asked to read a set of sentences out loud and then to recall the last words of each sentence. In the spatial working memory span test session, participants saw a set of capitol letters rotated either in a normal manner or as a mirror image. They had to remember how far each letter was rotated. As a result, male participants were found to excel on both verbal and spatial working memory span tests.

According to a study conducted by Zinser et. Al. (2004), memory and gender differences were studied by giving the participants maps of neighborhoods that included geographic site-names. There were 109 participants: 35 were men and 74 were women. Primarily, the participants were given a map of a college campus with the corresponding names for each building as well as a regional map with 12 major cities. After some time, the participants were asked to recall the names of campus sites when shown a representational map of the buildings, and to recall the names of the 12 cities when shown a representational regional map with dots as a city's location. Conclusively, the gender difference for recalling campus buildings was not significant, although men matched more cities than women did.

Beckman (2005) conducted a study to test gender differences in verbal and spatial memories of monkeys. The idea was that male monkeys were born with an innate ability to outperform females spatially, but the researchers found that with a little training, the female monkeys could perform as well as the male monkeys on the spatial memory task. Ninety monkey subjects, of both genders, participated in a game of spatial ability; they were to locate treats under discs in the correct order until they missed one. On average, with training on the spatial memory game, the female monkeys performed just as well as the male monkeys.

To test the idea that female monkeys could perform as well as or better than male monkeys spatially if training was involved, the researchers took twenty-two extra monkeys of both genders and trained them to find the treats. They found that the training did nothing for the young male monkeys, but the female monkeys performed much better

after the training. This seemed to close the 'gender-gap' regarding spatial memory ability; all the female monkeys needed was a little training to do as well as the male monkeys.

An experiment by Caplan and Lipman (1995) was conducted to study gender differences when participants were asked to remember a route through a neighborhood. Participants either received no map-aid, a map-aid labeled "map", or a map-aid labeled "diagram". The aids either did or did not include marked landmarks. It was hypothesized that men would outperform women when the aid was labeled "map" rather than "diagram" due to their advantage in spatial memory. The term "map" was considered a more spatial label than "diagram". Men were also hypothesized to outperform women if they were given landmarks (scene-spatial memory), since they do not usually process information this way. With the help of landmarks that are normally not used to find locations by men, it was thought that these cues would be used to their advantage because they were paired with maps that men are more able to read. On the other hand, women who were given configured information, such as how far a location was from another, (layout-spatial memory), would benefit more due to the lack of spatial memory they have in this category.

The researchers found that their hypotheses were partially supported by the results. Men did outperform women when using map-aids labeled "maps"; each of these conditions was shown to be less useful for women though. One reason found true was that if women had had bad luck reading maps previously, they were more apt to not perform well now with map-aids labeled "maps" due to the negative stigma they had

attached to maps. Men, on the other hand, are more spatial and do not become discouraged the same way women do when attempting to read a map.

The hypothesis that was fully supported was that map reading ability depended more on individual past experiences than their actual ability, such as the women whom had performed poorly after reading maps previously in life, which kind of spatial memory was being tested (scene or layout), if landmarks were used, and gender. It was found that there may be more differences within a gender instead of between the two genders, but more research needs to be conducted in order to show this.

Research by Rathus, Nevid, and Fichner-Rathus (2005) showed insignificant sex differences in cognitive ability, but found more significant results between the genders concerning spatial and verbal memory. It was thought that there were more differences within the genders rather than between the two. Nevertheless, research found that men tend to be superior to women in visual spatial abilities, the sort used in math, science and reading maps. On the other hand, females tend to perform better than males in verbal tasks, such as reading comprehending words found in sentences. These are overall differences because there will always be spatially-oriented women and verbally-fluent men in each group.

After reviewing the former research, we were interested to see how women and men would perform in a memory task that contained both verbal and spatial memory tasks. Our hypothesis was that male participants would better remember the placement of objects in a room (spatial memory), whereas female participants would better recall a list of the objects in the exact same placement in the same room (verbal memory). Neither

the male nor female participants were told that the objects on the table were to be remembered. We used 28 undergraduate students from the Human Subject Pool at Lindenwood University. The participants sat at a table with 12 objects strategically placed in front of them. The participants had two minutes alone at the table as we, the experimenters, left the room to "set up the experiment room".

Following the two minutes, we led the participants into another room, where they were given 5 minutes to recall the objects that they could remember on the table in both list and diagram form. Subsequently, after having collected the data and dismissing them, we counted the total items recalled from both the list and diagram to see if there were true gender differences in memory.

## Method

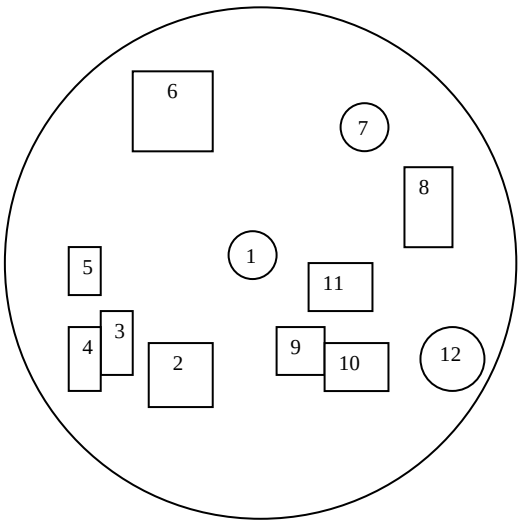
### *Participants*

Twenty-eight undergraduate students, seventeen men and eleven women, were recruited from Lindenwood University located in St. Charles, Missouri. The students were entry-level psychology, sociology and undergraduates. The participants were recruited through the Human Subject Pool, whose purpose is to bring together experimenters and participants while ensuring the safety of the participants. Participants received bonus points in their psychology, sociology or anthropology classes. Participants were given the experiment on first come first serve basis.

*Materials*

We used loose-leaf paper, two pens, and two rooms in close proximity with two chairs and a table, a lamp or overhead light fixture, and a stopwatch. A questionnaire (see Appendix A) was constructed in order to see whether the subjects were right- or left-handed, male or female, and if they learned better using their verbal or spatial memories (see Appendix A for a copy of the questionnaire used). In addition, the 12 specific items were placed on a table before the participants entered the room. These items included a candle, a psychology textbook, a pencil, a highlighter, a stapler, a box of Kleenex, a CD, a hairbrush, a pocket-sized dictionary, a calculator, a glass paperweight and a water bottle (see Figure 1). We also provided the participants with two pieces of loose-leaf paper, which the participants used after we gave instructions to draw a diagram and make a list of the former objects on the table (see Appendix B).

**FIGURE 1. Map of the items**




1. candle
2. book
3. pencil
4. highlighter
5. stapler
6. box of Kleenex
7. CD
8. hairbrush
9. dictionary
10. calculator
11. glass paper weight
12. water bottle

*Procedure*

When the participants entered the first room for the study, they signed the appropriate forms including the informed consent, questionnaire, the participant receipts, and the sign-in sheet. This exact setup was crucial so that each individual was tested under the same condition and, hence, were graded according to the standard diagram setup. After the participants finished the paperwork, we informed them that we had to leave the room for a couple of minutes to set up the experiment. We left the participants in the room alone for two minutes. When we returned, we told them to follow us to the "experiment room". Subsequently, we led them into the second room. The participants were never told what the memory experiment consisted of. They walked into the second room with no idea that the items on the table in the initial room were the items to be recalled for the memory task. We used deception because this was when the experiment actually started. Deception was necessary in order to get an accurate account of the participants' memories. Knowing in advance that they would be recalling the items would have skewed our results because every participant would have recalled all, or nearly all, 12 items. Therefore, the results would have been the same across the board.

In the second room, we asked the participants to recall the items they remembered seeing on the table in the initial room. Each was to recall the items in two fashions: a drawn out diagram and a simple listing of the objects. They were given 5 minutes to do both tasks, in either order, and were asked to recall the items to the best of their abilities. We left the room as the participants performed the memory tasks. When the time had lapsed, we collected both papers from the participant, asked if they had any questions,

and handed out the feedback letters with a full debriefing. Lastly, we thanked them for participating and they were dismissed.

## Results

Three independent t-tests were computed. The first t-test was conducted in order to assess whether there were any sex differences in questionnaire response. Overall, there was statistical significance in that male participants are more spatially-oriented than the female participants ($M$ =1.82 for men versus $M$ = 1.00 for women). Hence, the means differed reliably in the predicted direction, $t(25) = 2.180$, $p$ =.039. With regards to the other two t-tests, which were based on how many items were correctly drawn and how many items were correctly listed from each participant, they both were not statistically significant. Men had a lower mean than the women on how many items were drawn correctly in the diagram ($M$ = 33.82 versus $M$ = 42.50). Consequently, the results were surprisingly in the wrong direction, $t(25) = -.865$, $p$ >.05, without statistical significance. Although the last t-test result was also not statistically significant, the female participants did have a greater mean ($M$ = 48.14 versus $M$ =35.78) on how many items were listed correctly, pointing in the predicted direction, $t(25) = 1.353$, $p$ >.05. For these last two t-tests the individual scores were calculated by dividing the number of correctly drawn or listed items by 12. Then we found the mean of the men's scores as well as the women's.

## Discussion

The results of the present study did not reveal sex differences in memory based on whether the recall task involved spatial or verbal memory. What was actually found was that women drew better diagrams and produced better lists than men. The overall recall for women was better for both dependent variables (the diagram and the list).

One question that came to mind after seeing the results was if any of the participants were tipped off to the deception we used in the study. We told every participant to not to let the other prospective participants know about the nature of the study, but who is to say they still did not tell his/her friends? This is a question we will never have answered, but two female participants' results looked a little fishy. They recalled a very high number on each memory task, but we do not know if they are just attentive to their surroundings or if they knew what was going to be asked of them.

A statistically significant sex difference was found in the participant's responses on the questionnaire. There were three questions tapping into verbal and spatial memory: drawing a diagram (spatial) or giving written instructions (verbal); following written directions (verbal) or following a map (spatial); taking a drawing class (spatial) or a reading/writing class (verbal) at school. Men, on average, would rather use diagrams, maps, and take a drawing class at school than women; the women, on the other hand, preferred giving written instructions, following written directions, and taking a reading/writing class.

