6-2016

# 2016-2017, Full Issue

# Research Methods Journal
# Fall 2016/Spring 2017

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## Prologue

I am happy to publish the Spring 2017 Research Methods Journal featuring research papers

written by students enrolled in my PSY40400:  Advanced Research Methods class in the Spring

semester of 2017, as well as of those students who completed their independent or thesis projects

with me in the academic year of 2016-2017.  It is wonderful to have such a strong group of

students who are passionate about research, as witnessed by the fact that most have either

completed a research project in a previous semester or are signed up to take another research-

oriented course next semester.   You may also note that two of the students featured in this

journal, David de la Cruz and Alfa Ramirez have contributed two research papers to this

publication.  A good proportion of the students whose papers are found in this journal have also

presented their work at an in-house conference and plan to present at more conferences in the

future.   All in all, working with this group of students has been very rewarding, and I excitedy

look forward to their bright futures.  This journal's beautiful cover design was chosen by the

students enrolled in PSY40400:  Advanced Research Methods and was submitted by Mauri

Linero Fuentes.

Michiko Nohara-LeClair, PhD

Course Professor

**The Impact of Restricting a Jury's Access to Visual Information about a Defendant**

*Krystia Grembocki[1]*

*A primary problem with the current criminal justice system in the United States is that it almost solely relies on a jury to determine whether a defendant is guilty or not guilty of committing a crime. While this system has been in place for many years, it is flawed because it ignores the fact that people tend to make judgments based on extralegal factors, or variables that are not related to a case, which may lead them to have implicit biases toward or against an alleged offender. Previous findings indicate that extralegal factors that impact juries include gender, race and ethnicity, facial maturity, dress, perceived socioeconomic status, attractiveness, emotional engagement, and jurors' views of their own attractiveness. The present study evaluates whether the presence of visual information (i.e. what a juror can visually observe about a defendant) affects the verdict of a trial. Participants were divided into three groups who heard a fictional crime scenario about an armed robbery incident. Along with the scenario, participants in the first group saw a picture of an attractive offender, participants in the second group saw a picture of an unattractive offender, and participants in the third group did not see a picture of an offender at all. It was hypothesized that participants who saw the attractive offender would find him guilty less often and recommend less harsh sentences when convicted, but the findings were not significant for either of these hypotheses.*

The purpose of a criminal justice system in any society is to maintain order and protect individuals or groups from unfair and wrongful treatment. One may be lead to believe that justice systems around the world function relatively simply: in a criminal case, a person is accused of committing an act of wrongdoing and is thus subjected to court hearings, attorneys, and a fair and speedy trial by jury. However, it is usually not that straightforward. Extralegal variables, or

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non-evidence-based factors presented in court that tend to influence jurors' perceptions of a case, pose a significant and nearly unresolvable problem in the process, especially in the United States' criminal justice system. Many studies have been conducted by social psychologists that reveal how various extralegal variables impact the outcome of criminal trials.

A factor that is frequently studied in this context is gender. In an experiment conducted by Ahola, Hellstrom, and Christianson (2010), participants reviewed scenarios that differed in criminal severity as well as in the attractiveness of the criminals associated with each scenario. Participants answered questions pertaining to their assumptions of "the defendant's credibility, reliability, guilt, culpability, aggressiveness, insensitiveness, disagreeableness, ruthlessness, and degree of mental disorder, as well as seriousness of the crime" (Ahola et al., 2010, p. 314), and they also made a sentencing decision for each defendant. Women generally received more sentencing leniency than men, an effect that was exacerbated by attractiveness ratings. That is, attractive women were sentenced less harshly than unattractive women, and although men typically received more severe sentences compared to women, attractive men were generally given less harsh sentences than unattractive men. The most severe sentencing recommendations were given by female jurors to female defendants (Ahola et al., 2010). This suggests that the gender of jurors and defendants may influence the turnout of a case.

Jurors' decisions are also affected by race and ethnic identifiers of defendants. Abwender and Hough (2001) recruited 207 participants to take part in their study, 43% of which were

Black, 27% were Hispanic, and 30% were White. They read a scenario about negligent homicide

committed by an intoxicated female driver, and they were asked to rate how guilty the woman

was of committing the crime based on her photo and to make an appropriate sentencing decision.

Abwender and Hough (2001) believed that jurors who shared racial characteristics with the

defendant would treat her with more leniency than defendants of other races. They found that

White jurors treated Black and White defendants more harshly than Black and Hispanic jurors.

Like Ahola et al. (2010), they concluded that female jurors' sentencing decisions were much

more severe than male jurors, especially when shown pictures of unattractive defendants

(Abwender & Hough, 2001).

Another important extralegal variable is facial maturity. Work by Zebrowitz and Collins

indicates that when a person has immature facial qualities, he or she is said appear more kind and

less culpable of committing a crime than someone with more mature features (as cited in Dumas

& Teste, 2006). In an effort to better understand this claim, Dumas and Teste (2006) designed a

study in which participants were given a crime scenario and asked to determine whether they

believed the defendants were guilty, to rate their confidence in their decision, to recommend a

punishment, and to evaluate the facial characteristics of the defendants. While overall

attractiveness did not have a significant effect on conviction or sentencing decisions, facial

maturity did. Namely, there was a correlation between participants rating defendants as "baby-

faced" – as having immature facial features – and a "not guilty" verdict (Dumas & Teste, 2006).

These results seem to support Zebrowitz' and Collins' previous conclusions that looking

youthful is often associated with appearing innocent.

Fontaine and Kiger's (1978) work suggests that clothing choice may also impact a jury's

conviction decisions. In this study, participants were shown video footage of criminal trials

involving manslaughter committed by a White man and were asked to determine how guilty the

defendant looked. In the middle of the video, they were shown a picture of the defendant dressed

in a prison jumpsuit or a picture of the defendant wearing business-like attire. In each picture, the

defendant was either accompanied or not accompanied by a guard (Fontaine & Kiger, 1978). The

main conclusion was that lone-standing defendants wearing a suit were convicted less often and

given less severe sentences than all other defendants, and defendants who stood alone while

wearing a prison jumpsuit rather than a formal suit were judged more harshly by participants

overall (Fontaine & Kiger, 1978). This means that, at least to some extent, jurors are influenced

by the way defendants dress in court.

Interestingly, Kutys (2012) conducted a related study evaluating the effects of

defendants' perceived socioeconomic status on jurors' conviction decisions and sentencing

recommendations. While the findings were not statistically significant, a trend in the data

indicated that defendants who were perceived as unattractive and as having a low socioeconomic

status tended to be convicted more often and given harsher sentencing recommendations (Kutys,

2012).

Other variables that have been analyzed include jurors' perceptions of defendants' emotions during a trial and their perceptions of their own physical attractiveness. Researchers have found that the perceived emotional engagement of defendants has a significantly negative impact on jurors' conviction decisions, especially when their facial expressions indicate boredom or lack of remorse, whereas those who show sorrow and sincerity are likely to incur a lower conviction rate and less punishments for their crimes (Antonio, 2006). Similarly, work by Darby and Jeffers (1988) showed that participants who rated themselves as attractive convicted unattractive offenders more frequently and punished them more severely than attractive offenders, whereas the conviction and sentencing decisions of participants who rated themselves as average or unattractive did not systematically vary with offender attractiveness.

Given that the physical appearance of a defendant does seem to affect people's perceptions of the crime, guilt status, and punishment, it is important to consider whether withholding the visual impact of a defendant's image could potentially lead to fairer and more consistent outcomes in criminal trials. The present study aims to understand whether implicit biases form within jurors who do and do not have access to visual information about a defendant. That is, does knowing how a defendant looks impact jurors' conviction decisions? Participants were divided into three groups, and each group was provided with different visual information regarding the offender's appearance in respect to a scenario depicting armed robbery. The primary hypothesis of the present study was that participants who were shown an attractive

offender would find him guilty less often than participants shown an unattractive offender or

shown no picture at all. Secondarily, it was predicted that, when found guilty, an attractive

offender would receive a lighter sentence than an unattractive offender or an offender whose

attractiveness is unknown.

## Method

### Participants

For the present study, 37 participants were recruited (26 women, 10 men; $M$age = 20.0

years, age range: 18-28). Participants were recruited through Facebook and the Lindenwood

Participant Pool (LPP) using a recruitment description and fliers. LPP participants were

compensated with extra credit, but other participants from Lindenwood University and Facebook

were not compensated for taking part in the study. The majority of participants were Caucasian

women who have obtained some college education. Participants' occupations varied, and one

participant indicated that they had served on a jury during a trial at some point in their lives.

### Materials

**Recruitment materials.** The Sona Systems recruitment description included a basic

overview of the study, stating its purpose and that participants would be asked to watch a video

on a crime and answer questions about the video (see Appendix A). Fliers were created using the

Microsoft Office Publisher application and hung around campus to recruit interest from

Lindenwood University students and staff who are not members of the LPP; they included a

basic punchline about the study's purpose as well as an image of a judge and gavel (see

Appendix B). The Facebook recruitment description included a request for potential participants

to take part in a psychology study about how jurors make conviction decisions (see Appendix C).

**Informed consent statement and demographic survey.** The informed consent

statement was used to make participants aware that they would be taking part in an online study

containing a short video about a crime, and that they would subsequently be asked to answer

questions about the video. They were also made aware that they could discontinue the study at

any time without penalty (see Appendix D). A demographic survey was used to collect data from

participants regarding their gender, highest level of education achieved, race, age, current

occupation, and whether they have served on a jury in a trial prior to participating in the present

study (see Appendix E).

**Armed robbery scenario transcript.** The armed robbery scenario was completely

fictional and was carefully developed to include two separate accounts of an armed robbery

allegedly committed by a man against his brother-in-law. The alleged offender is named Will

Jones, and his brother-in-law is named John Robins. While Mr. Robins claims that Mr. Jones

came into his apartment, held a gun to him, and demanded $200 from his wallet, Mr. Jones

claims that the situation was a misunderstanding, that he was carrying a gun in a holster on his

hip, and that Mr. Robins offered him the money back after borrowing it a few weeks before (see

Appendix F). Differences between the accounts, which are both detailed in the scenario, were

intentionally included to instill a sense of ambiguity in participants regarding whether the

offender actually committed a crime or not. To avoid confusion, the scenario was written in

plain, non-technical language, and does not contain qualitative biases.

**Offender visuals.** Pictures of attractive and unattractive defendants were chosen using

one of Princeton University's Social Perception Lab databases containing 25 photos of computer

generated faces displaying attractive and unattractive characteristics (Todorov, Dotsch, Porter,

Oosterhof, & Falvello, 2013). The attractive and unattractive pictures feature faces of men on a

black background (see Appendix G). These photos have also been desaturated of color (i.e. they

were black and white), such that the skin and eye-color of the models did not become confounds

to the study.

**Voice over and video production.** The voice over for the present study was conducted

by the principle investigator, who read the scenario aloud and integrated a recorded copy of it

into the video. The video for the present study was created using Microsoft Office Power Point.

**Post-video questionnaire.** A questionnaire was administered to participants following

the video. The questionnaire ranged in length from two to four questions. The first question

asked whether the participant believed the defendant was guilty or not guilty. The second

question asked participants to justify their choice. The third question asked participants to make

a sentencing recommendation for a prison term of 0 to 5 years, 5 to 10 years, 10 to 30 years, life

in prison, or the death penalty. The fourth question asked participants to justify their choice of

sentencing recommendation (see Appendix H).

**Feedback statement.** A feedback statement was provided to all participants upon

completion of the study. The statement explained the purpose and proposed hypotheses as well

as necessary information regarding obtaining the findings of the study at a later date (see

Appendix I).

**Procedure**

The study was conducted online using Qualtrics, so that participants could watch the

video and complete the questionnaire when and where it was convenient for them. LPP

participants accessed the survey link through Sona Systems, whereas other Lindenwood

University participants and Facebook participants accessed the survey through a link provided by

the researcher. Prior to beginning the study, participants were asked to sign the informed consent

statement and complete the demographic survey.

Participants were then divided into three groups. The first group watched a video

featuring a written and verbal description of the armed robbery scenario. Included with the text

was a picture featuring an attractive male face (see Appendix G), with a caption stating that he

was the offender. The second group watched a similar video containing the same written and

verbal description of the armed robbery scenario, featuring the unattractive male face in the

accompanying picture (see Appendix G), with a caption indicating he was the offender. Lastly,

the third group watched a video containing only the written and verbal description of the armed

robber and no pictures of the offender. It is important to note that, although the attractive

offender group and the unattractive offender group were given a picture to go with the text on the

screen, no explicit information regarding the defendant's appearance was mentioned in the

armed robbery description to any of the groups. Participants were not informed of the offender's

skin color, eye color, height, weight, clothing, or anything else pertaining to his physical

appearance.

After watching the corresponding video, participants were asked to complete the post-

video questionnaire. Participants who found the offender guilty of committing armed robbery

answered all four questions, and participants who found the offender not guilty of committing

armed robbery answered only the first two questions. To thank participants for taking part in the

study, a feedback letter was subsequently provided.

**Results**

A total of 65 participants took part in the study; however, only 37 participants completed

the entire study (i.e. responded to all of the questions). Partial or incomplete responses from 28

participants were not used in the statistical analyses. To determine whether offender

attractiveness was related to conviction rates and sentencing decisions, a chi-squared analysis

was conducted. There was a significant difference between groups, $X^2$ (2, $N = 37$) = 6.20, $p <$

0.05. In comparing the three groups' conviction rates, it should be noted that 10 out of 14

participants (71.4%) who saw the attractive defendant found him guilty, 9 out of 12 participants

(75.0%) who saw the unattractive defendant found him guilty, and 6 out of 11 participants

(54.5%) who did not see the defendant found him guilty. Despite these group differences, the

first hypothesis, which predicted that offenders who were attractive would be convicted less

often than unattractive offenders or offenders whose attractiveness was unknown, was not

supported.

Furthermore, to understand whether the attractive defendant was given less severe

sentences than the unattractive defendant or defendant whose attractiveness is unknown, as the

second hypothesis suggested, an independent samples $t$-test was conducted, and statistical

significance was not found, $t$ (17) = -0.05, p = 0.48. These findings indicate that the second

hypothesis was also not supported, which means that sentencing recommendations was not

necessarily impacted by offender attractiveness.

For further insight into participants' justifications for their conviction decisions and

sentencing recommendations, content analysis was also conducted. Participants who found the

offender guilty, regardless of attractiveness, cited reasons such as the presence of a weapon on

the defendant's body, and most of them believed that the defendant's answers were "too perfect"

or "premeditated" when responding to officers' questions about the incident. Participants who

determined the defendant was not guilty reasoned that the defendant was properly licensed to

carry the firearm, and that there was not enough evidence to prove beyond a reasonable doubt

that the defendant was truly guilty. Regarding sentencing recommendations, most participants

who found the offender guilty indicated that they believed that prison would be useful in

teaching him a lesson about the crime he committed.

## Discussion

Although neither hypothesis was supported, it is interesting that there was a statistically

significant difference between groups based on defendant attractiveness and verdict. While there

is not a large difference between the groups who saw a picture of the attractive offender (71.4%)

and the unattractive offender (75.0%) in terms of finding him guilty, there is a relatively notable

difference between the groups who saw a picture – averaging 73.2% – and the group that did not

see a visual at all (54.5%). Perhaps this suggests that, as previous research indicates, the presence

of visual information regarding a defendant's physical appearance, has at least some effect on the

outcome of a criminal trial. Since only 54.5% of participants who did not see a visual of the

defendant found him guilty, it is possible that participants in this group took a more objective

approach to determining whether he was guilty or not guilty. This may indicate that participants

without a picture of the offender based their judgments solely off of facts presented in the crime

scenario rather than on the visual information that was provided in each picture. Further

investigation is required to understand if and how significant the effect of visual information on a

juror may be.

There are various design limitations that may have confounded the results of the present study. One potential design flaw is that this study took place online, making it incredibly difficult to replicate a realistic jury-style setting. An online study was conducted because it was most feasible for the researcher as well as in the recruitment process, since one of the primary methods of recruitment took place through Facebook. Even with the availability of a laboratory, it is nearly impossible create an environment that is similar to that of an actual court room. This challenge makes this line of investigation somewhat tedious because it is unlikely that future researchers will be able to simulate the setting of a real trial, regardless of the environmental controls they put in place.

Another potential limitation was that few participants were recruited to take part in the study. Since the study did not receive institutional approval until a late date, it was difficult to recruit a substantial amount of participants to take part in the study in a short period of time. It should be noted that the sample size was initially 65 participants, but had to be reduced to 37 participants for statistical analysis, given that almost half of the participants who took part in the study did not complete it entirely, meaning that they skipped questions or quit the survey early. Overall, the sample size issue can be improved in the future by allowing six to eight weeks for recruitment into the study.

In addition, no manipulation check was used to determine whether participants actually found the offenders attractive or unattractive. Since the offender visuals were retrieved from a

database comprised of computer-generated models of attractive and unattractive people, which

was constructed by previous researchers (Todorov et al., 2013), without the use of a

manipulation check, it is difficult to determine whether participants found the offenders truly

attractive or unattractive. Moreover, it is also possible that the offender visuals did not appear

realistic enough to impact participants. This may be improved in future studies by using

photographs of real people and by conducting a manipulation check to determine whether

participants believe the people are attractive or unattractive.

Lastly, there was potentially too much emphasis on the scenario rather than on the picture

featured with it. In the video, a text version of the crime scenario was featured on the screen next

to a picture or next to no picture at all. It is possible that participants were distracted by hearing

the voiceover of the scenario and trying to read along with the scenario that they did not pay as

much attention to the offender visual as would be desirable for research purposes. This design

flaw can be improved by removing the text from the screen and only placing a visual of the

offender on the screen while participants hear the crime scenario.

Experimenters who are interested in continuing this line of research may be interested in

uncovering whether observable variables other than attractiveness, such as race or age, have a

significant effect on conviction rates and sentencing recommendations. Researchers may also

investigate whether there is a difference between verdicts of participants who hear the facts of a

case, those who see a case unfold, and those who obtain facts by reading a case rather than

hearing or seeing it live. The continuation of this research is important because it may indicate

that a "blind" jury – one that does not have access to visual cues about a defendant's physical

appearance – is more objective, and thus more useful, in providing a fair and equal trial for all.

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**Appendix A**

LPP Recruitment Materials

Sona Systems Recruitment Description: "An important, and often under-discussed topic, is how jurors make conviction decisions during criminal trials. This study aims to understand the factors that influence these decisions. Participants will watch a video about a crime that has allegedly taken place and will then be asked to answer a few questions pertaining to the video. This only study should not take more than 10-15 minutes to complete."

**Appendix B**

Campus Recruitment Materials

# INTERESTED IN
# LAW AND ORDER?

## TAKE PART IN AN IMPORTANT PSYCHOLOGICAL STUDY* ABOUT JURY DELIBERATION TODAY!

*PLEASE NOTE: Study is online and will take no more than 10-15 minutes of your time. Members of the LPP will earn bonus credit for participating.

Contact: Krystia Grembocki
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**Appendix C**

Online Recruitment Materials

Facebook Recruitment Description: "Please consider taking part in my anonymous online psychology study about how jurors make conviction decisions. It is for my research project for the Advanced Research Methods class at Lindenwood University. It should not take more than 10-15 minutes of your time. Your participation is completely voluntary. Thank you!"

**Appendix D (cont.)**

Informed Consent Statement

**Introduction**

The researcher conducting this study is an undergraduate student at Lindenwood University who is enrolled in the PSY40400: Advanced Research Methods course. The primary purpose of this study is to understand how conviction decisions are made in criminal cases. The findings of this study may be published or presented at a future research conference.

**Procedures**

This survey asks you to respond to a few demographic items as well as watch and listen to a video about a crime. You will also be asked to respond to either 2 or 4 questions after the video regarding your thoughts on the crime. This questionnaire will be conducted with an online Qualtrics-created survey, and should not take more than 10-15 minutes of your time.

**Risks/Discomforts**

There are no known risks associated with this study. If you do not feel comfortable completing any part of this survey, you are free to skip any questions or withdraw without penalty.

**Compensation and Benefits**

By taking part in this study, Lindenwood Participant Pool (LPP) members will be compensated in the form of extra credit toward a participating course. Other participants will not be compensated. However, all participants will gain experience taking part in a psychological study and potentially learn more about the field. If you are interested in learning more about this study or would like to learn more about the results of this study once completed, please contact Krystia Grembocki at klg997@lionmail.lindenwood.edu.

**Confidentiality**

No personally identifying information will be collected, including your IP Address. All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, and no one other than the researcher and her course professor, Dr. Michiko Nohara-LeClair will have access to them. The data collected will be stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

**Questions about the Research**

If you have questions regarding this study, you may contact Krystia Grembocki at klg997@lionmail.lindenwood.edu or direct your inquiries to the course professor, Dr. Nohara-LeClair at mnohara-leclair@lindenwood.edu or (636) 949-4371.

Q1 I have read, understood, and printed a copy of the above consent form and desire of my own free will to participate in this study.

❍ Agree (1)

❍ Disagree (2)

Condition: Disagree Is Selected. Skip To: End of Survey.

Q2 How old are you?

❍ I am at least 18 years of age. (1)

❍ I am younger than 18 years of age (2)

Display This Question:

   If How old are you? I am younger than 18 years of age Is Selected

Q3 Do you have a signed parental consent form filed with the LPP Office?

❍ Yes (1)

❍ No (2)

❍ I don't know. (3)

Condition: Yes Is Not Selected. Skip To: End of Survey.

**Appendix E**

Demographic Survey

Q1 What is your gender?

○  Male (1)

○  Female (2)

○  Other (please specify): (3) _____

○  Prefer not to say (4)

Q2 What is the highest level of education you have completed?

○  High school degree or equivalent (e.g. GED) (1)

○  Some college, but no degree (2)

○  Associate's Degree (3)

○  Bachelor's Degree (4)

○  Graduate/Professional Degree (5)

Q3 What is your race? Choose all that apply.

❑  Caucasian (1)

❑  African American (2)

❑  Native American (3)

❑  Asian (4)

❑  Hispanic (5)

❑  Other (please specify): (6) _____

Q4 What is your age?

Q5 What is your current occupation?

Q6 Have you ever served on a jury during a trial?

○  Yes (1)

○  No (2)

Q7 Please specify the calendar year in which you last served on a jury during a trial (e.g. 2005, 2008, 2016, etc.).

Q8 Please specify the city in which you last served on a jury during a trial (e.g. St. Louis, Kansas City, etc.)

**Appendix F**

Armed Robbery Scenario Transcript

"On Saturday, September 21ˢᵗ, Will Jones was accused of armed robbery after allegedly entering into his brother-in-law's apartment and taking $200 from him while carrying a gun. Police arrived on the scene at 152 North Cherry Street around 9:00 p.m. The brother-in-law of the alleged perpetrator was identified as John Robins.

Mr. Robins gave a statement to the police regarding the incident, claiming that Mr. Jones knocked on Mr. Robins' front door at approximately 8:30 p.m. Though Mr. Robins was not expecting him, he opened the door and let him inside of his apartment. Mr. Robins told police that Mr. Jones had been angry with him because he borrowed $200 from Mr. Jones and had not yet paid the money back. The conversation quickly became heated, and Mr. Jones allegedly pulled a gun out his pocket, and threatened Mr. Robins that he would harm him if he did not tell him where his wallet was so he could retrieve his $200. Mr. Robins, terrified, pointed to the counter where his wallet was lying. Mr. Jones reached for the wallet, took $200 from it, and fled the scene.

After taking Mr. Robins' statement, police searched for Mr. Jones. They found him at his apartment, located less than a mile away. Police knocked on Mr. Jones' door, and he met them with a friendly demeanor. He welcomed them to come inside, and so they did. They explained the situation, and requested to know his side of the story.

In Mr. Jones' statement, he explained that this incident was nothing but a misunderstanding. He told officers that when he arrived at Mr. Robins' apartment, Mr. Robins opened the door and greeted him. He went inside, and the two of them talked for awhile about his new gun, which he displayed proudly on his hip in a leather holster. He stated that he had just gotten his Conceal to Carry License a week before purchasing his new handgun, and that Mr. Robins congratulated him on his accomplishment. Meanwhile, Mr. Robins had been making dinner. As he stirred a pot of soup, he said to Mr. Jones, "Hey, man. I forgot to pay you back when I saw you last week, but I have your money in my wallet. It's on the counter, if you want to grab it out of there. $200, right?" Mr. Jones removed two hundred-dollar bills from Mr. Robins' wallet, and told him, "Thanks, man! Money is tight right now, so I really appreciate you paying me back. But, hey, I gotta run! I'll catch ya later!" Mr. Jones subsequently stated that he exited Mr. Robins' apartment and made his way home.

After finding the gun on his hip and $200 in Mr. Jones' pocket, police weren't sure what to believe, so they put Mr. Jones into handcuffs and took him to the station for further questioning."

**Appendix G**

Offender Visuals *(*Todorov et al., 2013)
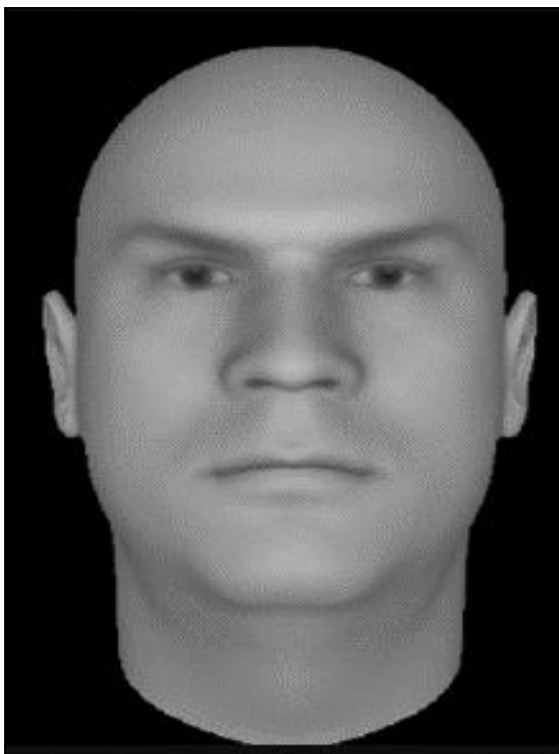


*Figure A:* Attractive offender



*Figure B:* Unattractive offender

**Appendix H**

Questionnaire

**Armed Robbery Scenario**

Q1 Please click the link to view the crime scenario. When you are finished, please proceed to the next question.

Q1 Please click the link to view the crime scenario. When you are finished, please proceed to the next question.

Q1 Please click the link to view the crime scenario. When you are finished, please proceed to the next question.

**Armed Robbery Scenario Responses**

Q1 Based on the information given in the scenario, do you think that the alleged offender is guilty or not guilty of committing the crime of armed robbery?

○  Guilty (1)

○  Not Guilty (2)

Display This Question:

  If Based on the scenario presented in the previous video, do you think that the alleged offender is gui Guilty Is Selected

Q2 Why do you believe the alleged offender is guilty?

Display This Question:

  If Based on the scenario presented in the previous video, do you think that the alleged offender is gui Not Guilty Is Selected

Q2 Why do you believe the alleged offender is not guilty?

Display This Question:

  If Based on the scenario presented in the previous video, do you think that the alleged offender is gui Guilty Is Selected

Q3 Armed robbery is recognized as a felony offense in the state of Missouri. It is punishable by up to 30 years in prison, and depending on the severity of the crime, an offender may be

punished by life imprisonment or given the death sentence. Based on the information presented in the scenario, what is an appropriate punishment for the crime committed by Mr. Jones?

○ Prison (up to 1 year) (1)

○ Prison (1-5 years) (2)

○ Prison (5-10 years) (3)

○ Prison (life sentence) (4)

○ Death penalty (5)

Display This Question:

   If Based on the scenario presented in the previous video, do you think that the alleged offender is gui Guilty Is Selected

Q4 Please explain why you believe this punishment is appropriate.

**Appendix I**

Feedback Statement

Thank you for participating in this study. The present study was conducted in order to determine whether restricting jurors' (participants') access to visual information about an alleged offender impacts conviction decisions. Participants were assigned to one of three groups. The first group was shown a picture of an alleged offender that is attractive in conjunction with the armed robbery scenario. The second group heard and read the same crime scenario, but saw a picture of an alleged offender who is unattractive. The third group was presented with the same crime scenario as the other groups, but did not see a picture of the alleged offender. None of the groups were directly told anything about how the alleged offender looked. The main hypothesis was that the participants in the first group (shown a picture of the attractive alleged offender) would find the offender guilty less often than participants in the second (shown a picture of an unattractive alleged offender) and third (shown no picture) groups. I believed that participants in the first group would think that the alleged offender who is attractive looks less capable than the alleged offender who is unattractive of committing armed robbery, and participants in the third group would base their judgments solely off facts of the case, not how the alleged offender looked. Please note that the purpose of this study was not to obtain or evaluate your individual results; rather, we are only interested in the overall findings based on aggregate data. No identifying information about you will be associated with any of the findings, nor will it be possible for us to trace your responses on an individual basis.

If you are interested in obtaining the final results of this study, or if you have any questions or concerns regarding any portion of this study, please do not hesitate to let the researcher know now or in the future. Contact information can be found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sincerely,

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# Effectiveness of Emotions as Retrieval Cues

*Mauri Linero[2]*

*This article describes an experiment that was conducted in order to determine the effectiveness of emotions as retrieval cues. Whenever someone is in the same state of consciousness while encoding and retrieving an experience or information, the person is able to recall a greater amount of information; this phenomenon is called state dependent memory. For this study the state of consciousness used was emotional state. The participant was shown a video that induced either positive or negative emotions during the encoding process followed by a study material for participants to read. Once again the participant was induced with a positive or negative emotion through another video during the retrieval process, and then was provided with a memory test about the study material. It was hypothesized that the group of participants who experienced the same emotion in the encoding and retrieval processes will do better in the memory test than the group of participant who experienced different emotions during the encoding and retrieval processes. The videos were effective in inducing the desired emotional state; however, analysis of the results showed no significant difference between the two groups.*

State dependent memory is a phenomenon through which humans are able to recall information to a greater extent whenever the state of consciousness matches the one we are in when encoding the experience or information (Ashby, Isen, & Turken, 1999; Bower, 1981).  To better understand state dependent memory, picture the following scenario: Jeffrey and Megan are in the same math class; they are both good students, and they usually get similar scores on their math exams. They were both studying for the exam they had next morning. After Jeffrey finished studying, some friends called him to invite him to a party. He knew that his exam was the next morning, but since he felt prepared, he agreed to go to the party. The next morning he was slightly intoxicated, and he almost failed the exam. Megan

was also invited to the party, but she decided not to go, so she took her exam sober and got a very high

score. If Jeffrey and Megan usually get the same scores, why did they earn different scores this time? A

possible explanation is that Megan's state dependent memory helped her succeed. She was sober while

encoding the information and was in the same sober state while retrieving the information in the exam.

On the other hand, Jeffrey was sober while encoding the information and intoxicated when retrieving the

information.

The same phenomenon happens with emotions and moods. If a person is encoding information in

a specific emotional state, it would be easier for the person to recall the information if he or she is in the

same emotional state that he or she is in when encoding it (Bower, 1981). The amygdala connects

emotional events and stimuli, making it an essential component for our memory system. During the

memory consolidation process, the amygdala makes an association between the individuals' emotional

state and the memory (Ashby et al., 1999).

The amygdala responds differently depending on the mood. Feelings of sadness activate the

amygdala to a greater extent than feelings of happiness (Ashby et al., 1999).  Storbeck and Clore (2005)

studied the impact of feelings in memory. They found that individuals whose negative emotions were

induced were more likely to encode more detailed information and therefore have more accurate

information in their retrieval process. On the other hand, participants whose positive emotions were

induced were more likely to encode with more rational processing and therefore have false memories.

Other researchers who studied emotions and memory are Teasdale and Fogarty (1979). They

studied the accessibility of memories on depressed moods and their results also supported the state-

dependent learning. In their study, participants that were depressed took significantly more time to recall

pleasant memories than the unpleasant ones. Burt, Zembar, and Niederehe (1995) also investigated the

effects of a depressed mood over memory. They conducted an archival study to investigate if depression

is directly associated with impairment in memory formation. They found that there was a significant

association between memory impairment and depressed moods.

All the studies mentioned above used adults as participants. This means that studies support the

presence of state dependent memory in adults; however, it should not be assumed that humans posses

state dependent memory since an early stage in life. Bartlett and Santrock (1979) studied this

phenomenon among 5-year-old children to investigate if it works the same way as in adults. The

experimenter manipulated the tone of voice when narrating a story and when asking for specific words

about the story. Whenever the voice and experimenters behavior matches the mood of the story at the

encoding and recalling process children were able to recall more words than when the tone of voice in

the narration did not matched the voice used when asking the questions. Bartlett, Burleson, and Santrock

(1982) worked again with children to prove the existence of state dependent memory in young children.

The researchers recruited children attending preschool/kindergarten and third-grade. They used a list of

words as study material. In the experiment 1, the children were put to study the list and before trying to

recall the lists they were put into relaxation exercises. In the experiment 2, the children were put to study

the list and then asking them to recall the list of words, omitting the relaxation exercises. The results

show that children do experience state dependent memory; the scores in experiment 2 were significantly

better than the ones in experiment 1, where the states of consciousness did not matched due to the

relaxation exercises provided.

The hypothesis for the present study was formulated based on the results of studies suggesting

that emotions and moods have a significant impact on memory and that we experience state dependent

memory. It was hypothesized that participants who have the same emotional state during the encoding

and retrieval process will do better on the memory test than participants who experience different

emotional states during the encoding and retrieval processes. The purpose of this research is to

investigate the effectiveness of emotions working as retrieval cues.

**Method**

**Participants**

A total of 29 participants took part of the present experiment. There were 23 female participants

and 6 male participants. Participants were randomly assigned to one of the four groups.  The age of

participants ranged from19 years to 28 years, with a mean age of 20.34 and a standard deviation of 1.86.

Participants were students at Lindenwood University who learned about the study through the

Lindenwood Participant Pool (LPP) or through flyers placed in some buildings of Lindenwood

University advertising the study.

Participants recruited through the LPP received extra credit for one of the courses they decided

who were eligible to earn LPP bonus points. Participants who learned about the study through the flyers

did not receive any extra credit or incentive. Participants' academic majors also varied and included

mostly psychology, followed by criminal justice and biology.

**Materials**

The main materials for this study included a demographic questionnaire, a self-created text to use

as study material, a self-created memory test, and a mood survey. The demographic questionnaire asked

participants for their age, gender, and academic major with the purpose of learning some information

about the participants who took part of the study (see Appendix A). A memory test was provided to

participants. The test was created by the Principal Investigator to assure that participants were not

familiar with the test. The memory test consisted of two parts. For part 1 (see Appendix B), participants

needed to read a text and try to memorize what they can, and for part 2 (see Appendix C), participants

were asked to answer 10 written questions about the text.