We ran into many different limitations while conducting our experiment. The most obvious was the fact that it is nearly impossible to get exactly half male and half-

female participants when recruiting from the HSP. The sign-up sheets were on a first come, first serve basis, and we could not be biased by stating we needed more females at the end of experimenting. There were also distractions in the library; other students were looking for books, the participant's cell phones were ringing, and some participants brought other homework to do before the experiment began. Since we could not tell them to concentrate on the table they were sitting at, we had to let them be distracted the entire time.

Some participants also misunderstood the instructions they were given. We told them, "recall the objects on the table", yet some participants recalled chairs, book bags, and other objects not sitting directly on the table they sat at. They also tended to draw and list the informed consent sheets we had them fill out before running the memory experiment. Those were not on our diagram, but the participants left them lying on the table when we took them to the second room. We wanted the objects we placed on the table ourselves recalled, not what each individual left on the table.

If this study were to be replicated, the overall number of participants needs to be increased due to the fact that it was truly up to fate if we were to get exactly half men and half women for an experiment like this. The more participants overall, the better chance there is of finding statistical significance.

Instead of giving the instructions verbally, we could have written them down for the participants to clarify more thoroughly. The participants who did not seem to be paying attention were the ones who drew the windows and chairs in their diagrams; perhaps that was because they could not recall any of the objects placed on the table. It

would have seemed odd if we would have told the participants to put their informed consent sheets in their book bags just so they did not draw them on the diagrams. It did not skew the results, however since we crossed out anything that was not included in our twelve listed objects on the table.

The study conducted by Caplan and Lipman(1995) supported our significant findings regarding gender differences and memory. From their research, it was concluded that there were more differences within a gender (woman A verse woman B) rather than between the genders (woman A verse man A). Our participants did not vary significantly on the verbal and spatial memory tasks, even though women preferred the verbal choices, and men the spatial choices, on the questionnaire.

Rathus et al (2005) also had findings that coincided with the results of our experiment. They also found more difference within a gender than between the two. We found this to be true due to the fact that humans are innately born with better verbal or spatial memories depending on gender, but these differences tend to even out over the lifespan. This may be a reason why our results were not significant; our participants were at least eighteen years of age or older.

Knowing this fact also connects to the study conducted by Beckman (2005) regarding the monkeys. He found the male monkeys were born with a tendency to be more spatially oriented than female monkeys, but with training, the female monkeys could perform just as well. Over the lifespan, women can learn how to better their spatial abilities, and thus, catch up to men eventually.

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## Appendix A

## Questionnaire

1. Are you MALE or FEMALE?

2. When explaining a new idea to someone, would you rather

DRAW A DIAGRAM or GIVE A WRITTEN DESCRIPTION?

3. Are you LEFT or RIGHT -handed?

4. When traveling to a new place, would you rather

FOLLOW WRITTEN DIRECTIONS or FOLLOW A MAP?

5. In college, would you rather take a

DRAWING CLASS or READING/WRITING CLASS?

## Appendix B

## Instructions

Instructions given to the participants after being placed in the second room for the memory tasks are as follows:

> "Do you remember the table you were just sitting at in the other room? I am going to ask you to make a list of the objects you remember seeing on the table on one sheet of paper, and to draw a diagram of where the objects were placed on the table on the other sheet of paper. You have five minutes, good luck!"

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# The Effects of Speech Rate on Comprehension

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*There is a perception that the rate of speech affects the level of comprehensibility of a listener. If the rate of a speaker during a speech or lecture does in fact affect the level of comprehension, then the speaker would have to modify his/her rate of speech in order to benefit the ears of all his/her listeners. In the present study, 40 participants listened to four passages, taken from www.testpreview.com all recorded at varying speeds, after which they answered 10 questions that corresponded with the passages. Results found that speech rate had no effect on comprehension. However, findings based on one passage suggest that there may be a link between speech rate and content.*

When speaking, people speak at a natural rate, and believe their speech to be auditable and understood; however, for listeners this may not be the case. Research on the topic of speech rate and comprehension has shown a variety of different findings. It has been found that speech rates vary widely across people. In a study that compared the difference in speech rates for native speakers of English to those who spoke English as a second language, it was found that both groups preferred to hear speech at a slower rate when it was not their native language (Derwing & Munro, 2001). Derwing and Munro also found that slower rates of speaking were preferred, but there was no significant effect on comprehension of these listeners when tested at different speech rates. In this

study, rate was measured in syllables per sentence measures, not by using passages or paragraphs.

Ernest (1966) conducted a study that looked at achievement and listening comprehension; in her study, she used university students and used book excerpts from different materials such as experimental or historical. Ernest used a word per minute measures of 120wpm for slow and 160 wpm for fast; results found that listening comprehension was not affected by the rate at which the excerpts were presented. However, a slight trend was found for historical material to be comprehended at quicker rates. Blosser, Weidner, and Dinero (1976) found in their research that as speech rates decreased, comprehension scores for their participants increased. Differences in this study were that children were the focus of the study and a speech compressor was used to change the rate of the speech samples, not the speaker. In another study that looked at compressed speech compared to normal speech, it was found that normal speech rates were found to be more comprehendible than faster rated compressed speech rates (Beatty, Behnke, & Froelich, 1980). Beatty, Behnke, and Froelich first used a male voice to record their excerpts at 140 wpm as the standard control and then used a machine to compress that speech recording to 210 wpm and 280 wpm. Based upon these studies, speech rate varies in what is considered normal and the measure of rate may also play a link into the end results of a study.

Researchers have demonstrated that comprehension and speech rate was largely combined with cognitive processing. Results of one study showed that regardless of age, speech that was presented at fast speech rates took longer to understand and process

cognitively because slow rates allow people more time, whereas fast rates of talking diminishes this time (Wingfield, Peelle, & Grossman, 2003). In the study, they compressed sentences at 35%-80% using a computerized algorithm with the standard for speech set at 205 wpm. Wingfield, Peelle, and Grossman also found in their study that when tested on comprehension of true/false questions, until rates were very fast at about a 595 wpm rate there was no difference in the comprehension scores between older and younger adults. In a more recent study, by Fallon, Peelle, and Wingfield (2006) the difference between older and younger adults in task demands and self-paced listening was researched. In the study speech rate was used as a condition; speech rates of 124, 155, and 207 wpm were used and were compressed on a machine. Results showed that speech rate did not affect either young or older adults or either task of recall or comprehension. However, the results of this may be attributed to the fact that the adults were able to go at their own pace and pause the recording when necessary. In a study that looked at compressed speech in commercials, Nickell and Pinto's (1984) finding refuted previous research that stated that faster communication on the radio was better; their findings show that people did not really have a preference for faster speech rates on the radio. Nickell and Pinto used compressed speech at 150 wpm for a control, and then compressed speech to rates of 175 wpm, 200 wpm, and 225 wpm. All of the research points to many different findings that, while related, all differ in some degree. The measure of rate differs in several of the studies, as does the method of how to control the speech rate by using either a computerized machine to speed up and slow down the rates or to use an actual human model. Research also differed on what was considered as fast,

slow, and average in speaking. Such factor may indicate the reason for such varied findings.

Based on this prior research, it is still not certain as to what speech rate is best for comprehension; upon this basis, one aim of our studying is to further our knowledge about how we communicate with one another. As humans, we rely heavily upon speech to communicate and the more knowledge we gain about communication, the better we become at communication. Our aim by conducting this experiment is to determine what rate of speaking is best for a listener to understand the content of speech. In classroom and university settings, such knowledge would be highly beneficial because speaking is the major means by which professors and teachers try to convey course content to their students. If professors and teachers knew at what rate to modify their speaking voices, they would be better equipped to communicate valuable information to students. Based on prior research findings, we hypothesize that slower speech rates will result in listeners obtaining higher comprehension scores.

In our study, we took four different passages, which were selected to control for different variables, and had a professional speaker record them at different rates: a fast rate (at 200+ wpm under 2 min), a slow rate (120 wpm in over 3 min), and two control rates (160 wpm in 2.15-2.5 min). Then, these selected passages were presented to participants at these different rates. Each participant heard each of the four different passages, but each at a different rate. After hearing each separate passage, participants were asked questions about the passages in order to obtain a measure of comprehension.

## Method

### *Participants*

A total of forty-one participants, all college students from Lindenwood University, were recruited in this study. Participants were recruited through the Lindenwood University Human Subject Pool (HSP) or they were recruited on the campus of Lindenwood University. Thirty-three of the participants were recruited from the Lindenwood HSP. Students that were able to participate in the HSP were students currently enrolled in an introductory social science course of the following: Principles of Psychology, Concepts of Sociology, Interactive Psychology, or Cultural Anthropology. Participants that were recruited through the HSP each received one bonus point for their respective courses for their participation in the study. The eight participants that were not recruited through the HSP were recruited on the campus of Lindenwood University. These eight students were all enrolled in classes at Lindenwood University. These participants did not receive any incentives for their participation in the study.

### *Materials*

In our study, four written passages were taken from www.testpreview.com. These four passages were prewritten for help on the reading comprehension section for the ACT exam (see Appendices A-D). Each of the passages was centered on historical figures, the length of each passage was about equal with an average of 426 words per passage, and the level of comprehension was found to be set at a high school level. Mike Wall, Lindenwood University Professor of Mass Communications, recorded the passages onto a Memorex CD using the professional radio station equipment of the university.

Professor Wall recorded each of the four passages four times, with each passage read at a different speech rate each time; the passages were recorded along a time scale for more efficient recording purposes.

The speech rates were recorded as follows. Each passage was recorded at a fast rate of less than two minutes, a medium rate lasting between two minutes and fifteen seconds and two minutes and thirty seconds, a control rate lasting between two minutes, fifteen seconds to two minutes and thirty seconds, and a slow rate of three minutes. The speed rates were based upon a word per minute measure, which was taken from previous studies. Our determination for the speeds were as follows: we found that 120wpm was considered to be a slow rate for speaking so we took that measure and divided it by the average number of words found in our four passages (426) and got a result of 3.55. Taking that result, we determined that each passage should be read at a speed that required about 3 minutes to complete the passage. 160-170 wpm was found as our medium and control group standard and when this was applied to our average number of words we determined that each passage should be read between 2 minutes and 15 seconds to 2 minutes and 30 seconds. 200+ wpm we found to be a standard for fast speech rates and again when applied to our average words per passage we determined that each passage should be read at under 2 minutes.