Four essential videos were used for this study. Two videos were intended to evoke negative

emotions and the other two intended to evoke positive emotions to participants. One of the positive

emotion video was 3 min 7 s long; the video consisted on a compilation of babies laughing with another

baby, with their parents, or by themselves (Funnyplox, 2013). The other positive video lasted 3 min 4 s

and consisted on a compilation of pictures that demonstrate acts of kindness with slow background

music. (Seven, 2012). One of the negative emotion videos lasted 3 min 36 s; this video showed a single

baby crying the entire video (Mybabyhascolic, 2011). The other negative emotion video was 2 min 22 s

long; this video was a compilation of pictures with a sad story behind, which was being narrated in the

video while the pictures were shown (Plethrons, 2016).

Depending on the group to which the participants were randomly assigned to, participants

watched two of the four videos. In addition, the order of the video seen by participants of each group

varied. For example, the first person from Group A saw two different positive videos in a randomly

assigned order, and the second person from Group A saw the opposite order seen by the previous

person; the same technique was applied to each group. A single question was asked after each video

asking participants to report how the video made them feel emotionally (see Appendix D). The mood

survey was given twice to each participant; however, for analysis purposes at the printing time the

survey had a number in the title. Survey 1 was asking about the first video seen, and Survey 2 was

asking about the second video watched by the participant.

Apart from the main materials, an informed consent form, a participant list, a receipt, and a

feedback letter were used. The informed consent and the feedback letter were given to every participant.

The participant list and receipt was only used with participants who signed up through the LPP for them

to receive the bonus points.

**Procedure**

Participants that were recruited through the LPP were able to enter Sona Systems and sign up in

any available timeslot. Participants who saw the flyer around Lindenwood's campus emailed the

Principal Investigator and agree on a time to meet. Once the assigned day and time came, the participant

came to the respective lab room during their specified time. Next, the participant was greeted and given

a consent form, which was explained verbally to avoid potential misunderstandings. After the participant

signed the informed consent, he or she was put into the first part of the experiment.

The first part consisted on completing a demographic questionnaire. Once he or she finished the

questionnaire, the second part of the experiment started, which consisted on having the participant watch

one of the two videos depending on the group the participant was in. The Participant was assigned into

the group depending in the order he or she sign up and show up. There were four different groups. For

the first video, Groups A and C watched a positive emotion video, and Groups B and D watched a

negative emotion video. After he or she watched the first video, they were given the part 1 of the

memory test. The participant had a maximum of 5 min to read and memorize details of the text; after the

5 min or after he or she announced that he or she finished, the participant was asked to report how the

video made him or her feel emotionally through a written survey.

After reporting his or her emotional state, the participant watched the second video. This video

also depended on the group the participant was assigned to previously. In this part of the study Group A

watched a different positive video, Group B watched a different negative video, Group C now watched

one of the negative videos, and Group D now watched one of the positive videos. After the participant

finished watching the second video, he or she was asked to proceed with the part 2 of the memory test,

which consisted on 10 questions about the text read. The last part of the study was survey 2, which

asked the participant to report how the second video made him or her feel emotionally. If the participant

signed up through the LPP, he or she was asked to sign up a participant list and a receipt to hand in to an

LPP officer. Once the participant was done with the study, the researcher explained to him or her that

there were different groups and they learned in which group they were in and why. The participant was

thanked and given a feedback letter.

### Results

For analysis purposes, data from Groups A and B and Groups C and D were pooled as the Same

Emotion Group and the Different Emotion Group, respectively. Scores earned in the memory test were

analyzed using an independent samples *t*-test to identify whether there was a significant difference

between the Same Emotion Group and the Different Emotion Group.

The mean score on the memory test for the Same Emotion Group was 6.733 ($SD = 1.579$), where

the Different Emotion Group had a mean score of 6.643 ($SD = 1.499$). The independent samples *t*-test

revealed that the differences between the Same Emotion Group and the Different Emotion Group are not

statistically significant, $t(27) = 0.158$, $p = 0.876$.

The videos were effective in evoking the desired emotional response from the participants, with

the exception of two participants. One participant experienced a positive emotion after watching the

negative emotion video of the baby crying for 3 min 36 s, and the other participant felt happy and sad

after watching the positive video of the compilation of images.

**Discussion**

The results from the present study differ from those found in previous studies, which suggested that emotions and moods have a significant impact on memory, and that we experience state dependent memory. Results from previous studies show a significant statistical difference between the scores earned by participants who experience the same emotion during the encoding and retrieval process to those who experience different emotions.

The differences between the present experiment and previous studies might be because the memory test provided to participants in this study was not a pre-existing standardized memory test. The study material and memory test were self-created. In addition to that, the sample size may not have been large enough to accurately represent the population being studied. It is also important to take note of the gender bias in the pool of participants, given that the majority were female participants. Individual differences and the willingness the person had to participate in the study may also have impacted the results. Participants who did not received any extra credit for their participation showed more interest to the study by asking more questions and explanations about the study; however, participants who were recruited through LPP seemed less interested in the study. The interest that participants had in the study may have altered the results. Some participants just answered the multiple-choice questions, leaving in blank all the free recall questions. Given that, there is the possibility that some participants did not read the text and guessed the answers from the questions asked in the memory test.

Improvements to this experiment might be made by using a standardized memory test, by having a longer period for recruitment of participants in order to obtain a bigger sample size and a more diverse sample composition, and by trying to have participants who are truly interested in the research by avoiding using extra credit as an incentive. If these suggestions are implemented in a future replication of this study, the slight difference shown in the present study between the mean scores of the Same Emotion Group and the Different Emotion Group may be seen as a significant difference that supports the existence of the state dependent memory.

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**Appendix A**

Demographic Questionnaire


1. How old are you? _____


2. Identify your gender: _____


3. Identify your major: _____

**Appendix B**

Memory Test Part I

Part 1. Read the text below.

Cindy just earned a master's degree in Industrial and Organizational Psychology from Maryland University. She currently lives in a quiet neighborhood with her husband and works at a very recognized company.

Sarah, Cindy's coworker from the financial department, is having issues with her boyfriend. Sarah desperately asks Cindy to help them find a solution. Cindy agrees to help them, so they plan on having couple therapy for Sarah and her boyfriend after work.

The next day, Cindy has an important and confidential meeting at work about a process of an ongoing project. Cindy for the first time decides to record the meeting. She does not know if she is allowed to record, but because she does not want to interrupt the meeting, she decides to start recording.

When she got home that day, Cindy's husband, Kevin, surprised her with some family members. They ate dinner and then went to the living room to talk. As Cindy needed to do some work related to the meeting, she decides to listen to what she recorded at that meeting. She starts writing an essay about her work and after a while she decides to look for some online information. She took some ideas from the source and continued writing without giving credit to the online source.

**Appendix C**

Memory Test Part II

Part 2. Answer the questions below.

1) What is the name of the main character? _____

2) The main character has a Master's degree in _____

3) From which university did the main character obtain her highest degree?


_____


4) Which word best describes the neighborhood that the main character lives in?


   a) Quiet                    b) Dirty                    c) Loud


5) What was the name of the main character's coworker? _____


6) With whom does the coworker have problems?


a)       Mother             b) Girlfriend        c) Father           d) Boyfriend


7) The main character always records the meetings she attends.


a)       True                    b) False


8) Does the main character have permission to record the meetings?


   a) Yes                       b) No


9) What was the name of the main character's husband? _____

10) What does the main character start writing?


a) Article                b) Essay                c) Outline

## Appendix D

Survey

1. How did the video made you feel?

a)      Fearful
b)      Sad
c)      Disgusted
d)      Angry
e)      Happy
f)      Surprised
g)      Other.  Specify _____

# The Effects of Intrusive Proctoring

*Mariah Palmer[3]*

*The purpose of this study is to look for any way that proctoring styles may affect test results. This is essential as test taking contributes greatly in the academic careers of students. If test results are not reflecting the true knowledge of students, there is a discrepancy that must be addressed. This study will use timed problems under two proctoring conditions. The two levels being measured are intrusive proctor behaviors and non-intrusive proctor behaviors. The results of this study show that there were no significant differences between test scores of intrusive proctoring (M = 42.1111, SD = 4.05) versus non-intrusive proctoring (M = 42.5556, SD = 11.28). Even though results were not significant, there is still a discrepancy between the between tests scores. Therefore, despite the data that is not in support of the original hypothesis, that tests intrusively proctored will result in lower test scores, the data still calls for additional research on this subject.*

Test taking can evoke a great deal of anxiety for some test takers. Additionally, the environment that a test takes place is also a large factor onto how the results of a test will come out. Upon reviewing an article by Romanowski (2008), there is an issue with students and the frequency of cheating and academic dishonesty. In 2002, when college students were asked if they had cheated during their academic career, 74% of all students admitted that they had cheated in high school. Cheating is viewed as common and therefore is not always seen as detrimental to education. While proctors are essential in test taking to ensure the academic honesty of students, Romanowski (2008) suggests that there are other ways to ensure that

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cheating does not occur. Romanowski (2008) focuses on the idea that education has become

solely grade based which removes the concept that education is for knowledge expansion. While

his suggestion of focusing assignments on more original ideas versus standardized tests seems

helpful, it is difficult to measure the full understanding of a concept by using this method.

Romanowski (2008) also mentions that of the students who admitted to cheating in high school,

the number of students who clarified that they had not been caught cheating was as high as 92%.

The response to this was for educators to act more harshly when in reference to cheating. As in,

create tougher punishments for students who are found cheating or create a way to look for

cheating that is outside of the normal type of test-taking (Romanowski, 2008).

The importance of more intrusive or actively proctoring is demonstrated in the

Romanowski (2008) article, by showing the prevalence of cheating among students; however,

there are still negative effects of intrusive proctoring on the achievement of students. Intrusive

proctoring can be both disruptive and uncomfortable. In an experiment completed by Wong and

Brown (1920), the researchers tested the effect of environment on efficiency of work. During the

experiment, participants were either placed in a "bad" room or a "good" room. The "bad" room

was operationally defined as the room with less light in comparison with the "good" room. This

room was also disorganized and was filled with multiple random objects that could be a

distraction to the participants. The "good" room was identified as the room that had better

lighting and was much more organized in comparison to the opposite room. During this study,

the participants were tested on how well they were able to solve a problem. While the results of this study showed to be slightly inconsistent as a result of participant differences, overall there were averages that showed participants in the "good" condition performed better than those placed in the "bad" condition (Wong & Brown, 1920).

Super, Braasch, and Shay (1947) assessed the ways that distractions can have an effect on test performance. These researchers examined if "normal" distractions would have a significant effect on test scores. This study focused on graduate students and used a distracted group and a control group. The researchers created specific times for the distractions to occur as a constant variable in their study. Some of the distractions were, for example, a pencil breaking and a timer going off at the wrong time. The experimenters tested for statistically significant differences in test performance based on participants' age and sex and those results showed that there were none. While the distractions of this study did not produce any significant differences in test results, there were group differences among those tested. It is also important to note that the experimenters write, "None of the distractions went unnoticed during the test period" (Super et al., 1947, pg. 375). While no significant results were reported from these researchers, it is important to acknowledge even small differences among test scores when in different environments, as it could be detrimental to some test takers (Super et al. 1947).

There are currently many tests, used for various reasons, that have adopted the idea of online testing as a way to still proctor tests in a remote way. The main concern for online tests is

the likelihood that test takers will end up cheating. However, benefits also arise from online

testing. Some of these benefits include cost savings in the administering of tests, time savings for

proctors, and it gives flexibility for test takers in when and where they will decide to take their

test. A design conducted by Karim, Kaminsky, and Behred (2014), researchers tested online

proctored tests. The results of Karim et al. (2014)'s study showed that the participants who were

being proctored also reported privacy and pressure concerns. This may have to do with the idea

that they were watched over video. The work of these researchers also show that more

participants in the proctored condition withdrew from the test over the participants placed in the

non-proctored condition. While the nervousness due to proctored testing was heightened, there

was only a small effect that showed proctored tests produced less cheating (Karim et al., 2014).

Additionally, this study also did not show any evidence that personal differences had an effect on

the results of the study. Knowing the information provided by Karim et al. (2014), there must be

a medium standpoint that can be adapted for test takers between proctoring and making sure that

test takers are in a setting that does not increase test anxiety. One way that the researchers

suggest a medium, is verifying that the test taker is independently taking a test through only a

selection of video and then continuing the test unmonitored. One problem arises here and it is

that after the initial verification, a test taker may not be completing the test alone (Karim et al.,

2014). In the study that I proposed, my concept was to be non-invasive and only monitor a

participant by turning around to check that they are not using any other resources and then

continue to let them work independently. Similarly, if Karim et al. (2014) extended the research they had done, that could be a possibility for changing the idea that the participant may use other sources later in the test by incorporating ways to make sure participants are not using other sources without being invasive.

In another remote type of testing, Kantrowitz and Dainis (2014), used employment tests to research the frequency of cheating on those particular types of tests. In order to test their hypothesis, that unproctored online tests increase cheating, Kantrowitz and Dainis (2014) found a company that was hiring and used the hiring data to observe cheating frequencies. Those applying for the job, and therefore submitting their data to this study, did both online employment testing and in person employment testing. Data for both of these was used in the study; however, only in person tests were used in the hiring process for these prospective employees. The results of Kantrowitz and Dainis (2014) were inconsistent. However, out of all 4,026 participants, 259 were shown to exhibit statistical significance for cheating (Kantrowitz & Dainis, 2014). While this showed results that exhibit cheating, more participants did not exhibit cheating behaviors. Additionally, the significance of the cheating can still be caused by outside factors in the study like nervousness or illness; therefore, not concluding that remote proctoring results in higher frequencies of cheating (Kantrowitz & Dainis, 2014).

Another reason that I believe that intrusive proctoring can be a detriment on test results is the idea that when a test-taker is being watched, he or she will not give full attention to the task

which is currently being dealt with. In a study completed by Belletier et al. (2015), the researchers evaluated the concept of "choking". The researchers define this as "Performing more poorly given one's skill level ("choking")… especially when one's performance is being evaluated" (Belletier et al., 2015, pg. 1410). Belletier et al. (2015) used three separate conditions that participants were randomly assigned to. The participants were either alone, placed with a confederate, or in the experimenter condition. The measurement taken involved a task where the participants were measured on how quickly they responded to a stimulus. Additionally, each participant had prior training in the task at hand. The results of this study show that there were no differences between the control condition, the condition where the participant was alone and the condition where the participant was with an experimenter both showed significant data. However, the condition where the participant was placed in a room with a confederate, there were no significant findings (Belletier et al., 2015). Similarly, in the study that I conducted, I was particularly looking for the effects that my presence while watching a participant may have.

While not directly related, it is important to look at the ways in which test-takers' perception of proctors can alter test results. For example, if a test-taker feels more comfortable around a certain type of proctor, there may be a relationship with a test score. This may have something to do with test-taking environment and the ways that it can impact results. Vormittag, Ortner, and Koch (2015) surveyed test takers on their proctor preferences. These participants viewed four video clips total with two male and two female administers. Following the viewing

of clips, each participant chose a preferred examiner in the event that they would be test taking.

The results of this study turned out that 66.13% of the participants preferred female proctors and

33.87% of participants preferred male proctors (Vormittag et al., 2015). One main reason why

test takers preferred female proctors was that they were viewed as more warm versus cold. This

is important to note when looking at test taking environment and the variables that go in to

making test takers feel comfortable. In the discussion section of this scholarly article, the authors

make note that there are preferences among types of proctors; however, they did not test to see if

preferences have an effect on test results. They reference that future research should test for this

type of test result effect (Vormittag, 2015).

Reviewing literature has led me to question the effectiveness of less intrusive proctoring

in association with knowledge and memory on tests. Even though research does not always give

significant support to the effects of test environment, it is still important to pay attention to the

small populations affected by these types of concepts (i.e. choking and test anxiety). By using

two separate proctoring styles, I attempted to test the hypothesis that intrusive proctoring will

produce lower test scores than non-intrusive proctoring. To complete this task, I administered

short tests in a within-subjects design to see if proctoring styles had an effect on test results.

Upon conducting this study, I hoped to support the idea that test environment plays a role on test

achievement and to come up with solutions on how to make test taking a more comfortable

environment.

## Method

### Participants

Throughout the entirety of this experiment, there was a total of nine participants. The age of the participants ranged from 18 to 22 with the mode of the participants ages being 19.5. Out of all the participants one identified themselves as male participants and eight identified themselves as female participants. While given the option, no participants identified themselves as other. The two most common majors of all participants were exercise science and public health. The academic standing of a majority of the participants was of sophomore ($M = 2$, $SD = .86603$) standing (see Figure 1 for demographics regarding all participants). All of the participants were recruited through the Lindenwood Participant Pool at Lindenwood University. The participants through the Lindenwood Participant Pool are able to participate in studies in order to earn extra credit through their allowed general education courses.

### Materials

In order to conduct this study, I used various materials such as the testing materials, surveys, and paperwork needed in order to conduct ethical research. The first material would be the informed consent. This is the form I had two copies of and made sure was filled out before beginning the study. Another material that was incorporated into this study was the demographic survey (see Appendix A). The demographic survey questioned the participants on a variety of information regarding their demographics. The survey that I wrote was done in person and on

paper. Each participant filled out the paper survey during his or her appointment time. The next

material used in the process of this experiment was the two sets of addition problems. Each set

consisted of 200 addition problems, which were set up through an online generator (see

Appendix B) The online generator used in order to set up these sets can be found at

http://www.softschools.com/math/worksheets/addition_worksheets.jsp. The addition problems

were each of three-digits and under. The last material I handled in addition to the experimental

materials was the feedback letter given to each participant (see Appendix C). This feedback letter

informed the participant what I was in search of during my study and gave them my contact

information in the event that they had any questions.

Along with the materials used in the experimental process, I also used a variety of

materials in order to recruit participants. I used the website Sona Systems to set up my study and

recruit the participants. Through here I was able to post numerous timeslots so that participants

could sign up and be part of the experiment.

In addition to the required materials for setting up a study through Sona Systems and

recruiting through the LPP, there are also required documents through the Lindenwood

Participant Pool that were needed to give credit to the participants. These documents included

the participant receipt and the participant sign-in sheet. After the completion of the experiment

and the collection of the data, I used IBM SPSS Statistics 23 to conduct the analysis for the

results of this study.

**Procedure**

After having my study approved by both the PPSRC and the IRB at Lindenwood

University, I was allowed to conduct research. Following my submission of all necessary

documents to the Lindenwood Participant Pool office, I set up my study on Sona Systems. The

necessary documents included IRB Approval Code, IRB Expiration Date, and multiple Room

Booking Requests. Since the goal of the study was to imitate a real-life test taking experience, I

requested a room that was more similar to a classroom versus a room with just one seat in it. I

conducted each study in the Psychology Research Lab at Lindenwood University. More

specifically, I ran each participant in the largest lab, Aronson.

As the participants entered the room, I asked them fill out each of the LPP forms

correctly. These forms were the Participant Sign-In Sheet and the Participant Receipt. I

explained to the participants that in order to receive credit for the study that they must turn in the

participant receipt by Friday before the LPP Office closes. The next step was to have the

participants sign two copies of an informed consent. The first copy was for them to keep and the

second copy was for my record. I then explained to the participants that they would start the

study with a survey. I verbally informed them that they were free to resign or skip any questions

on either the survey or the addition problems with no penalty and that they would still receive

full credit through the LPP whether they decided to complete the study or not.

I began the study with distributing the demographic survey. Following the completion of the demographic survey I gave the participants the instructions for the experiment. I told the participants that they would be timed for 5 min on each set of addition problems and that I would instruct them when it was time to stop. I made sure to mention that the addition problems were to be completed by hand and without a calculator. I then asked the participants if there were any questions or confusion. Following the clarification of any questions, I distributed the first set of addition problems. The first set was different for each participant as I used counterbalancing for this experiment. In order to counterbalance, I switched the position of the intrusive proctoring and the less intrusive proctoring with the set A and set B of addition problems. For the intrusive proctoring, I walked around the participant. I had also kept my movements consistent throughout the whole research process. I scheduled specific times for the intrusive proctoring that I could be walking so that it would be the same for each participant. My goal was to be slightly disruptive to the environment of the participant. The less intrusive proctoring consisted of me sitting in a chair somewhere far from the participant. During the less intrusive proctoring, I tried to remain as quiet as possible while still turning to look at the participants to make sure they were not using a calculator or another person to answer the addition problems.

Upon the completion of the experimental process, I thanked each participant for helping me in my study. I made sure to debrief each participant. To do this, I explained that the actual purpose of my study was to see the difference in test scores with different types of proctoring. I

told the participants that if they had any questions or were interested in knowing the results of

my study that my contact information was left on the feedback letter. I then reminded each

participant that he or she must submit his or her participant receipt to the Lindenwood Participant

Pool office.

## Results

After conducting a Paired Samples t-Test, SPSS calculated that Intrusive Proctoring ($M =$

42.1111, $SD = 4.05$) did not produce significantly lower scores than Non-intrusive Proctoring ($M$

$= 42.5556$, $SD = 11.28$), $t(8) = -.066$, $p = .4745$ (See Figure 2 for statistical analysis). No other

statistics were conducted in this study other than descriptive statistics for the participant

demographics and testing to see if there were any significant differences in the two tests I had

administered. The Paired Samples t-Test also gives no statistical significance between the two

tests, A and B (See Figure 3). In my study, I asked each participant about his or her math

difficulty and his or her enjoyment of math. According to the 5-point Likert scale, participants

rated their math ability a 3.3 and rated their math enjoyment a 2.2 out of 5 total.

## Discussion

Further research on this subject is necessary. There has not been much research done

which solely focuses on proctoring styles and test achievement. In furthering my own research, I

think it would be wise to additionally produce my own survey which asks about the occurrence

of cheating on tests. I would want to focus less on plagiarism and assignments and rather I would

want to specifically ask about frequency of cheating on tests. I may include questions about test

anxiety and figure out how test takers prefer their environment. I would then try to implement

that particular environment as an independent future research study. With my study, I had a low

participant count. This causes problems when looking for significant test results. In the future, I

will implement skills to try and recruit more participants.

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Figure 1

**Descriptive Statistics**

|                    | N | Minimum | Maximum | Mean    | Std. Deviation |
|--------------------|---|---------|---------|---------|----------------|
| VAR00001           | 9 | 18.00   | 22.00   | 19.5556 | 1.13039        |
| Valid N (listwise) | 9 |         |         |         |                |

**Descriptive Statistics**

|                    | N | Minimum | Maximum | Mean   | Std. Deviation |
|--------------------|---|---------|---------|--------|----------------|
| VAR00001           | 9 | 1.00    | 4.00    | 2.0000 | .86603         |
| Valid N (listwise) | 9 |         |         |        |                |

Figure 2

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pair 1 | Intrusive | 42.1111 | 9 | 12.14953 | 4.04984 |
| | Nonintrusive | 42.5556 | 9 | 11.28175 | 3.76058 |

**Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Pair 1 | Intrusive & Nonintrusive | 9 | -.474 | .198 |

**Paired Samples Test**

| | | Paired Differences | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval of the Difference | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| Pair 1 | Intrusive - Nonintrusive | -.44444 | 20.11909 | 6.70636 | -15.90935 | 15.02046 | -.066 | 8 | .949 |

Figure 3

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pair 1 | A | 43.6667 | 9 | 12.16553 | 4.05518 |
| | B | 41.0000 | 9 | 11.09054 | 3.69685 |

**Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Pair 1 | A & B | 9 | -.537 | .136 |

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval of the Difference | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | | | |
| Pair 1 | A - B | 2.66667 | 20.39608 | 6.79869 | -13.01115 | 18.34448 | .392 | 8 | .705 |

Appendix A

1.  What is your major? (if you have more than one, list both)


    _____


2.  How many credit hours are you taking this semester? \_\_\_\_\_


3.  What is your academic standing?

    o   Freshman

    o   Sophomore

    o   Junior

    o   Senior

    o   Other

4.  What is your age?

5.  How would you identify yourself?

    o   Male

    o   Female

    o   Other _____

6.  On a scale of 1 to 5, how would you rate your difficulty doing math problems?

            1              2              3              4              5

    Least Difficult                                              Most difficult

7. On a scale of 1 to 5, how would you rate your enjoyment while doing math problems?

|   1   |   2   |   3   |   4   |   5   |
|-------|-------|-------|-------|-------|

Do not enjoy  ☹                                                                 Enjoy ☺

Appendix B

Set A

| 298 | 209 | 328 | 383 | 12 | 195 | 623 | 271 |
| +31 | +913 | +571 | +291 | +338 | +41 | +805 | +301 |

| 282 | 796 | 800 | 995 | 684 | 356 | 851 | 358 |
| +491 | +15 | +363 | +361 | +963 | +526 | +469 | +966 |

| 212 | 80 | 230 | 670 | 992 | 95 | 120 | 4 |
| +588 | +257 | +602 | +690 | +856 | +2 | +723 | +21 |

| 46 | 798 | 810 | 203 | 540 | 742 | 222 | 504 |
| +355 | +559 | +603 | +561 | +62 | +406 | +573 | +244 |

| 173 | 524 | 903 | 891 | 658 | 446 | 29 | 543 |
| +445 | +433 | +279 | +466 | +584 | +253 | +276 | +267 |

| 443 | 902 | 213 | 988 | 125 | 762 | 179 | 825 |
| +761 | +855 | +546 | +962 | +229 | +626 | +264 | +866 |

| 211 | 215 | 600 | 128 | 164 | 827 | 646 | 902 |
| +130 | +1 | +403 | +9 | +741 | +279 | +3 | +981 |

| 906 | 791 | 45 | 194 | 205 | 613 | 716 | 723 |
| +536 | +345 | +190 | +304 | +747 | +356 | +277 | +979 |

| 616 | 728 | 257 | 155 | 918 | 763 | 856 | 372 |
| +396 | +621 | +522 | +95 | +998 | +223 | +393 | +653 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 194 | 466 | 419 | 352 | 17 | 509 | 966 | 528 |
| +392 | +144 | +396 | +990 | +412 | +906 | +820 | +458 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 381 | 679 | 590 | 740 | 331 | 174 | 543 | 126 |
| +351 | +6 | +974 | +248 | +420 | +657 | +743 | +493 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 451 | 6 | 239 | 597 | 645 | 751 | 226 | 724 |
| +677 | +619 | +547 | +67 | +108 | +117 | +50 | +707 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 877 | 113 | 433 | 179 | 813 | 72 | 240 | 79 |
| +836 | +136 | +168 | +352 | +662 | +603 | +247 | +860 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 514 | 581 | 167 | 840 | 637 | 53 | 239 | 430 |
| +385 | +225 | +463 | +475 | +618 | +7 | +791 | +710 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 798 | 139 | 332 | 100 | 21 | 520 | 33 | 988 |
| +58 | +713 | +121 | +522 | +405 | +801 | +354 | +941 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 473 | 714 | 839 | 184 | 884 | 122 | 722 | 134 |
| +403 | +587 | +557 | +529 | +696 | +668 | +512 | +334 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 335 | 822 | 380 | 500 | 355 | 824 | 713 | 818 |
| +465 | +868 | +247 | +210 | +53 | +232 | +360 | +672 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 485 | 793 | 332 | 593 | 733 | 478 | 143 | 675 |
| +24 | +833 | +249 | +662 | +381 | +412 | +550 | +882 |

| 619   | 318   | 314   | 41    | 708   | 985   | 182   | 339   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +882  | +120  | +389  | +575  | +674  | +886  | +259  | +920  |

| 824   | 837   | 879   | 814   | 366   | 529   | 749   | 471   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +698  | +177  | +628  | +413  | +568  | +165  | +581  | +891  |

| 995   | 636   | 209   | 673   | 425   | 264   | 787   | 302   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +398  | +672  | +592  | +288  | +320  | +249  | +130  | +763  |

| 380   | 564   | 874   | 438   | 71    | 278   | 990   | 185   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +963  | +896  | +395  | +678  | +63   | +194  | +232  | +130  |

| 333   | 538   | 187   | 444   | 856   | 634   | 522   | 980   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +894  | +108  | +343  | +683  | +932  | +39   | +577  | +298  |

| 299   | 986   | 869   | 60    | 528   | 368   | 956   | 339   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +630  | +803  | +945  | +950  | +318  | +884  | +980  | +910  |

| 459   | 688   | 707   | 919   | 261   | 866   | 287   | 751   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| +513  | +534  | +367  | +872  | +144  | +558  | +958  | +414  |

Set B

| 34 | 639 | 535 | 267 | 624 | 998 | 326 | 973 |
| +1000 | +982 | +579 | +319 | +972 | +65 | +236 | +683 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 658 | 862 | 520 | 878 | 795 | 936 | 888 | 338 |
| +182 | +332 | +724 | +14 | +965 | +563 | +273 | +542 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 981 | 472 | 522 | 614 | 851 | 336 | 420 | 955 |
| +994 | +630 | +253 | +422 | +512 | +886 | +139 | +892 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 744 | 179 | 100 | 344 | 987 | 669 | 528 | 516 |
| +302 | +326 | +895 | +319 | +54 | +24 | +60 | +201 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 343 | 987 | 867 | 52 | 759 | 52 | 822 | 648 |
| +59 | +565 | +98 | +532 | +414 | +479 | +806 | +115 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 811 | 165 | 606 | 891 | 501 | 55 | 778 | 115 |
| +150 | +900 | +839 | +689 | +971 | +953 | +637 | +3 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 282 | 506 | 500 | 171 | 472 | 49 | 957 | 204 |
| +517 | +590 | +328 | +173 | +347 | +881 | +384 | +956 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 444 | 399 | 974 | 757 | 237 | 616 | 96 | 783 |
| +43 | +983 | +101 | +793 | +125 | +285 | +186 | +743 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 485 | 191 | 650 | 410 | 801 | 502 | 558 | 529 |
| +711 | +469 | +16 | +656 | +71 | +463 | +363 | +224 |
| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |

| 24 | 363 | 919 | 541 | 962 | 620 | 640 | 845 |
| +534 | +534 | +633 | +742 | +391 | +13 | +934 | +721 |

| 529 | 990 | 617 | 900 | 420 | 614 | 255 | 941 |
| +750 | +377 | +499 | +695 | +495 | +687 | +289 | +847 |

| 725 | 18 | 329 | 682 | 113 | 458 | 470 | 592 |
| +790 | +620 | +818 | +315 | +791 | +574 | +491 | +287 |

| 493 | 829 | 789 | 566 | 293 | 621 | 407 | 82 |
| +511 | +598 | +25 | +258 | +989 | +122 | +735 | +44 |

| 749 | 615 | 910 | 177 | 848 | 275 | 11 | 811 |
| +208 | +733 | +748 | +444 | +431 | +486 | +443 | +633 |

| 823 | 52 | 914 | 472 | 349 | 50 | 180 | 84 |
| +882 | +481 | +664 | +673 | +940 | +708 | +511 | +741 |

| 816 | 767 | 83 | 558 | 349 | 853 | 757 | 576 |
| +290 | +374 | +756 | +945 | +685 | +235 | +192 | +837 |

| 449 | 117 | 621 | 425 | 410 | 220 | 886 | 973 |
| +259 | +634 | +456 | +989 | +567 | +264 | +133 | +243 |

| 903 | 762 | 129 | 117 | 373 | 736 | 232 | 284 |
| +766 | +874 | +191 | +500 | +628 | +417 | +48 | +159 |

| 143 | 537 | 191 | 818 | 368 | 995 | 563 | 335 |
| +296 | +378 | +817 | +578 | +974 | +256 | +539 | +151 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 235 | 134 | 582 | 374 | 55 | 614 | 197 | 936 |
| +962 | +467 | +449 | +885 | +723 | +121 | +567 | +584 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 701 | 946 | 375 | 417 | 433 | 873 | 979 | 873 |
| +181 | +187 | +63 | +940 | +324 | +379 | +112 | +730 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 254 | 559 | 726 | 101 | 698 | 641 | 785 | 358 |
| +809 | +552 | +613 | +918 | +779 | +965 | +433 | +955 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 951 | 826 | 793 | 530 | 401 | 257 | 459 | 123 |
| +152 | +581 | +696 | +285 | +389 | +775 | +630 | +761 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 186 | 108 | 364 | 357 | 957 | 954 | 786 | 500 |
| +950 | +183 | +826 | +822 | +200 | +260 | +284 | +615 |
| —— | —— | —— | —— | —— | —— | —— | —— |

| 283 | 673 | 628 | 834 | 441 | 896 | 798 | 914 |
| +746 | +319 | +851 | +490 | +440 | +140 | +916 | +522 |
| —— | —— | —— | —— | —— | —— | —— | —— |

Appendix C

Feedback Letter

Thank you for participating in my study. The present study was conducted in order to compare the test scores of intrusive proctoring versus non-intrusive proctoring. I hypothesized that while being closely observed, the participant would not answer as many addition problems correct. This experiment is beneficial because it would help grow the general information on students when test taking. Knowing this has the potential of assisting educators find the most effective way of proctoring tests and helping their students succeed.

Please note that I am not interested in your individual results; rather, I am only interested in the overall findings based on aggregate data.  No identifying information about you will be associated with any of the findings, nor will it be possible for me to trace your responses on an individual basis.

If you are interested in obtaining the final results of this study based on aggregate data, or if you have any questions or concerns regarding any portion of this study, please do not hesitate to let me know now or in the future.  My contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sincerely,

Principal Investigator:

XXX XXX-XXX-XXXX (XXX@lionmail.lindenwood.edu)

Supervisor:

Dr. Michiko Nohara-LeClair  636-949-4371 (mnohara-leclair@lindenwood.edu

# Effects of Music on Stress and Mindfulness

*Brittany McKenzie[4]*

*The possible differential effects that Zen and electronic dance music (EDM) have on stress and mindfulness were analyzed. The purpose of this study is to understand if certain factors of music are more influential on stress levels and mindfulness scores. Factors of music that were analyzed include different genres and the tempo or pace of these music genres. Fifty-six adult participants ages 17-79 completed an online survey. The online survey had participants complete a mental rotation task then rate their perceived state stress levels and mindfulness scores for baseline measures. Participants listened to either a 3 min. audio file of a Zen or EDM song. Lastly, participants were asked again to rate the extent of their agreement or disagreement on statements regarding state levels and mindfulness scores. The results did not reveal any significant differences in stress levels and mindfulness scores between participants in the Zen and EDM condition. However, there was a significant decrease in stress levels for participants whom listened to EDM. Additionally, there was a significant increase in mindfulness scores for participants who listened to Zen music.*

Music is an immense part of several people's lives in today's age. Music can be heard playing almost anywhere including malls, restaurants, cars, gyms, and etc. Several genres of music can be readily available through the internet, radio systems, TVs, cell phones, tablets, and Mp3 players. Music in general has the capability to affect a listener's physical and mental state in a variety of ways. However, different types of music or genres seem to have differential effects on listeners. For example, previous research has found that listening to classical music for just 20 min reduced heart rate, skin conductance, and respiration (Labbe, Schmidt, Babin, &

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Pharr, 2007). Smith and Joyce (2004) conducted a study to analyze the effects of listening to

Mozart and New Age Music  on relaxation and symptoms of stress. Participants who listened to

Mozart once a day for three days felt more relaxed (mentally more at peace) and gracious. On the

other hand, Jiang, Zhou, Rickson, and Jiang (2013) found that preferred "stimulative" and

sedative music equally reduced anxiety and tension scores within participants (without any

additional activity); sedative music has a slower tempo and less pitch changes. Aside from

examining tempo, Nakajima, Tanaka, Mima, and Izumi (2016) have found that listening to a

higher frequency version of a Mozart composition resulted in lower stress scores.

In addition to reducing stress and anxiety, listening to a specific type of calming music has

increased measures of mindfulness and spatial reasoning. Bell, McIntyre, and Hadley (2016)

found that listening to classical music for up to 6 or 12 weeks daily resulted in a positive

correlation between spatial reasoning and mindfulness. This means that these two individual

scores increased throughout the 12 weeks after listening to classical music. Listening to a faster

paced classical composition by Mozart compared to a slower composition by Albinoni yielded a

happier shift in mood and arousal by participants; several other studies suggest that a shift or

increase in arousal and mood resulted in improved or better scores on cognitive tasks rather than

the music itself (Schellenberg, 2005). Since many studies select songs for participants to listen

to, Perham and Withey (2012) analyzed the effect of song preference on spatial rotation abilities.

These researchers' found that listening to faster-tempo song yielded significantly more accurate

answers to a spatial rotation task, regardless of preference (Perham & Withey, 2012). Therefore

these studies are suggesting that regardless of preference, a faster paced song (which could

possibly be a classical composition) positively influences mindfulness in general.

Living in the very busy world today, it is important to examine how one can possibly build

attentiveness to personal thoughts, emotions, and to surroundings. Being mindful includes,

"being attentive to and aware of what is taking place in the present moment" (Bell, McIntyre, &

Hadley, 2016, p.227). Another outlet for music can be to bring about an overall awareness to

thoughts and feelings. Specific genres such as Zen or meditation music are specifically paired

with calming activities such as yoga to induce a relaxing yet mindfully awakening effect.

It is additionally important for individuals to know which genre elicits a calming effect

for themselves, personally because stress is a daily occurrence for most people. Previous studies

that have tested the effects of music have predominantly used classical music, however, not

everyone may not enjoy listening to classical music. To account for this, the present study

examined music genres other than classical music to see if these genres were significantly

effective in reducing stress. Two different genres were used within this study in order to compare

the differential effects. The principal investigator hypothesized that stress scores would be

significantly lower and mindfulness scores would be significantly higher after listening to Zen

music compared to Electronic Dance music. The purpose of this study is to better understand if

effects on stress and mindfulness are influenced more so by listening to certain genres of music,

tempo or pitch of music, or music in general.

## Method

### Participants

Fifty-six adult participants between the ages of 17 through 79 (with a mean age of 25.4

years) completed the study. There were 2 participants whom identified themselves as American

Indian or Alaskan Native (3.57%), 4 as African American or Black (7.14), 15 as either Hispanic,

Latino or of Spanish origin (26.79), 1 as Middle Eastern or North African (1.79%), 2 as Pacific

Islanders (3.57%), and 40 as Caucasian or White (71.43%) through self-report. Additionally 22

participants identified themselves as male, 32 as female, 1 as intersex, and 1 preferred not to

answer.

Participants attending Lindenwood University were recruited through Sona Systems

online. The principal investigator additionally recruited participants through social media,

including Facebook. Participants only received extra credit for select courses through the

Lindenwood Participant Pool (LPP) at Lindenwood University, as compensation. The present

study was available to potential participants on March 28th through April 14th on Sona Systems.

Participants still have access to the present study on Facebook. A total of 27 participants listened

to Zen music while 25 participants listened to EDM.

### Materials

An online survey was administered to participants in order to measure perceived stress levels and mindfulness scores. Music was used in this study to examine the relationships between music and reduced stress, as well as music and increased mindfulness. The survey included two different songs.  Both genres were chosen for this study to determine if one type of genre can induce more relaxing or mindful effects more significantly than the other. Two different songs were presented as audio files instead of videos in order to eliminate possible confounding variables (such as distractions from the visual video and to increase consistency).

Zen music was chosen instead of classical music because the intention was to induce relaxation, which Zen has mostly been used for this purpose. Zen music or meditation music is a subgenre of new age music, which is mostly instrumental. Zen music played for every other participant while EDM played for the participants in between. EDM was chosen for this study because it is a subgenre of electronic music and therefore is upbeat (the opposite of a relaxing tune). Both songs were both roughly 3 min long and are instrumental songs. The length of each song needed to be long enough in order to have an effect but not too long where participants would become bored or distracted. Participants only listened to one of the songs in order to eliminate fatigue or order effects. Nearly half of the participants listened to a Zen song, *Is Not All One* by Scott (1965) while the other half of participants listened to an EDM song, *The Only Way is Up* by Martin Garrix and Tiesto (2015). The informed consent form requested participants to have headphones or speakers in order to participate within this study.

If music is going to have any calming or relaxing effects, participants must feel at least

some level of stress prior to listening to whichever song is assigned to them. To induce stress, a

cognitive task was implemented and participants were asked to complete this before continuing

with the study.  The cognitive task included seven different questions, adopted from Karanovsky

(n.d), which had participants match rotated shapes with their correct original shape by visually or

mentally rotating them. Participants had 4 min to complete seven different mental rotation tasks.

Results of the mental rotation task was not scored or presented to the participants. Next, the

participants were asked to rate the extent of their agreement or disagreement on statements

regarding state levels and mindfulness scores.

Items regarding stress were adopted from Levenstein et al. (1993). The stress items

(numbered 14 and 23) were modified to "I" statements rather than "you" statements in order to

be parallel with mindfulness items. For example, one item was changed from "you feel calm" to

"I feel calm." A total of 10 questions were adopted from Levenstein et al. (1993) rather than the

full set in order to make sure that the survey would not be too long or tiring for participants.

Eight items regarding mindfulness were also adopted from Tanay and Bernstein (2013).

Mindfulness items (numbered 15 and 24) were switched to present tense format instead of past

tense in order to match tense of stress items. A Likert scale rated state stress and mindfulness

items. Half of the items regarding stress levels and mindfulness scores were placed before the

audio while another set of items regarding stress and mindfulness scores were placed after the

audio to reduce repetition.

Items numbered 18 through 22 were filler items and were not included in the final

calculations; these questions relate to music and stress. The survey included filler questions in

order to make a swift and logical transition from listening to music to answering questions

regarding stress and mindfulness again. These questions were asked to additionally understand if

participants' thoughts on music. Lastly, demographic questions such as age, gender, and

origin/race or ethnicity were asked in order to describe the sample. The totality of this survey

was created on Qualtrics. Qualtrics is an online source that has the tools to create, distribute, and

analyze the results of a survey. Qualtrics provided an anonymous link to distribute the survey.

**Procedure**

First, participants began the survey by clicking on the link of the anonymous survey.

Participants first voluntarily gave consent to take part in this study after briefly reading what the

study is about (see Appendix A). They were then prompted to either choose to participate or

choose not to participate (see Appendix B). Consent to participate in the study suggested that the

participant had access to speakers or headphones, voluntarily participated, and understood that

there were minimal risks. Participants were then asked their age in years (see Appendix B); the

survey would not allow participants under the age of 18 to continue unless they had a parental

consent form filed with the LPP. On a typical computer screen, participants had to click on two

forward arrows in the bottom right corner of the screen to access the next page of the survey. A

timer appeared starting at four minutes on the next page; participants had four minutes to

complete seven different cognitive tasks including items numbered 7 through 13 (see Appendix

B). Only seven out of 13 questions were adopted from Karanovsky (n.d.) (see Appendix C).

A set of 5 statements under item number 14 appeared next regarding perceived state

stress levels (see Appendix B). In the following order, items numbered 3, 6, 30, 26, and 14 were

presented from Appendix D. The survey prompted participants to indicate the extent of their

personal agreement or disagreement. Participants could then choose either strongly disagree,

somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree for each

item. Next, they were prompted again to indicate the extent of their agreement or disagreement

on four statements regarding their current state of awareness of mindfulness scores (see

Appendix B). In the following order, items numbered 13, 14, 18, and 12 were presented from

Appendix E.

Next, the survey prompted participants to fully listen to whichever audio file they were

given to (see Appendix B). After listening to either the Zen audio file for 3 min and 16 s or the

EDM audio file for 3min and 9s, participants were prompted to answer questions numbered 18

through 24. Survey items 18 through 22 in the correct following order appeared (see Appendix

B).

Next item number 23 prompted participants to indicate the extent of their agreement or disagreement on five different statements regarding perceived state stress levels (see Appendix B) again. In the following order, items numbered 10, 18, 20, 27, and 12 were presented from Appendix D. Item number 24 prompted participants again to indicate the extent of their agreement or disagreement on four different statements regarding their current state of awareness of mindfulness scores (see Appendix B). In the following order, items numbered 19, 3, 15, and 20 were presented from Appendix E.

On the following page of the survey, question number 25 and 26 appeared. Item number 25 asked participants to choose the category of ethnicity that best described them (see Appendix B). Item number 26 prompted participants to choose the category presented that best described their gender identity (see Appendix B). Participants next read a debriefing statement including an explanation of the mental rotation task, the audio files, and the proposed hypothesis. Possible benefits and contact information were listed as well (see Appendix F). Lastly, a quick thank you from Qualtrics appeared on the next page and participants were lastly free to exit the anonymous online survey.

For calculation purposes, individual answer options for each item regarding stress and mindfulness were coded with different values (questions numbered 14, 15, 23, and 24). The difference between pre-stress and post-stress levels was calculated for each participant within the Zen condition. Additionally, the difference between pre and post stress levels was calculated for

each participant within the mindfulness condition. Next, two separate independent t-tests were

conducted to compare the total differences between the Zen condition and the EDM condition.

## Results

The analysis revealed that the mean difference score for stress levels for participants who

listened to Zen music was .32 (SD=3.68) and the score for those who listened to EDM was -.85

(SD=4.40), which are not statistically different from each other, t(52)=1.06, p=.14 (see Table

G1) . For participants who listened to Zen, the mean difference mindfulness score was 1.64

(SD=2.08) and the score for those who listened to EDM was 1.15 (SD=3.00), which are not

statistically different from each other, t(52)=.70, p=.24 (see Table H1). Four separate paired t-

tests were conducted in order to determine if there were significant differences between pre and

post scores for each variable with in each music condition. The analysis revealed that the mean

of stress levels for participants who listened to the Zen music did not significantly change but did

increase, p= .36 (see Table I1). Mean stress levels for participants whom listened to the EDM

song significantly decreased, p=.018 (see Table J1). The mean mindfulness score for participants

who listened to EDM did increase and almost reached statistical significance, p=.059 (see Table

H3). The mean mindfulness score for participants whom listened to Zen music significantly

increased, p=.00023 (see Table K1).

On average participants reported that they listened to music for a total of 4.75 hours each

day. Participants reported 4 different favorite broad types of music to listen to each day.

Participants reported a total of 12 different favorite genres and 8 different subgenres of music

(see Table L1). There were 11 participants whom reported pop as their favorite music genre to

listen to (19.6%), 9 reported Country (16%), 6 reported Hip Hop (10.7%), 4 reported Alternative

(7.1%), 3 reported rap (5.4%), and 3 reported R&B as their favorite. The remaining 35.7% of

participants reported other genres, types or subgenres of music as their favorite to listen to (see

Table M). Over fifty percent of participants reported feeling a moderate amount of stress daily

(51.8%). Thirty-one participants reported they sometimes felt at ease after listening to music

(55.4%), while 41.1% reported always feeling at ease after listening to music. Fifty-four

participants declared that music was calming to listen to (96.4%).

## Discussion

There were not any significant differences in stress or mindfulness measures across both

conditions; therefore, the hypothesis was not supported. Previous research by Jiang et al. (2013)

supports these findings. Jiang et al. (2013) found that the effects of upbeat and slower music did

not significantly differ on stress levels. However, Nakajima et al. (2016) and Schellenberg's

(2005) research supports positive effects of faster paced and higher frequency music on stress or

an increase in mood. Additionally, Perham and Withey's (2012) as well as Schellenberg's (2005)

research supports that faster paced music results in increased cognition or mindfulness. These

findings suggest that Zen music and EDM music are substantially influential on mindfulness

scores. However, listening to Zen music is not influential on stress levels while listening to EDM

music is positively and significantly influential on stress. The overall interpretation that can be

drawn from this study is that the upbeat/ faster tempo of EDM influences a positive effect on

state stress and state mindfulness while stress is significantly effective on state mindfulness

scores. The majority of participants' favorite kinds of music to listen to were upbeat/faster tempo

genres, which could have influenced the increase in stress levels within the Zen condition. The

Zen song was 7 s longer than the EDM song, however it is unlikely that this was largely

influential on the results.

Although variables such as order and fatigue effects were controlled for, limitations still

arose. Online and self-report surveying could have created limitations. For future modifications

to this study, the study should be held in person to observe participants actually listening to the

song given to them. A larger sample size could possibly yield different results. If this study was

replicated, other measures such as preference and additional genres should be analyzed. Having

participants listen to music several times across a longer time span may yield more significant

differences among the different conditions. The overall lack of significant differences between

participants who listened to the Zen song or the EDM song suggest that listening to music in

general does affect stress and mindfulness.

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**Appendix A**

# LINDENWOOD

**Informed Consent/Information/Cover Letter**

"Music, Mindfulness, and Stress"

Principal Investigator: Brittany McKenzie

Telephone: (636)248-6126 E-mail: bnm925@lindenwood.edu

1.  You are invited to participate in a research study conducted by Brittany McKenzie under the guidance of Dr. Michiko Nohara-LeClair.  The purpose of this specific research study is to understand if simply listening to certain kinds of music will either significantly decrease stress and increase mindfulness or not.

2.  a) Your participation will involve completing this online survey.

    b) The amount of time involved in your participation will be 15 minutes. Approximately 50 participants or less will be involved in this research.

3.  There are no anticipated risks associated with this research.

4.  There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge of stress reduction and mindfulness. The possible benefits to you from participating in this research are to find out if listening to specific types of music play a role in increased scores of mindfulness and/or reduces stress levels.

5.  Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw.

6.  We will do everything we can to protect your privacy. As part of this effort, your identity will not be revealed in any publication or presentation that may result from this study. All answers will be anonymous even to the principle investigator and the information collected will remain in the possession of the principle investigator in a safe location.

7.  If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Brittany McKenzie or the Supervising Faculty, Michiko Nohara-LeClair.  You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Dr. Marilyn Abbott, Interim Provost at mabbott@lindenwood.edu or 636-949-4912.

**Electronically, I consent to my participation in the research described above.**

ELECTRONIC CONSENT: Please select your choice below.

Choosing to participate indicates that:

• You have read the above information.

• You voluntarily agree to participate.

• You are at least 18 years of age or have a parental consent form

## Appendix B

Music, Mindfulness, and Stress Survey

I choose to participate

I choose not to participate

---

Write is your age in years

[                    ]

04:00

Please answer the following seven questions which are adopted by Karanovsky, A. R. (n.d.); You have four minutes to complete all of the questions.

---

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored).



| A | B | C | D |
|---|---|---|---|

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored)



| A | B | C | D |
|---|---|---|---|

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored)



| A | B | C | D |

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored)



| A | B | C | D |

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored) Click to write the question text



| A | B | C | D |

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored) Click to write the question text



| A | B | C | D |
|---|---|---|---|

Please Indicate which shape on the right matches with the shape on the left (with the shape being rotated not mirrored) Click to write the question text



| A | B | C | D |
|---|---|---|---|

Please indicate the extent of your agreeement or disagreement with the following statements based on your current mood.

Questions adopted from Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. (1993).

|  | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|
| I am irritable | O | O | O | O | O |
| I find myself in situations of conflict | O | O | O | O | O |
| I feel under pressure | O | O | O | O | O |
| I feel mentally exhasuted | O | O | O | O | O |
| I feel tense | O | O | O | O | O |

Please indicate the extent of your agreement or disagreement with following statements based on your current state of awareness.

Questions adopted from Tanay, G., & Bernstein, A. (2013).

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|
| I notice pleasant and unpleasant thoughts | ○ | ○ | ○ | ○ | ○ |
| I notice emotions come and go | ○ | ○ | ○ | ○ | ○ |
| I feel closely connected to the present moment | ○ | ○ | ○ | ○ | ○ |
| I feel that I am experiencing the present moment fully | ○ | ○ | ○ | ○ | ○ |

Please take a few minutes to solely listen to this song. It is very important that you listen to the full song.

▶  0:00 / 3:16  ●————  ◀))  —●  ⬇

Please take a few minutes to solely listen to this song. It is very important that you listen to the full song.

▶  0:00 / 3:09  ●————  ◀))  —●  ⬇

On average, how much time do you spend listening to music, daily? ( in minutes or hours).

What is your favorite genre of music to listen to?

Indicate the average amount of stress you feel, daily

| A substantial amount | A moderate amount | a little | none at all |
|---|---|---|---|

Do you feel at ease after listening to music

| Always | Sometimes | Never |
|---|---|---|

Do you feel it is calming to listen to music?

Yes

No

Please indicate the extent of your agreeement or disagreement with the following statements based on your current mood.

Questions adopted from Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. (1993).

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|
| I feel calm | O | O | O | O | O |
| I have many worries | O | O | O | O | O |
| I feel discouraged | O | O | O | O | O |
| I have trouble relaxing | O | O | O | O | O |
| I feel frustated | O | O | O | O | O |

Please indicate the extent of your agreement or disagreement with following statements based on your current state of awareness.

Questions adopted from Tanay, G., & Bernstein, A. (2013)

| | Strongly agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
|---|---|---|---|---|---|
| I notice thoughts come and go | O | O | O | O | O |
| I find some of my experiences interesting | O | O | O | O | O |
| I notice various sensations caused by my surroundings(e.g., heat, coolness, wind) | O | O | O | O | O |
| I feel in contact with my body | O | O | O | O | O |

Choose the categories that describes you:

American Indian or Alaska Native

Asian

African American or Black

Hispanic, Latino, or Spanish Origin

Middle Eastern or North African

Pacific Islander

Caucasion or White

Other

I prefer not to answer

Choose the category that describes your gender identity:

Male

Female

Nonconforming gender

Intersex

Transgender

I prefer not to answer

## Appendix C

◢ PsycTESTS®

**Spatial Rotation Test**
Version Attached: Full Test

Instrument Type:
Test

Test Format:
The Spatial Rotation Test uses a multiple-choice response format.

Source:
This historic document is included through collaboration with The University of Akron, The Archives of the History of American Psychology, University Libraries.

Ann R. Karnovsky, Ph.D.
10 Wyman Road
Cambridge, MA 02138
U.S.A.
patent pending

**Spatial Rotation Test**

**Shapes**

Date of Test _____          Name _____

Date of Birth _____         School _____

Age _____           Grade _____

Left handed_____ Right handed _____          #R_____ #M_____

SUMMARY OF DIRECTIONS   (The teacher will give full directions.)

At the bottom of this page are three sample problems.  In each box at the left there is a picture, and following it are four pictures which look like it, but only one is exactly the same.

The right answer is just like the first shape, but it has been turned around in space to another position.   It has not been flipped over.  Put an X on the shape, in each row which is exactly like the one in the box.
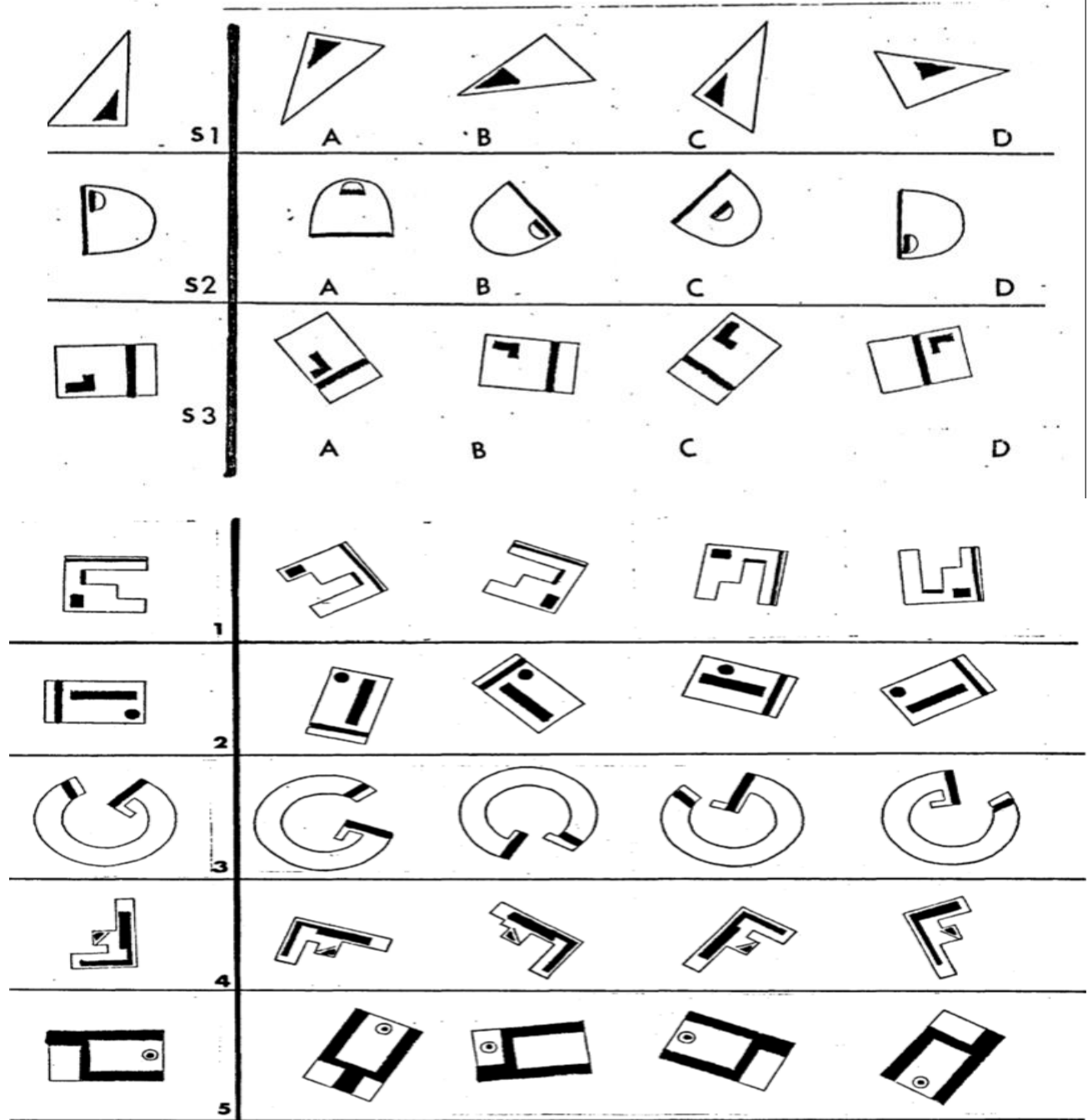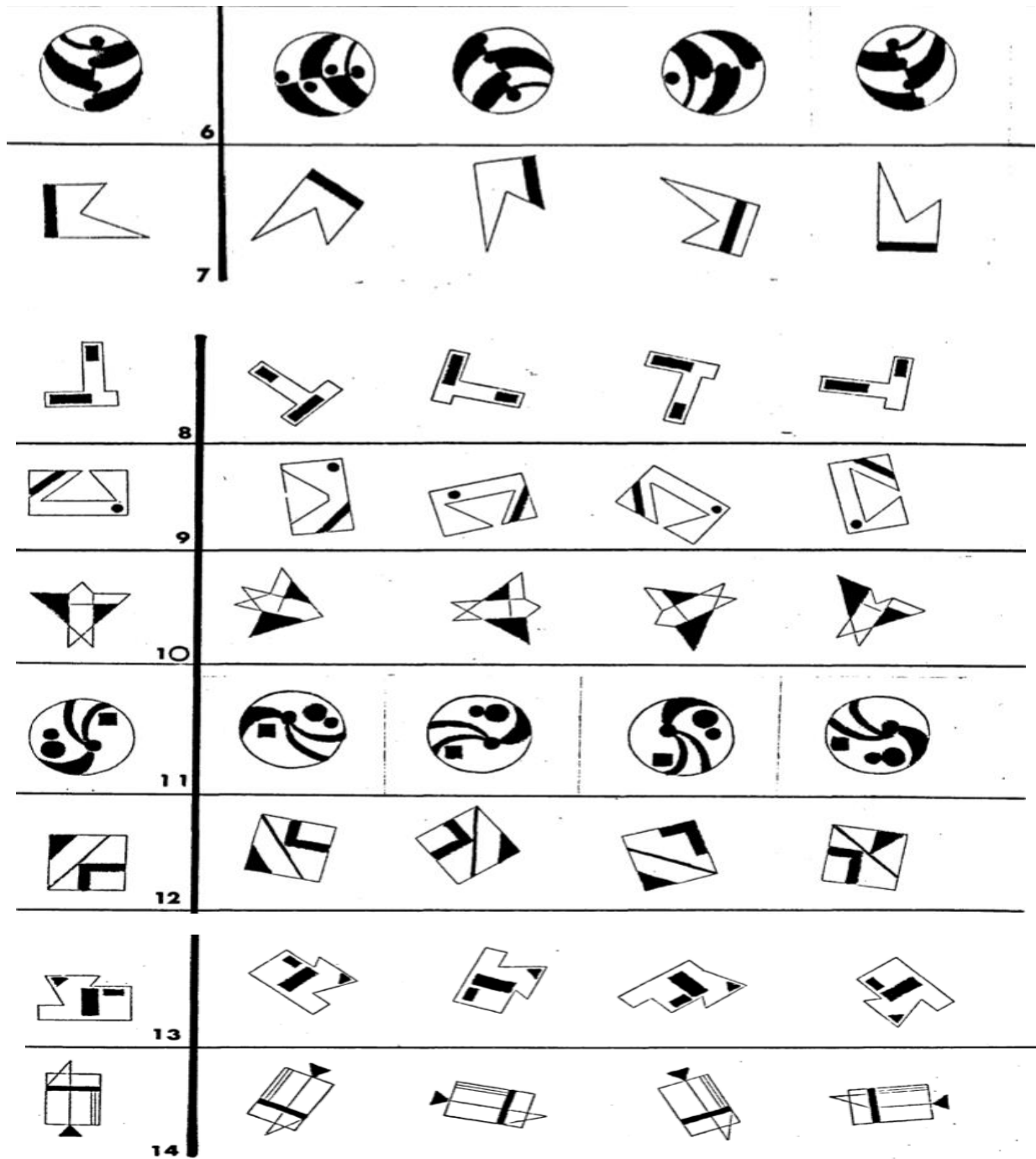
Ann R. Karnovsky, Ph.D.

## Appendix D

**PsycTESTS**

**Perceived Stress Questionnaire**
Version Attached: Full Test

PsycTESTS Citation:
Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. (1993). Perceived Stress Questionnaire [Database record]. Retrieved from PsycTESTS. doi: http://dx.doi.org/10.1037/t10467-000

Instrument Type:
Inventory/Questionnaire

Test Format:
Responses are recorded on a 4-point scale where 1 = Almost Never, 2 = Sometimes, 3 = Often, and 4 = Usually.

Source:
Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. (1993). Development of the Perceived Stress Questionnaire: A new tool for psychosomatic research. Journal of Psychosomatic Research, Vol 37(1), 19-32. doi: 10.1016/0022-3999(93)90120-5, © 1993 by Elsevier. Reproduced by Permission of Elsevier.

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PsycTESTS™ is a database of the American Psychological Association

**PsycTESTS**®

**Perceived Stress Questionnaire**
**PSQ**

Items

*Instructions for the General questionnaire* :  For each sentence, circle the number that describes how often it applies to you in general, *during the last year or two.*  Work quickly, without bothering to check your answers, and be careful to describe your life *in the long run.*

| | Almost never | Sometimes | Often | Usually |
|---|---|---|---|---|
| 1. You feel rested | 1 | 2 | 3 | 4 |
| 2. You feel that too many demands are being made on you | 1 | 2 | 3 | 4 |
| 3. You are irritable or grouchy | 1 | 2 | 3 | 4 |
| 4. You have too many things to do | 1 | 2 | 3 | 4 |
| 5. You feel lonely or isolated | 1 | 2 | 3 | 4 |
| 6. You find yourself in situations of conflict | 1 | 2 | 3 | 4 |
| 7. You feel you're doing things you really like | 1 | 2 | 3 | 4 |
| 8. You feel tired | 1 | 2 | 3 | 4 |
| 9. You fear you may not manage to attain your goals | 1 | 2 | 3 | 4 |
| 10. You feel calm | 1 | 2 | 3 | 4 |
| 11. You have too many decisions to make | 1 | 2 | 3 | 4 |
| 12. You feel frustrated | 1 | 2 | 3 | 4 |
| 13. You are full of energy | 1 | 2 | 3 | 4 |
| 14. You feel tense | 1 | 2 | 3 | 4 |
| 15. Your problems seem to be piling up | 1 | 2 | 3 | 4 |
| 16. You feel you're in a hurry | 1 | 2 | 3 | 4 |
| 17. You feel safe and protected | 1 | 2 | 3 | 4 |
| 18. You have many worries | 1 | 2 | 3 | 4 |
| 19. You are under pressure from other people | 1 | 2 | 3 | 4 |
| 20. You feel discouraged | 1 | 2 | 3 | 4 |
| 21. You enjoy yourself | 1 | 2 | 3 | 4 |
| 22. You are afraid for the future | 1 | 2 | 3 | 4 |
| 23. You feel you're doing things because you have to not because you want to | 1 | 2 | 3 | 4 |
| 24. You feel criticized or judged | 1 | 2 | 3 | 4 |
| 25. You are lighthearted | 1 | 2 | 3 | 4 |
| 26. You feel mentally exhausted | 1 | 2 | 3 | 4 |
| 27. You have trouble relaxing | 1 | 2 | 3 | 4 |
| 28. You feel loaded down with responsibility | 1 | 2 | 3 | 4 |
| 29. You have enough time for yourself | 1 | 2 | 3 | 4 |
| 30. You feel under pressure from deadlines | 1 | 2 | 3 | 4 |

**PsycTESTS**®

**Perceived Stress Questionnaire**
**PSQ**

Items

*Instructions for the Recent questionnaire*
For each sentence, circle the number that describes how often it applied to you *during the last month.*
Work quickly, without bothering to check your answers, and be careful to consider only *the last month.*

*Score*  5-circled number for items 1, 7, 10, 13, 17, 21, 25, 29
Score circled number for all other items
PSQ Index = (raw score—30)/90.

PsycTESTS™ is a database of the American Psychological Association

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# Appendix E

**PsycTESTS**

**State Mindfulness Scale**
Version Attached: Full Test

PsycTESTS Citation:
Tanay, G., & Bernstein, A. (2013). State Mindfulness Scale [Database record]. Retrieved from PsycTESTS. doi:
http://dx.doi.org/10.1037/t29421-000

Instrument Type:
Rating Scale

Source:
Tanay, Galia, & Bernstein, Amit. (2013). State Mindfulness Scale (SMS): Development and initial validation.
Psychological Assessment, Vol 25(4), 1286-1299. doi: 10.1037/a0034044

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**PsycTESTS**

**State Mindfulness Scale**
**SMS**

Items

| | |
|---|---|
| 7. | I noticed pleasant and unpleasant emotions. |
| 13. | I noticed pleasant and unpleasant thoughts. |
| 14. | I noticed emotions come and go. |
| 1. | I was aware of different emotions that arose in me. |
| 5. | I felt aware of what was happening inside of me. |
| 21. | I was aware of what was going on in my mind. |
| 18. | I felt closely connected to the present moment. |
| 17. | I had moments when I felt alert and aware. |
| 8. | I actively explored my experience in the moment. |
| 12. | I felt that I was experiencing the present moment fully. |
| 2. | I tried to pay attention to pleasant and unpleasant sensations. |
| 22. | It was interesting to see the patterns of my thinking. |
| 4. | I noticed many small details of my experience. |
| 19. | I noticed thoughts come and go. |
| 3. | I found some of my experiences interesting. |
| 16. | I noticed physical sensations come and go. |
| 23. | I noticed some pleasant and unpleasant physical sensations. |
| 15. | I noticed various sensations caused by my surroundings (e.g., heat, coolness, the wind on my face). |
| 9. | I clearly physically felt what was going on in my body. |
| 20. | I felt in contact with my body. |
| 10. | I changed my body posture and paid attention to the physical process of moving. |

**Appendix F**

Thank You Statement

Thank you for taking the time to complete this survey for my class project at Lindenwood

University. The hypothesis of this project states that stress will significantly reduce after

listening to the meditation music while mindfulness scores will significantly increase. The last

hypothesis states that electronic dance music will not improve either measure. Results would

then add to the understanding of whether or not just listening to meditation music can bring any

benefits. Knowing how either genre of music affects your emotional state or mental function can

in turn possibly influence you to better determine which music is more beneficial to listen to.


If you would like to see the results of my survey, please feel free to contact me using the contact

information below. Again, thank you very much for your time and effort!