The passages were first recorded onto one Memorex CD, but were then burned onto four separate Memorex CDs; each CD contained a condition of our variable so when conducting the study the process would be more efficient. Two portable CD players, a Lennox model and Memorex model, both equipped with standard headphones, were used

by the participants to listen to the recordings. Comprehension tests were used to measure the comprehension ability of the participants. These comprehension tests were based on questions that corresponded to the passages that were found at www.testpreview.com (see Appendices A-D). Each test consisted of ten multiple choice questions. Writing utensils and paper were used to fill out the comprehension tests. The study was conducted in a small room in which there was a desk, two chairs and a computer; the room was located at Lindenwood University in the Young building in room 105 in labs A and D. The labs in Young 105 were mostly quiet areas and provided few interruptions or distractions for participants.

### *Procedure*

A within-subjects design was used in this study. Participants were each tested on an individual basis. Four reading comprehension practice ACT tests were selected from the website www.testpreview.com. These four passages were selected upon the basis of being about equal in the areas of length, comprehension level, and interest level (see Appendixes A-D). After selecting these passages, they were recorded at three different speech rates: fast, medium, and slow. These three rates would have left us with twelve conditions, and would have made counterbalancing a cumbersome task; a fourth rate was added so that a Latin Square Design could be implemented. This fourth rate was called the control rate and was the same measure as our medium rate in that it was also recorded at a time between two minutes, fifteen seconds to two minutes and thirty seconds in length. The control rate then was not included in the analysis of the data, for it was equal to our medium rating. Professor Mike Wall, a professional speaker and Dean of the

Communications Department, served as the voice model for all conditions; a professional speaker was chosen to read these passages to help control for the different variables of language, such as tone, consistency in rate, speech errors, etc. He recorded each the four passages at each of the four different rates for a total of sixteen different conditions. Professor Wall was thanked for his help in the study and was offered a gift card.

For each passage, a ten item questionnaire was created that was used to measure the comprehension level of the listener for each passage. The questions were based on questions that were provided with each passage at www.testpreview.com (see Appendices A-D). These questions, like the passages, were chosen so that all would be at on the same level of comprehension and about the same type of questions. This was done again to control for extraneous language variables, such as the wording used to ask the questions.

Each participant was asked to listen to the first passage and then answer the ten item questionnaire about that particular passage. After the participants had completed the first questionnaire they then listened to the next passage. Upon completion, it was then followed by another questionnaire that pertained to that particular passage. This procedure was repeated until the participant had completed each set of four passages and questions. The sequence in which participants heard each of the passages did not vary, but the speech rate for each of the passages varied and was counterbalanced. For example, participant one heard passage one at the slow speech rate, passage two at the medium speech rate, passage three at the medium speech rate, and passage four at the fast speech rate. The second participant then heard the first passage in the medium speech

rate, the second passage in the slow speech rate, the third in the fast speech rate, and the fourth in the medium speech rate. This was done until all registered participants had each heard all four of the passages and answered all four sets of questions. Participants at the completion of the study were then debriefed on the purpose of the study. We then made sure to guide them in the completion of the participant slips to ensure that they received their bonus points.

## Results

A multivariate analysis of variance (MANOVA) performed on participants' comprehension scores revealed that there was no significant effect of different speech rates on comprehension, $F(2, 78) = .039$, $p>.05$. The mean scores on the comprehension by rate were 6.43 for the fast, 6.33 for the medium, and 6.38 for the slow. The maximum score received on each test was ten out of ten and the minimum score was two on the slow and medium conditions and a score of one on the fast condition.

For each individual story, a one-way analysis of variance (ANOVA) was conducted on participant comprehension scores. On passage 1, the ANOVA revealed that there was no significant effect, $F(2, 30) = .170$, $p>.05$. Passage 2 revealed that scores were not significant, but were approaching the point of significance, $F(2, 30) = 2.668$, $p<.05$. The ANOVA on passage 3 showed that the results were not significant, $F(2, 30) = .548$, $p>.05$. Passage 4 ANOVA results displayed that, again, there was no significant effect found, $F(2, 28) = .502$, $p> .05$. The mean scores when analyzed for each individual passage were all consistent with the medium rate being the rate that received the highest scores, with the exception of passage 2 results. Passage 1 mean

scores were 5.73 (fast), 6.20 (medium), and 5.70 (slow). Passage 3 mean scores were 5.90 (fast), 5.90 (medium), and 5.09 (slow). Scores on passage 4 had a means of 6.90 (fast), 7.67 (medium), and 6.80 (slow). The means on passage 2 show an opposite effect from the other passages. The medium score is the lowest instead of the highest; results showed that the means were 7.50 (fast), 5.90 (medium), and 7.70 (slow).

## Discussion

In our study, the results showed that the rate of speech does not have any effect on listeners' comprehension scores. Our hypothesis that a slow speech rate would result in higher comprehension scores must therefore be rejected on this data. The means of the different rates showed that participants scored at a relative consistency, with an average score of six out of ten questions correct. While in the analysis of individualized stories the results of the overall study were supported by passages 1, 3, and 4, passage 2 results indicated an opposite effect from the other test results in which the medium score turned into the lowest score instead of the highest. In passage 2, results were not found to be significant but were approaching significance, which show that the speech rates may have had an effect on the comprehension scores for this specific passage. The overall conclusion that speech rate is not a main influence on comprehension supports the findings of previous research, such as in Fallon, Peele, and Wingfield (2006).

The results of our study compared to prior studies may be contributed to several factors. As in the Fallon, Peele, and Wingfield (2006) study, a word per minute measure (wpm) was used to control speech rate speeds instead of a syllable per second (sp/s) measure. The difference in the use of the way speech rate is measured may be a factor in

the variety of results. In the studies previously reviewed a range of speech rates were used, from a rate of 160 wpm to a rate as high as 207 wpm. This was indicated in different studies as the average rate at which a person would normally speak. The wide range may be a result of other extraneous factors that would dictate speech, such as the area in which the study took place or outside cultural influences. There was no standard rate publicized at what is definitely an average speech rate it may be that our results are skewed to the ratings at which we chose. This suggests that our study may have yielded different results if our standardized rates had been on a broader scale and not on what now seems to be a moderate difference in speech rate comparisons. Another way in that the study could have been altered would be to use a more intricate scale of syllables per second and test on sentences rather than passages.

A more detailed look at the passages in the study suggests that the results may also be linked to the content and wording of the passages, rather than on speech rate. As Ernest (2003) suggested, it may be that the content or wording style of the passages that influenced the results of the study. The four passages were all selected to be about historical people and should all be about at the same interest and content level for people. However, this may not have held true. Passage 1 was an excerpt about the life of Sojourner Truth, passage 2 told the story of Anna Anderson who believed herself to be Anastasia, passage 3 presented information about the life of Charles Lindbergh, and passage four was about the Wright brothers and building the first model airplane. Passages 1, 3, and 4 contained information that was presented in what could be considered a more factual manner, with dates and events listed and told, while passage 2

was presented in more of a story type manner. It contained events and dates it was of a more recent event. Passage 2 was more recent than any of the other passages and could have been of more interest to listeners than the other passages.

A post hoc assumption of the results of passage 2 then may be indicative of passage content or perhaps a listener's interest relationship when compared with speech rate and comprehension. Ernest (2003) found that historical material had a trend of being better understood when at a slightly faster rate than other material. When that finding is related to individualized results of the passages, it can be said that passages 1, 3, and 4, which were perhaps of more historic content than passage 2, were showing comprehension results that may have been influenced by their content and wording styles. Passages 1, 3, and 4 all had results that showed that scores were better, though only slightly when heard at either the medium or fast rates, which is supportive of Ernest's conclusion. Passage 2 results act differently and may be reflecting the listener interest or the fact that though somewhat historical the passage was more recent then any of the other passages. Passage 2 was scored better on at a fast rate or a slow rate, but not at the medium rate. If this content hypothesis could be assumed as true, it may then be said that passage 2 was then considered by listeners as either a historical story and if that was the case did better when given in at a faster rate. Perhaps listeners perceived it as more complex sort of story that intertwined recent events with historical background. Also it could be due to the complexity it needed to be heard, for some, at a slower rate so that more time for cognitive processing was allowed.

This study, on the whole, only suggests that more research in the field of speech rate is needed to better understand its effects on comprehension. Results show that speech rate itself may not be an effective influence on comprehension, but with more research it may be found that the content of what is being heard and listener interest may play a role in what speech rate is more preferable and beneficial in regards to comprehension.

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## Author Note

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## Appendix A

## Passage 1

"Old woman," grumbled the burly white man who had just heard Sojourner Truth speak, "do you think your talk about slavery does any good? I don't care any more for your talk than I do for the bite of a flea."

The tall, imposing black woman turned her piercing eyes on him. "Perhaps not," she answered, "but I'll keep you scratching."

The little incident of the 1840s sums up all that Sojourner Truth was: utterly dedicated to spreading her message, afraid of no one, forceful and witty in speech.
Yet forty years earlier, who could have suspected that a spindly slave girl growing up in a damp cellar in upstate New York would become one of the most remarkable women in American history? Her name then was Isabella, many slaves had no last names and by the time she was fourteen she had seen both parents die of cold and hunger. She herself had been sold several times. By 1827, when New York freed its slaves, she had married and borne five children.

The first hint of Isabella's fighting spirit came soon afterwards, when her youngest son was illegally seized and sold. She marched to the courthouse and badgered officials until her son was returned to her.