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## Appendix G

Table 1

| Stress Levels | | |
|---|---|---|
| | ZEN | EDM |
| Mean | 0.321428571 | -0.846153846 |
| Variance | 13.55952381 | 19.33538462 |
| Observations | 28 | 26 |
| Pooled Variance | 16.33637997 | |
| Hypothesized Mean Difference | 0 | |
| df | 52 | |
| t Stat | 1.060665501 | |
| P(T<=t) one-tail | 0.146871834 | |
| t Critical one-tail | 1.674689154 | |
| P(T<=t) two-tail | 0.293743668 | |
| t Critical two-tail | 2.006646805 | |

**Appendix H**

Table 1

| Mindfulness Scores | | |
|---|---|---|
| | ZEN | EDM |
| Mean | 1.642857143 | 1.153846154 |
| Variance | 4.312169312 | 9.015384615 |
| Observations | 28 | 26 |
| Pooled Variance | 6.573330516 | |
| Hypothesized Mean Difference | 0 | |
| df | 52 | |
| t Stat | 0.70031704 | |
| P(T<=t) one-tail | 0.243425499 | |
| t Critical one-tail | 1.674689154 | |
| P(T<=t) two-tail | 0.486850999 | |
| t Critical two-tail | 2.006646805 | |

**Appendix I**

Table 1

| Zen Music | PreStress | Poststress |
|---|---|---|
| Mean | 15.3333333 | 15.5925926 |
| Variance | 19.6923077 | 10.7891738 |
| Observations | 27 | 27 |
| Pearson Correlation | 0.56643341 | |
| Hypothesized Mean | 0 | |
| df | 26 | |
| t Stat | -0.3604448 | |
| P(T<=t) one-tail | 0.36071319 | |
| t Critical one-tail | 1.70561792 | |
| P(T<=t) two-tail | 0.72142638 | |
| t Critical two-tail | 2.05552944 | |

**Appendix J**

Table 1

| Column1 | Column2 | Column3 |
|---|---|---|
| EDM | | |
| | PreStress | PostStress |
| Mean | 16.4 | 14.96 |
| Variance | 20.8333333 | 11.3733333 |
| Observations | 25 | 25 |
| Pearson Correlation | 0.702159 | |
| Hypothesized Mean | 0 | |
| df | 24 | |
| t Stat | 2.2125063 | |
| P(T<=t) one-tail | 0.01834745 | |
| t Critical one-tail | 1.71088208 | |
| P(T<=t) two-tail | 0.03669491 | |
| t Critical two-tail | 2.06389856 | |

**Appendix K**

Table 1

| Zen Music | PreMind. | PostMind. |
|---|---|---|
| Mean | 14.4444444 | 16.0740741 |
| Variance | 7.33333333 | 7.53276353 |
| Observations | 27 | 27 |
| Pearson Correlation | 0.69918135 | |
| Hypothesized Mean | 0 | |
| df | 26 | |
| t Stat | -4.0038198 | |
| P(T<=t) one-tail | 0.00023144 | |
| t Critical one-tail | 1.70561792 | |
| P(T<=t) two-tail | 0.00046287 | |
| t Critical two-tail | 2.05552944 | |

**Appendix L**

Table 1

| Column1 | Column2 | Column3 |
|---|---|---|
| EDM | | |
| | PreMind. | PostMind. |
| Mean | 14.72 | 15.56 |
| Variance | 5.21 | 4.75666667 |
| Observations | 25 | 25 |
| Pearson Correlation | 0.32575521 | |
| Hypothesized Mean | 0 | |
| df | 24 | |
| t Stat | -1.6197835 | |
| P(T<=t) one-tail | 0.05917299 | |
| t Critical one-tail | 1.71088208 | |
| P(T<=t) two-tail | 0.11834598 | |
| t Critical two-tail | 2.06389856 | |

## Appendix  M

|            | Music           | Total |
|------------|-----------------|-------|
|            | Everything      | 1     |
| Type       | Upbeat/ Dance   | 1     |
| Type       | Instrumental    | 1     |
| Type       | Acoustic        | 1     |
| Type       | Slow/ Sad       | 1     |
| Genre      | Pop             | 11    |
| Genre      | Hip Hop         | 6     |
| Genre      | Indie           | 2     |
| Genre      | Rap             | 3     |
| Genre      | R&B             | 1     |
| Genre      | Country         | 9     |
| Genre      | Reggae          | 2     |
| Genre      | Rock            | 3     |
| Genre      | Electronic      | 1     |
| Genre      | Alternative     | 4     |
| Genre      | Folk            | 2     |
| Genre      | New Age         | 1     |
| Genre      | Classical       | 1     |
| Subgenre   | EDM             | 2     |
| Subgenre   | Techno          | 1     |
| Subgenre   | Synthwave       | 1     |
| Subgenre   | Dubstep         | 1     |
| Subgenre   | Tropical house  | 1     |
| Subgenre   | Punk            | 1     |
| Subgenre   | Chill Pop       | 1     |
| Subgenre   | Bluegrass       | 1     |
| Subgenre   | Classic Rock    | 3     |
| Subgenre   | Alternative  Rock | 1   |

## Arming Airline Pilots

*Tyler Monroe[5]*

*The issue whether to arm pilots has been a great debate for the last decade. With terrorism on the rise, the idea of arming pilots has also became an interesting subject. The purpose of this study was to examine the opinions of individuals about arming airline pilots. The article was about the past issues of gun control in America. Once the participants read the letter, then they will answer questions based off of what they read. Then the target question was asked, which was whether the participants believe the pilot shown should be armed. The variable that was manipulated was the race of the pilot shown. Each email had a picture of a pilot on it. The pilot either was Caucasian, African American, or Middle-eastern. They were be male pilots. The race of the pilot inserted in the letter was randomly assigned to each participant. I believe that the race of the pilot will have an impact on the readers' decision whether to arm the pilot or not. My hypothesis is that the participants will agree to arm a pilot if they received the picture of a Caucasian pilot along with the email. I also believe that participants will least likely choose to arm the Arabic pilot. Results showed that the participants did not want to arm the Arabic pilot vs. the other two races.*

The purpose of this study is to examine the opinions of individuals about arming airline pilots. Also in America, race inequality has risen over the years. Race inequality is showing no signs of slowing down, so it is a very important variable to always consider when discussing topics. This study will also look at race factors, and it will examine if race has an impact on participants decision to arm pilots or not.

Fraher (2004) conducted a study about why U.S airline pilots want to carry guns (Fraher, 2014). Fraher used a field theory, systems psychodynamics, and a participant observation to

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analyze defense mechanisms created after the attack on the Twin Towers in 2001. Fraher's main

hypothesis was that pilots desired the right to be armed because of internal and external

pressures, personal valences, and work life changes. This study examined collected data from

different perspectives over a 20 year span. Many formulated findings/hypothesis were presented,

but one that stuck out was the "American hero myth." This basically means that American wants

to be the savior of situations. Fraher argued that pilots want to be armed after 9/11 so they can

potentially stop a catastrophic event from happening again. Before 9/11, there was not a push for

pilots to be armed. However, afterwards there were immediate pushes to arm pilots. Other

theories Fraher presented were that pilots did not feel safe after 9/11, and pilots developed major

anxiety after 9/11(Fraher, 2014).

After 9/11, people had major fears of terrorism. Researchers Cameron, Maslen, and Todd

(2013) conducted a study examining the dialogic construction of the self and other in response to

terrorism. The study consisted of 12 different study groups and the researchers wanted to

examine of the effects terrorism had on individuals' personal and social and landscapes. The

most common emotional response found in response to terrorism was the fear of violence around

everyday activities (Cameron, Maslen, & Todd, 2013). The findings of these two different

studies can correlate with each other. Everyone has a fear of terrorism because it is growing.

People have anxiety and a substantial amount of fear. After the attack on the Twin Towers, pilots

(as well as everyone else) became very fearful of the event happening again. Pilots where

probably more afraid because the event happened at their place of work. After 9/11 occurred,

pilots grew fears of terrorism, so the push to be armed came about.

Arming pilots is a very hard decision to make. People may have developed a fear of

individuals having a weapon on board after 9/11. Would individuals will safe if only certain

races was armed? Researchers Winter, Rice, and Mehta (2014) conducted a study examining the

trust in pilots. A sample on Indian participants were given a description about the pilot of their

plane that they would be flying with (the flight was imaginary). The participants were then asked

to rate their level of trust in the pilot based on variables such as age, weight, gender, and

ethnicity. The researchers believed the results of the study were likely impacted by social

stigmas. The study consisted of 56 males, and 46 males. Results showed that the participants

showed extremely low levels of trust in Arabic pilots. The researchers believed this was due to

emotional stressors of terrorism (Winter, Rice, & Mehta, 2013). After 9/11, the trust in Arabic

pilots most likely diminished greatly. The trust in Arabic people depleted no matter what

occupation they had. Following 9/11, individuals probably did not feel safe at all if the pilot was

Arabic because of the threat of terrorism. Researchers Saleem and Anderson (2013) conducted a

study to examine the effects of stereotypes within violent contexts on attitudes, perceptions, and

affect. There were two experiments conducted in the study. In one experiment, the participants

played an Arab terrorist game (violent). For the other experiment, individuals played an anti-

terrorism videogame with Arab characters. For the participants who played the Arab terrorism

game, they were more likely to draw "typical" Arabs with stereotypic traits, negative affect, and

weapons. For the individuals who played the non-violent game, they still showed increase anti-

Arab attitudes. The participants were asked to draw pictures of an Arabic man, Arabic female,

Caucasian man, and a Caucasian female. The drawings for both experiments showed strong

negative views of the Arabic people. The Caucasian males were usually drawn with smiles on

their face. However, Arabic males were drawn with evil faces and bombs (Saleem& Anderson,

2013).

American airline pilots are usually white. This can lead to less trust in minority pilots

because society has never really experienced flying with them. When new situations happen,

people usually feel uncomfortable. Why are the pilots mostly white? Researchers Barucky and

Stone (1999) wanted to find possible answers. The United States Air Force expressed their

concerns with the lack of minority pilots in the workforce. Traditionally, there have been a very

small percent of African-American and Hispanic pilots. Researchers gathered information by

focus group interviews with African-American and Hispanic pilots and trainees at the Air Force

Academy. The study consisted of 38 subjects. The results showed that the minorities had a lack

of interest as a military officer, especially for the most qualified students. A lack of interest in

flying was also noted. Other reasons were minorities had a distrust with the military, so they did

want to commit to multi—year agreements. Findings also show that a lack of interest is flying

can be due to a lack of general knowledge about aviation (Bucky & Stone, 1999).

The focal point of my study was to examine people's opinions about arming certain pilots. I hypothesize that the participants will feel more comfortable arming a Caucasian pilot over an African-American and Arabic pilot. An online survey was created to test my hypothesis.

## Method

### Participants

The participants of this study were individuals in the age range between 18 and 65. There were 26 women in the study, and 37 men in the study. The races of participants were African-American, Caucasian, and Asian .There was a sample size of 53 participants in the survey. The recruitment process was mainly conducted through social media. A link was posted on Facebook and Instagram, asking individuals to take part in the survey. It was free will, so participants had the option to not take part in the survey. No physical compensation was awarded to the participants, but this project can provide healthy societal benefits for the future.

### Materials/Procedure

A computer and online survey were the main materials used for this study (see Appendix A). The survey through qualtrics was created as an online study, so participants had to use a computer (or any technology accessible to the internet) to take part in the study. The researcher did not provide a specific computer to use, so the participants had the liberty to take the survey where ever they chose to. The survey consisted of a make email from a pilot that was sent to the Air Traffic Control Center. The pilot was explaining why he would want to be armed while

flying. There were three different versions of the email. Each email had a picture of the pilot who was either African-American, Caucasian, or Arabic. After the email was read, the participants were asked to answer 15 questions. The questions were about safety while flying, and trust in the pilot. The procedure was completely random, so the participants was not aware that there were three different pilots. Before reading the email, the participants had to agree to a consent statement (see Appendix B). It was the participant's decision to agree or disagree with the statement. If they agreed, then they continued with the study. After the survey was complete, a feedback statement was given (seen Appendix C). The feedback statement thanked the participants for their participation. It also explained the true nature of the study.

## Results

My hypothesis is that the participants will agree to arm a pilot if they received the picture of a Caucasian pilot along with the email. A chi-square analysis to examine how likely people are to arm pilots based on race was conducted. The results revealed that participants responses greatly varied by race, $X < (2) = 19.26$, $P < .005$

## Discussion

My hypothesis was supported by data. Participants did not want to arm the Arabic pilot as suspected. The African-American and Caucasian pilots were not significant. Even though data supported my claim, there where limitations to this study. The sample wise for very small. Also, better pictures of the pilots of each race could have been selected. Also, the mock letter was

probably too long for the participants to read. However, these results still do hold value. The

results show that there is still racial inequality in America. Only one participant elected to arm

the Arabic pilot. I plan to further this study with hopefully a bigger sample.

**Appendix A**

Dear US Department of Transportation,

I am an airline pilot who is writing today to state my opinions on a specific issue. Over the last decade, the debate of whether to arm airline pilots has been intensifying. Many people are against it, and many people are for it. Terrorism is a huge problem in today's society. On the other hand, people understandably want to feel safe wherever they go. Stuck thousands of miles up in the air, it is hard to be in control of one's life. As an airline pilot, I believe guns should be allowed in the cockpit. I also believe that it should be optional for the pilot to choose to have the gun or not. If the pilots had guns, then the 9/11 probably would not have happen. The pilots would have had the opportunity to control the terrorists, and potentially save innocent lives. I believe passengers will feel safer on the plane I am flying if I had a gun. I believe I would feel comfortable flying with a gun near me. I am a firm believer in the second amendment, and I believe flying with guns will make the passengers feel safer.

1. On average, how often do you fly by plane a year?

2. On a scale from 1-5, how safe do you feel when flying? (I feeling extremely not safe, and 5 feeling extremely safe)

3. In comparison to other means of travel, how safe do you think it is to fly?

Flying is much safer than other means of travel

Flying is safer than other means of travel

Flying is just as safe as other means of travel

Flying is less safe than other means of travel

Flying is much less safe than other means of travel

4. After reading this letter, would you arm this pilot? Yes or no?

5. If you would arm him, why? If not, why not?

6. Would you feel comfortable if the pilot had announced he had a gun in the cockpit? Why, or

why not?

7. How old are you?

8. What is your race?

9. What State are you from?

10. What is your gender?

**Appendix B**

1. You are invited to participate in a research study conducted by Tyler Monroe for a class project in the department of Psychology at Lindenwood University, under the guidance of Dr. Michiko Nohara-LeClair. The purpose of this study is to examine the opinions of individuals about arming airline pilots

2. Your participation will involve completing this anonymous online survey. The amount of time involved in your participation will be approximately 15 minutes.

3. There are no anticipated risks associated with this research.

4. There are no direct benefits for you participating in this study. If you are in the LPP you will receive one extra credit point in the course for which you signed up for the LPP. You will receive extra credit simply by virtue of completing this informed consent; you are free to withdraw your participation at any time without penalty. Participants who are not part of the LPP will receive no compensation beyond the possible benefits listed above. However, your participation is an opportunity to contribute to psychological science.

5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw.

6. Your responses will be anonymous. No information that identifies you personally will be collected, not even your IP address. The primary investigator will not be able to identify your answers as belonging to you; data will be examined at the group level only. All data will be kept securely, in accord with the standards of the University, Federal regulations, and the American Psychological Association.

7. If you have any questions or concerns regarding this study, you may call the Investigator, Tyler MONROE, at 314-503-4845 or the Supervising Faculty, Dr. Nohara-LeClair, at 636-949-4519. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Lindenwood's Provost, Dr. Marilyn Abbott at mabbott@lindenwood.edu or 636-949-4912.

**Appendix C**

Thank you for taking the time to complete this survey for my class project at Lindenwood

University. I wanted to see if race had an impact on individuals' decision to arm pilots. I

manipulated the race of the pilot. There were three versions of this project. The survey either

contained a Caucasian, African American, or Middle-Eastern pilot. The survey that you were

given was completely random. I hypothesized that the participants would whether arm the

Caucasian pilots instead of the other two races. I chose to do this study to potentially show that

racism exists on many levels. Gun control is a big issue in today's society, so if most of the

participants chose to only arm the Caucasian pilot, then that raises an issue.

If you would like to see the results of my survey after December 4, 2016, please feel free to

contact me using the contact information below. Again, thank you very much for your time and

effort!

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# The Impact of Appearance on Students' Opinions of Others

*Kelsey Smith[6]*

*This study was conducted in order to test if people are able to correctly identify a person's sexual orientation based on seeing a photo alone. This study used 12 stimulus photos, 6 of men and 6 of women, to see if participants would be able to correctly assume the depicted individuals sexual orientation. I hypothesized that participants would not be able to properly identify an individual's sexual orientation based off of a photo alone. I also hypothesized that conservativeness would be positively correlated with an increased confidence score. My final hypothesis was that stimuli photos that featured individuals with unconventional appearances would be identified as not heterosexual. Unconventional appearances referred to multiple piercings, unnatural hair colors, and hair length. The study was conducted online through Qualtrics. Participants were recruited through Facebook, a social media website. Results found that individuals are able to identify an individual's sexual orientation better than chance alone. The results also found that conservativeness was not positively correlated with an increased confidence score. Finally, individuals who had unconventional appearances were more likely to be identified as not heterosexual.*

There is little doubt that individuals who are considered part of a minority of a population face hardships that individuals in a majority do not face. Individuals of the lesbian, gay, bisexual, transsexual (LGBT) community have been discriminated against for many years. It is important to note that people are not only discriminated against for actually being a part of the LGBT community, but also when they are perceived to be a part of this community (Stern, West, Jost, & Rule, 2013). Espelage and Swearer (2008) found that 26% of boys in 9th through 11th grade were bullied by being called gay. Regardless of whether these boys were part of the

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LGBT community or not, these boys reported the highest levels of both physical and verbal

aggression.  The reason I chose this research project is because people are bullied for being

"gay," regardless of if they are really gay or not.  I believe it is important to show that "gaydar,"

a tool people like to use, as a reason to suspect an individuals sexual preference, is not always

accurate.

I created this study because as someone who is a part of this community, I see the

discrimination that is present every day.  The words "you are so gay" and "that is so gay" are

used as insults towards younger children, which are linked to psychological turmoil in young

men and boys alike (Espelage & Swearer, 2008).  The fact is that in these instances, being gay is

being considered inherently bad.  No junior high boy gets excited when his classmates call him a

faggot, because it is not a socially desirable label.  These labels can lead to many negative

consequences for the individuals who are being targeted.

Espelage and Swearer (2008) found that homophobic rhetoric in schools leads to

increased psychological distress and an increase in drug and alcohol use for LGBT students.  It

was found that 90% of LGBT students in an online study done by Harris Interactive & the Gay,

Lesbian, and Straight Education Network [GLSEN], (2005) had been harassed or assaulted in the

last year.  Furthermore, this study found that LGBT students were three times as likely to feel

unsafe in school compared to their non-LGBT counterparts (Harris Interactive & GLSEN as

cited in Espelage & Swearer, 2008).  Not only are LGBT students more prone to bullying and

harassment, they are also more prone to parental rejection and suicide as well (Wylie, Corliss,

Boulanger, Prokop, & Austin, 2010). Wylie et al. (2010) found that not only do individuals

suffer from psychological distress, they can suffer from posttraumatic stress disorder, depression,

and anxiety. These individuals can manifest these troubles into physical symptoms, such as

headaches, dizziness, and vomiting. Studies have also show that transgender students are at a

high risk of sexual assault; with between 10-69% of transgender respondents stating that they

had been sexually assaulted because of their gender identity (as cited in Wylie et al., 2010).

According to the American Civil Liberties Union (2017), 28 states in the United States have no

nondiscrimination clause against individuals in the LGBT community getting fired from their job

and being denied housing. These inequalities can be addressed when we are aware of our biases.

This leads to the development of my study. As the president of Lindenwood's

Gay/Straight Alliance, it is important to me that, as a campus, LGBT students can coexist with

non-LGBT students peacefully. This means addressing stereotypes and generalizations we make

about people we see during our daily routine. Evans and Herriot (2004) found that as non-LGBT

students develop supportive attitudes towards LGBT students, there is a more positive campus

climate. As a place of learning, this is important because positive learning environments can

lead to better academic success and help improve student's confidence to continue towards

success and goal making (Li, 2012).

Sexual orientation is unique because it is perceptually ambiguous in comparison to things

like race (Stern et al., 2013).  Instead of using direct stimuli (such as skin pigmentation) to

categorize a certain individual, we use indirect stimuli to categorize them.  Indirect stimuli can

be easier described as some stereotypical ideas reserved about gay individuals, such as being

flamboyant, drama lovers, or using hand gestures.  It was found that men who have more

traditionally feminine features were more likely to be seen as part of the LGBT community

(Stern et al., 2013).  This is has been shown in political ideologies; because multiple studies

show that conservative have greater inclination to be confident when faced with a decision-

making task (Stern et al., 2013).  Connecting this to perception of sexuality, those who consider

themselves conservatives politically should then be more likely to make decisions based on

stereotypes of gay men and women rather than assess all of the stimuli.

While not all individuals who are part of the LGBT community are what would be

considered a stereotypical gay person, there are individuals who do submit to these stereotypes.

Studies have found that sexual orientation can be correctly identified through video clips and

vocal stimuli (Rule, Ambady, Adams, & Macrae, 2008).  Because of this, it is important to know

what features are the primary determinants of perception.  Hair is considered the most

distinguishing characteristic when it comes to the categorization of individuals (Rule, et al.,

2008).  This could be because hair is one of the easiest facial qualities to manipulate (compared

to the nose or eyes, which would require extensive surgery to change).  Rule et al. (2008) found

that many of the participants who were accurately choosing men's sexual orientation during a study had been guessing during the duration of the study, which means they were leaving it up to chance.  This is important to note because while these guesses may have been correct, they were still assumptions, not factual driven conclusions.

My hypothesis is that individuals will not be able to correctly identify student's sexual orientation based on appearance alone.  I also have a hypothesis that individuals who have a political leaning towards conservative ideology will be more confident in their answers than individuals who lean toward liberal ideology.  My final hypothesis is that the pictures of individuals who have unconventional appearances for their perceived sex will be more likely to be selected as not heterosexual.

The survey was conducted online through Qualtrics.  The survey consisted of 12 stimulus photos where participants had to identify sexual orientation as well as how confident they were in their answer.  After answering these questions they were asked demographic questions, including their political leanings.  Finally, the participants were asked if they knew anyone in the LGBT community.  If they responded yes they were asked how that might have influenced their decisions; if they responded no they were asked how it might have not influenced their decisions.

## Method

### Participants

I had 17 participants.  This sample was collected through Facebook.  There were 7 male,

8 female, 1 who did not answer, and 1 non-binary participants.  A majority, 13, of the

participants were Caucasian; there was also 1 African-American participant, 1 Hispanic/Latino

individual, 1 who did not answer, as well as 1 individual of mixed ethnicities. When asked how

religious the participants would rate themselves, 31.25% responded as being probably not being

religious and 25% reported themselves as may or may not being religious.  A majority of the

participants have attended Lindenwood for four years.  There were 3 participants that had

attended Lindenwood for two years, three years, and five years. Participants responded that they

were more liberal (the mean being 24.64, where 1 is liberal and 100 is conservative.)

### Materials and Procedure

**Stimulus Photos.** I asked individuals to be depicted in my survey. The stimulus photos

(see Appendix A) were chosen from acquaintances from my high school, in Lake Forest,

California; this way there was less of a chance that the participant had prior knowledge about the

individuals in the stimulus photos. I sent these individuals a message through Facebook asking if

they would be willing to be depicted in my upcoming research project (see Appendix B).  Once

the individual agreed to be part of the study I looked through his or her profile pictures on

Facebook for the most recent photo that featured him or her alone, this way there was no

confusion about who the participant was being asked to judge. I chose 6 female and 6 male

models, this way there would be an equal number of models from each gender. Two of the

female models and two of the male models that were depicted had unconventional appearances,

meaning they had multiple piercings or tattoos, unnaturally colored hair, or other physical

appearances that did not conform to the main stream of society.  Four of the female models and

male models did not have unconventional appearances.  Six of the pictured individuals reported

being lesbian, gay, or bisexual; 6 of the pictured individuals reported being heterosexual.  Using

a variety of individuals ensured that one type of sexuality was not represented more than another,

and using both male and female models ensured that real life conditions are simulated.

**Online Survey.** Once getting approval from all the individuals, I created my online

survey on Qualtrics.  The first item on this survey was an informed consent statement (see

Appendix C), which participants had to agree to before they were able to take the survey.  The

first question block on the survey (see Appendix D) asked whether or not the participant is a

Lindenwood student.  If the participant was a Lindenwood student, they would be directed to

answer the rest of the questions on the survey.  If the participant was not a Lindenwood student,

they would be sent to the debriefing statement (see Appendix E).  Since this was an online

survey, participants were able to take it in a multitude of settings.  The participants were shown

stimulus photos and selected what they believed the individual in the stimulus photos sexuality to

be.  They would then be directed to a Likert scale of how confident they were in their opinion.

By using a Likert scale to record confidence, it helped show if there were commonalities

between participants and certain depicted individuals.  This continued 11 times until the

participant had seen all 12 photos.  They were then given a short demographic survey (see

Appendix F).  In this demographic survey they were asked if they knew anyone that is part of the

LGBT+ community.  If they answered yes to this question, they were then directed to another

series of questions asking whether or not they believed that knowing someone in the LGBT+

community influenced their decision making, and if so why.  If they answered no they were then

sent to answer demographic questions.  After the participant had completed the survey they were

directed to the debriefing statement and thanked for their participation.

## Results

In order to test my first hypothesis I conducted a chi-square analysis.  When measuring

the correct identification of individuals it was found that participants were able to correctly

identify the stimuli photos sexual orientation better than chance, $\chi^2_{(1)}=9.33$, p<.005.  A

correlational analysis was used in order to see if conservativeness was positively correlated with

increased confidence in answers.  This hypothesis was also not supported, $r_{(19)}= -.187$.  For my

final hypothesis I used a chi-squared analysis again.  Individuals who were labeled as having

unconventional appearances were more likely to be labeled as not heterosexual, $p < .005$,

supporting my hypothesis.

## Discussion

After conducting this survey I noticed that stimuli photos that were of women were identified incorrect more often than men.  If I were to conduct this study again, I would be curious to see if there is a sex difference when it comes to being able to correctly identify a stimuli photos sexual orientation.  One of the limitations of my study was that a majority of the participants were liberal.  This made it hard to test if conservativeness affected confidence, because no one identified as conservative.  Finally, the results to this survey are limited because there was a small sample size.  If I were to conduct this again I would consider going through the Lindenwood Participant Pool, as well as reaching out to other local universities.

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## Appendix A

Stimulus Photos
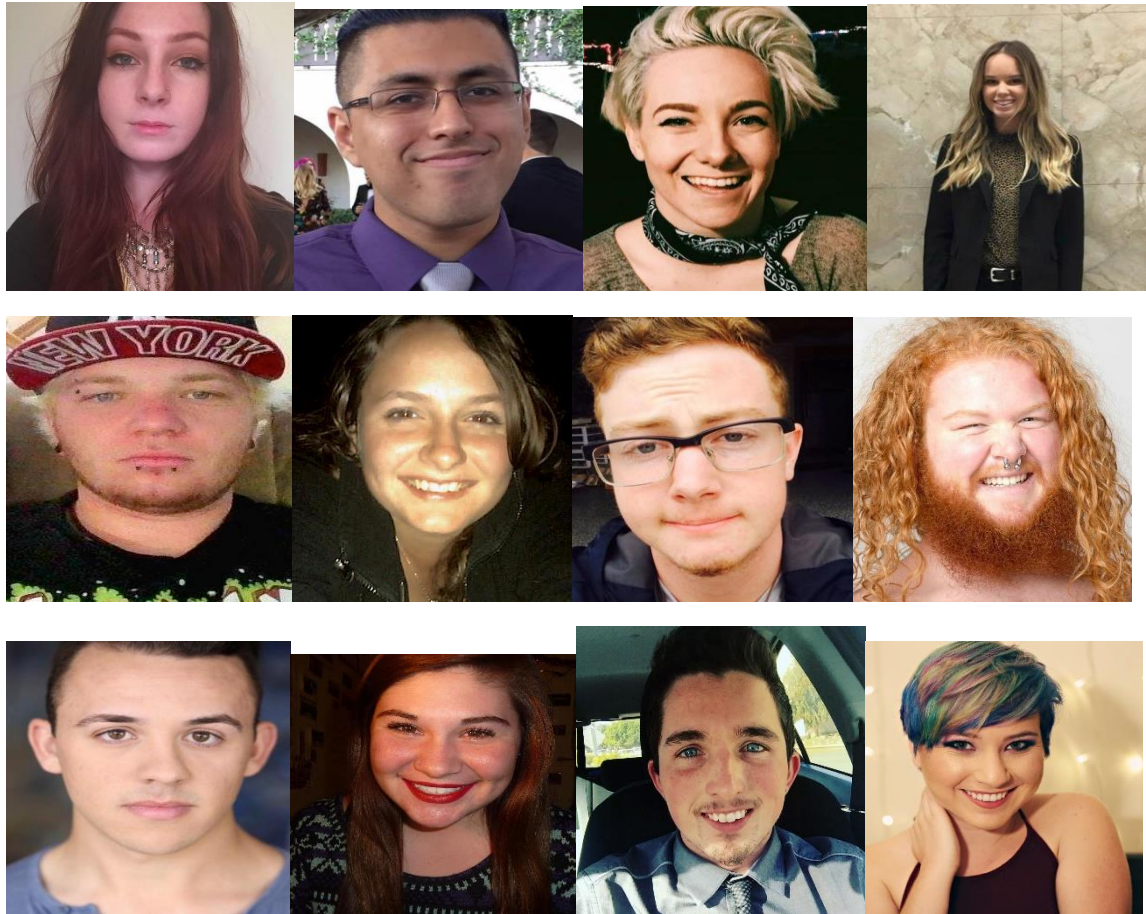
**Appendix B**

Letter Sent to Depicted Individuals

Hey! So I'm doing a research project at my university about appearance and stereotypes.

Basically, I'm theorizing that people will incorrectly judge people's sexual orientation based on their appearance alone (because obviously you can't tell someone is part of the LGBT community by just looking at them 90% of the time.) I was wondering if you'd be willing to let me use your picture as one of the photos that people will have to be assuming their orientation.

The goal of my research is to show that you can't just judge someone by his or her appearance, because you will most likely be wrong. There will be no identifying information about you (meaning I won't give your name, you sexual orientation, where you're from, etc.) I want to choose people not from our university for a few reasons; mostly because I don't want the person I am testing to have prior knowledge of the depicted person (aka they had a class with them and they all ready know their orientation.) I'm reaching out to you because in this current political climate I think it's important to do research like this to prove our extremely conservative Americans that looks are deceiving. I will obviously not use your photo if that make you uncomfortable, because I totally get that! If you have any questions I can answer them to the best of my abilities!

**Appendix C**

Informed Consent Form

## Introduction

The researchers are conducting this project are undergraduate students at Lindenwood University who are enrolled in the PSY40400: Advanced Research Methods course.

## Procedures

This survey asks you to respond to a few demographic items as well as questions asking whether you believe a depicted individual is heterosexual or not heterosexual.  This questionnaire will be conducted with an online Qualtrics-created survey, and should not take any more than 10-15 minutes of your time.

## Risks/Discomforts

There are no known risks associated with this study. If you do not feel comfortable completing any part of this survey, you are free to skip any questions or withdraw without penalty.

## Compensation and Benefits

By taking part in this study, you will earn bonus points toward your LPP participating course.  You will also gain experience taking part in a psychological survey project and potentially learn more about the field.  If you are interested in learning more about this project or would like to learn about the results of this project once completed, please contact Kelsey Smith at kas003@lionmail.lindenwood.edu

## Confidentiality

No personally identifying information will be collected, including your IP Address.  All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, and no one other than the researchers listed below and their course professor, Dr. Michiko Nohara-LeClair.  The data collected will be stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

**Questions about the Research**

If you have questions regarding this study, you may contact Kelsey Smith at kas003@lionmail.lindenwood.edu or direct your inquiries to the course professor, Dr. Nohara-LeClair at mnohara-leclair@lindenwood.edu or (636)949-4371.

**ELECTRONIC CONSENT:** Please select your choice below.
Clicking on the "Agree" button below indicates that:

• You have read the above information.
• You voluntarily agree to participate.
• You are at least 18 years of age or you are a minor but have a signed parental consent form filed with the LPP Office.

## Appendix D

Survey for Participants

Q2 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q4 How confident are you in your answer?

_____ Click to write Choice 1 (1)


Q7 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q8 How confident are you in your answers?

_____ Click to write Choice 3 (1)


Q10 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q11 How confident are you in your answer?

_____ Click to write Choice 3 (1)


Q13 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q14 How confident are you in your answer?

_____ Click to write Choice 3 (1)


Q16 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)

Q17 How confident are you in your answer?

_____ Click to write Choice 3 (1)


Q19 What do you believe this person's sexual orientation to be?

○  Heterosexual (1)

○  Not Heterosexual (2)


Q20 How confident are you in you answer?

_____ Click to write Choice 3 (1)


Q23 What do you believe this person's sexual orientation to be?

○  Heterosexual (1)

○  Not Heterosexual (2)


Q26 How confident are you in you answer?

_____ Click to write Choice 3 (1)


Q29 What do you believe this person's sexual orientation to be?

○  Heterosexual (1)

○  Not Heterosexual (2)


Q30 How confident are you in you answer?

_____ Click to write Choice 3 (1)


Q32 What do you believe this person's sexual orientation to be?

○  Heterosexual (1)

○  Not Heterosexual (2)


Q33 How confident are you in you answer?

_____ Click to write Choice 3 (1)

Q38 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q39 How confident are you in you answer?

_____ Click to write Choice 3 (1)


Q41 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q42 How confident are you in you answer?

_____ Click to write Choice 3 (1)


Q39 What do you believe this person's sexual orientation to be?

○ Heterosexual (1)

○ Not Heterosexual (2)


Q40 How confident are you in you answer?

_____ Click to write Choice 3 (1)

**Appendix E**

Debriefing Letter

Thank you for taking the time to complete this survey.  The questions on this particular survey allowed me to find out how perceptions of others can lead to bias.

I hypothesized that individuals who have unconventional appearances would be more likely to be labeled as not heterosexual.  Someone who breaks societal norms means someone who goes against what is considered the standard that most of society considers acceptable.  I also hypothesize that people will not be able to correctly identify whether someone is heterosexual or not heterosexual by looking at a picture alone.

Although I cannot provide you with individual findings due to the fact that this survey was conducted anonymously, I would be happy to answer any questions you may have about this study. Please feel free to contact me using the information below.

Thank you again for contributing data to my project!

Student Researcher:
Kelsey Smith: kas003@lionmail.lindenwood.edu

Faculty Supervisor:
Dr. Michiko Nohara-LeClair
636-949-4371
mnohara-leclair@lindenwood.edu

**Appendix F**

Demographic Survey

Display This Question:

    If Are you or anyone you know part of the LGBT+ community Yes Is Selected

Q35 Do you believe your familiarity with the LGBT+ community impacted any of your decisions?

○ Yes (1)

○ Unsure (2)

○ No (3)

Display This Question:

    If Do you believe this impacted any of your decisions? No Is Not Selected

Q36 How do you think knowing someone in the LGBT+ community may have impacted your decisions?

Display This Question:

    If Are you or anyone you know part of the LGBT+ community No Is Selected

Q49 How do you think not knowing anyone in the LGBT+ community may have impacted your decisions?

Q42 What is your gender identity?

○ Male (1)

○ Female (2)

○ Non-binary (3)

○ Other (4)

○ Prefer Not To Answer (5)

Q44 What is your ethnicity?

❍ White (1)

❍ Black or African American (2)

❍ Hispanic or Latino (3)

❍ American Indian or Alaska Native (4)

❍ Asian (5)

❍ Native Hawaiian or Pacific Islander (6)

❍ Other (7)

❍ Mixed (8)

Q45 Do you consider yourself religious?

❍ Definitely yes (1)

❍ Probably yes (2)

❍ Might or might not (3)

❍ Probably not (4)

❍ Definitely not (5)

Q46 How many years have you attended Lindenwood?

Q47 Would you consider yourself more liberal or conservative?