In 1843, inspired by religion, she changed her name to Sojourner Truth, meaning "one who stays briefly" and, with only pennies in her purse, set out to preach against slavery. From New England to Minnesota she trekked, gaining a reputation for her plain but powerful and moving words. Incredibly, despite being black and female, for at the time only white males were expected to be public speakers, she drew thousands to town halls, tents, and churches to hear her powerful, deep-voiced pleas on equality for blacks-and for women. Often she had to face threatening hoodlums. Once she stood before armed bullies and sang a hymn to them. Awed by her courage and her commanding presence, they sheepishly retreated.

During the Civil War she cared for homeless ex-slaves in Washington. President Lincoln invited her to the White House to bestow praise on her. Later, she petitioned Congress to help former slaves get land in the West. Even in her old age, she forced the city of Washington to integrate its trolley cars so that black and white could ride together.

Shortly before her death at eighty-six, she was asked what kept her going. "I think of the great things," replied Sojourner.

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## Passage 1 Questions

1. The imposing black woman promised to keep the white man-

A searching
B crying
C hollering
D scratching
E fleeing

2. This incident occurred in the-

A 1760s
B 1900s
C 1840s
D 1920s
E 1700s

3. In what city was Sojourner Truth raised in a damp cellar?

A New York
B Georgia
C New Jersey
D Idaho
E Maryland

4. Isabella lost both parents by the time she was what age?

A 27
B 2
C 7
D 14
E 19

5. When New York freed its slaves, Isabella had-

A problems
B no children
C five children
D an education
E three children

6. Isabella's name change was inspired by?

A a fighting spirit
B religion
C her freedom
D officials
E friends

7. She traveled from New England to-

A Canada
B California
C Minnesota
D Alaska
E Virginia

8. What did Sojourner force the city of Washington to do?

A integrate its trolleys
B give land grants
C care for ex-slaves
D provide food for ex-slaves
E clean its trolleys

9. What did Isabella preached against?

A smoking
B slavery
C alcohol
D hoodlums
E women having no rights

10. What age was Sojourner Truth when she died?

A 48
B 72
C 63
D 86
E 88

## Appendix B

## Passage 2

One of the most intriguing stories of the Russian Revolution concerns the identity of Anastasia, the youngest daughter of Czar Nicholas II. During his reign over Russia, the Czar had planned to revoke many of the harsh laws established by previous czars. Some workers and peasants, however, clamored for more rapid social reform. In 1918 a group of these people, known as Bolsheviks, overthrew the government. On July 17 or 18, they murdered the Czar and what was thought to be his entire family.

Although witnesses vouched that all the members of the Czar's family had been executed, there were rumors suggesting that Anastasia had survived. Over the years, a number of women claimed to be Grand Duchess Anastasia. Perhaps the best –known claimant was Anastasia Tschaikovsky, who was also known as Anna Anderson.

In 1920, eighteen months after the Czar's execution, this terrified young woman was rescued from drowning in a Berlin river. She spent two years in a hospital, where she attempted to reclaim her health and shattered mind. The doctors and nurses thought that she resembled Anastasia and questioned her about her background. She disclaimed any connection with the Czar's family.

Eight years later, though, she claimed that she was Anastasia. She said that she had been rescued by two Russian soldiers after the Czar and the rest of her family had been killed. Two brothers named Tschaikovsky had carried her into Romania. She had married one of the brothers, who had taken her to Berlin and left her there, penniless and without a vocation. Unable to invoke the aid of her mother's family in Germany, she had tried to drown herself.

During the next few years, scores of the Czar's relatives, ex-servants, and acquaintances interviewed her. Many of these people said that her looks and mannerisms were evocative of the Anastasia that they had known. Her grandmother and other relatives denied that she was the real Anastasia, however.
Tired of being accused of fraud, Anastasia immigrated to the United States in 1928 and took the name Anna Anderson. She still wished to prove that she was Anastasia, though, and returned to Germany in 1933 to bring suit against her mother's family. There she declaimed to the court, asserting that she was indeed Anastasia and deserved her inheritance.

In 1957, the court decided that it could neither confirm nor deny Anastasia's identity. Although we will probably never know whether this woman was the Grand Duchess Anastasia, her search to establish her identity has been the subject of numerous books, plays, and movies.

## Passage 2 Questions

1. Anastasia is the grand duchess of-

A Russia
B Spain
C Ukraine
D Germany
E Romania

2. Anastasia is the daughter of-

A Ferdinand IV
B Phillip V
C Tschaikovsky
D Nicolas II
E Charles I

3. What group overthrew the government and murdered the Czar's family?

A Mutineers
B Bolsheviks
C Czarists
D Communists
E Revolutionists

4. How many years did Anna Anderson spend in the hospital?

A 3
B 4
C 5
D 2
E 1

5. The brothers that rescued Anna were-

A sailors
B doctors
C soldiers
D princes
E lawyers

6. What city was Anderson left penniless?

A Rome
B Romania
C St. Petersburg
D Paris
E Berlin

7. What year did Anderson migrate to the United States?

A 1956
B 1930
C 1928
D 1940
E 1925

8. In 1933 Anderson returned to Germany to do what?

A find her real family
B look for her husband
C start a new life
D prove she was Anastasia and file suit against her mother's family
E collect her inheritance

9. Who in particular claimed that Anderson was not Anastasia?

A the grandmother of Anastasia
B The court
C hospital nurses
D Anna Anderson
E Nicolas II

10. The court claimed that-

A Anastasia's identity could not be confirmed or denied
B Anderson was Anastasia
C Anderson was not Anastasia
D Charged Anderson for Fraud
E a movie should be made about Anderson

## Appendix C

## Passage 3

Charles Lindbergh is remembered as the first person to make a nonstop solo flight across the Atlantic, in 1927. This feat, when Lindbergh was only twenty-five years old, assured him a lifetime of fame and public attention.

Charles Augustus Lindbergh was more interested in flying airplanes than he was in studying. He dropped out of the University of Wisconsin after two years to earn a living performing daredevil airplane stunts at country fairs. Two years later, he joined the United States Army so that he could go to the Army Air Service flight-training school. After completing his training, he was hired to fly mail between St. Louis and Chicago. Then came the historic flight across the Atlantic. In 1919, a New York City hotel owner offered a prize of $25,000 to the first pilot to fly nonstop from New York to Paris. Nine St. Louis business leaders helped pay for the plane Lindbergh designed especially for the flight. Lindbergh tested the plane by flying it from San Diego to New York, with an overnight stop in St. Louis. The flight took only 20 hours and 21 minutes, a transcontinental record.

Nine days later, on May 20, 1927, Lindbergh took off from Long Island, New York, at 7:52 A. M. He landed in Paris on May 21 at 10:21 P. M. He had flown more than 3,600 miles in less than thirty-four hours. His flight made news around the world. He was given awards and parades everywhere he went. He was presented with the U. S. Congressional Medal of Honor and the first Distinguished Flying Cross. For a long time, Lindbergh toured the world as a U. S. goodwill ambassador. He met his future wife, Anne Morrow, in Mexico, where her father was the United States ambassador.

During the 1930s, Charles and Anne Lindbergh worked for various airline companies, charting new commercial air routes. In 1931, for a major airline, they charted a new route from the east coast of the United States to the China.

Even while actively engaged as a pioneering flier, Lindbergh was also working as an engineer. In 1935, he and Dr. Alexis Carrel were given a patent for an artificial heart. During World War I in the 1940s, Lindbergh served as a civilian technical advisor in aviation. Although he was a civilian, he flew over fifty combat missions in the Pacific. In the 1950s, Lindbergh helped design the famous 747 jet airliner. He died August 1974, having lived through aviation history from the time of the first powered flight to the first steps on the moon and having influenced a big part of that history himself.

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## Passage 3 Questions

1. What is Charles Lindbergh's middle name?

A Augustus
B Adolf
C Al
D Albert
E Adam

2 What is Lindbergh remembered for?

A building the first airplane
B being given the patent for an artificial heart
C making a nonstop solo flight across the Atlantic
D flying in the military
E being a goodwill ambassador

3. What city's business leaders helped pay for Lindbergh's plane?

A Paris
B St. Louis
C San Diego
D Los Angeles
E Long Island

4. What happened after Lindbergh crossed the Atlantic?

A he flew the mail between St. Louis and Chicago
B he left college
C he attended the Army flight-training school
D he was given the Congressional Medal of Honor
E he married Anne Morrow

5. Who was Anne Morrow?

A a US Goodwill Ambassador
B a doctor
C a friend of Lindbergh
D recipient of the Congressional Medal of Honor
E wife of Lindbergh

6. When did the Lindberghs map an air route to China?

A before they worked for an airline
B before Charles worked with Dr. Carrel
C after World War II
D while designing the 747
E when he was thirty

7. Who was Lindbergh's artificial heart patent partner?

A Anne Morrow
B Alexis Carrel
C Averil Bennett
D Paris Bloomberg
E he did not have a partner

8. Lindbergh received what award?

A Purple Heart
B National Medal of Honor
C Flying Aces
D Distinguished Medal of Honor
E Congressional Medal of Honor

9. What did Lindbergh help design?

A an airplane
B the 747 airline
C the map of where to cross the Atlantic
D Map from St. Louis to Paris
E the award for Distinguished Flying Cross

10. What month did Lindbergh die?

A April
B May
C January
D August
E December

## Appendix D

## Passage 4

Many great inventions are greeted with ridicule and disbelief. The invention of the airplane was no exception. Although many people who heard about the first powered flight on December 17, 1903, were excited and impressed, others reacted with peals of laughter. The idea of flying an aircraft was repulsive to some people. Such people called Wilbur and Orville Wright, the inventors of the first flying machine, impulsive fools. Negative reactions, however, did not stop the Wrights. Impelled by their desire to succeed, they continued their experiments in aviation.

Orville and Wilbur Wright had always had a compelling interest in aeronautics and mechanics. As young boys they earned money by making and selling kites and mechanical toys. Later, they designed a newspaper-folding machine, built a printing press, and operated a bicycle-repair shop. In 1896, when they read about the death of Otto Lilienthal, the brother's interest in flight grew into a compulsion.

Lilienthal, a pioneer in hang-gliding, had controlled his gliders by shifting his body in the desired direction. This idea was repellent to the Wright brothers, however, and they searched for more efficient methods to control the balance of airborne vehicles. In 1900 and 1901, the Wrights tested numerous gliders and developed control techniques. The brothers' inability to obtain enough lift power for the gliders almost led them to abandon their efforts.

After further study, the Wright brothers concluded that the published tables of air pressure on curved surfaces must be wrong. They set up a wind tunnel and began a series of experiments with model wings. Because of their efforts, the old tables were repealed in time and replaced by the first reliable figures for air pressure on curved surfaces. This work, in turn, made it possible for them to design a machine that would fly. In 1903 the Wrights built their first airplane, which cost less than one thousand dollars. They even designed and built their own source of propulsion- a lightweight gasoline engine. When they started the engine on December 17, the airplane pulsated wildly before taking off. The plane managed to stay aloft for twelve seconds, however, and it flew one hundred twenty feet.

By 1905 the Wrights had perfected the first airplane that could turn, circle, and remain airborne for half an hour at a time. Others had flown in balloons or in hang gliders, but the Wright brothers were the first to build a full-size machine that could fly under its own power. As the contributors of one of the most outstanding engineering achievements in history, the Wright brothers are accurately called the fathers of aviation.

## Passage 4 Questions

1. The inventors of the first flying airplane were?

A Wilbur Sloane and Otto Sloane
B Otto Lilienthal and Wilbur Wright
C Orville Wright and Wilbur Wright
D Orville Lilienthal and Wilbur Keystone
E Orville Wright and Otto Lilienthal

2. What year was the first powered flight?

A 1907
B 1917
C 1920
D 1913
E 1903

3. How did the Wright brothers earn money as young boys?

A selling paper airplanes
B making and selling kites and mechanical toys
C performing imaginary air shows for the neighborhood children
D selling lemonade
E pick-pocketing

4. Otto Lilienthal was a pioneer in-

A flying
B creating wings for balance
C in selling kites
D hang-gliding
E building air planes

5. What type of shop did the Wright brothers run?

A a bicycle-repair shop
B a hang-gliding shop
C a flying shop
D a kite shop
E a printing press

6. What problem almost made the brothers give up trying to invent an airplane?

A finding a place to test their gliders
B getting a permit for building
C finding out how to make e the machine turn
D finding materials to build the machines
E obtaining enough lift power in the gliders

7. How far did the first airplane go on its first flight?

A 1,000 feet
B 100 feet
C 120 feet
D 350 feet
E 1 mile

8. How much did the first airplane cost to make?

A less than $1000
B more than $500
C more than $1500
D less than $500
E less than $10000

9. How long could the first plane stay aloft by the Wright brothers?

A third of an hour
B two hours
C one hour
D quarter of an hour
E half and hour

10. The Wright brothers are commonly called-

A the fathers of flying
B the first hang-gliders
C the Wright flyers
D the fathers of aviation
E pioneers of aviation

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# Hours Worked Versus Academic Grades in College Students

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*A students' grade point average has a huge impact on the life of a student. This study proved that the amount of hours worked is not reflective of the students' grade point average which proved our hypothesis incorrect. Past studies have shown varied results on grade point average and the amount of hours a student works. Individual differences may be a determining factor in considering how the individual balances work and school. There were sixty participates in this study from Lindenwood University. The results of this study showed a negative correlation of -.043 between the two variables.*

Everyone has heard the phrase "Poor college student", but it seems that more and more college students are working while they are in school. A working student has a full and stressful day. Students wake up and go to school for about four hours then they go to work and once they are off they go home and do homework. Some students also have sports and extra-curricular activities they have to fit in their busy schedules. Studies have shown that males are more likely than females to spend four or more hours per week in extracurricular activities (Zierold, Garman & Anderson, 2005). Students may feel more inclined to work because of tuition costs. In 1999, the average tuition was $3600. An increase in tuition rates was enforced and the average cost of tuition in 2001 rose to $4500 (Manthel & Gilmore, 2005). In one study, students reported that the reasons they

work were to save up for college, pay for a car or just to get the employee discounts (Ruscoe, Morgan & Peebles, 1996).

Many students reported that their jobs did damage their academic performance (Callender, 2006). In that same study, students that worked received lower grades than the students that did not work. On the other hand, it was reported in a past study that nonworking students had a slightly lower grade point average than students that worked (Zierold et al, 2005). One study showed that students that worked did not get lower grades; however, their drop-out rates were higher than non-working students (Hawkins, Smith, Hawkins II & Grant, 2005). Eighty percent of high school students are employed at some point before they graduate high school. Of those employed, forty-six percent worked more than 20 hours per week (Zierold et al., 2005).

Some of the advantages to students working is that most students report having greater self-esteem and a sense of responsibility (Zierold et al., 2005). However, students that worked reported that their stress increased, and they had feelings of exhaustion and fatigue (Hawkins et al, 2005). Students that work are at greater risk of developing unhealthy behaviors, such as smoking, drinking and using drugs (Zierold et al., 2005).

Do the hours that a student spends at work take up precious study time? The purpose of this study is to see if there is a correlation between a students work schedule and GPA. The results of the study could help students balance their work and school schedules. Employers and educators can also benefit from the results because they could have a better understanding of their employees and students. This is also important when

employers screen job applicants based on their grade point average when they are analyzing resumes (Ridgell & Lounsbury, 2004).

The researchers also wanted to explore the thought that students who worked are less likely to participate in sports and/or school related activities. Some of the participants were recruited from the Human Subject Pool at Lindenwood University and the others were students from the university that were recruited through word of mouth. All participants were undergraduates. The participants that were recruited through the Human Subject Pool received extra credit for their time. Each participant was asked to fill out a short survey asking them about the amount of hours they work and if they participated in any extracurricular activities. Each participant was thanked for their time and debriefed about the study. The researchers hypothesized that students who worked more hours would have poorer grades than the students that did not. They also hypothesized that students that work are less likely to participate in sports and extracurricular activities.

## Method

### *Participants*

The subjects in this experiment consisted of 60 undergraduate students from Lindenwood University. Forty-four subjects were from the Human Subject Pool and the other sixteen were not from the Human Subject Pool but still attended Lindenwood University. Twenty seven of the participants were male and thirty three were female. Thirty of the subjects were freshman, eight were sophomores, twelve were juniors and

ten were seniors. The subject's ages ranged from 17 to 62 years of age with a mean age of 20.77.

The students from the Human Subject Pool were recruited by the sign up sheet and the description of the experiment posted on the HSP bulletin board. The other students were recruited by word of mouth and students from our classes. The students from the HSP received extra credit from their professors in their 100-level or 200-level classes for their participation in our experiment. The other participants did not receive any compensation for their time.

### *Materials*

We developed a questionnaire to find out the subjects year in school, age, gender, current grade point average, hours worked per week, if he/she does work and learn, and his/her feelings about working and school (see Appendix A for questionnaire). We used psychology lab B with a table and four chairs in Young. We also used a couch and table at Butler Library. A computer was used to type out the questionnaire, feedback letter, informed consent form, participant receipt, experimenter's list of participants and the results. A printer was used to print out all of the forms for this experiment. A binder was used to hold all the paperwork needed for the study. Two pens were used to fill out the appropriate forms, and a three- hole punch was used to put all the papers into the binder.

### *Procedure*

A brief description of the experiment along with a sign up sheet with the time and location was posted on the Human Subject Pool board. Interested subjects from the HSP signed up for a particular time in which they would participate in the experiment. The

same brief description of the experiment was said to the other subjects when approached and asked if they had five minutes to complete this survey. The following procedure was for the Human Subject Pool members. Each subject filled out two informed consent forms, a participant receipt, signed the experimenter's list of participants form, and filled out the ten question questionnaire on amount of work and grade point average. The students who were not part of the Human Subject Pool filled out two informed consent forms and the questionnaire. Once the questionnaire was complete, the subject was debriefed on the study and was administered the feedback letter that contained the hypothesis of the study and both experimenter's contact information for further questions or for the final results. In conclusion, the subject was thanked for his/her participation in the study. Once the subjects were finished and had left, the papers were collected and put into the separate folders to later analyze the results. The entire process was repeated for each subject.

## Results

The Pearson correlation test was used to compute the results of the hours work and the grade point average of the subjects. It was a two-tailed test that showed a negative correlation of -.043 between the two variables which revealed that the number of hours students work and their GPA are not highly correlated r=-.043. Descriptive statistics was used to compute the frequencies in the remaining variables and are as follows: 11.7% were completely responsible for school cost while the remaining 88.3% were not solely responsible for school cost by getting assistance from family, financial aid, grants, scholarships, loans and college funds. Out of the 88.3% of subjects who

received assistance, 60% had help from family, 48.3% had help from financial aid, 26.7% received grants, 70% received scholarships, 40% took out loans, and 5% had a college fund.

Of the 60 subjects 76.7% participated in the work and learn program at Lindenwood University and out of that percentage, 40% also worked outside of school. There were less than half of the subjects who participated in sports while in school at 41.7% and a smaller amount who participated in extracurricular activities at 35%. When asked about their opinion on the amount of hours worked and their grade point average, 55% believed that their grade point average had an effect on the number of hours they worked with 58.3% feeling that the amount of hours they worked affected their grade point average. If the subject had the option of not working and just going to school 68.3% said that they would.

## Discussion

The results of the present study showed no difference in the grades of students who worked more hours. The purpose of this study was to examine if there was a relationship between the hours a student works and his/her grades. The findings did not support our hypothesis, there seemed to be no relation between the number of hours worked and their grades. This is believed to have happened because of the self reporting measures used to obtain the grade point average. The way the question was asked to obtain the grade point average could have also been a negative factor because the grade point averages were asked in clusters instead of a written reply blank. The findings of this study did coincide with the study done by Grant et al., which appeared in the Journal

of Social Work Education in 2005. There it was reported that students who worked more did not get lower grades then the people who did not work or worked fewer hours, but that they had a higher dropout rate and/or took longer to graduate.

The study had some limitations that could have skewed the results. Some of these limitations could include, the population studied from just one university that the data was obtained from since it was not a very large subject pool. There were also limitations from the questionnaire. We should have taken into account how many credits the students were currently enrolled in and if they were seeking a double major. Another limitation could be that students work more in the winter for holiday funds than in the spring. The last and final limitation could have been the length time the study was conducted in.