_____ Click to write Choice 1 (1)

**Autonomous Sensory Meridian Response (ASMR) in relation to**

**Flow, Relaxation, and Tingles**

Alfa Ramirez[7]

*Autonomous Sensory Meridian Response (ASMR) is a community mainly on Reddit where people have reported feeling tingle sensations like goosebumps after watching YouTube videos that contain triggers such as whispering, close personal attention, and crisp sounds. This study explored ASMR in relation to flow, tingles, and relaxation. The hypothesis is that flow, tingles, and relaxation will be positively correlated when listening to ASMR. Since ASMR is new and gaining more attention every day, this will add to the body of knowledge to the field. If it is found that there are positive correlations, there maybe a use for ASMR in therapeutic settings. Participants were recruited through the principal investigator's social media such as Reddit and Facebook. While there were 118 participants who took part in this study, there was no support for the hypothesis. There was a significant finding that participants felt relaxed after listening to ASMR. Therefore, ASMR still needs to be studied, and with the significant finding of relaxation, can begin to be tested to see if it helps people in therapeutic settings.*

*Keywords:* autonomous sensory meridian response, ASMR, flow, relaxation, tingles

Autonomous Sensory Meridian Response (ASMR) was coined in 2010 by Jennifer Allen

(Richard, 2016). It is defined as a physiological response than can produce tingles and feelings of

relaxation due to triggers (Poerio, 2016). Currently ASMR is a new phenomenon in psychology

that has just begun its scientific exploration. Some researchers are beginning to research the

strange occurrences that happen while listening to ASMR, while its popularity begins to grow

more and more every day.

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Very few years have passed by since the term ASMR came about, and what makes it so

interesting is how people not only feel tingles, but relaxation too. Among this, there are a variety

of factors that people have not even begun exploring in the scientific community. In the

following literature review, I will discuss of ASMR's impact in a plethora of interesting areas.

These areas include: the identity of ASMR culture, intimacy, affect, flow, relaxation, tingles, and

triggers.

The first area to explore within the ASMR community is its identity. What is ASMR, and

who are the people in this community? Have there been any real answers to these questions yet?

The first thing to establish is that the primary way to view ASMR videos are through YouTube

and ASMRReddit, that also links back to YouTube. Anderson (2015, p. 3), comments that

ASMR "creates a pleasure through a distant intimacy that relies on heteronormative gender roles

of care…" What he means is that women typically are the content creators of ASMR videos who

usually make 'personal attention' videos as a trigger. A trigger in the ASMR community is a

type of video that induces whatever response the audience may have, such as wood carving,

whispering, role-playing, etc. He also comments that in the ASMR community video stimulation

takes a backseat, while audio is the primary focus. Anderson (2015) attempted to support the

idea that people listen to ASMR because it is "an effective experience that demonstrates the links

between affect and emotion" (Anderson, 2015, p2). A tingle is most commonly referred to as the

feeling a person gets while watching ASMR, or probably a goosebump like feeling. This is not

entirely true though, because as it will later be spoken of, the goosebump feeling comes from

"awe" and "surprise" and may even come from fear, while the ASMR experience is more of a

'light touch' feeling along the neck, spine, and other areas of the body (Maruskin, 2012). Barratt

and Davis (2015), were the first people to complete a study in ASMR and write up a report, their

study consisted of an exploratory view on who partakes in ASMR, to discover who was in the

community. The participants responded to multiple questions which included a Beck Depression

Inventory (BDI) to measure negative feelings like depression and anxiety. Barratt and Davis

(2015) asked about ASMR viewing habits, kinds of triggers, location of tingles, flow, and

relaxation. They wanted to figure out the identity of the ASMR community. People who listened

to ASMR had more depression and anxiety than the normal population, and a lot of people used

ASMR for their chronic pain relief (Barratt & Davis, 2015).

Furthermore, Gallagher (2016), calls ASMR video makers ASMRtists and says, framing

ASMR as a real experience is misguided because these people are not really causing the tingles

or relaxation, it is sort of a cohort effect (Gallagher, 2016, p. 10). He says people say there is

proof that tingle sensations are real because ASMR viewers feel them, but no one has really

studied them scientifically.

Poerio (2016), mentions that ASMR's identity lives on YouTube; this has been

mentioned before, but is an important fact to note. How long have people been feeling the tingle

sensation, apart from ASMR? This is a good question to ask, but one that is not and cannot be

answered now. Poerio (2016) mainly say that the ASMR community has ways of categorizing in

unique ways. The ASMR community categorizes videos into how much tingling or relaxation a

person may have felt; this is all based on the triggers the video/audio creator does. Schaefer

(2015) does an interview with some ASMR content creators. He points out that the community

opposes mainstream YouTube due to duration, repetition of actions, and an alternate time

conscious. This means that ASMR artists mainly take 30-min to an hr to listen to ASMR, and in

these videos the creators are repetitive. Repetition allows the viewers to feel tingles and

eventually lose track of time. Ezra, the person being interviewed, says this is different from other

communities because the mainstream YouTube community, and mainstream American society

can only hold their span of attention on a task such as a video for a short period of time

(Fishman, 2016).

Weinberg (2015) comments that there are four ways the video creators of ASMR express

themselves. The first is that ASMR video creators strive for real authenticity (Weinberg, 2015, p.

81-82). ASMR video creators want to be as real as possible, which is completely different from

mainstream internet, where people wear facades. Second, is that content creators share personal

information to create a bond with their viewers, this can go along with how intimacy and close-

personal attention is a popular ASMR trigger for people (Weinberg, 2015). Third, the creators

strive for a common affect, which means that the creators want to induce relaxation and tingles

in their viewers. Lastly, ASMR creators try to reply to all their messages and comments, while

embracing their flaws and taking into consideration "requests" for new YouTube videos

(Weinberg, 2015).

The ASMR creators have spoken about the ASMR identity, and in sum the ASMR

identity cannot be completely defined or confined, much like anyone's identity is not just one

definition. ASMR identity flourishes on the internet, mainly YouTube, but the ASMR content

creators are usually women, and people in physical pain (Barratt & Davis, 2015; Poerio, 2016;

Weinberg, 2015). People strive to be as authentic as content creators can be, and what makes this

community unique is how ASMR viewers sort their videos (Anderson, 2015; Schaeffer, 2015).

Gallagher (2016) mentions that there is not enough evidence without a fMRI study to back up all

of the claims.

Within the ASMR community there is the common idea of intimacy. There are only two

people who speak of intimacy within the ASMR community. First there is Anderson (2015), who

believes that people who watch ASMR videos are making intimate connections with the content

creators, and therefore feeling pleasure out of ASMR. Anderson (2015) supports this by saying

that "ASMR enthusiasts" will gravitate towards the close personal attention videos and

experience a maternal intimacy with the content creators. This is analogous to the Freudian view

which suggest that people who watch ASMR are in need of close contact, and are missing some

kind of maternal/paternal feeling in their life (Anderson, 2015). This can begin early in

childhood, which is typically when people begin surfing the internet and finding out about

ASMR, which nowadays is becoming a roaring phenomenon. Furthermore, ASMR viewers say

that this emotional contact is what is creating the sensation of the shiver. This phenomenon is

reminiscent of the phantom limb syndrome. A phantom limb syndrome is when someone loses a

limb, but feels it is still there. Similarly, a person is watching a content creator "touch their face"

or "cut their hair" or "whisper in their ear," ASMR viewers will feel it as well through a tingle

even though the viewers are not physically with the creator (Anderson, 2015).

Gallagher takes a different approach on ASMR by looking at it on the mainframe of the

internet. He calls people who watch ASMR "bodies" and where the viewers watch it on are

"algorithms" (Gallagher, 2016). His idea is that the algorithms bring in more people, and the

more people who say ASMR works, the more others say it works as well. This is a never ending

cycle really; when one person agrees with another then it turns into a group, then it turn into a

whole subreddit. A subreddit is a when a specific topic becomes a thread where people can

comment on. What Gallagher (2016) says about intimacy is that there really is not any true

intimacy people feel for the content creators, rather the algorithm shows a person a video then

shows them another based on that video, further making viewers feel intimate with the

community, when they may not be.

Gallagher (2016) goes on to say that ASMRtist's are creating their own genre of video

and audio, the content are not just videos on the internet. These people are creating videos on

YouTube that gain traction and show recommendations to people in the ASMR community who

already agree that they feel close to the ASMR content creators. The two opposing views are

striking; on one hand there is the belief that people who watch ASMR videos say they feel

intimacy with the content creators, almost a maternal intimacy (Anderson, 2015), while the

opposing view says people do not really feel close, but they think this because of the algorithmic

recommendations that make the viewers feel closer to the content creator (Gallagher, 2016).

Anderson (2015) comments on the idea of affect and how the tingles are an "affective

experience" that creates intimacy and emotionality towards the content creator and the viewer or

audience (Anderson, 2015). Gallagher (2016), opposes these ideas and says that people think

they feel affect when they watch ASMR, but there are not any conclusions without further

evidence or scientific proof and/ or disproof. Schaefer (2015), comments that "the voice is the

vehicle" of a person, sort of like how people who make ASMR videos will whisper, breathe, or

say weird speeches in a different language or just sounds. Furthermore, if the person's voice is

the vehicle then the ASMR viewers are the ones getting hit, with tingles. Therefore, the feelings

of tingles may come from feeling intimate with the creators. This creates a cycle where content

creators create tingles that the viewers like, and then it makes them feel even more intimate and

more tingles.

In the study by Pageau and Surgan (2015, p133), "flow involves full engagement in a

task and is characterized by both positive affect and a feeling that time has passed quickly," and

in their study of 77 undergraduate participants, they sought out to see if the passage of time and

complexity of a task affected someone's mood. Basically, they wanted to see if we had more fun

when time flies. Pageau and Surgan (2015) found that the perception of time to people was

important in determining if they were having fun and feeling happier is better. If the participants

thought time was going quickly, they had a heightened positive mood over those who thought

time was going slower, and were not as happy. This is important to note because when people

listen to autonomous sensory meridian response (ASMR) they are said to be in a 'flow like'

mental state (Barratt & Davis, 2015). This flow like mental state study wanted to see the

correlations between ASMR and, viewing habits of the community already on ASMRReddit, and

how they felt relaxed, the tingles they felt, their flow, mood and chronic pain levels in relation to

the new phenomenon. Barratt and Davis (2015) obtained 475 participants to take part in their

study, the majority of people did not answer, but with the results of the participants that

answered, the researched found a highly significant amount of correlation (Barratt & Davis,

2015). In Ramirez (2016), I also did a general study based off Barratt and Davis's (2015) study,

and hypothesized that the more flow people felt, the more tingles and triggers they would feel

(Ramirez, 2016). In this study a majority of people also did not answer just like in Barratt and

Davis (2015), but for those who did the results were inconclusive. This is why in this current

study; flow is approached differently than the other studies. In this current study flow state

questions are more condensed and precise so that it will hopefully give more accurate results of

the phenomenon between flow and ASMR (Payne, et al. 2011).

Furthermore, relaxation has been looked at in ASMR through Barratt and Davis (2015)

study. In their study 98% of individuals answered that they sought out ASMR for relaxation.

This is the only data they gathered about relaxation, but the alarmingly high number means a lot.

Out of 475 participants, more than half of the people said they felt relaxed (Barratt & Davis,

2015). This is a common theme within the ASMR community and the videos, people may feel

relaxed after watching and listening to them. In Ramirez's (2016) study, 419 participants

recorded responses, and 57.42% of people said they felt relaxed. This is interesting to note since

both studies were only a year apart, and yet there was such a large difference among results.

While one study had a large sample of people feel relaxed (Barratt & Davis, 2015), the other had

a little over half of people say they felt relaxed (Ramirez, 2016). A new voice comments that the

ASMR community who watch the videos usually feel relaxed as well, further supporting the idea

that people do feel relaxed after listening to ASMR.

Anderson (2015) vouches upon the tingles in his paper, and calls them the shiveries. He

connects the tingles to how people feel intimately and emotionally connected to the content

creator. Barratt and Davis (2015) found that 50% of their participants felt tingles, and the

majority of participants who did, felt them on the back of their head down to their neck and

spinal cord (Barratt & Davis, 2015). Outliers include other body parts that are not as prominent

to feeling this.

Habibi (2014), describes the tingles apart from ASMR and focuses on psychomusiology

and how there are changes to the body when listening to music, much like there are changes in

the body when listening to ASMR. What is interesting is that Habibi (2014) says the chilling

feeling is a way for homeostasis to happen, a way for our body to maintain an equal state within

ourselves. He goes on to talk about the brain and imaging that people have seen while people

listen to music. Usually the occipital lobe lights up, and other regions in the brain, but what says

that instead of studying the brain scientists should be studying the brain stem. Surprisingly

enough, ASMR viewers feel tingles more in that area as well. Furthermore, Habibi (2014)

ponders whether people feel these feelings because they anticipate them. This would make a lot

of sense in the ASMR community because if a person anticipates feeling a tingle and relaxation,

they will feel those once they view the video, much like the placebo effect, or power of

suggestion.

Maruskin and Thrash (2012), the authors make a reference to tingles, goosebumps, and

chills. They do four studies on a vast amount of participants to figure out how to categorize the

different meanings and how people categorize and feel them, themselves. What Maruskin and

Thrash (2012) found was that people usually felt tingles, the same type of feeling that ASMR

viewers feel, during times of great emotion and that the different terms were attributed to

different emotions. For example, tingles were referred to as a relaxing feeling, while shivers

were not. The one thing that does not align with ASMR is when Maruskin and Thrash (2012)

mention that even though tingles did make people feel relaxed, they usually were surprised and

did not feel enjoyment

This is different from the community because people typically do enjoy watching the

ASMR videos, and feeling relaxed and possibly some tingles. Finally, Schaefer (2015) found

support the idea that people feel tingles in ASMR, too. The creators have started a new sort of

language that has made people feel more close and intimate, therefore feeling more tingles.

The final idea in the ASMR community that must be discussed are the triggers. Triggers

are audio and visuals that induce tingling. Triggers are usually felt in the audio and the video

usually comes second (Anderson, 2015). In Barratt and Davis (2015), the top trigger in their

study was whispering. This is also supported by Ramirez (2016), where the top trigger was also

whispering (Figure 1). Poerio (2015) says that the common triggers in ASMR are "whispering,

soft speaking, tapping, scratching, crinkling, slow deliberate hand movement, watching repetitive

tasks, and close personal attention," (Poerio, 2015, p. 120). Schaefer (2015) suggests that triggers

are sort of a new language in the ASMR community, that they take on a new meaning to the

creators and viewers, sort of like tapping on pottery, drawing on chalkboard, and touching milk

on a screen (Schaefer, 2015). All of these writers have supported the idea that ASMR has a

variety of triggers. In my study I focused on exploring if there are correlations between ASMR,

flow, relaxation, and tingles. Finding support in this will add knowledge to the body of

psychology, and could possibly be used in future research and therapy.

**Method**

**Participants and Materials**

A total of 118 participants were recruited (57 women, 26 men; $M$age = 19 years, age

range: 18-72) where 30 people did not answer the gender question, and using a recruitment

statement through my social media, including: Facebook, Reddit, and Twitter (see Appendix A).

An online Qualtrics survey was created for this study, and no one was compensated for taking

part in it. The majority of participants were from the Autonomous Sensory Meridian Response

(ASMR) community. There were 97 people who reported listening to ASMR before, and 10 who

reported not listening to ASMR before, there were 11 missing responses. 72 participants reported

being White, 8 people reported being Hispanic, Latino, or Spanish origin, 1 person reported

being: American Indian or Alaska Native, Asian, or some other race. 3 people preferred not to

answer and 29 participants did not answer. All participants were asked in the informed consent

form to have headphones with them while taking the survey (see Appendix B).

**Video.** A video from YouTube by the content creator named "Made in France ASMR"

was used in the survey. The video was called "*[ASMR] Zen Garden Sleep AID (decreasing

brightness) 45 min - No Talking*", and was chosen because it is possibly both relaxing and tingle

inducing, with 14,000+ likes on YouTube ([Made in France ASMR], 2014).

**Flow.** Flow was taken from a five point Likert scale from an established flow state scale

taken from previous researchers (see Appendix C). I took the most relevant questions from the

flow state scale and reworded them to fit the survey for example, on the flow state scale a

question said "I lost my normal awareness of time" and I reworded it to say "I lost awareness of

time (time slowed down, stopped, or sped up)". A total of five questions were responded to in a

Qualtrics survey (see Appendix D).

**Relaxation.** Relaxation was judged based on 10-point scales (0= not at all relaxed and

10= extremely relaxed). One question was asked before the video, which prompted the

participants to answer "How relaxed do you feel right now?," and after the video, "How relaxed

do you feel after watching this video?" If a participant felt more relaxed after the video they

would be considered relaxed, if the participant felt less relaxed after the video they would be

considered not relaxed. For example, if a person put 2 then 10, they would be relaxed, but if a

person put 10 then 2, they would not be "more" relaxed. For those who stayed the same such as 2

and 2, they would be considered not relaxed, and those who stayed the same at 7 and 7 would be

considered relaxed. The people who were 10 then 9 would be considered less relaxed before,

even though they are both relaxed, they self-report that they were less relaxed.

**Tingle Effect.** Participants were asked if they felt tingles or a goosebump feeling on their

body. If they selected 'yes' they were prompted to answer the body heat map (Appendix E). If

they selected 'no' they were prompted to the demographic questions block.

**Body Heat Map.** Participants were redirected to the body heat map if they selected 'yes'

when asked if they felt tingles or goosebumps. The body heat map was made in GIMP, an image

editing program. The principal investigator put two images together; the top image was of four

bodies from all points of views, and the bottom image was of four heads from all points of views.

This way a person could click anywhere they felt the tingles or goosebumps. In addition to that,

92 different regions were coded for participants to click (see Appendix E).

**Procedure**

The study was conducted online using an online Qualtrics survey, so that participants

could watch the video and complete the questionnaire when and where it was convenient for

them. The principle investigator posted the survey on their social media accounts such as

Facebook, Twitter, and Reddit. Prior to beginning the study, participants were asked to sign the

informed consent statement, and the secondary age verification statement (see Appendix B). The

secondary age verification statement asked if the participants were "Under 18" or "At or Above

18" (see Appendix F), if they answered they were under 18 they would be redirected to the thank

you statement (see Appendix G). If they answered they were at or above 18 they would be

directed to the survey. Right before taking the survey there was one last reminder about having

headphones for the survey (see Appendix H). The first question the participants were asked was

if they had listened to ASMR, a yes or no question. They were asked how relaxed they felt on a

10 point Likert scale, 0 being not at all relaxed, and 10 being extremely relaxed. The participants

were told to listen to the video by "Made In France ASMR" for a minimum of 5 minutes, and

then proceed to the next questions. I also added an invisible timer to see how long the

participants stayed on the page to watch the video. They were asked how they felt after listening

to the video on a 10 point Likert scale where 0 was not at all relaxed, and 10 was extremely

relaxed. Then they were asked if they felt tingles or goosebumps, if they said yes they would be

redirected to the body heat map (see Appendix E), and if they said no they would be redirected to

the demographic questions. The demographic questions were used to describe the sample and

asked their age, gender, and race and-or ethnicity (see Appendix I). Once the participants were

done they received the thank you statement with the principal investigators contact information,

and the survey ended.

## Results

I hypothesized that people who report high immersion will report having greater

relaxation, and feel more tingles. This hypothesis was not supported when statistical analysis was

run. Descriptive statistics were done with flow and tingles, where 36% of people felt flow, and

43% of people reported feeling tingles in the regions 1, 2, 25, 26, 27, and 29 (see Figure 2).

Participants relaxation before listening to the ASMR video was compared to relaxation after

listening to the ASMR video. Where 79% of people reported feeling relaxed and a paired

samples t-test was run. Where participants pre-video relaxation (M=6.17, SD= 1.695) and

participants post-video relaxation (M=7.30, SD= 1.871; t(93)= -5.664, p= 0.000. Only 22% of

participants reported feeling all three variables, which were flow, relaxation, and tingles.

## Discussion

What I expected to find was that all three variables would be positively correlated to each other after participants listened to the ASMR video. My hypothesis was not supported because a low amount of participants did not feel immersed in the video, which I defined as flow, relaxed, or the tingle sensations all together.

There wasn't a significant amount of people who felt flow which I expected there to be because there were correlations with ASMR and flow state in a study conducted by Barratt & Davis (2015), where flow state was higher with more triggers. Pageau and Surgan (2015) also found that flow state affected people's moods which is why I believed it would correlate with the other variables, flow state has come up unsupported with most studies including mine.

There was also not a significant amount of people who felt the tingle sensation. The most tingle sensations were felt on the back of the head and down the spine which was supported by Barratt & Davis (2015) by their research in ASMR (Barratt & Davis, 2015, p8). There was also the fact that 43% of people reported feeling tingles in the current study and 42% of people reported feeling tingles in Ramirez (2016). This is an interesting trend especially noting the difference in sample size, where in this current study there were only 118 participants but in Ramirez (2016) there were over 400 participants. This could possibly mean that around 40% plus or minus people in the ASMR community feel tingles, while others do not. There is also the fact that the community could have been expecting the tingles much like in Habibi (2014), where

people felt tingles because they expected them, maybe participants in this study also didn't feel

the tingles because they didn't expect to feel them as well.

There was a significant number of people who felt relaxed after listening to the ASMR

video. While there were 79% of participants who felt relaxed, there were 63% of participants in

Barratt & Davis (2016, p7) that felt relaxed. On top of that 98% of participants answered they

sought out ASMR for relaxation. The significance of relaxation in this study can be seen in the

comparison of the means where people who responded to the second relaxation question reported

feeling more relaxed than they did before watching the ASMR video.

Based on the results I can conclude that people may feel relaxed after listening to ASMR

which would be a great tool to use in therapy. I can also conclude that people mostly feel tingle

sensations on the top of their head and down their spine, but there isn't any support that people

who listen to ASMR feel immersed in the video as in flow, relaxed while listening to the video,

and tingles all at the same time.

Some limitations to these study was that I didn't take into account counterbalancing with

a within-subjects design that could have affected the results. There is also the limitation of my

knowledge on statistics that didn't allow me to do factor analysis on flow, which could have

affected results as well. On top of this, the targeted community has been repeatedly studied and

done tests, also they listen to ASMR videos all of the time too. This may have caused a fatigue

effect and caused inaccurate results. Another limitation is that there was a video accompanied

with the audio, whereas I should have provided only an audio file.

Future directions for research would be to explore why tingle sensations occur and

possibly begin doing brain scan studies on participants who watch or listen to ASMR. There is

also interest in looking at trigger choices and how they affect relaxation or tingles. Furthermore,

there should be more research in why people feel so relaxed by ASMR videos, why the tingle

sensations are sometimes reported and sometimes not, and if flow still has anything to do with

ASMR at all.

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*Figure* 1. Top triggers reported by the ASMR community in a study by Ramirez (2016).
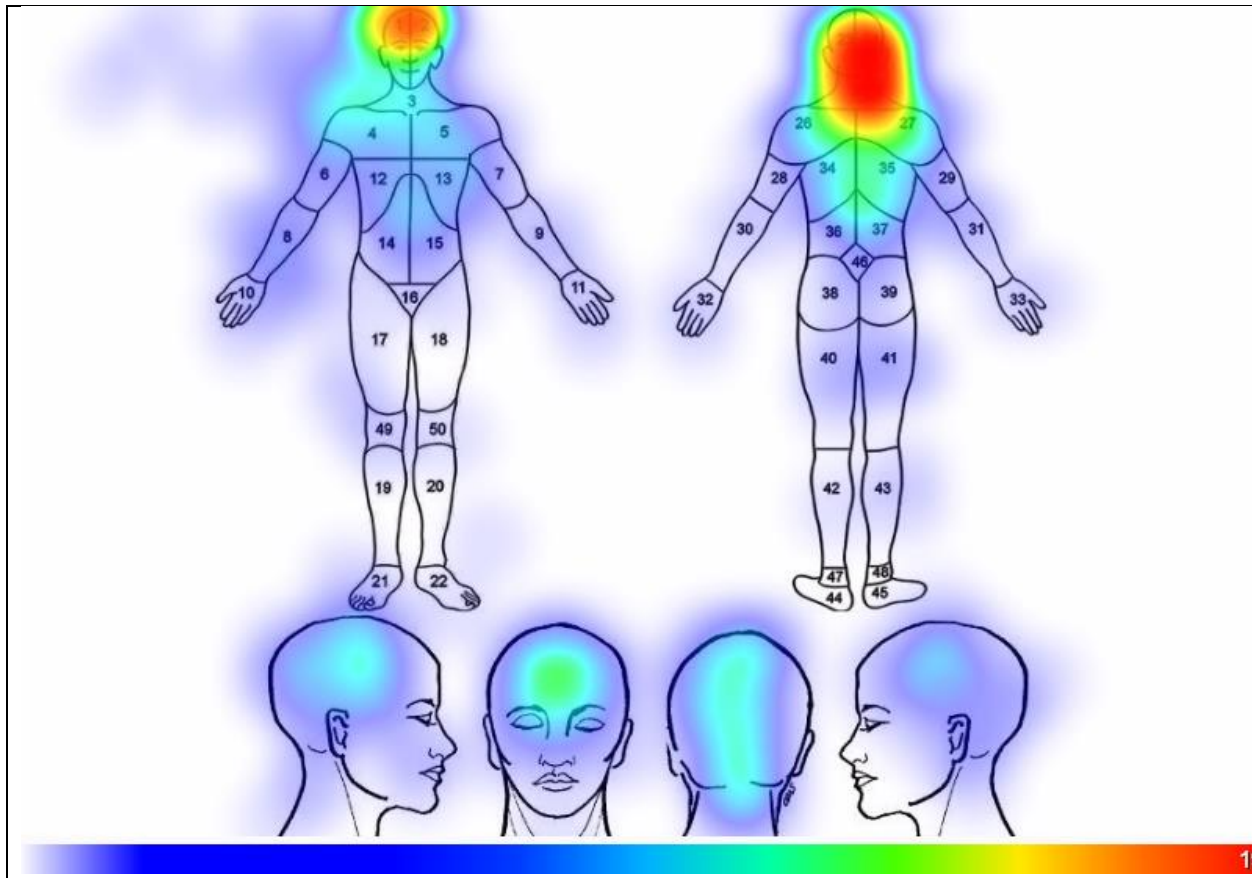
*Figure* 2. Tingles felt in regions 1, 2, 25, 26, 27, and 29 where red is the where most people felt tingles.

**Appendix A**

Recruitment Statement

Please consider taking my anonymous survey on Autonomous Sensory Meridian Response (ASMR): an auditory stimulus that may cause relaxation and a tingle feeling. I'll be asking about immersion in the task, relaxation, and the tingle effect. You will need headphones for this survey. This is my research project for my Advanced Research Methods class at Lindenwood University and shouldn't take more than 15 minutes of your time. Your participation is completely voluntary and you may stop at any time. Thank you!

## Appendix B

### Informed Consent Form

Informed Consent Form

Introduction

The researcher that is conducting this project is an undergraduate student at Lindenwood University who is enrolled in the PSY40400: Advanced Research Methods course. The primary purpose of this project is to continue exploring Autonomous Sensory Meridian Response (ASMR).

Procedures

This survey asks you to respond to a few basic demographic items as well as questions asking about your knowledge of ASMR, immersive state, relaxation, and the tingle effect that is perceived through ASMR. Autonomous Sensory Meridian Response (ASMR) is an auditory stimulus that has been observed to create relaxation and a tingle effect on the body. The tingle effect is a slight goosebump sensation somewhere on your body. An auditory stimulus is a sound that causes you to feel something such as goosebumps when you listen to a great song. This survey can be used in order to see whether there is a relationship among the following three variables: flow, relaxation, and the tingle effect. This questionnaire will be conducted with an online Qualtrics-created survey, and should not take any more than 15 minutes of your time. Five of these minutes will be taken to watch an ASMR video. You will need headphones/earphones for this survey.

Risks/Discomforts

Some people may experience discomfort after feeling the tingle sensation. If you do not feel comfortable completing any part of this survey, you are free to skip any questions or withdraw without penalty.

Compensation and Benefits

If you are a student or of the general public, you will also gain experience taking part in a psychological survey project and potentially learn more about the field. If you are interested in learning more about this project or would like to learn about the results of this project once completed, please contact XXX at XXX@lionmail.lindenwood.edu.

Confidentiality

All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, and no one other than the researchers listed below and her course professor, Dr. Nohara-LeClair. The data collected will be stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

Anonymity

Your responses will be anonymous. No information that identifies you personally will be collected, not even your IP address. The primary investigator will not be able to identify your answers as belonging to you; data will be examined at the group level only. All data will be kept securely, in accord with the standards of the University, Federal regulations, and the American Psychological Association.

Questions about the Research

If you have any questions or concerns regarding this study, you may email or call the Investigator, XXX, at XXX@lionmail.lindenwood.edu, and 954-294-4368, or the Supervising Faculty, Dr. Nohara-LeClair, at 636-949-4371. You may also ask questions of or state concerns regarding your participation to the Lindenwood Institutional Review Board (IRB) through contacting Lindenwood's Provost, Dr. Marilyn Abbott at mabbott@lindenwood.edu or 636-949-4912.

ELECTRONIC CONSENT: Please select your choice below.
Choosing to participate indicates that:
• You have read the above information.
• You voluntarily agree to participate.
• You are at least 18 years of age

## Appendix C

### Original Flow State Scale

**PsycTESTS**

**Activity Flow State Scale**
Version Attached: Full Test

PsycTESTS Citation:
Payne, B. R., Jackson, J. J., Noh, S. R., & Stine-Morrow, E. A. L. (2011). Activity Flow State Scale [Database record]. Retrieved from PsycTESTS. doi: http://dx.doi.org/10.1037/t06855-000

Instrument Type:
Rating Scale

Test Format:
Items are rated on a 5-point Likert ranging from 1 (strongly disagree) to 5 (strongly agree).

Source:
Payne, Brennan R., Jackson, Joshua J., Noh, Soo Rim, & Stine-Morrow, Elizabeth A. L. (2011). In the zone: Flow state and cognition in older adults. Psychology and Aging, Vol 26(3), 738-743. doi: 10.1037/a0022359

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PsycTESTS™ is a database of the American Psychological Association

---

**PsycTESTS**

doi: 10.1037/t06855-000

**Activity Flow State Scale**
**AFSS**

Items

**MAA**
I performed automatically, without having to think about it.
Things just seemed to happen automatically.
I did things spontaneously without having to think.

**CG**
I had a strong sense of what I wanted to accomplish.
I knew what I want to achieve.
My goals were clearly defined.

**CO**
My attention was focused entirely on what I was doing.
It was no effort to keep my mind on what was happening.
I had total concentration.
I had no difficulty concentrating.

**UF**
It was really clear to me how my performance was going.
I had a good idea while I was performing about how well I was doing.

**CS**
I was challenged, but I believe my skills will allow me to meet that challenge.
The challenge and my skills were at an equally high level.
I felt just the right amount of challenge.

**TT**
Time seemed to alter (either slows down or speeds up).
The way time passed seemed to be different from normal.
I lost my normal awareness of time.

**CN**
I felt as though I had everything under control.
I felt that I had everything under control.

**SC**
I was not concerned with how others might be evaluating me.
I was not concerned with how I was presenting myself.
I was not worried about what others might be thinking of me.

**AE**
I really enjoyed the experience.
The experience left me feeling great.
The experience was extremely rewarding.

Note. MAA = merging actions and awareness; CG = clear goals; CO = concentration on task at hand; UF = unambiguous feedback; CS = challenge skill balance; TT = transformation of time; CN = sense of control; SC = loss of self-consciousness; AE = autotelic experience.

PsycTESTS™ is a database of the American Psychological Association

**Appendix D**

Flow State Scale for ASMR Study

Please answer the following questions about the video you just watched, on a scale from 1 (being strongly disagree)-5 (being strongly agree).

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly agree |
|---|---|---|---|---|---|
| I felt like I didn't have to think about what I was listening to | ○ | ○ | ○ | ○ | ○ |
| I was not concerned with my surroundings | ○ | ○ | ○ | ○ | ○ |
| My attention was focused entirely on what I was listening to | ○ | ○ | ○ | ○ | ○ |
| I lost awareness of time (time slowed down, stopped, or sped up) | ○ | ○ | ○ | ○ | ○ |
| Listening to this video made me feel great | ○ | ○ | ○ | ○ | ○ |

**Appendix E**

Body Heat Map
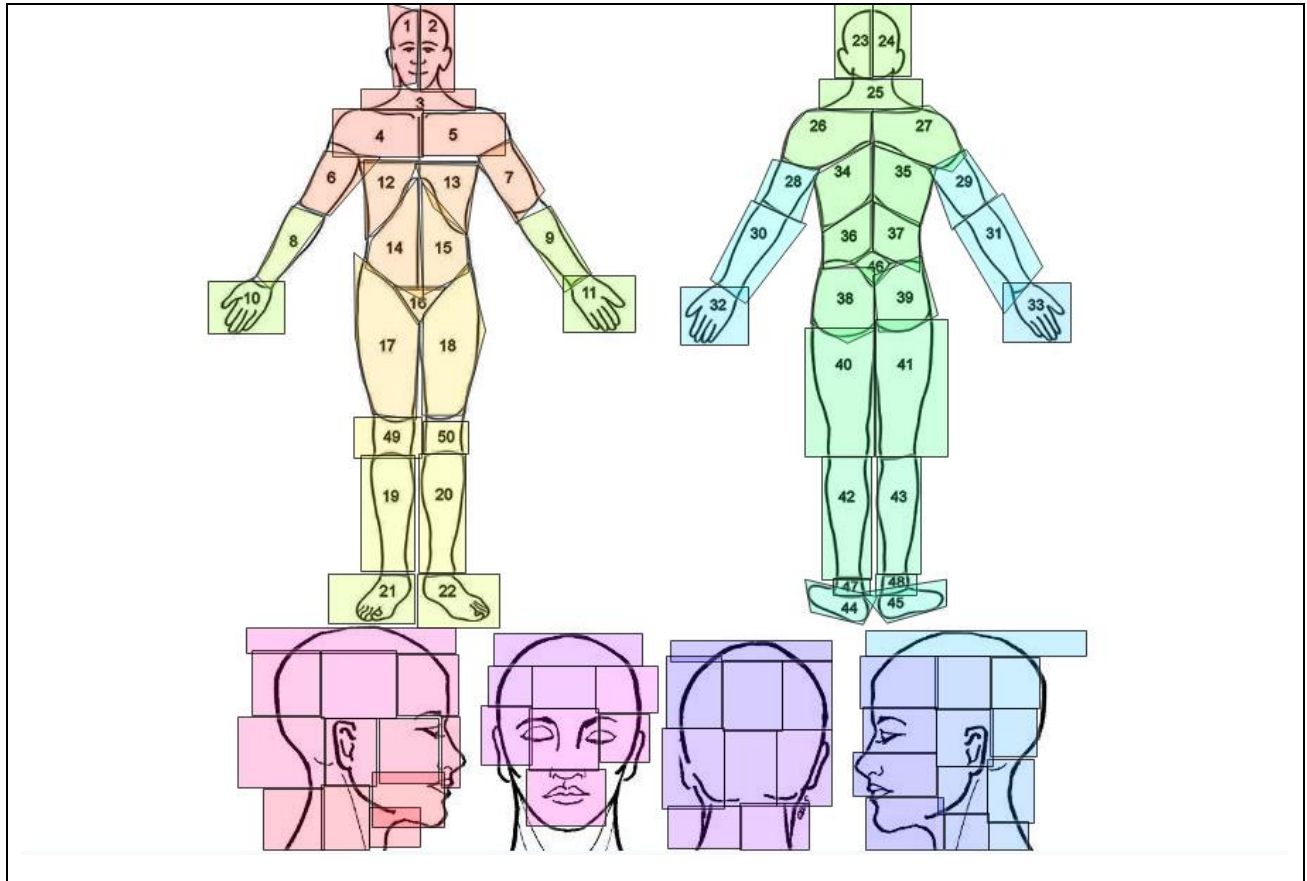
## Appendix F

Age Verification

What is your age?
-Under 18
-At or Above 18

## Appendix G

Thank You Statement

**Thank You Statement**

Thank you for taking the time to complete this survey for my class project at Lindenwood University. I am investigating ASMR (Autonomous Sensory Meridian Response) in relation to how immersed people get into the video, how relaxed people are, and if and where people feel the tingle sensations. I hypothesize that people who report higher immersion will report greater relaxation as well as more tingle effects.

 If you would like to see the results of my survey after May 6, 2017, please feel free to contact me using the contact information below. Again, thank you very much for your time and effort

Principal Investigator,
XXX
XXX-XXX-XXXX
XXX@lionmail.lindenwood.edu

Faculty Supervisor
Dr. Nohara-LeClair
636-949-4371
mnohara-leclair@lindenwood.edu

**Appendix H**

Headphone Statement

Headphones will be needed for this study, any of the following headphones can be used. If you do not have headphones please retrieve them.



In-Ear          On-Ear          Over-Ear

**Appendix I**

Demographic Questions

What is your age?

How do you currently describe your gender identity?

○ Man, male, or masculine

○ Transgender man, male, or masculine

○ Transgender woman, female, or feminine

○ Woman, female, or feminine

○ Gender nonconforming, genderqueer or gender questioning

○ Intersex, or two-spirit

○ Other

○ I prefer not to answer

Which categories describe you? Select all that apply to you.

☐ American Indian or Alaska Native- For Example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Vilage of Barrow Inupiat Traditional Government, Nome Eskimo Community

☐ Asian- For example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese

☐ Black or African American- For example, Jamaican, Haitian, Nigerian, Ethiopian, Somalian

☐ Hispanic, Latino or Spanish Origin- For example Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Colombian

☐ Middle Eastern or North African- For example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian

☐ Native Hawaiian or Other Pacific Islander- For example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese

☐ White- For Example, German, Irish, English, Italian, Polish, French

☐ Some other race, ethnicity, or origin, please specify:

☐ I prefer not to answer

**SPECIAL FEATURE:**

**Senior Thesis/Independent Research Project Papers 2016-2017**

## ASMR and Culture

*Alfa Ramirez*[8]

*The purpose of this study if to see if there are demographic descriptions that can be attributed to ASMR. My expected results are there will be more Caucasian males in the Western and European regions between the ages of 13-25 in middle class and their preferred viewing habits will be to watch whispering ASMR videos alone. They will be recruited through social media outlets like Reddit and asked demographic question on an online Qualtrics survey.*

*Keywords:* ASMR, culture

Autonomous Sensory Meridian Response (ASMR) is a physiological response called tingles induced by triggers and may cause relaxation in individuals (Barrat & Davis, 2015). ASMR's rise in the scientific community begun recently, which means there is a lot of room for exploration on the topic, and there is still more to discover. Therefore, there is not a lot known about culture in the ASMR community. Primarily, ASMR is housed online and has been around since 2007, but was not coined autonomous sensory meridian response until 2010 by Jennifer Allen (Brenkman, 2017). Is ASMR universal to everyone, or predominantly felt by a select group of internet users? Is ASMR like music or shivers, or is it something else? ASMR has a lot of fascinating aspects and its application to the people around the world. To examine ASMR, which is primarily an audio trigger that induces tingles and relaxation, there must be a review of what we already know.

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[8] Alfa Ramirez, Department of Psychology, Lindenwood University.  Correspondence concerning this project should be addressed to Alfa Ramirez, Department of Psychology, Lindenwood University, 209 S Kingshighway St, St Charles, MO 63301. Email: AMR905@lionmail.lindenwood.edu

The basics of ASMR is how it came to be and its internet identity. Grewe, Kopiez, and Altenmuler (2009), choose seven different pieces of music for 95 participants who rated how they felt, and measured their physiological state during each piece of music. They found that chills were most common in emotional peaks during the music. These chills are reported in ASMR as well, except they are called tingles.

In ASMR there are tingles, and there is not a known cause for this, but by looking at music's chills there may be the beginnings of an idea. Music is known to give chills and physiologically speed up the heartbeat, while tingles may give tingles and slow down the heartbeat. However, there is something happening to the brain and body that affects it different while listening to music versus ASMR. Silvia and Nusbaum (2011), also conducted a study on how often people felt these chills or shivers during music, with 188 participants who responded that they felt it daily, and that they often felt it during periods of high concentration and feelings of being touched. These shivers and chills are much like ASMR's tingles, where people experience feelings of being touched. There is even an idea that high flow may be a contributing factor to how people feel tingles (Barrat & Davis, 2015). Today's average teen has access to internet from their smartphone to their watch. Kraut and Buke (2015), points out that internet identity is hard to study because there have been significant problems with people generalizing common symptoms to the whole of the internet, when it is not true. For instance, not everyone who is on the internet has depression, but some people who have depression or depressive

symptoms may be more drawn to specific internet sites. There are ways in which we need to

reword and change the way we study internet in general. Therefore, in the view of ASMR

research, where can a person even begin to study? ASMR began on the internet itself and the

most used websites to stream ASMR is on YouTube and ASMRReddit (Gallagher, 2016). The

scientific community has used these resources advantageously in gathering participant samples

for their ASMR research. However, the scientific community needs to reach out to a larger

sample of all internet users, rather than restrict themselves to accessing those who already

subscribe to ASMR.

Music and ASMR have some similarities and differences. The question is, how much do

we know about music is generalizable to ASMR?

Recours, Aussaguel, and Trujillo (2009), did a study that examined how metal music

changed the way people felt in France. It was mainly young adults in the study who had the same

levels of depression and anxiety as the national average statistic. They found that people with

levels of depression and anxiety leaned towards metal music more than other genres. This is like

ASMR because people with depression and anxiety tend to lean towards ASMR (Barratt &

Davis, 2016). On the other hand, ASMR is not just one category like metal music, so people can

look up any video or trigger to their liking and feel better. They also found that people who did

have elevated depression and anxiety scores were into arts and not the sciences (Recours, et al.,

2009). This shows how audio can affect someone and if there may be a positive correlation

between negative feelings and audio. Much like ASMR has support that people with negative

feelings are drawn towards the audio (Barratt & Davis, 2015). Shwates and McKinney (2010)

did a study in Mexico with Mexican migrant workers that explored depression and anxiety with

music therapy. The results were that the migrant workers felt more relaxed after music therapy,

so they had less elevated feelings of depression and anxiety. This is interesting, because ASMR

has support that it makes people feel relaxed, while the community does not know whether it

really lowers a person's symptoms of negative feelings. The hip-hop community is mostly

geared towards young people, and young people were recruited for this study. People in this

study were already in music therapy positions with hip-hop music incorporation and it showed to

help them (Travis, 2012). This is also interesting because if hip-hop could help a person, ASMR

help a person as well.

There is not much known about how ASMR affects different cultures such as different

races and ethnicities, different socioeconomic standings, and regionally where most people who

are listening to ASMR are. Therefore, one must delve into how music has affected people in

general, because music and ASMR are closely related; both are audio stimuli that can affect

people. Music has been correlated to chills, goosebumps, and even feelings of tension. What

people call chills and goosebumps in music is what the ASMR community called tingles. These

tingles are feelings like chills that go from the head down to the spine, but correlates to

relaxation (Baratt & Davis, 2015). If ASMR has tingles and relaxation, then music is its cousin

that correlates with chills and feelings of tension.

Campbell, Connell, and Beegle (2007), Got 1155 students from middle to high school

ages 13-18 to take part in self-reporting how they interpret music and make it important, which is

called music meaning making. This relates to ASMR because people do not meaning make with

it, but in the study, there was exceptional support for people to meaning make in their music. The

participants in this study thought music formed their identity and let them have an emotional

outlet (Campbell et al., 2007). In contrast, what does ASMR provide for people who listen to it

constantly? Maybe it is the connection to the people they are viewing, or the relaxation and

tingles they feel through the screen.

There are also views of music all over the world that goes hand in hand with ASMR and

its slow rise to widespread popularity. Like music, ASMR will probably continue to rise. Juslin,

P., Barradas, G., Ovsiannikow, M., Limmo, J., & Thompson, W. (2016), speak about music

differentiation from individualistic versus collectivistic cultures.  They surveyed 668 participants

to take part in the study of their music listening habits. They found that collectivistic cultures

will listen to more nostalgic and love music than individualistic ones, who listen to less music in

general, and will listen to different types of music (Juslin, et al., 2016). This is an interesting find

because if people in a collectivist culture all listen to the same general genre of music, it is

because collectivistic cultures tend to like the same music as a group, while individualistic

cultures will empower the self and this may be a reason why ASMR has been more prevalent

among the western and European places of the world. If this is so, how can we account for how

fast ASMR is growing?

Speaking of culture, there has been literature reviewed about music and culture. Jozuka

(2016) did an interview with a woman named Yumijuku, who says ASMR has predominantly

come from Western and European places. She presented a cross-cultural comparison between

ASMR in Western cultures and in Japan This is explored in the article where people from

Western and European places may not show anything but their hands, Yumijuku shows her face

and does ASMR related things towards her culture, like playing traditional Japanese instruments.

In the interview with Yumijuku she reports she does this because it appeals to her audience in

Japan (Jozuka, 2016).

Herbst, Wet, and Rijsdijk (2005), who studied music education in South Africa, where

resources such as internet access is not as used, there is a low report of how many people come

across ASMR. Ho and Law (2009), who surveyed 3,243 students and interviewed 20 teachers

that focused on teaching only Chinese music versus those teachers who teach Chinese music and

other music as well. Children are mostly taught one specific type of music; therefore, this is

another reason we can account for ASMR not being around other places outside of European

nations and the Western world, either, because of the lower amounts of musical freedom and

choice selection.

My proposed study will focus on ASMR and culture, I hypothesize that there will be

significantly more viewers of ASMR from Europe and the Western part of the world between the

ages of 13-25 that prefer to watch ASMR alone. The fact that ASMR is so new may mean that

what is learned today will be outdated even by the next two years, but this is no implication to

stop questioning. The more places that are collectivistic and with less resources seem to be the

ones that may not find ASMR as widespread as in the European and Western cultures.

Proposed Methodology

**Participants**

Participants will be recruited through the principal investigators, social media including:

Facebook, Reddit, and Twitter using a recruitment statement (see Appendix A). An online

Qualtrics survey was created for this study, and no one will be compensated for taking part in it.

Participants who were a part of the ASMR community will complete extra preliminary questions

about their ASMR viewing habits, while the participants who are not a part of the ASMR

community skipped directly to rest of the survey that asks questions about their demographic and

cultural background.

**Materials and Procedure**

An online Qualtrics survey was made to gain descriptive data on who listens to ASMR.

Questions including race, ethnicity, job, income, etc., will be asked in order to see who listens to

ASMR based within and without the community (see Appendix B). The principal investigator

will post an anonymous link on their social networking sites and whoever chooses to click it will

be able to get to the study. If they choose to participate they will be asked their age, anyone from

the age of 13+ will be able to participate in the study.

Expected Results and Implications

I expect that the results of the demographics will be more Anglo-males in their teen years

from 13-25, and that their preferred viewing habits would be to watch ASMR alone and would

prefer whispering videos. Typically, Anglo-males have been attracted to ASMR more than any

other demographic group. In the study done by Barratt and Davis (2015), they found people's

preferred trigger video would be a whispering video, which is what I predict Anglo-males will be

attracted to. The extensive cross-culture literature also reveals that there is a lack of ASMR in

communities other than America and European places. This is why I believe that Caucasian

people will be more inclined to watch ASMR videos. On top of that, the ages of 13-25 have been

reported by numerous studies that have reported an age range. Adolescents who are into today's

internet culture, such as Gallagher (2016) suggested, means that they are more inclined to watch

and listen to ASMR. Though I am doing a demographic study of ASMR and culture, there are

implications that this could be potentially beneficial to society in the future. If it is true that these

specific demographics are representative of the ASMR communities sample, then this could

mean that ASMR is more of an Americanized idea, and that could lead to the question- why? On

top of that, if it isn't representative of the expected results, then there is even more interest. Then

there is the question as to why it isn't representative and who really are the people listening and

watching ASMR. It would be interesting to see if the expected results were rejected because then

this would mean this community was diverse and spreading their ideas of relaxation and tingles

around fast, this could be implications for more and more people to feel the relaxation feeling.

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## Appendix A

**Recruitment Statement**

Please consider taking my anonymous survey on Autonomous Sensory Meridian Response (ASMR) and Culture. I'll be asking demographic questions. You will not need headphones for this survey. This is my research project for my Psychology Research Lab class at Lindenwood University and shouldn't take more than 15 minutes of your time. Your participation is completely voluntary and you may stop at any time. Thank you!

## Appendix B

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What is your age in years?

[                                                                    ]

Have you ever listened to Autonomous Sensory Meridian Response (ASMR)?

○ Yes
○ No

When do you listen to ASMR the most? (Mark all that apply)

☐ During the day
☐ During the afternoon
☐ During the night

How often do you listen to ASMR per week?

[                                                                    ]

How do you usually listen to ASMR?

○ Alone - For example, in a room alone, not around others
○ Around others- For example, around family and or/friends, in a crowded area, on the
   bus/train/ or any public area

What is the primary reason you listen to ASMR?

[                                                                    ]

What are your top 3 favorite ASMR video triggers to watch? (For example - whispering,
carving, no talk, soap, personal attention, etc.)

[                                                                    ]

When was the first time you've heard of ASMR?

[                                                                    ]

What is your relationship status?

[                    ▼]

How do you currently describe your gender identity?

○ Man, male, or masculine

○ Transgender man, male, or masculine

○ Transgender woman, female, or feminine

○ Woman, female, or feminine

○ Gender nonconforming, genderqueer or gender questioning

○ Intersex, or two-spirit

○ I prefer not to answer

What is your nationality? (Example: Colombian, American, Nigerian, etc.)

[                                                            ]

Which ethnicity describes you best? Select all that apply to you.

☐ American Indian or Alaska Native- For Example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Vilage of Barrow Inupiat Traditional Government, Nome Eskimo Community

☐ Asian- For example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese

☐ Black or African American- For example, Jamaican, Haitian, Nigerian, Ethiopian, Somalian

☐ Hispanic, Latino or Spanish Origin- For example Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Colombian

☐ Middle Eastern or North African- For example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian

☐ Native Hawaiian or Other Pacific Islander- For example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese

☐ White- For Example, German, Irish, English, Italian, Polish, French

☐ Some other race, ethnicity, or origin, please specify: [                    ]

☐ I prefer not to answer

What languages do you speak at home? (This is in alphabetical order and you may click more than 1 belief using the SHIFT key)

| Arabic |
| Cantonese |
| English |
| French |
| German |
| Hindi |
| Italian |
| Japanese |
| Korean |
| Mandarin |

What languages do you speak?

With which belief do you identify yourself with? (This is in alphabetical order and you may click more than 1 belief using the SHIFT key)

Agnostic
Amish
Ancestor Worship
Animism
Asatrú
Atheism
Bahá'í Faith
Brahma Kumari
Buddhism
Celtic Paganism

What is the highest education level you have?

What is your occupation? (if you're a student a student please put student)

What social class group do you identify with?
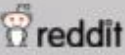
○ Poor
○ Working class
○ Middle Class
○ Affluent

How many people do you live with at this moment?

Who were/was your primary caregiver(s) when you were growing up? (ex: babsitter, mom, and brother)

Where do you reside currently ? (Please specify which state in write in box, example: Midwest:MO)

○ Midwest- Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, North Dakota, South Dakota, Wisconsin

○ Northeast- Conneticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode, Island, Vermont

○ South- Arkansas, Alabama, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia

○ West- Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

○ Puerto Rico or other U.S. territories

○ Other, please specify [            ]

Please click where you were born.

Please click all places where you have lived for a substantial amount of time (2+ years)

# Effect of Learned helplessness on Students

*Alex Moll[9]*

*This experiment was conducted in order to see if a relationship existed between learned helplessness and students. In other words, I sought to see if enforced learned helplessness would have a negative impact on student test performance. Learned helplessness can be defined as the belief that a task or an obstacle has an outcome that is outside an individual's realm of control (Marshik, Kortenkamp, Cerbin et al., 2015). In order to test learned helplessness, anagrams were used. Anagrams may be defined as groups of letters that are scrambled, and then are attempted to be unscrambled in order to form words. For example, the word "television" could be made into an anagram by scrambling the letters to form "nivsioetel." In order to enforce learned helplessness, I used three different lists: List A, which is easy to solve, List B, which is impossible to solve, and List C, which is possible but difficult to solve. List B consisted of participants that have learned helplessness enforced upon them. My hypothesis was that students who have learned helplessness enforced upon them will be less likely to be able to solve anagrams in a second trial, demonstrating that Learned helplessness discourages future attempts. This study could have positive implications in school settings through test score improvement.*

Learned helplessness can be defined as the belief that the outcome of an event is not within control of an individual (Marshik, Kortenkamp, Cerbin et al., 2015). In other words, an person thinks that there is no reason to try, since an event is impossible to influence one way or another. Learned helplessness can be applied to any event, but is commonly seen in academic situations. Specifically, students are prone to suffering from learned helplessness, feeling as though there is not a point in applying effort in particular subjects since they will not find success regardless of application. Falling to learned helplessness in school could lead to

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problems for students in the future, since academics tend to lay groundwork for future success,

both professionally and socially. Studying learned helplessness could help those working and

participating in academic settings to identify instances of it, and potentially overcome it through

repetition. In addition, this research could help lead to more recognition of the concept, which

could help students overcome it and transition this skill into professional and social settings.

Overmier and Seligman (1967) founded learned helplessness by using canine subjects as

participants, measuring response to electric shocks. In order to enforce the learned helplessness,

the canines in the experimental group were restrained and forced to feel shocks that were

significant, but did not cause harm to the dogs. These shocks were administered by a series of

wired panels on the surface of the floor. The dogs in the experimental group were initially able to

avoid the small shocks by leaping over a miniscule gate. However, when the restraint was used

to enforce the shocks, the dogs were unable to escape the sensation. By using these restraints,

learned helplessness was enforced, and the dogs would learn to believe that the shocks were

unavoidable. The findings revealed that a fairly significant amount of trials including the dogs

that were forced to endure the shocks would not make an effort to get over the gate that would

allow them to avoid shocks, even when the harness was removed (Overmier & Seligman, 1967).

Through this experiment, conclusions about behavior relating to learned acceptance of failure

came about. It was found that the dogs, while having the means to escape the shocks, would not

make an effort to escape them.

Previous applications have been carried out in the field of learned helplessness. For

example, Firmin, Hwang, Copella, and Clark (2004) attempted to draw an association between

learned helplessness from failure and frustration levels, which could result in implications for

future test taking. According to Buss (1963), failure frustration is a leading cause of aggression

in university students. The relevance of Buss's (1963) work is that it displays how easily

frustrated students can be, and how quickly emotions can rise within an individual. Firmin et

al.'s (2004) study tested students that attended school in the Midwest. A total of 61 students

participated in the study. In order to conduct the study, a test was created, but the questions were

broken into two sets. The tests had the same set of questions and content, but the sequence of

questions was organized oppositely for test B. (Firmin et al., 1963.) Both tests consisted of

questions ranging from simple to challenging. Test A had the challenging questions at the

beginning of the exam, while test B had the challenging problems at the end of the test. The

researchers sought to see whether or not the location of difficult problems had an impact on the

success rates of the easier questions. Their prediction was that the students in group A, consisting

of the test that had hard questions at the beginning, would have fewer simplistic problems solved

correctly when compared to group B, in which the test had the easier questions toward the

beginning (Firmin et al., 2004.)

Firmin, Hwang, Copella, and Clark (2004) uncovered a significant difference in the

number of correctly solved simple problems between the two groups. Group A had a

significantly lower score than group B did on correctly solved simple questions. These findings

fit with Firmin et al.'s (2004) hypothesis that having the frustrating questions toward the

beginning of the test would cause discouragement for the rest of the exam, even if the questions

were simpler. Possible implications from Firmin et al.'s (2004) study could be applied to exams,

both standardized and subject based. Because this study found significant differences in test

scores due to a manipulated variable, the results could be applied in order to improve students'

test scores. (Firmin et al., 1963) Also, students' projective scores could be more accurately

demonstrated if the exams are created in a way that allows students to have better levels of

success without changing the content. For instance, a student may see a rise in an ACT score if

the problems were set up in order to help the student find success, rather than being thrown in a

random order.

Another study by Frankel (1977) focused to see if there was a correlation between

learned helplessness and failure anxiety, known also as failure avoidance. According to Mandler

and Sarason (1952), this failure anxiety is defined as an emotional response that is evoked by

situations that relate to education and learning. Frankel's study used participants that were to

participate in cognitive tasks. The first task was rather simplistic, but only half of the participants

received criticism on their outcome (Frankel, 1977.) The researcher manipulated the second task,

being an anagram, by notifying the participants that the list would be either rather simple or

challenging (Frankel, 1977).

The results did not appear to align with the predictions of the researchers. It was found that the participants who were in the no-feedback group did not display worse performance on the anagram set, even when the participants were told that the anagrams were challenging (Frankel, 1977). To the contrary, those participants in the no-feedback condition showed better performance on the very difficult condition when compared to the feedback condition (Frankel, 1977). A potential reason behind this result could be that the participants found encouragement in the "difficult" anagram list if they were to find one or two words correct initially. This could lead to the participants gaining confidence, which would counteract the intention of the experiment.

Frankel and Snyder (1978) examined test performance ability in relation to conditions of high or low success levels. There were 41 participants, all of whom were students attending college. There were 10 women and 31 men partaking in the study. The participants received $4 for participating. Each participant was asked to complete one remedial task, one anagram, and one task where they were allowed to pick their difficulty level (Frankel & Snyder, 1978.) Two groups were used in this study, an unsolvable and solvable group. In the solvable group, both tasks given prior to the anagram had a possible solution, and feedback was given to the participants (Frankel & Snyder, 1978.) For the impossible group, no feedback was given to the participants. The first task had the participants identify a correct answer to a problem from multiple-choice formatted answers. The second was an anagram, and telling the participants

different levels of difficulty prefaced it. The third task did not actually take place, but the

participants were asked to describe what level of difficulty for the task they would be most likely

to want to perform (Frankel & Snyder, 1978.)

Frankel and Snyder's (1978) found that there was a significant difference in the number

of words solved correctly in the anagram task between the easy description and hard description.

The simple description had the researchers tell the participants that the anagram set was simply,

and they were quite confident that the words could be solved quickly. The difficult description

had the researchers inform the participants that other students and participants were having

difficulty completing the anagram list, and it was common that the students would not find

solutions (Frankel & Snyder, 1978.) In addition to impacting the performance of the anagram set,

the level of difficulty described had a significant impact on the participants' choice in difficulty

level for the third task, which did not actually take place. Participants who had a more difficult

time with the anagram list selected an easier task a much higher amount than those participants

who did well on the anagram list.

**Method**

**Participants**

There were a total of 17 participants in my study. Each participant signed up for my study

using Lindenwood Sona Systems. Students were drawn from the Lindenwood Participant Pool

(LPP), which is a pool of students who are eligible to take part in studies and receive extra credit.

If allowed by their professors, the students received extra credit in their respective classes. Of the

participants, there were 6 men and 11 women. There were 4 freshmen, 4 sophomores, 6 juniors,

and 3 seniors. Seventeen of the students were full time students, and there were no part time

students. Thirteen of the students were primary English speakers, and 4 students spoke another

language as their primary language. One student spoke Nepali, 1 student spoke Spanish, 1

student spoke Thai, and 1 student spoke English and Japanese bilingually as their primary

languages. Every participant was a student at Lindenwood University.

**Materials**

The Lindenwood Participant Pool, which participants signed in order to get credit for

participating, gave me sign in sheets. Along with this sheet, I was provided small slips that

participants would fill out so that they would be able to receive credit for the study. I developed

an informed consent letter informing the participants of what was expected of them in the study

(see Appendix A). The informed consent letter communicated to the participants that they would

be taking part in a study that asked them to attempt to unscramble two sets of letter scrambles

that would take no longer than 20 min. Additionally, I created four demographic questions that

each participants would answer, in order to receive knowledge about the participants while still

maintaining individuality (see Appendix B).

For the test materials, I developed three lists of letter scrambles in total. List A consisted

of letters that are relatively easily unscrambled to form words (see Appendix C). List A consisted

of four to five letters, and I created an answer sheet in order to check responses (see Appendix

D). List B contained letters that were impossible to unscramble in order to form words (see

Appendix E). List B consisted of four to five letters. List C used letter scrambles that were more

difficult than the first list to unscramble, but still completely possible to solve (see Appendix F).

List C consisted of letter scrambles that had five or more letters, and I created an answer key for

List C in order to check responses (see Appendix G). Each list consisted of 10 letter scrambles.

In order to create the second list of letter scrambles that were impossible, I took the letter

scrambles from the first list and changed the third letter of each set of letters. There were no

categories used in any of the lists.

In order to solve the anagrams, the participants were told to use a pen or a pencil. The

experiments took place in the basement of Young Hall. In order to time the participants, my

research assistant and I used our mobile phones with built in timers. Finally, I created a feedback

letter that informed the participants of the purpose of my study, which also gave my contact

information in case of questions in the future about the experiment. Along with the feedback

letter (see Appendix H), I also developed a tip sheet for solving letter scrambles that was given to

the participants at the end of the experiment (see Appendix I).

**Procedure**

When the participants arrived to the study, they were asked to sign two copies of the

informed consent letter and then to give back one copy for my records. The participants were

given the second copy of the informed consent letter to keep. Along with the informed consent,

each participant was asked to sign a sign in sheet that would be turned into the Lindenwood

Participant Pool at the end of each week. After signing the informed consent letters and the sign

in sheet, the participants were asked to fill out a demographic survey that consisted of four

questions that I created. After completing the demographic surveys, the participants were told

that they would be asked to attempt to unscramble different letter scrambles in order to form

words.

The experiment was a between-groups study. Each participant was assigned to either

Group 1 or Group 2, and they were assigned by alternating the order of signing up, so every

other participant would be in Group 1. Participants in both Groups 1 and 2 were told that they

would have 5 min to attempt to unscramble List A. The participants were informed when a timer

was started.

After attempting to unscramble their respective first lists of letter scrambles, each

participant was asked to attempt List C, which was an additional list of 10 letter scrambles. There

was no time limit for the second set of letter scrambles, and the participants were told to attempt

to solve as many as they could figure out. After giving up one time, the participants were

encouraged to look over the letter scrambles one last time to see if they could solve anymore

before being finished. After looking over the list once more, the participants were told that the

experiment was completed.

After the experiment had been completed, the participants received a feedback letter, a tip

sheet for solving letter scrambles, and were debriefed on the purpose of the experiment. The

participants were informed which set of letter scrambles they were given, in order to avoid a

reduction of confidence in their ability to solve letter scrambles in the future. Finally, the

participants were asked if they had any questions for me regarding the experiment, and then were

thanked for their participation. Before leaving, the participants were asked to fill out a small slip

that would allow them to receive extra credit for their participation. Additionally, the students

received a tip sheet that I created that is helpful with future anagram solving.

### Results

The purpose of my study was to see if a connection existed between impossible letter

scrambles and words solved when the solutions are possible. In other words, I was attempting to

see if learned helplessness would have an impact on how students perform on future

assessments. I hypothesized that participants that had the impossible letter scramble list initially

would have a significantly fewer number of solved letter scrambles on the second list given to

them when compared to those who were initially given simple letter scrambles.

An independent samples *t*-test was conducted to compare anagram-solving ability,

measured in words unscrambled correctly, between a neutral condition and a learned

helplessness condition. The independent variable was the list of words given to the participants,

being either the List A, or List B, consisting of letters that are impossible to unscramble. The

dependent variable was the number of words solved correctly by the participants on List C by the

participants who received List B, which was measured by counting the number of correctly

unscrambled words. It was found that there was a significant difference in scores of the learned

helplessness condition ($M = 4.56$, $SD = 2.51$) and the neutral condition ($M = 8.25$, $SD = 1.83$);

$t(15) = 3.43$, $p = 0.004$.

These results suggest that learned helplessness has a significant impact on anagram-

solving ability. More specifically, my research suggests that when a student or individual has

learned helplessness enforced upon them, future performance of similar tasks, in this case

anagrams, decreases significantly.

## Discussion

The target of my study was to see the relationship between learned helplessness and

future performance, through means of letter scrambles. The focus of the results was on the

number of words correctly unscrambled from the list of letters given to both groups of

participants after the initial list was attempted. My prediction was that the students who were in

the learned helplessness condition, those who had a list of letters that were impossible to

unscramble in order to form words, would have a significantly lower number of words

unscrambled correctly when given a second list that consisted of letter scrambles that were

possible to unscramble when compared to the neutral group. The results implied that there is a

significant difference between the neutral group and the learned helplessness group, showing that

the learned helplessness group had roughly an average of four less words unscrambled.

Nevertheless, the data may be extreme since it was such a small sample size (*N*=17).

While my prediction was correct that the learned helplessness group was able to

unscramble fewer words than the neutral group, I was actually expecting the learned helplessness

group to unscramble fewer words than it actually did as a whole. As a group, the learned

helplessness group successfully unscrambled an average of 4.56 words, which seemed to be high

compared to the expectation that I had. There are a few reasons that this could have happened.

First, it is possible that the selection of students were simply skilled at working with anagrams,

which would make the results prone to being higher in regards to the number of words solved

correctly. Second, it is possible that since the sample size is so small, that if the experiment were

to be continued, the average would be lowered, since more people are participating. Third, it is

conceivable that the students were able to catch on to the purpose of the experiment. Since all 10

words on the first list were impossible for the learned helplessness group, the students may have

realized that the list was unable to be solved, meaning that the manipulation would not function

as intended. Finally, it is also likely that effort levels would come into play for the second list

performance. For instance, there were students who, even though no words were found, insisted

on attempting every single set of letters on both lists, which demonstrates a high effort level. As

well as high levels of effort, some students were able to find word and letter combinations from

different language, such as in Spanish or Nepali. It would be very interesting to continue the

research to see how the numbers would change with more participants coming from a more

diverse pool.

A potential source of error could come from two major places: foreign languages and the

letter scramble "cuyk" which was found in the impossible list. In addition, another word "sect"

was possible to find in the impossible list, yet no participants were able to identify this word. In

the experiment, there were students who spoke multiple languages. There were letter scrambles

in the impossible letter set that could be used to form words in a different language, which was a

factor that I did not consider. This could have changed the results because it encourages students

to continue trying, even if the words may not be in English. The second potential source of error

is the letter scramble "cuyk." In order to make sure that letters could not be unscrambled to form

words, I had multiple people test them out by attempting to form words with the letters.

Participants in this study kept finding "yuck" from this particular letter combination. While yuck

is classified as onomatopoeia, or a word that is a sound, not an actual word, finding this

onomatopoeia may have encouraged students to continue to try and unscramble the letters. While

small, these two sources of potential error could have skewed my results.

These results could have positive implications in academic settings, more specifically

related to test taking, both standardized and regular subject tests. For standardized tests, multiple

subjects are tested over, and students have a tendency to burn out while taking one test after

another. It is very possible that if a student feels as though they performed poorly on the first

portion of an exam, their performance on the rest of the standardized test may be skewed, since

the effort level and level of optimism could be decreased. A way to overcome this potential

problem would be to help students by separating each subject by including either a light-hearted

activity or a mental break, which would act as a "reset" window for students.

In regards to regular subject tests, it is common for students to have a subject that is

claimed to be their worst performing subject. Many times, the reason for this is that the students

have had negative experiences with a particular class or teacher that has unintentionally enforced

learned helplessness upon them. Due to this, the levels of effort in the particular subject may be

decreased, affecting a student's academic representation as a whole. If students are able to

understand the impact that learned helplessness has, it could be possible to overcome it through

practice and positive build up by professors.

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**Appendix A**

Informed Consent

I _____ (print name) understand that I will be participating in a research

experiment that requires me to attempt to solve two sets of word scrambles and complete a

demographic survey. I understand that I should be able to complete the experiment within 20

minutes total. I understand that I can skip any question that I am not comfortable answering. I

understand that my participation is totally voluntary, and if at any time I am uncomfortable, I am

allowed to withdraw from the study without penalty. I understand that the information obtained

from my responses will be kept confidential and will only be used for data collection. My

responses will be kept confidential and the data collected is only used for educational and

research purposes. I understand that my participation is not restricted due to any personal

information, such as primary language. I verify that I am at least 18 years of age and I am legally

able to consent or that I am under the age of 18 but have parental consent form filed with the

LPP office that allows me to consent as a minor.


Participant Signature

_____ Date: _____

Researcher Signature

_____ Date: _____


Researcher:                                         Supervisor:
Alex Moll                                           Dr. Michiko Nohara-LeClair
314-458-3441                                        Course Instructor
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## Appendix B

Demographic Survey

1.  What is your academic standing?
    a.  Freshman
    b.  Sophomore
    c.  Junior
    d.  Senior
    e.  Other


2.  Are you a full time student?
    a.  Yes
    b.  No


3.  What is your primary language spoken?


    a.  _____


4.  What is your gender?
    a.  Male
    b.  Female
    c.  Other

**Appendix C**

Group 1 List 1 Letter Scrambles

rpeag

tcas

boko

wtera

malp

cudk

lhigt

otsta

hpeno

lvie

This list of letter scrambles will be given to group 1 as the initial list.

**Appendix D**

Group 1 List 1 Answer Key

Grape (Can also spell pager)

Cast (Can also spell cats)

Book

Water

Lamp (Can also spell palm)

Duck

Light

Toast

Phone

Evil (Can also spell live or vile)


This list of words serves as the answer key for group 1. It will not be given out to participants.

**Appendix E**

Group 2 List 1 Letter Scrambles

rpoag

tces

boro

wtira

matp

cuyk

lhegt

otrta

hpino

lvue

This list will be given to group 2. These letter scrambles are impossible to unscramble to form

words.

**Appendix F**

Group 1 and 2 List 2 Letter Scrambles

rcpumtoe

nagrde

rysitho

bsamnete

boktoeon

fstaberak

tofbolal

sesalsg

itnetern

btelto

This list will be given to participants in both groups after the initial list of letter scrambles.

**Appendix G**

Groups 1 and 2 List 2 Answer Key

Computer

Garden

History

Basement

Notebook

Breakfast

Football

Glasses

Internet

Bottle

This list serves as the answer key for the second set of letter scrambles. It will not be given out to

participants.