For future research, devising a questionnaire that does not have the self reporting measures of the GPA and the hours worked, would entail the researchers a more accurate result. The researchers should receive the consent from the participants to obtain their actual GPA from the schools record. Also have the participants state which semester they are taking their GPA from such as J-Term, Spring, Summer, or Fall. Keeping in mind the grade levels of the participants could sway the results in different directions because of the maturity level. For an example, upper-class students could have more responsibilities that would cause them to work more such as: rent, car loans, utilities, children, etc. For future studies, we recommend that the study be conducted over a full school year instead of the fraction of the time the present study was based on.

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## Appendix A

## Questionnaire

1. Are you male or female?

   Male Female

2. What is your age? _____

3. What is your year in school?

Freshman Sophomore Junior Senior Other

4. Are you completely responsible for your schooling costs?

   Yes or No

5. If no to #4, where do you receive financial help for school cost? (Circle all that apply)

   Family financial aid grants scholarships loans college fund

6. How many hours do you work per week including work and learn? _____ hrs/wk

7. What is your current grade point average from your last semester of school?

> 1.0 1.0-2.0 2.0-3.0 3.0-3.5 3.5-4.0 4.0< Do not know

8. Do you participate in the work and learn program?

   Yes or No

9. If yes for #8, do you also work outside of school?

   Yes or No

10. Do you participate in any sports?

   Yes or No If yes, which one(s):

11. Are you involved in any extracurricular activities?

Yes or No If yes, which one(s):

12. Do you feel your GPA affects the number of hours you work?

Yes or No

13. Do you feel the amount of hours you work affects your GPA?

Yes or No

14. If you had the option of not working and just going to school, would you?

N/A Yes No

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# Birth Order Effects on Academic Performance

**January Boston & Kristal Cook**

**Lindenwood University**

*In the experiment, 85 participants were recruited to participate in a questionnaire regarding birth order and academic performance by grade point averages (GPA). The survey was conducted to determine if there was a relationship between an individual's birth order and an individual's academic performance. Both of the experimenters come from relatively large families so we were interested to see if there was a positive or negative relationship between academic performance and birth orders. There was statistical significance between birth order and GPA however; the positive correlation was between the youngest siblings and the highest GPA.*

In a previous study, experimenters wanted to determine if birth order has an affect on an individual's academic performance. According to Russell and Vandana (1995), birth order does have an impact on the level of education completed by the middle class. They believed there were two factors that determined the amount of impact birth order has on academic performance. One factor would be the environment that the child is surrounded by. This is referring to the level of intelligence of child's parents and other siblings. The other factor would be the older child taking it upon him/herself to teach the younger sibling (Russell & Vandana).

Another earlier study conducted by Flowers and Brown (2002) dissected individual differences in competitiveness anxiety. Their finding was that firstborn

athletes have higher anxiety than their younger siblings (Flowers & Brown, 2002). In an earlier study conducted by Nymann (1995), he focused on the personality traits for particular birth order positions. Some results from this study showed that first born individuals were able to enter into higher professional careers than other birth order individuals. Another study conducted by Freese, Powell, and Steelman (1999), where they focused on the birth order affecting by social attributes. Children of different ages, being raised together is in some way or form shaping them to form views about themselves. In this particular study, it was believed that first born adults are more conservative than non first born adults. In study conducted by Steelman, Powell, Werum, and Carter (2002), they stated without a longitudinal study it would be hard to verify that parental family planning and parenting would affect their children's educational achievements within the families. In all the mentioned studies birth order is considered an important factor the individual academic achievement but that there are other important factors that could play a major role as well.

Although the above studies found evidence to support their hypotheses, there are findings which challenging their studies. According to Rogers (1990), there is no absolute link connecting academic performance and birth order. A problem that she found with most studies was they did not compare the children within each family (Rodgers, 2000).

Each participant was given a short questionnaire referring to birth order and academic performance. After accepting the hypotheses of the first two studies mentioned it gave us some confidence that our hypothesis could possibly be supported (Flowers & Brown, 2002; Russell & Vandana, 1995). Our hypothesis is the first born child is more

responsible than children of other birth order therefore; they have a greater success rate in their academic performance.

## Method

### *Participants*

There were 85 participants which took part in the study. There were 49 females and 36 males. Twenty-one of the participants were recruited through the Human Subject Pool at Lindenwood University and thirty-five were recruited through the men's and women's lacrosse teams at the university. Twenty-nine of the participants were recruited from other universities. There were 16 only children, 17 youngest children, 27 middle children and 25 firstborn children. Out of the 85 subjects 22 were freshmen, 28 were sophomores, 22 were juniors and 13 were seniors.

The students recruited through the HSP were rewarded with extra credit in their general psychology or sociology classes. The others were just thanked for their time. All of the participants surveyed were undergraduate students attending a university.

### *Materials*

A private room in the library with a table and at least two chairs was used to conduct the survey for some of the Lindenwood University participants. While the field house classroom was used to conduct the rest of the Lindenwood University students. The participants surveyed off campus were done in a private home. A questionnaire (see Appendix A) and a pen or pencil was administrated by the experimenter to the participants. The questionnaire included questions about their age, gender, class load, GPA, birth order, number of siblings and types of siblings.

*Procedure*

Once the participants arrived at the private room they were given a consent form as well as a verbal explanation of the study. The experimenters explain that the purpose of the study was to see if there was any correlation between birth orders and academic performance measured by grade point average. Each participant was assured that the information obtained was to be kept confidential and will only be used for research purposes. They were also informed the experimenters were only interested in the results as a whole. The participants then signed the consent form and given the questionnaire. There was no time limit in which the participants had to finish the questionnaire in. The questionnaire asked questions regarding any siblings the participant might have as well as questions about school, such as grade level, study habits, etc. There was also a question about an outside job. The participants were asked to answer the questions to the best of their ability, and if they did not feel comfortable answering a question, they did not have to answer any it. Once they were finished with the questionnaire they were given a feedback letter and were also verbally debriefed. The HSP participants received their extra credit forms at this time. If the participants had any questions they were answered right away.

## Results

An analysis of variation (ANOVA) was conducted with the participants' surveys to see if there was a correlation between GPAs and sibling birth order and we found statistical significance between the two, $F(3, 81) = 8.5645$, $p$ .05. The data (Table 1) showed the youngest with the highest GPA ($M = 3.0$) while the oldest were a bit lower

(M = 2.48) and then the middle children were very close behind them (M = 2.41) and the only children had the lowest (M = 2.31). However we can accept the null hypotheses.

**TABLE 1. Subjects GPA and position in family**

| Birth Order | Mean | N | Std. Deviation |
|---|---|---|---|
| Only child | 2.31 | 16 | .873 |
| Youngest | 3.00 | 17 | .791 |
| Middle | 2.41 | 27 | .694 |
| Oldest | 2.48 | 25 | .963 |
| Total | 2.53 | 85 | .853 |

## Discussion

Our original hypothesis stated that older children would have the higher GPAs because they tend to be more responsible. However our findings failed to support our hypothesis in fact it was the opposite with the youngest children having the highest GPA and the oldest having close to the lowest GPAs. With the youngest having an average of a 3.0 or low B average and the oldest with a 2.48 average or C average. While the middle children had a 2.41 average also a C and the only children with a 2.31 a lower C average.

Other factors may come into play such as working an outside job or taking more credit hours with more class work to study. Computing the statistics might show that maybe the oldest worked more hours outside of school, or that the youngest studied more hours a week therefore earned the better GPA. An ANOVA could be conducted to see if there is a correlation in future research.

When conducting this research again it could be beneficial to possibly conduct more participants from a more diverse population, such as from other university of even possibly high schools. Also change some of the questions on the questionnaire, such as a

more specific grade point average instead of such a large range. Also when gathering the data do not group the numbers (under 20 hours, 20-30 hours, etc.), such as work hours keep them all the original hours worked. There could have been a problem with the participants' honesty and what their GPAs were really, they could have lied to say they had a higher or lower GPA than they really do. Another change in the research design might be to compare siblings from the same family, instead of comparing the general population.

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## Appendix A

## Effects of Birth Order Questionnaire

1. How old are you? _____ years old
2. Do you have any siblings, half siblings, step siblings? Yes No

   If yes,

| Initials | Age | Sex (M,F) | Type (Half, Step, Full) | Same Home |
|---|---|---|---|---|
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |
| _____ | ___ | _____ | _____ | _____ |

3. What year are you enrolled in for school?

   Freshmen Sophomore Junior Senior

4. How many credit hours are you taking currently? _____ credit hours
5. How many hours per week do you study? _____ hours
6. What is your cumulative GPA?

   Below 2.0 2.0-2.9 3.0-3.9 4.0 or higher

7. Do you work outside of school? Yes No

   If yes, how many hours a week do you work? _____ hours

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# Possible Undue Stress Factors on Graduating Seniors

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*The purpose of this study is to determine whether the hypothesis of the experiment is true, which was to find if the student body thinks that a policy to which the graduating seniors must turn in all graded work two weeks before the final exam is fair. It also offers a chance for the student body to voice opinions or suggestions in an open and anonymous questionnaire format. Fifty students chose to partake in a questionnaire that included questions about the university's policy. They were divided into two groups: one group had twenty-three students [freshman and sophomores] of Human Subject Pool (HSP) students and additionally a small group of one-eighty class respondents; in the second group there were twenty-seven students that were upper-class students [juniors and seniors] from two three-hundred level classes. However, the results were not proven statistically significant as far as the wanting of a policy change between the groups. Nonetheless, the total results of the study added together did show a trend towards a policy change.*

Universities will frequently change their policies in order to make things more efficient, more beneficial to students, or even to reduce cost. Making sure that the student's skills are always improving is a desire of most educational institutions (Luke, 2003). However, every once in awhile there is a change in policy that does not bode well with the student body. The main reason of the discord by students is the increased stress

on their part while seeing no actual benefit of the new policy. When this happens there could be two options in solving the predicament. One option is to have the university switch back to the original policy, while the other is to try to make it more accommodating by modifying the existing policy. Policies are changed by the universities when the student is directly affected like in student mobility (Pusser & Turner, 2004).