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**Appendix H**

Feedback Letter

**Dear Participant,**

Thank you very much for participating in my research experiment. This study involving word scrambles was conducted in order to test whether or not learned helplessness has an impact on ability to solve future word scrambles. Learned helplessness can be defined as the belief that an individual does not have any control over the outcome of an event. There were two groups of subjects, Group A and Group B. Each group was given a different list for the first trial. The subjects in Group A received word scrambles that could be solved. The subjects in Group B received a list of letters that were impossible to unscramble to form a word. I hypothesize that students in Group B will have a significantly lower number of words unscrambled correctly when solving the second list. In other words, I believe that if a student has learned helplessness enforced upon them, then their ability to complete word scrambles even when possible will be diminished.

Remember that your personal information will not be disclosed. I am only interested in the data as a whole as compared to individual datum. Your personal information will not be released. If you are interested in seeing the completed results after the study, or should you have any questions regarding the study, you are free to email me at my email address that is listed below. Thank you again for participating in my study. Your contribution is valuable.

Sincerely,

                                                 Supervisor:
Alex Moll                                        Dr. Michiko Nohara-LeClair
314-458-3441                                     Course Instructor
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**Appendix I**

Tip Sheet by Alex Moll

**Tip Sheet**

- Attempt to rearrange the letters in a different way. Doing this allows you to see the combination of letters in a different way, which may make it easier to see the hidden word.

- Separate the vowels and consonants from each other. By separating them, it is easier to see if the consonants can line up into a particular word. If an answer becomes evident, plugging in the vowels becomes much easier.

- If you cannot figure out a word, come back to it! Sometimes taking a break from attempting to solve a particular word lets your brain see it with fresh eyes the next time it is reviewed.

**Mental and Physical Practice: Comparing their Effects on Hand-Eye Coordination Tasks**

*Ryan M. Dyck[10]*

Lindenwood University

*The present study aims to determine whether mental or physical practice is more beneficial immediately prior to a hand-eye coordination task. In order to test this the present experiment uses a game similar to beer/water pong, a common party game among college students, and records the amount of cups made. The study uses a pre-test post-test design to account for individual differences on pong playing ability. In between the two tests, participants underwent either mental or physical practice. Two hypotheses are present for this study: first that all participant's post-test scores will be higher than their pre-test scores, and second, that participants in the mental practice condition will have higher post-test scores than those in the physical practice condition. Using a 2 (practice) X 2 (trial) ANOVA, it was concluded that there was no statistically significant difference between the two trials, nor between the two different practice conditions. The present study concludes that future research should utilize more trials in both the post and pre-test as well as having a longer practice period.*

Since the beginning of sport, individuals have endlessly tried to improve their performance through practice. In modern sports, coaches and athletes use the most advanced technology to learn how to push the body to its limits and prepare it for competition. Research in this area is persistently conducted, and records are constantly broken. Take the 2016 Olympics for example, where 27 world records were set (Olympics, 2016). However, it is not only physical training that affects one's performance, psychological or mental practice often plays an important role in the success of an athlete. The extent to which mental practice aids individuals

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has been a hotly debated topic in sport, health, and psychological research (Driskell, Cooper, &

Morgan, 1994). For example, it has been found that imagery can be beneficial for stroke victims

in regaining upper limb motor function (Crosbie, McDonough, Gilmore, & Wiggam, 2004);

moreover, focused imagery has a significant effect on one's physiological response (Hecker &

Kaczor, 1988). Thus it can be concluded that the mind plays an important role in the functioning

of one's motor movement as well as their physiological responses. The next logical question then

becomes; can, and how, does the mind affect one's performance in sport?

Previous research has indicated that mental practice is better than not practicing at all,

and that mental practice seems to be more beneficial for motor tasks that require more cognition

(Landers, 1983). Research on sport-specific mental practice further suggests that negative

imagery is detrimental to the successful completion of a task, and that mental practice works best

when it is combined with physical practice and implemented at the beginning stages of skill

acquisition (Lejeune, Decker, & Sanchez, 1994; Taylor & Shaw, 2002).

Using previous research as a foundation, this experiment is designed to test the most

effective way to prepare for a known or learned cognitive based motor task. In order to do this,

the experiment will subject half of the participants to a mental practice condition and the other

half to a physical practice condition. In an attempt to acquire as many participants as possible,

the cognitive motor task chosen was water/beer pong. This game is one that is commonly played

at parties around college campus, and involves shooting a ping pong ball into a party cup.

Participants of this particular study had 10 chances to shoot a ping pong ball into a party cup

partially filled with water. After this initial pre-test participants were subject to one of the

aforementioned conditions. In the mental practice condition participants were shown three basic

mental practice techniques (relaxation, visualization, and body rehearsal) and left alone to

practice them for 5 min. In the physical practice condition participants were shown the generally

accepted technique for beer/water pong, and then left alone to practice for 5 min. After

participants underwent their respective practice they repeated the pre-test. I hypothesized that

participants in both conditions would improve their make percentage in the second trail, and that

participants in the mental practice condition would improve significantly more than those in the

physical practice condition.

## Method

### Participants

In this study there were 27 participants. All of the participants were between the ages of

18-64. The sex of the participants was not asked as it was not pertinent to this study. There were

25 participants who had previous experience playing a game that involved a similar shooting

motion to the task in the study. Of these 25 participants, 6 considered themselves to have poor

shooting skills while 13 considered themselves to be proficient at the task, and 6 considered

themselves to be great at the task. Of all the participants in the study, 17 play sports

competitively while 10 do not. Finally, 9 participants have received formal mental training while

19 had never received any formal training. Of these 9, only 5 are still receiving training.

Participants for this study were recruited by the posting of fliers around campus and

through the Lindenwood Participant Pool (LPP) using a data management system called Sona

Systems. There were 7 participants recruited using fliers. These fliers were posted on bulletin

boards around Lindenwood University's campus with the permission of the dean of each

building. Participants recruited through this method received no compensation other than the

knowledge that they contributed to the advancement of scientific knowledge. There were also 20

participants who were recruited through the LPP. The LPP is designed to help researchers at

Lindenwood gain participants for their studies. To do this the LPP offers students in introductory

classes from various disciplines the opportunity to earn one to two extra credit points for

participating in a given study. For this particular study, participants were given one extra credit

point toward their LPP participating class for their participation (points are determined by the

length of the study).

**Materials and Procedure**

Prior to the arrival of participants, the testing room was set up so that 10 red solo cups

partially filled with water were arranged in a triangular formation. Two ping pong balls were

placed at the other end of the table. Once participants arrived, they were asked to sit down at

which time they were handed the informed consent form. If participants agreed to participate,

they were given a questionnaire (see Appendix A). After participants completed the

questionnaire, they were randomly selected to be in either the mental or physical practice

condition. In order to randomize selection all even numbered participants underwent the physical

practice condition while the odd numbered participants underwent the mental practice condition.

After placed into their respective condition, participants were informed of the potential rewards:

one sour patch kid for every cup made and a $10 dollar iTunes gift card if they made all 10 cups.

Participants then underwent the pretest. During the pretest, participants shot 10 ping pong balls

into the triangular formation of red solo cups. Each time a participant made a cup, the cup was

removed from the formation to ensure that the same cups were not counted twice.

   After completing the pretest, participants underwent their respective condition. In the

physical practice condition, participants were offered a 1 min tutorial on the established

techniques for "beer pong," a game that utilizes the same shooting concept. After the tutorial,

participants were left alone to practice for 5 min. In the mental practice condition, participants

were shown three basic mental training techniques. The first was a breathing exercise designed

to release tension in the participant's body. The exercise consisted of participants breathing in

through their nose for 4 s, holding their breath for 4 s, and then exhaling for 4 s out of their

mouth in a controlled manner. Participants were told that this exercise could be used to control

their arousal level if they felt themselves becoming nervous or overly aroused.

The next exercise that participants were shown was imagery. In this exercise, participants

were asked to close their eyes and visualize themselves correctly executing each step involved in

making a shot. Participants were informed that the more vividly they visualized the process the

greater their chance of making the shot. Finally, participants were shown body rehearsal

techniques. During this explanation, participants were asked to go through the motions of

shooting the ping pong ball and visualize themselves correctly making the shot. After each of the

three mental training techniques were demonstrated and explained, participants were left alone

for 5 min to practice these techniques. To ensure that participants did not perform any physical

practice, the ping pong balls were taken from the room.

After 5 min had passed, participants of both groups participated in the posttest portion of

the experiment. This portion of the test was exactly the same as the pretest and involved the same

potential rewards as the pretest. Results of the participants were recorded, feedback letters were

handed out, and participants were asked if they had any questions pertaining to the study. If

participants did have questions they were answered to the best of my ability, and then

participants were dismissed. Those participants recruited through the LPP were also given their

participation receipts to turn in for extra credit.

## Results

The hypotheses I proposed for this study were first that the mean scores of trial two

would be greater than those of trial one, and second, that the mean difference between trial one

and trail two would be greater for those in the mental practice condition. In order to determine if these research hypotheses were correct, I conducted a 2 (practice) X 2 (trial) mixed ANOVA to determine if the number shots made was affected by practice type, and trial number. There was not a significant main effect of trial as trial one (*M = 2.67, SD = 1.52*) was not significantly lower than trial two (*M = 2.59, SD = 1.39*), *F*(1, 25) = 0.311, p = 0.582. Thus the research hypothesis that participants would significantly improve on the second trial was not supported.

The second hypothesis concerned the interaction between trial and training. There was not a significant interaction as the change in the mental practice condition (*M = -0.23, SD = 1.79*) was not significantly different from the change in the physical practice condition (*M = 0.071, SD = 1.86*), *F* (1, 25) = 0.185, p = .671. Therefore, the null hypothesis was supported.

**Discussion**

The present studied aimed to determine whether mental or physical practice was more effective immediately prior to a hand-eye coordination task. In order to determine this, I examined whether practice in general had a positive effect on participants' scores, and then whether this effect was greater for participants in the mental or physical practice condition. After analyzing the data there was no significant difference in participants' scores between trial one and trial two. Moreover, the practice condition in which participants were subjected to did not significantly affect their results either way.

After analyzing the data and finding no significant correlations I went back and reviewed

previous research in order to determine the potential reasons why this may have occurred. In

Taylor and Shaw's (2002) study on putting performance they found that only negative imagery

had a significant effect on putting (positive and no imagery were also used). These findings

suggest that negative imagery is more powerful than positive imagery. However, after comparing

these results and procedure with my own study it appears as though there may be another factor:

time. In Taylor and Shaw's (2002) study, participants went through a guided imagery process

prior to every fourth putt. Participants did not have the time to practice and enhance the skill of

imagery. This coincides with the present study as participants here did not have a substantial

amount of time to practice and refine their visualization, relaxation, and body rehearsal skills

either. What this suggests is that positive mental practice is like any other motor skill; it must be

practiced and refined before its benefits begin to show quantitative results.

The preceding proposal is further supported when reviewing a meta-analysis of studies

designed to test the effects of mental and physical practice. In all of the studies reviewed by

Landers (1983), the ones that showed statistical significance in favor of mental practice had

individuals participate in the condition over a period of at least five days. Furthermore, in

Lejeune, Decker, and Sanchez's (1994) study, on the effects of mental practice on ping pong

skills, participants underwent a mental training program that lasted seven days. The results of

this study indicated that mental practice had a positive effect on participants' performance of

table tennis skills. Thus mental training takes time for its effect to be noticeable. In future studies

I recommended that researchers have participants undergo mental training for at least a five-day

period for a minimum of 20 min per day as per previously successful studies.

After conducting preliminary analyses and reviewing past literature I was interested to

see if there were any data to support previous findings that the mind plays an important role in

the successful completion of hand-eye coordination tasks. To do this, I decided to run a

Pearson's product-moment correlation coefficient analysis (Pearson's $r$) comparing participants

perceived task competence with their results in the two trials. In order to minimize error, I did

not include the two participants who had not played beer/water pong before. The test yielded no

significant findings; however, there was a positive correlation that approached statistical

significance ($r(23) = 0.302$, $p = .071$). The implications of these findings are the following. First,

the higher a participant's perceived competence, the more he or she improved from trial one to

trial two. This is especially interesting because on average the whole of participants actually did

slightly worse on the second trial than the first. The test also suggests that confidence plays an

important role in the successful completion of a motor task.

The last important finding of this study was that on average, participants of both

conditions did worse, albeit not significantly, on the second trial. This result goes against one's

intuition as it is commonly accepted that "practice makes perfect," or at the very least, practice

will aid in an individual's ability to successfully complete a task. In order to explain this, I will

use one participant's comment combined with some previous research related to flow states. One

particular participant did very well on the first trial making half of the cups and netting the

second highest score of all participants. After providing the participant with instructions on how

to best mentally practice and allowing to him to do so, trial two commenced. In this trial,

however, the participant only made 1 of the 10 cups, suggesting that the mental practice actually

had a negative effect on his performance. After the participant was done he asked me a few

questions and stated that although he felt more confident during the second trial he was also

more concerned with the result. Moreover, he stated that he felt as though he was no longer

reacting to the cups, but was analyzing his movement and trying to figure out why he missed. In

the applied world of sport psychology many practitioners would call this paralysis by analysis

which basically means that the athlete is not able to perform to his or her potential due to one's

over analysis of the situation. This falls in line with research on flow or optimal states which

highlights the fact that in a flow state one's brain hovers in a state of consciousness just above

the dream level (Fowler, 2015). This means that one's brain is not analyzing a situation, but

merely going along with the action. The individual is so immersed in the activity that he or she is

not concerned with the specific how so long as the task is completed.

Although the present research did not yield any statistically significant data, it did

provide valuable information pertaining to mental practice, the time it takes, and future research

implications. The study's lack of statistically significant findings one way or another combined

with previous research suggest that in order for the effects of mental or physical practice to take place the practice must be longer than 5 min and should take place over a period of at least 5 days. When conducting future research, I recommended that researchers keep this and three other major things in mind. First, I recommended that there be both quantitative as well as qualitative analysis especially if the quantitative data is limited. One of the major downfalls of this study was that there was not enough data per participant to account for extraneous variables such as good or bad bounces. By assessing shots in a qualitative manner it will be easier to assess minor improvements that may not be quantitatively noticeable will the current sample size or until a later date. The second recommendation is to increase the amount of quantitative data per participant. By having participants undergo three to four trials per condition some of the previously mentioned extraneous variables could be eliminated. Moreover, the general tendencies of an individual tend to appear more in larger sample sizes. The third suggestion for future research deals with the makeup of conditions. Although it was not possible for this present study, due to the limited number of participants, I recommended that there be an additional group that incorporates both physical and mental training as their compounding effects may be greater than either one individually. All in all, the present study provided significant information that should influence future research, and ultimately will lead to a greater of understanding of how to most effectively and efficiently practice motor tasks.

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**Appendix A**

Questionnaire

Subject Number (Filled in by researcher) _____

1 Have you ever played beer/water pong before?  (please circle one)    YES        NO

2 If you answered NO to the above question, please skip to question 3. Please rate your

 beer/water pong skills on the scale provided below, with 1 being not very good and 9

 being the best.

   1      2    3    4    5    6    7    8    9

3 Do you play any sports competitively?  (please circle one)    YES        NO

4 If you answered YES to the above question please indicate what sport(s) in the space provided below.

_____

_____

5 Have you ever received any formal training in any of the following areas? Relaxation, Visualization, and/or Body Rehearsal.  If yes, please indicate which one(s), and the approximate number of hours spent training in the space below.

_____

_____

_____

_____

_____

# Effects of Music on Puzzle and Math Problem Solving

*Roberta Kerosevic[11]*

*The purpose of this project is to see how different music genres affect performance on word searches and multiplication problems. The present study consists of four 10 min rounds; each round including a genre of instrumental music: classical, heavy metal, or pop, and silence. Students did four different word searches and four different 100-problem multiplication worksheets; one word search and one multiplication worksheet per round. Lastly, a survey about their daily music use and opinions of the experiment's music, will take 5-10 min. The results of this study were analyzed using a one-way ANOVA to compare the students' performances on the two tasks completed under each genre of music. I hypothesized silence will produce better results than music, but with music, classical will be better than heavy metal or pop. Silence would provide sole concentration on the task, while classical is known to be relaxing and is a sign of intelligence if listening or having some other involvement with it. The first hypothesis was shown to be true, while the second was false, since metal music was the best or second best condition for each task.*

Studies on how music has been influential on studying as well as memory have been highly conducted among researchers. The hypotheses for this experiment focuses on the background conditions, as silence is predicted to be the condition in which students do the best on both tasks, while between just the genres of instrumental music, classical will show the most favorable results compared to pop and metal music. The focus on how the task is affected by mere presence of background music is more uncommon than other manipulations of independent variables. In recent studies, the manipulation of music not only includes different genres, but also the speed, loudness, and the mood of the music as well. There is also more of a focus on different

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groups of students; personality traits and musical training are examples most commonly used in

background music studies for comparison.

Some researchers look for specific participants to further their results, and one common

category participants were put in for background music studies was whether they were musicians

and/or non-musicians. Three studies used this categorization, and had a different use of

background music; whether it be the speed, the loudness, or the genre (Kang & Williamson,

2013; Thompson, Schellenberg, & Letnic, 2011; Yang, Mcclelland, & Furnham, 2015).

Thompson et. al. (2011) were looking to see the difference between musicians and non-

musicians in the loudness and speed of the music. They defined participants as having musical

experience if they had at least two years' worth of lessons, while non-musicians had usually zero

to one year's worth of experience (Thompson et. al., 2011). The test administered to all

participants was a reading test that involved reading a passage and answering question about

what was read. The results showed musically-trained participants did better in each variation of

music speed and loudness over those with no musical training.

The hypothesis of musicians doing better than non-musicians was also kept alive in a

study where musicians were categorized by whether they were piano players or guitar players

(Yang et. al., 2015). One participant took three different tests while listening to one of three

different instrumental music pieces, which included a guitar, piano, and saxophone solo; all

within the genre of jazz. The tests involved math, grammar, and an algebra and geometry test

used to usually determine IQ (Yang et. al., 2015). There was no effect on the math test when it

came to musical experience, but guitar players did worse on the grammar test while listening to

guitar music, while piano players did worse on the algebra-geometry based test when listening to

piano music. In the researchers' discussion, they postulated that the results could have been

influenced in part by the fact that musicians who are familiar with a certain instrument may be

concentrating more on the familiar music than the task, and thus perform worse than non-

musicians.

Another study had researchers believe the hypothesis of the previous study; that

musically-inclined participants will do better than those who are not, the only difference is they

were tested to see if they could learn some common words and phrases of another language

better under music or no music (Kang & Williamson, 2013). There were two languages involved,

and people were assigned to groups for each language. Within each group, they were further

divided in half to learn the language with or without music (Kang & Williamson, 2013). The

participants were given two weeks to learn the language they had chosen, which was either

Arabic or Chinese. Five CD tracks were listened to daily in certain patterns and the additional

task of writing down what was done that day in a diary was provided by the researchers, before

coming back to report the results in various tests on the computer after the 2 weeks were up

(Kang & Williamson, 2013). It was found that those who were musicians or non-musicians did

not show any significance in language learning under no music or music which the researchers

suspected was because it was short-term learning. This shows that the difference between

musicians and non-musicians can vary, and it might be because of the genre, speed, or loudness

of the music, or the feeling the music gives the participant (Dobbs et. al., 2011; Kang &

Williamson, 2013; Thompson et. al., 2011; Tze & Chou, 2010; Yang et. al., 2015).

A common way to control for differences in music is simply to pick different genres or

styles. A study conducted in a "medium-sized college" in Taiwan used western music such as

"light" classical and hip hop to see how English majors performed on reading tests (Tze & Chou,

2010). There were three different groups; one for each genre and another in silence, and each

group completed the same three different reading prompts and questions. Silence turned out to

produce the most correct answers to the reading prompts while hip hop showed the worst scores

(Tze & Chou, 2010). However, silence and classical music were shown to be similar in results,

even though silence was the best.

Another study used the genre of "garage" music, which is common in the United

Kingdom and includes electronic-dance music and more unknown artists (Dobbs et. al., 2011).

The experiment also consisted of noise (classroom and playground noises) and silence as

independent variables, and each group of female school children ages 11 to 18 was placed in one

of these three conditions, yet completed each task in each condition. The three tests included

finding a missing piece within a picture, a math test with comparisons, mistakes, geometry, and

story problems, and a vocabulary, sentence, and grammar test (Dobbs et. al., 2011). The scores

on each test corresponded with each genre and whether the participant was introverted or extraverted; which was measured before the three tests were taken. Extraversion scores showed slightly better performance with noise on the first test (picture), music on the math test, and on the grammar test with noise (Dobbs et. al., 2011).

Another study did not use multiple genres, but one genre of jazz using three different instruments: a piano, a guitar, and a saxophone (Yang et. al., 2015). Participants were tested in a math test, a sentence-checking test, and an algebra-geometry test to see whether they performed better under one of these music conditions. There were also the variables on whether they were pianists, guitarists, or non-musicians (Yang et. al., 2015). The results showed no difference in math performance under each genre, but piano players did worse on the algebra-geometry test under piano music while the guitar players did worse under guitar music for the sentence-checking test. Non-musicians did best on both piano and guitar music for the sentence-checking and algebra-geometry test, showing that familiar music and knowing the structure of it can be a distraction (Yang et. al., 2015).

Music can also be manipulated by the experimenter by speed, arousal, and whether it is outside music or music made up by the experimenters. In a study conducted in a Swiss university, tempo or speed and "in-tune" and "out-of-tune" music was controlled by the experimenters, as well as a background sound of noise, which included "brown" noise (Jäncke & Sandmann, 2010). There were five different background conditions: four that combined fast and

slow tempos, and in-tune and out of tune music, for example: high tempo in-tune music, and just the noise condition. The test was to see if participants could recall made-up words while listening to one of these background sounds (Jäncke & Sandmann, 2010). The number of milliseconds was counted after the participant was presented a word, and it was found that the best condition for recall was in-tune slow music, while in-tune fast and out-of-tune slow were the worst. Emotional satisfaction and arousal ratings were also measured using surveys after the test, and it was found participants were happier with the in-tune music and arousal ratings were not significant.

However in another experiment, arousal did play a difference in the results. A study also conducted in Europe tested to see if unknown music made by the experimenters or music that participants brought with them, was better during a driving simulation task (Cassidy & Macdonald, 2009). The experimenters also controlled for arousal in their music selections, as the levels were high and low arousal, but the music participants brought was songs that have been popular on the UK charts in the past 5 years. The accuracy of their driving was measured; which was how many mistakes they made, their time per lap, and their lap speed average (Cassidy & Macdonald, 2009). It was found that high-arousal music offered the most inaccuracies, and longest lap times, while self-selected music had the lowest inaccuracies, best lap times, and highest average speed. Arousal and mood was also measured before and after the experiment, and high arousal was associated with high distraction, low enjoyment, low liking, low

appropriateness, high arousal, and low liking compared to self-selected music and sometimes the

low-arousal music (Cassidy & Macdonald, 2009). Music can hinder or help a person based on

what he or she knows and what task they are doing, and there are many tests used to see whether

background music affects their results.

Testing can be done in many ways for background music, as school subjects like

language, reading, and math involve different processes and possibly take more concentration

than another. Background music can be more of a hindrance or an aid to doing well on a task,

and can be shown in the similar topics of reading and language. Two studies involved reading

while listening to certain types of music, which were Thompson et. al. (2011) and Tze and

Chou's (2010) studies. For Thompson et. al. (2011), they used four reading passages from the

GMAT, which is a test used for students to be eligible for graduate school. They had participants

listen to slow and soft, slow and loud, fast and soft, and fast and loud music for each passage. It

was found that fast and soft increased the correct answers for the passage, while fast and loud

showed the worst performance (Thompson et. al., 2011).

Subsequently in Taiwan, the students were English majors and they took three different

English-language reading tests, each being a topic native Taiwanese students understood, so they

did not get distracted from not knowing English or Western topics as well (Tze & Chou, 2010).

However, each group did all the tests and the differences between them were not tested.

Grammar tests, in which students fixed errors in sentences, were also used in two studies. Results

of these tests showed pianists did slightly better than non-musicians while guitarists did the worst (Yang et. al., 2015), while in another study, extraverts did the best under noise, then silence, and lastly music (Dobbs et. al., 2011). A related test to language skills was also included in a study where learning made-up words was influenced by different background music and noise. Before the actual experiment began, subjects were given a pretest to see how good their verbal memory was with their own language (German), as to rid of any subjects who already had trouble with words they knew (Jäncke & Sandmann, 2010). They were shown one word at a time on a computer screen, and were told to press the "right" button if it was a new word in the list, and the "left" button if an old word showed up. The same test was done during the initial experiment, only with made-up and meaningless words under different background conditions (Jäncke & Sandmann, 2010).

Math was also a common dependent variable, as basic tests and the Wonderlic Personnel Test were used to measure outcomes of background music. The Wonderlic Personnel Test was also used in the extravert and introvert study, as well as the pianist, guitarist, and non-musician study (Dobbs et. al., 2011, Yang et. al., 2015). This test showed that non-musicians performed the best and that music and silence would produce the best results, yet in the musician study, music was used constantly but did not affect the non-musicians. Since it was math and algebra-based, the explanation might be that liking music for non-musicians and subjects not tested for those qualities do well (as well as extraverts), while those who are taught music are more easily

distracted, as well as introverted (Dobbs et. al., 2011, Yang et. al., 2015). A more basic math test

in the musician study was also used and only involved answering up to 30 addition problems

within a 4-min timeframe, and guitarists did better than piano players and non-musicians, yet it

was not a significant difference (Dobbs et. al., 2011). It seems like language tasks can be helped

with more calm music while math tasks depended on how easily distracted one was when

listening to the music, as more quiet or soft music helped introverted over extraverted people

who need more sound in the background.

The study I conducted had instrumental music as the independent variable, and three

different levels which included classical, metal, and pop music. A control condition was also

included, and this was silence. Each participant did two tasks under each level of the independent

variable and in silence, and the tasks included finding as many words as possible in a 20-word

word search, and solving as many double-digit multiplication problems possible out of 100.

students completed the word search and then did the multiplication problems, each task lasting 5

min for a total of 10 min, and both tasks were done during each background condition. Each

word search was different theme, and the multiplication problems were all in a different order for

each round. Students then took a survey after participating in each condition, and this was to see

how they used music in their daily lives as well as feedback about the music used in the study.

**Method**

**Participants**

A total of 35 Lindenwood University students between the ages of 18 and 24 years old

participated in the experiment through the Lindenwood Participant Pool (LPP) program or by

contacting the researcher through fliers (see Appendix A) posted in Young Hall, which is a

building designated to the School of Sciences on campus. The fliers contained the researcher's

email and phone number for contact, as well as tearable tabs for those interested to take with

them. All Lindenwood students could participate, but all the students came from the LPP. LPP

students received two credits that could go to a class participating in the program, and the bonus

point value of each credit depended on the instructor (i.e. one credit is two bonus points). If there

were students recruited through the flyer, they would receive no compensation for their

participation. Sona Systems was the recruitment site used for LPP students and for the

researchers to keep track of when and who took their studies. Participants had the option of

choosing whatever date and time was convenient for them to participate by signing up for a

timeslot the researcher posted; a maximum of 12 students could enroll for that certain timeslot.

**Materials and Procedure**

A room booking request was first emailed to the LPP office to obtain a room or rooms.

The room was a classroom size of 20-30 desks, and had a computer for the researcher to be able

to give credit through Sona Systems and access files needed for the experiment. A group of 1-7

students per time slot came to the room they signed up for through Sona Systems. All students

signed in on a participant list to account for their presence during the experiment and to validate

their extra credit. Students were also given a participant receipt for participating through the

LPP. Students then chose a seat wherever they felt most comfortable. Before the experiment

began, each student received two informed consent forms (see Appendix B) from the researcher

to confirm their willingness to participate in the experiment. One form was kept by the student

and the other was given to the researcher. The students then took out their writing utensils to start

the experiment.

There were four different word search puzzles (see Appendix C-F), each with a different

theme with instructions posted on the bottom of each word search.  The themes were animals, ice

cream flavors, college life, and summer, and the instructions explained that the words could be

found vertical, horizontal, and diagonal. There were also four different packets of multiplication

problems (two digit by two digit), each labeled either A, B, C, or D, and consisted of one-

hundred different problems (see Appendix G-J). Each student did one word search for 5 min, and

then a multiplication packet also for 5 min, for a total of 10 min. To prevent possible cheating on

either of the puzzles, a classroom with many seats was secured to allow for space between

students and different orders of the word searches and multiplication problems were randomized.

students were instructed to find as many words out of 20 possible in the word search, and to

complete as many of the multiplication problems by hand.

There were four rounds total for each timeslot, and each round consisted of a different

instrumental background music: metal, classical, or pop, and silence as the control. Each student

had a packet in order of word search and multiplication problems, so papers did not have to be

passed out for each round. The results would measure how many words were found during each

condition in the word search, and how many and how correctly multiplication problems were

solved during each condition. After all four rounds, students took a paper survey (see Appendix

K) that asked them questions about how they use music in their daily lives and their opinions on

the music used in the experiment. The survey usually took between 5-10 min to fill out, but there

were few instances where it exceeded that time for certain students. At the end, students turned

in their packet of word searches, multiplication problems, and the survey to the researcher. They

were thanked for participation verbally and by a thank you letter (see Appendix L). Students

were free to leave and LPP students were reminded to turn in their participant receipts.

**Results**

Separate one-way ANOVAs were conducted to see if music condition affects the

performance on the word search and the multiplication task. The first hypothesis was that silence

would show better performance on both tasks compared to the genres, but classical music would

show to be better out of the three music genres. The first hypothesis was shown to be correct, as

for the word search ($F(3,136) = .30$, $p > .05$; $n^2 = .007$), the highest average was 12.94 but it was

not significantly different from the other genres. With the multiplication problems, metal music

and silence (M = 15.4) were better when doing a large amount of problems in general (F (3,136)

= .117, p > .05, n$^2$ = .003). However, multiplication problems solved correctly (F (3,136) = .194,

P > .05, n$^2$ = .004) displayed the best results during just silence (M = 12.51, SD = 5.83), which

shows accuracy can increase with no music playing. The least amount of words was found

during classical (M = 12.17, SD = 3.96) and pop music (M = 12.17, SD = 4.42), and the least

multiplication problems done (M = 14.77, SD = 5.08) and correctly done (M = 11.54, SD = 5.46)

were during classical music. Classical was never shown to be the best genre in either task

compared to the other genres, but metal was either tied with or the best genre compared to

silence in all conditions.

In terms of the results for words found during the word search, the average was around

12 out of 20 for each condition. Multiplication problems were assessed by how many were

completed and how many were completed accurately. The average number of problems

completed during the 5 min mark was 15, with the lowest being 14 problems. The accuracy of

multiplication problems was assessed by if the person got the correct answer, and the average

was lower compared to the amount attempted. The average was 12 problems correct, and the

least amount correct was 11.

The survey was conducted to see what genres the students listened to often, how often

they used music for certain activities, and whether they recognized and liked the music they

heard during the study. Genres that students themselves liked included a wide variety: pop, rock

(17%), country (17%), electronic (11%), and hip hop (8%), and the most popular among students

was pop, with 43% saying they listen to this genre the most often. The most common places

students listen to music is in the car (63%) and somewhere at home (55%), particularly in the

bedroom (49%). Since music can come from many sources, devices and apps are used commonly

to listen to music and the most popular were using a phone (91%), radio (51%), laptop (37%),

YouTube (31%), iTunes (20%), Spotify (23%), and CDs (29%). Music was basically a daily part

of life, and used in many activities such as studying (63%), exercising (74%), cooking (46%),

walking (9%), and cleaning (9%). The music that was most liked during the study was pop

(60%), with classical being a close second with 51%. Some songs were recognized, which were

mostly the pop songs (83%) and some classical songs (71%). The artist and titles of the songs

were recognized as well, especially with the pop music.

### Discussion

The first hypothesis for this study was supported, as silence was the best condition, while

the second hypothesis was unsupported, as metal music was the best out of all the genres. While

other studies measured the type of students who took the test, such as musicians and non-

musicians, or introverts and extraverts (Dobbs et. al. 2011; Yang et. al. 2015), this study focused

more on the music genres and tasks. The only task that was remotely like a test compared to

previous studies, was that participants took a type of math test (Dobbs et. al. 2011; Yang et. al.

2015), but it was in more complicated forms in previous studies than the double-digit

multiplication offered during this study. However even during this study, some students got all or

most questions wrong, and one student also opted out half-way through the study because she

had forgotten the process of solving one of these problems by hand. The reasoning for doing

more poorly on this part of the study could be not remembering how to multiply by hand, since

most people just use technology for most math, even simple math learned during elementary and

middle school years.

The 5 min time limit might have also added pressure, and this includes the finding of the

words in the word search. Yet for some of the word searches, finding more than 15 words out of

20 or even all 20 was common, especially during the "summer" themed word search. The themes

were made to be more positive, familiar, or neutral so the effects of the music could be more

accounted for the results rather than the feelings provoked by the words found, but since the

summer word search would initiate more positive feelings, this might have motivated more

words found. The survey results also might have been more accurate if every question was

answered, as some students skipped the activities portion totally and gave short answers for the

first six questions of the survey. Answers might have possibly been falsified, and doing a study

right before a class might have meant short or rushed answers.

With genre having no effect on the word search or multiplication problems solved or

correctly solved, this might be due to the sample size or the time limit of the study. There were

35 total students, so possibly a bigger sample size might produce more discrepancy in results or

even more favorable results towards the hypotheses. The age group tested included just college

age students, so it would be interesting to see results with a younger or older age group to see if

music affects their ability to find the words or solve the multiplication problems. However, the

math might be harder to solve for younger students, and getting consent from a parent or

guardian would be an extra measure to take.

Even though the results were not significant, it seems unfamiliar music such as the metal,

produced the best results for solving a significant amount of multiplication problems. But since

accuracy is more valued in math problems, silence would be the best condition, as well as for the

word searches. Silence did not involve having to split one's concentration, since the only thing to

focus on was the task. Metal music was shown the best genre probably because it was the least

recognized, and the rhythm of each song was less repetitive and a faster tempo than the pop and

classical. In the future, maybe different tests or activities that students do could be timed or

measured for accuracy during certain background music to see if performance is improved, as

well as involving lyrical or songs or different tempos as shown in other previous studies.

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**Appendix A**

Flier for Non-LPP Recruitment

## Appendix B

Adult Consent Form

To verify students as 18 or older and if they will participate in the experiment

Informed Consent Form

I, _____ (print name), understand that I will be taking part in a research project that requires me to complete word search puzzles and multiplication problems in silence and while listening to different genres of music, and taking a survey about how music is included in my everyday life. I understand that I should be able to complete this project within 55 minutes. I am aware that I am free to refuse to listen to the music, not do the activities, and skip any questions in the survey if I feel uncomfortable with. I am aware that my participation in this study is voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete the study. I understand that the information obtained from my responses will be analyzed only as part of aggregate data and that all identifying information will be absent from the data in order to ensure anonymity. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher(s) involved to my satisfaction. Finally, I verify that I am at least 18 years of age and am legally able to give consent.