There have been studies on the well-being of the students regarding stress factors. For example, studies show that students under financial strain may be affected or result in serious implications in their health (Jessup, Herberts, & Solomon, 2005). The report found a correlation between the mental and the physical health of individuals, with the worsening of financial matters being consistently associated with deteriorating health. Although financial matters could be the upper tier in regards of stress factors, grades are very important to the student also. Thereby, it is causing increased stress to students when a threat comes against their grade point average (GPA). With the increased workload in a shorter amount of time, it is bound to cause interest in how well the students perform within all sectors (Hall & Thomas, 2004).

It is common for most students to wait till the last minute before doing an important paper or research project at the end of the semester. Secondly, just trying to squeeze enough time into a hectic schedule in order to complete the assignment will cause stress alone. Now imagine yourself as a graduating senior, and in every one of your classes, you have a paper due, and further to top it off, you have to have it done two weeks earlier than the other students in class. When universities change the curricula it

may require further changes in support issues (Whittle & Murdoch-Eaton, 2005). This results in the stress level for the senior to be magnified to a much higher degree. For students with a high GPA, who want to maintain it, or other students who are on the edge of failing a class, this is even more of a concern. Whether it's a goal of the student to graduate Magna Cum something or to just get their diploma, this is an unneeded stress that is added to the graduating senior. Hence, these feelings of concern do manifest amongst the graduating student body, but the voice of resistance is weak and disorganized.

What can one do about it? People could voice concerns with their professors and maybe even their departmental Dean. But let's face it; one student is not likely to change a university policy by oneself. However, if a study was performed and it had proven that the new policy is a significant concern within the student body, there may be a chance for a change in policy considered for future seniors.

It is possible to change university policies; one researcher used focus groups in order to solve a problem. By using a questionnaire to gather information it was found that deaf and disabled post-graduates were not sufficiently aware of the facilities and support services available at their university (Pearn, 2004). If the standards of using a questionnaire and using focus groups can affect university affairs, it surely can be done with the preexisting problems that the students are experiencing at Lindenwood University.

In a survey of Lindenwood University's Human Subject Pool (HSP) students, a group of one-eighty level class students, and two groups of three-hundred level class

students, the total population results showed that a slightly higher percentage did not favor the mentioned Lindenwood's University policy. My hypothesis therefore is that a significant amount of students will state that having graduating seniors complete their final course content before final exams is stressful and unfair.

The purpose was to determine that the hypothesis is in fact true and to offer a chance for the student body to voice their opinions or suggestions regarding the policy in an open format. Similarly, the rationale is to make it publicly known what the students of Lindenwood think of the Lindenwood policy by offering a format in which many students at one time can voice an opinion.

## Method

### *Participants*

The study's subjects was divided into three groups: The first group was Human Subject Pool (HSP) students who have volunteered for the study by signing up their name and picking a timeslot from the set times that fit their schedule by using a HSP sign up form (B) on the HSP board on the fourth floor of Young Hall of Science. These students from the HSP are typically first year students. Additional students were added to this group, but they came from a 180-level class that contains some sophomores and juniors. What's more this group was offered a full-sized snickers bar as gratitude for filling out a questionnaire when it was turned in. The second group of students is volunteers from two 300-level classes that agreed to take part of my survey. There was no compensation for this group. The total number of subjects that participated was 50; 27 from 300-level students and 23 from a combination of the HSP and 180-level courses.

*Procedure*

There were two groups surveyed in this experiment. Group one participants began there portion of the study by choosing a scheduled time on the HSP board. These appointments were set by HSP students who have volunteered for the study by signing their name and picking a timeslot that was made available by the experimenter. The times were on the corkboard that contains the HSP sign up sheet (B) which is beneath the recruitment letter. Upon arranging the set appointments, the HSP student was welcomed and given a consent letter explaining the purpose of the study. It required a signature verifying that the student understands the content of the letter, and it was also required that the student's initials confirmed their age of 18 years or older. Again, it was stressed at this point in time that all personal identifying information was to be held confidential. The experimenter then asked if the student was aware of the policy regarding the last semester of graduating seniors. If the student was not familiar with the policy, the policy was explained to the student in a flat and unbiased manner. However, if it was understood the student continued with the questionnaire (Appendix A). Next, the student was asked a series of nine questions regarding the Lindenwood policy change regarding that the graduating seniors complete all their grades two weeks before final exams of their last semester. The researcher made sure that the student was aware that the student could ask any questions regarding clarity or definition. After eight questions had been answered, the survey asked if the student had an opinion of a different policy and if so inclined would they write it down on the questionnaire form in the space provided. After the questionnaire was completed, the researcher personally thanked the interviewee for

his/her efforts and handed the student a feedback letter, the extra credit form and a copy of the consent form regarding the purpose of the study, he/she was then dismissed. At the end of each interview the response papers were coded so that all personal identifying information was not available when the analyses were computed. Additionally, there was a one-eighty-level class at Lindenwood that was included in this group due to the lower class type population. This group was given an incentive of a snickers candy bar for their participation in the study. The mass handout was performed like the second groups handout mentioned below.

The second group was administered the survey by a mass handout of questionnaires in two three-hundred-level classes. The professors' approval was given before the presentation of the questionnaires. At the end of class the experimenter asked for the help in completing a survey for a research project (Appendix B). Every student that wanted to take the survey was given one. It was made clear that each student was given a choice on whether or not to take the survey. This was the same questionnaire as mentioned above. The questionnaire, when it was handed out was stapled to a consent form for the students to read, sign, and initial, just like the previous group had to go through. The researcher also made it clear that the questionnaires would be collected at the beginning of the next class. As they were turned in, I handed out their copy of the signed consent form and also a feedback letter to all those who turned in a questionnaire.

## Results

Even though 65% of the respondents rated the increased stress because of the time constraints in the middle-high range to very-high range, my hypothesis was not proven to be significant between the groups of students. However, an optimistic view could be seen by the showing that the percentage rates are in favor of the hypothesis, with 56% of the respondents agreeing that the policy was not fair. Nevertheless, two significant matters were found during the analysis. One was in the question, "Do you want to be able to show off your diploma with your name in it to family and friends on graduation day?" there was a 90/10 split in responses, with the favor going to students wanting to show the diploma with their name on it. What's more, this is one of the main reasons why the policy got changed to begin with. The other question proven significant, "Do you feel that if you have completed your grades before the semester ends as a graduating senior that you should have to attend the remaining classes of course in the semester?" had the same response rate, a 90/10 split, in favor of not having to attend classes after grades were turned in. The other yes or no questions that were in the questionnaire, regarding if the school's policy was fair and whether one felt that there would be an effect on their GPA in a shorten semester, were approaching a higher percentage difference. The percentages were identical on both questions with about a 60/40 split. The responses showed opinions against the policy and also belief in increased stress levels regarding their GPA. Interestingly, there was a high percentage rate of students that do not prefer a later graduation date; seventy percent of students thought it was mid-range high or very-high in inconvenience.

## Discussion

It seems that the upper-class students were more inclined to think that the new policy was not fair, while the freshman were split about even with half of them thinking that it was fair and the other half thinking it wasn't. My original thought before the experiment was that the lower class students (freshman and sophomores) would not be aware of the hectic schedules or in fact realize the stress of a shortened semester as the upper-class students that were closer to graduation would. However, the difference between the groups was insignificant. There were a couple of reasons in which the snickers bar was made an incentive to the one-eighty class students and not the three-hundred level classes. One being the cost to the experimenter, and secondly, the experimenter expected more of a showing from the classes due to the nature that they were psychology classes and that they would be more sympathetic to the cause of the act of running an experiment. The cause may have been twofold, as the students were also in fact seniors about ready to graduate. There also were a few concerns regarding the comments made at the end of the survey. One was the lack of comments there was only nine comments made, and they did not offer any real substantial offerings of change. Many were reiterating the proposal that seniors should not have to attend classes after grades were turned in. Two participants stressed that the professors were under an equal amount of strain and also felt the pinch at the end of the semester. The best suggestion was that there should be more surveys in order to understand the true nature of the student body.

Another suggestion offered was a new question on just how much stress would be enough before the new policy is not worth it. Keep in mind the survey that I have completed, with the fifty people tested, was only one percent of Lindenwood's student population. This can not reflect, as a whole, the student body's opinion. However it may be a start for a bigger survey in the future.

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## Appendix A

## Questionnaire

1). Do you feel like the Lindenwood University policy that graduating seniors must complete their grades before a final exam on their final semester in order to graduate is fair?

Yes _____ No _____

2). If you were or are a graduating senior, on a scale of 1 to 6 (1 being the lowest and 6 being the highest) how would you rate the anticipated stress/pressure on completing grades before final exams?

1_____ 2_____ 3_____ 4_____ 5_____ 6_____

3). If a policy change meant an inconvenience to you such as getting an authentic diploma with your name on it, how would you rate the inconvenience on a scale of 1 to 6 (1 being the lowest and 6 being the highest).

1_____ 2_____ 3_____ 4_____ 5_____ 6_____

4). If a policy change meant an inconvenience such as a later graduating date, how would you rate the inconvenience on a scale of 1 to 6 (1 being the lowest and 6 being the highest).

1_____ 2_____ 3_____ 4_____ 5_____ 6_____

5). Do you feel that if you have completed your grades before the semester ends as a graduating senior, that you should have to attend the remaining classes of courses in the semester?

Yes _____ No _____

6). Do you feel that your overall grade point average (GPA) would be effected by the shortened semester and the early completion of graded work for the graduating seniors?

Yes _____ No _____

7). How much, if any, concern would you have regarding your overall GPA by this policy on early grade completion? Label the amount of concern on a scale of 1 to 6 (1 being the lowest and 6 being the highest).

1_____ 2_____ 3_____ 4_____ 5_____ 6_____

8). Do you want to be able to show off your diploma with your name in it to family and friends on graduation day?

Yes _____ No _____

9). Are there any not concerns regarding this policy or a suggestion for a new policy that you would like to contribute towards this study? (Your opinion and suggestion are completely anonymous and your name will be held confidential and no identifying information will be disclosed)

## Appendix B

## Dialogue

Hello my name is Steven Hahne; I'm doing an experiment in Research Methods. Basically it is a questionnaire/opinion poll that should not take more than 5 to 10 minutes to complete. I'm doing this to try and get a little more feedback from the upper-class people. There is no pressure to do this, nor is there any reward to do it, like grades or extra credit. It is regarding a Lindenwood policy on graduating seniors. If you do complete the survey, your names will be held in the strictest of confidence and all opinions will be anonymous. If there are any questions please feel free to ask either now or before you return them at your next class. I will be in the hallway collecting them before class.

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# Home Court Advantage and Quality of Team

**Anthony Clarkston**

**Lindenwood University**

*Home court advantage was examined using archival data taken from the onset of NCAA Division I basketball record keeping. The effect of team quality on home court advantage was analyzed by examining games where number one ranked teams faced number two ranked teams. The purpose of only examining games between number one and number two ranked teams is an attempt to equalize team quality (team quality in this study is defined by national rank) to better examine home court advantage. My hypothesis is that if team quality is evenly matched then a home court advantage will not play a role in determining a victor. The results of my study lead me to support my hypothesis through examination of a chi square test. Even though my hypothesis is a null hypothesis there are still possible uses for this study. It is the first experiment I have found that examines team quality on a larger scale (national instead of conference) and is a possible study to build upon.*

American interest in sporting competitions can be traced back practically to the conception of our nation. Although basketball does not quite date back as far as the formation of the United States in 1776, Dr. James Naismith's creation of basketball in 1891 and the thirteen original rules of the game signaled the onset of a game that was destined to evolve from a game played with a fruit basket for a hoop to a multi-million dollar business. As basketball has grown in popularity so has the interest paid to the sport

in the form of weekly if not daily up-to-date statistics, countless of sport shows on television, and an increased interest in sports betting. ESPN (sport television), a variety of other sport news shows, and numerous casinos in Las Vegas run sporting odds are all examples of an increase in sport coverage. An increase in sport coverage can be caused by one of two things, but more than likely a mixture of the two, either an increase in sport popularity or an affect of technology/media coverage.

With all the new found popularity in following sports, interest in athletics has created new arenas of opportunity. Both psychology and sociology fields have explored topics related to sports and athletics at all levels. A major concern or question that is consistently attempted to be answered is questions that are related to determining what factors cause teams to win and lose. Psychologists in search of answers to this question have examined athletics psyche, anxiety levels, and a number of other sport/athlete related issues. An issue that is examined that is believed to be a contributing factor of team success is home advantage in sports. More simply put, does a team have an advantage on home turf? Courneya and Carron laid the ground work for home advantage research in their paper, *The Home Advantage in Sport Competitions* (1992). Their experiment was conducted in 1992 and was really one of the first psychological experiments that delved into the topic of home advantage theory in sports. Their study found statistical data that supported the theory that home advantage did play a role in sports. Though they found support what was unclear were what factors caused home advantage. Courneya and Carron suggested that further testing be conducted aimed at studying a variety of factors ranging from attendance numbers, offense/defense statistics,

game location, etc. From these suggestions other psychologists conducted experiments aimed at determining what causes home advantage, if any one factor can be solely influential.

Though evidence has been presented to prove home advantage in sports does exist, there has been no evidence discovered to justify what causes home advantage to occur. Certain variables such as, game location factors, historical performance, team offense/defense, attendance numbers, and a variety of other factors have been examined in previous studies.

Team quality is the factor that this study is focused upon and its effects on home advantage. Basic home advantage theory states that the home team has a better chance of being triumphant than it would if the team was competing at an away site. In Madrigal and James' study, *Team Quality and the Home Advantage*, they find that, "high quality teams enjoyed a greater home winning percentage than moderate or low quality teams when matched against comparable opponents," (Madrigal & James, 1999). Both Madrigal and James and Courneya and Carron's studies were useful in forming my experiment. They both provided different perspectives for me to draw upon when designing my experiment.

My hypothesis is that if team quality is evenly matched then home court advantage will not play a factor in determining outcomes of games. The purpose of this study is to downplay the importance of home advantage and to re-examine Madrigal and James' study applying a different operational definition of team quality. They defined team quality as wins in a season; the more wins the better the team quality. There is no

real problem in this, but I believe that where they lack is that they only examined a certain conference. By examining one conference you really don't get a good sample size and the sample really is not that representative of the entire nation, be it college basketball, baseball, etc. In my study by examining the number one versus the number two teams games team quality does not become a factor. Depending upon the conference in examination really has an effect on the quality of teams being examined. One conference maybe strong one year and weak another, and some conferences are weaker than the others. I do not believe that home advantage plays that great a role in determining victors of sporting competitions. I believe that a greater emphasis should be placed upon team quality. A better team is commonly favored to win, but if the teams are of an equal quality differing aspects of the game are commonly examined in an effort to predict the victor. Home advantage is commonly used as prediction device, often if teams are of an equal quality the home team is given the advantage, I however feel that home advantage in this regard plays an insignificant role in this capacity. By examining competitions involving number one and number two ranked teams in men's NCAA Division-I games I hope to provide statistical evidence supporting my hypothesis.

## Method

### *Materials*

There was one primary source drawn upon, The Official 2006 NCAA Men's Basketball Records Book, to obtain the necessary statistics for completion of this study. This record book held statistics dating back to 1946 all the way up to 2006. No statistical

programs (computer software) were used in analyzing my data. Instead, a chi square analysis was employed.

### *Procedure*

The study was conducted using archival research methods. The statistics used for the study was gathered from The Official 2006 Men's Basketball Records Book which is a compilation of statistical records for men's NCAA records from 1946 to 2006. The statistics can also be found on-line at various websites, but I found the afore mentioned text (The Official 2006 Men's Basketball Records Book) to be most useful. Previous studies of team quality and home advantage conducted by Madrigal and James, *Team Quality and the Home Advantage*, defined team quality mainly as the best teams out of a certain college conference (Madrigal & James, 1999). I did not particularly like this way of examining team quality for a few reasons, but mainly because conference team's strength or quality depends on the conference. A team with a record of 21-3 in a mid-major conference does not necessarily say much for the team when compared to a more average record team, for instance a 14-10 team, from a major conference. I chose to examine equal or somewhat equally rated teams, by this I mean that no two teams are exactly equal but the closest one can come to examining equal teams is to examine closely rated teams, to test to see if home court advantage played a factor when teams were of an evenly matched quality.

To do this I only included meetings of number one versus number two ranked teams. This has occurred thirty-five times since 1949. I then disregarded all games that were played at neutral locations, mainly national and tournament championship games

that offered neither team a real home advantage. When this was done it left eighteen games to be examined. I then listed all eighteen games assigning them numbers 1-18 based on the older games starting at #1 (the earliest game) and #18 (the latest game). The sample size is small because since 1949 number one and number two teams have only met eighteen times with a home court setting. If the sample was expanded out to include more rankings, say one through tenth ranked teams, the equality of teams would greatly be jeopardized. The problem with expanding the sample out into other sports is that each sport has different rating systems and the very fact that you would be comparing different sports would present a problem. Comparing different sports is similar to comparing a motorcycle to a moped. While many similarities can be found they are too different to really form a good analysis. I then set up three columns. The first two columns were labeled A and B. Column A was showed the wins and loses for the number one ranked teams and like wise for Column B, but for the number two ranked teams. The third column was labeled H for which the home team was placed in this column with the letter X representing #1 ranked teams and letter Y representing #2 ranked teams (Table 1).

I then took the data and transferred it into a data distribution chart. Home and away teams were split into two columns with rank in the opposing axis. Then I placed the numbers of wins in the appropriate boxes. After this I calculated the degrees of freedom and found the p-value to 3.60 and the significant p-value to be 3.84 at .05 level.

**TABLE 1. Wins and losses for number 1 and number 2 ranked teams, while at home**

| Meetings | School Rank #1/A | School Rank #2/B | Home Court H |
|---|---|---|---|
| 1) | L | W | (2) |
| 2) | W | L | (1) |
| 3) | L | W | (2) |
| 4) | L | W | (2) |
| 5) | L | W | (2) |
| 6) | L | W | (2) |
| 7) | W | L | (2) |
| 8) | W | L | (1) |
| 9) | W | L | (2) |
| 10) | L | W | (1) |
| 11) | L | W | (1) |
| 12) | W | L | (2) |
| 13) | W | L | (2) |
| 14) | L | W | (1) |
| 15) | W | L | (2) |
| 16) | W | L | (2) |
| 17) | L | W | (2) |
| 18) | L | W | (2) |

W-Win
L-Loss
(1)-Number one ranked school
(2)-Number two ranked school

## Results

My hypothesis stated that if team quality is evenly matched then home advantage will not play a factor in team success. I used a chi square analysis and found that there was no statistical significance between home court advantage and team quality, $X (2/1) = 3.60$, $p>.05$.

## Discussion

I concluded that evenly matched teams seemed to split games regardless of which team held home court advantage. The previous research in the field helped a great deal by creating a starting point to go from and allowed me to adapt my research to my standards I felt better exemplified team quality. It seemed that evenly matched teams tended to split games. There were only a small number of games to draw upon. This study should only be used as a study to be expanded upon and not as a model for duplication since I tested a null hypothesis.

I think that the concept of home advantage in athletics is a very interesting topic, but I feel that there are just too many factors that take place in a sporting event to clearly find solid evidence for anything really in terms of definites. Sports seem to have too many factors and possibilities to gauge the question of home advantage in my opinion at least. By examining the win-loss chart and apply years to the data it seems that earlier games prior 1980 (which would numbers one through nine) home advantage does seem to play a larger role. Possible factors to this could be caused by early graduation rates in college athletics. Prior to 1980 far more students stayed in college the full four year duration. The effects of early graduation on home advantage would be an interesting topic to examine. In order to make my experiment better, maybe next time some one could operationally define team quality on a longer continuous measure perhaps examining a sport dynasty, or broadening the teams to the top 25 AP polls in college basketball. Due to time constraints and lack of the luxury of hindsight these measures were not put into place.

## References

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