_____        Date: _____

(Signature of participant)

_____        Date: _____

(Signature of researcher obtaining consent)

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## Appendix C

Animal Word Search

## Animals

```
S  G  N  R  V  G  V  W  A  L  R  U  S  X  D  Z  O  H  O  L  U  Y  F
P  A  R  R  O  T  K  C  P  U  Y  T  S  V  I  Z  F  T  J  B  O  S  R
S  O  F  Y  V  L  N  R  X  R  L  G  Y  Q  P  E  N  G  U  I  N  L  O
C  Z  L  L  K  I  E  F  F  O  C  V  E  V  K  U  I  Q  M  A  J  R  G
O  W  F  A  N  N  A  L  E  O  P  A  R  D  R  O  D  U  C  K  E  A  N
N  L  W  K  R  A  F  O  R  G  O  D  E  I  R  I  A  R  P  C  L  Y  E
N  P  V  T  K  B  U  F  F  A  L  O  O  K  W  D  B  L  O  V  I  V  K
V  S  Y  I  J  Q  E  E  I  M  C  L  J  L  A  U  E  N  A  V  D  I  C
X  J  B  N  E  J  A  D  Z  L  Q  O  Z  P  N  N  E  X  A  O  P  I
U  O  O  B  R  H  Z  F  R  W  N  X  A  O  B  H  G  C  R  Q  C  B  H
W  K  B  A  M  N  O  H  T  Y  P  C  S  L  J  E  I  A  R  P  O  Z  C
F  A  V  R  W  G  R  E  F  F  A  R  I  G  V  N  U  N  R  W  R  G  F
E  L  E  P  H  A  N  T  V  U  L  V  P  T  R  Z  L  Y  O  O  C  M  Y
M  O  L  V  U  K  E  M  L  G  U  C  G  F  L  A  M  I  N  G  O  B  V
N  M  A  A  Y  Y  P  S  W  Z  N  O  N  P  G  D  J  O  R  W  Y  Z  V
P  N  Z  X  E  G  G  A  O  K  G  S  Y  S  I  I  K  G  V  U  N  S  J
```

Find the following words in the puzzle.
Words are hidden ↑  ↓  →  ←  and  ↘ .

| | | |
|---|---|---|
| PRAIRIE DOG | LEOPARD | WALRUS |
| POLAR BEAR | DOLPHIN | RABBIT |
| CROCODILE | BUFFALO | KOALA |
| KANGAROO | GIRAFFE | FROG |
| ELEPHANT | CHICKEN | DEER |
| FLAMINGO | PYTHON | DUCK |
| PENGUIN | PARROT | |

## Appendix D

Ice Cream Flavors Word Search

## Ice Cream Flavors

```
J  K  Z  D  M  Q  J  F  H  S  W  M  J  R  E  G  Z  H  T  B  C  M  I
U  S  Y  S  E  R  O  M  S  F  C  H  P  L  N  W  O  A  D  P  H  I  M
Y  L  E  M  A  R  A  C  Y  O  O  E  T  I  R  A  M  I  S  U  O  I  Z
J  L  U  A  K  M  A  K  J  N  O  B  R  N  S  Z  U  T  E  N  C  Y  N
B  A  I  C  D  N  D  C  O  B  K  U  U  A  D  T  M  U  O  S  O  T  P
H  T  B  G  Z  K  W  I  L  O  I  F  S  T  M  X  A  L  Q  D  L  V  S
R  J  J  I  R  A  H  Y  B  C  E  K  J  I  T  E  Y  C  L  I  A  U  E
N  T  O  P  E  Y  V  A  B  A  D  B  S  L  Z  E  R  Q  H  Y  T  H  S
A  O  J  S  T  M  A  N  H  P  O  N  R  O  L  A  R  K  W  I  E  L  E
D  F  T  Y  T  I  N  Y  K  O  U  O  N  P  V  A  E  P  E  N  O  V  E
E  Y  U  R  A  N  I  R  I  Q  G  M  I  O  M  C  B  A  E  O  J  A  R
P  H  N  R  B  T  L  R  J  I  H  E  T  E  Q  I  W  Z  F  C  J  N  C
V  A  O  E  E  N  L  E  G  Y  P  L  N  N  Y  P  A  Z  F  I  A  A  Q
S  T  C  H  K  Q  A  B  X  T  H  Q  P  F  M  E  R  M  O  I  K  N  P
X  U  O  C  A  Y  R  R  E  B  P  S  A  R  B  P  T  I  C  Y  Z  A  Z
K  J  C  B  C  E  O  W  L  M  Z  Q  B  A  Z  Z  S  S  I  I  H  B  C
```

Find the following words in the puzzle.
Words are hidden ↑  ↓  →  ←  and  ↘ .

| | | |
|---|---|---|
| COOKIE DOUGH | RASPBERRY | CHERRY |
| BUTTER PECAN | TIRAMISU | SMORES |
| CAKE BATTER | VANILLA | REESES |
| NEOPOLITAN | CARAMEL | LEMON |
| STRAWBERRY | COCONUT | BERRY |
| CHOCOLATE | COFFEE | MINT |
| PISTACHIO | BANANA | |

## Appendix E

College Word Search

**College**

```
J  H  C  N  U  L  H  B  E  V  F  I  N  A  L  D  J  S  F  R  G  F  R
E  K  I  H  L  P  O  T  T  M  M  N  T  F  H  E  W  W  C  O  T  F  T
B  S  P  W  L  R  M  U  E  I  K  Z  M  A  C  G  A  B  O  K  C  S  A
V  M  S  C  W  O  E  Q  Z  X  A  J  R  S  G  R  U  D  F  A  E  F  R
O  U  B  A  V  F  W  T  K  F  T  K  O  T  D  E  X  P  F  F  J  W  C
I  E  M  X  Y  E  O  B  B  L  Z  B  D  F  E  E  A  Q  E  Q  O  C  A
C  Z  Z  G  Z  S  R  O  P  E  P  C  O  O  C  K  S  R  E  W  R  D  F
H  U  A  H  B  S  K  N  Y  A  A  G  N  O  V  V  T  R  S  Y  P  E  F
L  X  Y  K  I  O  H  E  A  R  R  X  P  D  K  X  U  Q  H  K  J  E  E
C  L  C  X  Q  R  Y  B  M  N  K  G  G  P  K  M  D  V  O  B  B  T  I
P  V  G  R  M  L  E  F  O  I  I  K  T  D  Z  C  E  D  P  V  S  E  N
L  D  L  O  G  Q  P  D  N  N  N  H  W  O  D  K  N  P  P  O  A  L  E
A  J  B  T  O  Y  A  N  E  G  G  L  K  M  Y  Y  T  R  I  D  Q  H  T
E  A  D  C  X  K  G  B  Y  F  J  M  L  E  Z  S  T  O  N  H  U  T  Q
R  L  K  O  K  Z  I  Y  B  Y  Z  O  J  H  B  Z  L  J  G  L  L  A  S
O  S  K  D  K  U  O  O  A  L  A  R  M  C  L  O  C  K  O  O  G  C  F
```

Find the following words in the puzzle.
Words are hidden ↑ ↓ → ← and ↘ .

| | | |
|---|---|---|
| ALARM CLOCK | SHOPPING | DEGREE |
| FAST FOOD | STUDENT | LUNCH |
| PROFESSOR | ATHLETE | MONEY |
| HOMEWORK | PARKING | FINAL |
| LEARNING | PROJECT | ESSAY |
| TEXTBOOK | DOCTOR | DORM |
| CAFFEINE | COFFEE | |

**Appendix F**

Summer Word Search



Find the following words in the puzzle.
Words are hidden ↑ ↓ → ← and ↘ .

| | | |
|---|---|---|
| SIGHTSEEING | VACATION | SURFING |
| RELAXATION | UMBRELLA | TANNING |
| FLIP FLOPS | VACATION | DIVING |
| SANDCASTLE | LEMONADE | OCEAN |
| ICE CREAM | SWIMSUIT | BEACH |
| SUNSCREEN | SWIMMING | SUNNY |
| TRAVELING | SANDALS | |

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Appendix G

Multiplication Packet A

3 pages total of 100 total different multiplication problems

4

Name: _____                                                    Date: _____

Multiplication Worksheets

| 53 x58 | 43 x28 | 95 x40 | 20 x57 | 98 x65 |
|---|---|---|---|---|
| 85 x45 | 12 x32 | 39 x16 | 34 x77 | 74 x13 |
| 31 x16 | 93 x18 | 90 x42 | 85 x30 | 42 x22 |
| 59 x60 | 64 x68 | 10 x35 | 64 x30 | 19 x86 |
| 71 x97 | 88 x28 | 52 x47 | 13 x41 | 36 x73 |
| 79 x20 | 16 x44 | 85 x92 | 19 x28 | 57 x64 |
| 25 x23 | 18 x12 | 51 x55 | 52 x86 | 79 x84 |

**Appendix H**

Multiplication Packet B

3 pages total of 100 total different multiplication problems

B

Name: _____                    Multiplication Worksheets                    Date: _____

| 46 | 69 | 50 | 63 | 12 |
|----|----|----|----|----|
| x68 | x59 | x83 | x43 | x92 |

| 55 | 74 | 35 | 34 | 45 |
|----|----|----|----|----|
| x97 | x25 | x96 | x77 | x49 |

| 54 | 82 | 31 | 56 | 77 |
|----|----|----|----|----|
| x47 | x34 | x82 | x51 | x40 |

| 29 | 71 | 79 | 63 | 68 |
|----|----|----|----|----|
| x32 | x21 | x50 | x12 | x32 |

| 39 | 85 | 38 | 49 | 85 |
|----|----|----|----|----|
| x45 | x15 | x53 | x88 | x96 |

| 24 | 25 | 62 | 70 | 69 |
|----|----|----|----|----|
| x54 | x84 | x78 | x77 | x91 |

| 69 | 57 | 64 | 13 | 80 |
|----|----|----|----|----|
| x19 | x13 | x79 | x48 | x92 |

**Appendix I**

Multiplication Packet C

3 pages total of 100 total different multiplication problems

C

| Name: | | | | Date: |
|-------|---|---|---|------|

Multiplication Worksheets

| | | | | |
|---|---|---|---|---|
| 84<br>x85 | 85<br>x35 | 63<br>x58 | 83<br>x98 | 40<br>x42 |
| 87<br>x85 | 73<br>x56 | 58<br>x60 | 26<br>x29 | 46<br>x76 |
| 92<br>x19 | 54<br>x86 | 34<br>x17 | 13<br>x38 | 40<br>x69 |
| 11<br>x17 | 27<br>x89 | 68<br>x75 | 20<br>x22 | 97<br>x66 |
| 67<br>x93 | 86<br>x53 | 46<br>x74 | 39<br>x42 | 57<br>x26 |
| 32<br>x60 | 72<br>x50 | 24<br>x79 | 24<br>x19 | 95<br>x15 |
| 79<br>x13 | 95<br>x58 | 33<br>x14 | 99<br>x24 | 56<br>x85 |

**Appendix J**

Multiplication Packet D

3 pages total of 100 different multiplication problems

D

Name: _____          Die Berein          Date: _____

Multiplication Worksheets

| 88 | 13 | 81 | 42 | 64 |
| x52 | x49 | x71 | x65 | x87 |

| 34 | 25 | 72 | 76 | 30 |
| x36 | x96 | x68 | x17 | x55 |

| 88 | 32 | 34 | 49 | 42 |
| x66 | x49 | x41 | x81 | x44 |

| 80 | 73 | 12 | 53 | 72 |
| x26 | x78 | x22 | x32 | x11 |

| 50 | 76 | 73 | 73 | 89 |
| x60 | x50 | x37 | x68 | x80 |

| 93 | 53 | 45 | 70 | 63 |
| x18 | x95 | x55 | x93 | x11 |

| 89 | 44 | 51 | 89 | 66 |
| x50 | x40 | x52 | x64 | x60 |

## Appendix K

Music Usage and Opinion Survey

1.  How old are you? _____

2.  What is your favorite genre of music? Why?

3.  Where do you listen to music the most (in the car, bedroom, outside, etc.)?

4.  What devices do you use to listen to music (phone, radio, etc.)?

5.  What sources do you get your music from (radio, apps, CDs, etc.)?

6.  Do you use music for specific activities?

    YES                                        NO (please skip to question 8)

7.  The following section will list certain activities to which music is commonly used in the

background. Circle YES or NO if you do this activity while listening to music, and please list

which genre(s) of music you listen to for the activity. There will also be an additional option to

write in any activity or activities you commonly do with background music if they are not in one

of the questions listed.

    a.  Do you listen to background music for studying? YES or NO

        If yes, which genre(s)?

b.        Do you listen to background music while exercising? YES or NO

          If yes, which genre(s)?

c.        Do you listen to background music while cooking? YES or NO

          If yes, which genre(s)?

d.        If there are any other activities you do while listening to background music, please list

them below as well as the genre(s) associated with the activities.

8.  Were any of the genres of music you listened to today distracting or not to your liking?

          YES             or              NO

9.  If YES, which genre was distracting or not to your liking?

      CLASSICAL        POP        HEAVY METAL

10.  Please explain why you found it distracting or not to your liking.

11.  Which genre(s) did you prefer the most?

      CLASSICAL        POP        HEAVY METAL

12.  Were any of the songs you heard today familiar or recognizable? If so, please list the song(s)

and/or from which genre you recognized the song(s).

**Appendix L**

Thank You Letter

Thank you for participating in this study. The present study was conducted in order to determine whether different genres of music and if the presence of music affect a person's performance on word puzzle finding and completing multiplication problems. The hypothesis is that having no background music will produce more positive results than any background music, and that more words would be found as well as more multiplication problems would be completed (correctly) during classical music over pop and heavy metal. This information can help us and others figure out if music is a useful tool in increasing productivity in learning and working at jobs.

Please note that we are not interested in your individual results; rather, we are only interested in the overall findings based on aggregate data. No identifying information about you will be associated with any of the findings, nor will it be possible for us to trace your responses on an individual basis.

If you are interested in obtaining the final results of this study based on aggregate data, or if you have any questions or concerns regarding any portion of this study, do not hesitate to let us know now or in the future. Results will be confirmed by early December. Our contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sincerely,


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Supervisor:
Dr. Michiko Nohara-LeClair 636-949-4371 (mnohara-leclair@lindenwood.edu)

## Difference between Detecting Emotional and Non-Emotional Lies

David De la Cruz[12]

*There are various approaches currently used to detect deception. While many of those approaches encounter different flaws, there is a constant factor that could affect lie detection, intuition. Intuition allows any person to detect some lies, but it also disrupts others, including trained professionals, from accurately detecting deception. When individuals communicate between each other they are able to experience and understand what others are feeling through empathy. Without realizing, people are able to use their intuition, empathy, and emotions to unconsciously detect some deception. However, truth tellers and liars could experience the same emotions regardless of the veracity of their statement. Since there are many emotions that are displayed by individuals by communicating, lie detectors are overwhelmed with different signals that affect their accuracy. How much does unconscious lie detection affect people's ability to detect lies? In this study people's ability to detect lies will be assess by comparing individual's accuracy when detecting the veracity of statements that vary in the amount of emotions displayed. I hypothesize that people will be better at detecting deception from others if there is a lower display of emotions, because they will be able to concentrate on the statement and the few truthful or untruthful emotions displayed with it.*

From small white lies to great deceptive schemes, lies exist in every part of the society.

Being surrounded by lies, people constantly judge the veracity of other individuals' statements.

From parents judging if their kids are being deceptive, to train professionals trying to detect

deception, people unconsciously use their intuition to catch liars (Brinke, Stimson, & Carney,

2014). Even if trained professionals learn a different variety of methods to detect deception, the

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unconscious intuition is always a factor that is present in lie detection, because they are also

humans. People can intuitively discover deception through their ability to emphaticize with

others' emotions (Decety & Jackson, 2004). However, while intuition allows individuals to

detect some lies, it also misleads them to misjudge other people's statements. I hypothesize that

people will be better at detecting deception from others if there is a lower display of emotions

that would consciously or unconsciously distract the lie detector.

The ability to detect deception is important in a variety of situations: clinical

psychologists use it to discover truths about their clients in order to help them; when meeting

new people, and individual use it to assess others, in every profession, the ability to detect

deception is used to judge and recruit the best candidates, there are other countless settings where

lie detection is necessary. One of the most important situations where lie detection is necessary is

in the criminal justice system (Frank & Feeley, 2003). In all the areas of the criminal justice

system, the veracity of people's statements is constantly doubted; criminals sometimes lie about

their deviant actions, their reasons, and even their own mental sanity. It is up to the police

investigators, juries, judges, and many criminal justice professionals to be able to detect

deception and separate it from truthful statements, and it is a heavy burden because their decision

could free criminals into society or convict innocent citizens. Even if the importance of detecting

deception is so important in the criminal justice system, most law enforcement agents' lie

detection ability is not above average (51%) (Ekman & O'Sullivan, 1991). Only a few trained

personnel have an ability above average to detect lies (73%), which is not highly accurate

(O'Sullivan, Frank, Hurley, & Tiwana, 2009).

In order to detect deception, people need to understand the different factors that influence

liars, truth tellers, lie detectors, deceit detection techniques, and lies. Deception has various

definitions depending on the setting it is use in; however, in a broad definition deception or lying

is an intentional attempt, without warning, to create in another individual a belief which the

communicator knows to be untruthful (Vrij, Granhag, & Porter, 2010). People are able to deceive

because the area of the brain that controls verbal communication is located in the forebrain,

which is the part that humans can consciously control (Navarro & Karlins, 2008). All individuals

lie for different reasons, but not all people have the same ability to deceive others. There are

different individual characteristics that good liars possess. The best liars are people whose

natural behavior dismantle suspicion, who do not find it cognitively hard to lie, who do not

experience negative emotions such as fear or guilt while lying, who are good actor and display

an honest behavior, whose attractiveness may lead to an interference with the belief of their

dishonesty, and /or who are "good psychologists" (Vrij, et al., 2010).

The ease with which individuals are able to detect lies depends on the other person's

ability to lie, but even among the best liars there are still differences in their behavior compared

to truth tellers. However, any behavioral differences between truth tellers and liars are typically

small, which produces more difficulties for lie detectors (Depaulo, et al., 2003; Frank, & Feeley,

2003). Both truthful and untruthful individuals display emotions when answering for a question

that could elicit emotion (e.g. both may experience sadness when asked about the death of their

father; the only difference is that liars could display sadness because they are consciously or

unconsciously thinking about the death of another person or the idea of their father's death). Lies

are usually embedded in truths. Most untruthful statements are based on and/or inspired by the

truth with minor differences in the details. Lies embedded in truth are used more than blatant lies

because of the lower cognitive load or necessity to create all of the different details of a lie

(Depaulo, et al., 1997).

Lie detectors also have different motivations to differentiate truthful from untruthful

statements. As a common problem, lies sometimes are undetected because people do not attempt

to uncover the truth, which is known as the ostrich effect (Frank & Feeley, 2003; Vrij, et al,

2010). People often believe the lie they are told because it is more tolerable, preferred and/or

easier to accept than the possibility that they were told a lie (e.g. in a relationship people may

prefer to believe that their partner is not seeing other people, even if they suppose otherwise). Lie

detectors need to possess the motivation to discover the truth, even if the truth is not what they

expect. The ostrich effect, which is the effect of how stereotypes affect lie detection, affects lie

detectors' beliefs and ability to detect deception. Another advantage of liars is that lie detectors

do not receive adequate feedback after deciding whether others are being truthful or deceptive.

Therefore, lie detectors cannot be certain if their lie detection method is successful in most cases.

On the other hand, liars receive feedback after successfully deceiving others, if their lie was

successful other people will not doubt them.

There are many different techniques used to detect deception. The most common

methods involve the use of verbal and nonverbal communication simultaneously (Depaulo, et al.,

2003). Reading an individual's body language can be a great source of information to determine

if someone is lying or being truthful. Humans cannot control the nonverbal signals they display,

because the part of the brain that controls those signals, the limbic system, reacts instantly and

subconsciously (Navarro & Karlins, 2008). Reading another individual's body language is not an

easy task for a variety of reasons. The main reason is that people are different from one another,

meaning their baseline, nonverbal cues, and reactions are different. Humans show a variety of

different cues when they are lying, mainly negative signs, like discomfort or guilt, but there is

not a specific body language signal that characterizes lying (Depaulo, et al., 2003; Navarro &

Karlins, 2008; Vrij, et al., 2010). However, by seeing and distinguishing nonverbal cues, and at

the same time considering other factors, like the setting, the baseline nonverbal behavior, and

others, the likelihood of distinguishing lies from truths greatly increases (Navarro & Karlins,

2008).

Traditionally, the focus of deception detection has been in the emotions experienced and

displayed by truthful and untruthful individuals. However, this approach has limitations because,

as previously described, both truth tellers and liars display the same emotions. The misreading of

any emotion could lead to errors in lie detection, and it is known as the Othello error (Vrij, et al.,

2010). Another approach to detect lies is the premise of cognitive load. The argument of

cognitive load is that being deceitful is mentally more demanding that being truthful (Ekman &

O'sullivan, 1991). When people lie they use more cognitive process, which causes deceivers to

lose focus easier while conducting various tasks. By making possible liars perform various tasks,

their ability to create deception will decrease and eventually they will commit a mistake. There

are also other methods for lie detection that are learned, such as the statement validity

assessment. This method to detect deception is a criteria-based content approach that analyzes a

list on 19 criteria argue to be present more in truthful statements that in untruthful ones (Vrij,

2005). However, learning different methods to detect deception is difficult and time consuming,

and it requires motivation from the learner to master (Vrij, et al., 2010), which is why verbal and

nonverbal cues, emotions, and intuitions are mostly use by people to detect lies even if there are

various factors that interfere with these lie detection techniques.

A constant factor encountered in most lie detection techniques, which disrupt trained

professionals from accurately catching liars, a factor that also allows other individuals from

distinguishing lies in some circumstances, is human's intuition. When humans interact with

others, many different conscious and unconscious brain processes occur simultaneously; one of

those processes, is humans' ability to empathize with others (Decety & Jackson, 2004). People

can perceive how others feel on a subconscious level through nonverbal signals, and that feeling

can give people the ability to feel deception, or notice a difference between others' verbal

statements and nonverbal cues. This intuition makes people able to detect some lies without

training, but it also makes trained professionals unable to accurately distinguish some statements

(Albrechtsen, Meissner & Susa, 2009). People who are trained to detect deception would apply

their knowledge in body language, cognitive load, and other strategies to detect lies. However,

since they are still humans, their intuition can easily affect their judgement. Intuition for lie

detection depends on the ability to empathize with others, and empathy depends on the emotional

nonverbal signals others displays (Albrechtsen, et al, 2009; Decety & Jackson, 2004 ).

There are various methods used to detect deception. However, unconscious and

uncontrollable factors, such as emotions, empathy, and intuition are always present when

interacting with others; therefore affecting people's ability to detect lies.  People can detect other

individual's emotions through their empathy, which gives them an intuitive response of how

others are feeling. The ability to know other people emotions is an advantage and a disadvantage

in lie detection. The degree of how different emotions are display in each individual, depending

on the truthfulness of their statement. However, every emotion is display in both liars and truth

tellers. If lie detectors emphaticize with liars, there are various emotions that could be perceived.

The flow of emotions prevents lie detectors from making an accurate judgement because

categorizing each emotion as truthful or deceitful is not possible. Therefore, the least emotions

are display could improve individuals' lie detection abilities. Is not possible to entirely omit

emotions from statements, however, the less emotions displayed by people, means less

information perceived by lie detectors. Therefore, improving the chances detecting lies by

perceiving and concentrating in the most important emotions displayed and other elements, such

as body language, voice tone, and story content.

**Proposed Methodology**

In order to research how the emotions displayed by others affect people's lie detection

ability, this research will test people's ability to detect lies from models that answered emotional

questions and less, almost non-emotional questions. To create questions that would create an

emotional response in the models and questions that would not create a high emotional response,

faculty members will be ask to fill out a survey with 30 different questions. Each question in the

survey will be constructed different; some questions will be more personal, while other questions

will be common spoken topics. Faculty members will be ask to rate each question, from zero to

five, depending on the level of emotion they think it will elicit in the models, zero being the less

emotional and five more emotional. Additionally, faculty members will rate each question

depending on the type of emotions it could elicit in the models, a negative sign before the

number if the question could provoke a negative emotional response, and not sign for emotional

response. Only a small number of faculty members will be ask to complete the survey if the

responses from five professors do not vary among each other. From the list, a total of 10

emotional questions are going to be selected depending on the highest it is rated. Questions that

could provoke a negative response will not be use because it could motivate models to ignore the

instructions of the investigator. A total of 10 non-emotional questions are going to be selected

depending on the lowest-closer to zero score receive.

The videos will be created by the principal investigator to obtain more control over the

models and location in the videos, the questions asked, and the length of each video. A total of

32 videos will be recorded using eight models from four different ethnic groups (Caucasian,

African American, Asian, and Hispanic/Latino).  All eight models will respond to four randomly

chosen questions. Half of the questions asked to the models will be from the emotional category,

while the other half will be form the non-emotional category of questions. Models will be

instructed to tell the truth or lie before listening to the question. In order to obtain the most

natural response, models will not be informed about the topics of the questions they will be

required to answer. If the model prefers to avoid answering a question, another random question

from the same category will be asked.  Each of the eight models will respond to four questions,

one non-emotional and emotional question with the truth, and one non-emotional and emotional

question with a lie. The videos will be recorded using specialized cameras in order to provide

research participants with most body signals and expressions displayed by the models. Models

will be instructed to create a response for each question of at least 10 s. This will be instructed to

models to avoid short responses which would lower the feedback display to participants. Each

video will be expected to range from 20 to 35 s. The videos will be divided in four different

groups, with half of the videos being models responding to emotional questions, and the other

half responding to non-emotional questions. Four videos in each group will display models lying,

while the rest will display models telling the truth.

The study will be online to obtain a bigger and more varied participant sample.

Participants will be able to enter the study through social media (Facebook) or Psy Chi

undergrad research webpage.  Before beginning the study, participants will be required to read

and sign a consent form (see Appendix A). Participants will begin by answering to the Toronto

Empathy Questionnaire to measure their level of empathy, which will be use because it has high

validity. (Spreng et al., 2009). Participant were then be instructed to carefully watch the short

videos and respond whether the model in the video in telling the truth or a lie. There are going to

be four different possible groups of videos, each with the eight videos previously recorded. The

group of videos each participant is going to be assigned will be selected at random. After

assessing each video and determining if the model is truthful or deceptive, participants will be

require to rate their own decision and the method they think they use to decide (see Appendix A).

A scale will be used for two variables, intuition and behavior observation, and participants will

decide how much of each they think they use. If the behavior observation is higher than half the

highest score, participants will be ask an additional question to prove that they use behavioral

observation; participants will be require to write what they notice that made them judge the

model's statement as truthful or deceptive.

After watching and answering the questions from the eight videos, participants will be require to complete a short survey to measure their knowledge and misconceptions in lie detection (see Appendix A). Participants will then fill a five question demographic survey to understand the culture, ethnicity, age, sex, and other differences of the participants. After completing the demographic survey, participants will receive their lie detection score and a note thanking individuals for their participation (see Appendix A).

*Expected Findings*

I expect to find a difference between the accuracy of detecting the non-emotional and emotional videos. I hope to find that participants will be better at detecting the non-emotional videos, because there is less overwhelming feedback presented to them, which can lower their accuracy. I predict that participants who notice something in the videos will be more accurate than participants who use their intuition if their score in the lie detection questionnaire is higher than average. If their score is lower, their knowledge about the signs and behaviors that allows lie detection will not be accurate, therefore, lowering their accuracy. I also expect to find that participants who are more empathetic will use more their intuition than other method to detect deception. Participant who have a better knowledge of lie detection will have higher accurate rates overall. There are many other variables in this research, which I do not know what to expect. For example, which category of videos will the more empathetic participants will be more accurate; empathy could allow individual to perceive models true emotions in the

emotional videos, but that empathy could also overwhelm the participant. There are many

different results that could be obtained from this research study, which will allow to find more

about deception detection, and unconscious lie detection.

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**Appendix A**

Emotional/Non-Emotional Lie Detection

Informed Consent Statement

Thank you for your interest in this research study. If you agree to participate, you will be asked to respond to some questions about how you relate to others and about your basic demographic information. You will also view some short videos and determine whether the person depicted is lying or telling the truth. You are free to skip any questions you feel uncomfortable addressing. Your participation in this study is strictly voluntary and you may choose to withdraw from the study at any time without any penalty or prejudice. The project should take between 10-15 minutes of your time. The information obtained from your responses will be analyzed only as part of aggregate data and all identifying information will be absent from the data in order to ensure anonymity.  Your responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. In order to participate in this study you need to be 18 years old or older.  Questions about the Research

If you have questions regarding this study, you may contact the principal investigator, David De la Cruz at dad991@lionmail.lindenwood.edu or the course professor, Dr. Nohara-LeClair at mnohara-leclair@lindenwood.edu Clicking on the "Agree" button below indicates that you have read and agreed with all the information previously mentioned, and you are legally 18 years old or more.

☐　　　Agree (1)

☐　　　Disagree (2)

Display This Question:

If Informed Consent Statement     Thank you for your interest in this research study. If you agree

to. Is Selected

Thank you for taking the time to read my consent statement!

If Thank you for taking the time... Is Displayed, Then Skip To End of Survey

When someone else is feeling excited, I tend to get excited too

☐ Always (4)

☐ Often (3)

☐ Sometimes (2)

☐ Rarely (1)

☐ Never (0)

It upsets me to see someone being treated disrespectfully

☐ Always (4)

☐ Often (3)

☐ Sometimes (2)

☐ Rarely (1)

☐ Never (0)

I enjoy making other people feel better

☐ Always (4)

☐ Often (3)

☐ Sometimes (2)

☐ Rarely (1)

☐ Never (0)

I have tender, concerned feelings for people less fortunate than me

☐        Always (4)

☐        Often (3)

☐        Sometimes (2)

☐        Rarely (1)

☐        Never (0)


I can tell when others are sad even when they do not say anything

☐        Always (4)

☐        Often (3)

☐        Sometimes (2)

☐        Rarely (1)

☐        Never (0)


I find that I am "in tune" with other people's moods

☐        Always (4)

☐        Often (3)

☐        Sometimes (2)

☐        Rarely (1)

☐        Never (0)

I get a strong urge to help when I see someone who is upset

☐    Always (4)

☐    Often (3)

☐    Sometimes (2)

☐    Rarely (1)

☐    Never (0)


When I see someone being taken advantage of, I feel kind of protective towards him\her

☐    Always (4)

☐    Often (3)

☐    Sometimes (2)

☐    Rarely (1)

☐    Never (0)


Other people's misfortunes do not disturb me a great deal

☐    Always (0)

☐    Often (1)

☐    Sometimes (2)

☐    Rarely (3)

☐    Never (4)

I remain unaffected when someone close to me is happy

☐      Always (0)

☐      Often (1)

☐      Sometimes (2)

☐      Rarely (3)

☐      Never (4)


When a friend starts to talk about his\her problems, I try to steer the conversation towards

something else

☐      Always (0)

☐      Often (1)

☐      Sometimes (2)

☐      Rarely (3)

☐      Never (4)


I do not feel sympathy for people who cause their own serious illnesses

☐      Always (0)

☐      Often (1)

☐      Sometimes (2)

☐      Rarely (3)

☐      Never (4)

I become irritated when someone cries

☐       Always (0)

☐       Often (1)

☐       Sometimes (2)

☐       Rarely (3)

☐       Never (4)

I am not really interested in how other people feel

☐       Always (0)

☐       Often (1)

☐       Sometimes (2)

☐       Rarely (3)

☐       Never (4)

When I see someone being treated unfairly, I do not feel very much pity for them

☐       Always (0)

☐       Often (1)

☐       Sometimes (2)

☐       Rarely (3)

☐       Never (4)

I find it silly for people to cry out of happiness

☐        Always (0)

☐        Often (1)

☐        Sometimes (2)

☐        Rarely (3)

☐        Never (4)

Please watch the following videos and answer the question: Is the person in the video lying or

telling the truth?

Video

☐        Truth (1)

☐        Lie (2)

Display This Question:

If Video Truth Is Selected

By using the slider below indicate the extend to which you relied on intuition and observation

when judging the truthfulness of the model in the video.

_____ I feel it (Intuition) (0)

_____ I observed truthful signs or behavior (1)

Display This Question:

If By using the slider below indicate the extend to which you relied on intuition and observation

when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is

Greater Than or Equal to  50

Great job. Which signs and/or behavior did you noticed in the video? For example, eye

movement, tone of voice, or any signs you observed.


Display This Question:

If Video Lie Is Selected

By using the slider below indicate the extend to which you relied on intuition and observation

when judging the deception of the model in the video.

_____ I feel it (Intuition) (0)

_____ I observed deception signs or behavior (1)


Display This Question:

If By using the slider below indicate the extend to which you relied on intuition and observation

when judging the deception of the model in the video. I observed deception signs or behavior Is

Greater Than or Equal to  50

Great job. Which signs and/or behavior did you noticed in the video? For example, eye

movement, tone of voice, or any signs you observed.


A deceptive person is likely to avoid direct eye contact when asked a question.

☐       True (0)

☐       False (1)

People who are nervous or show fear when answering a question are lying.

☐      True (0)

☐      False (1)


Which of the following is the least reliable indicator of deception?

☐      Presence or absence of illustrators when talking (0)

☐      Vocal quality (1)

☐      Facial micro expressions (0)

☐      Emotions display (0)


When someone says a phrase like "To be honest…" or "To tell you the truth…" in response to a

direct question:

☐      It indicates he is likely telling the truth (0)

☐      It suggests he is lying or omitting something (1)


Fake smiles can be identified because of the lack of action in which muscles?

☐      Muscles orbiting the eye (1)

☐      Muscles at the corners of the mouth (0)

☐      Muscles around the nose (0)


When a person is lying, the mistakes that can reveal his deception are more likely to be found in:

☐      The words of his story (0)

☐      The nonverbal behavior (1)

☐      The voice tone (0)

When asked the direct question "At what time did you arrived home yesterday?" a person being deceptive is more likely to respond by:

☐ Repeating the full question before answering (1)

☐ Repeating just a few words of the question before answering (0)

When asked a question, a person answering with a detail prologue is likely telling:

☐ A truthful story (0)

☐ A deceptive story (1)

When asked a question, a person who answers by using a strict chronological order is likely telling:

☐ A truthful story (0)

☐ A deceptive story (1)

When asked a question, a person who answers by sharing giving many details about the main event is likely telling:

☐ A truthful story (1)

☐ A deceptive story (0)

What is your gender?

☐ Male (1)

☐ Female (2)

What is your age?


What is your occupation or major?


How would you rate your ability to tell whether someone is lying or telling the truth?

☐        0 (0)

☐        1 (1)

☐        2 (2)

☐        3 (3)

☐        4 (4)

☐        5 (5)

☐        6 (6)

☐        7 (7)

☐        8 (8)

☐        9 (9)

☐        10 (10)


What is your ethnicity? (Check all that apply)

☐        White/Caucasian (1)

☐        African American (2)

☐        Hispanic (3)

☐        Asian (4)

☐        Native American (5)

☐        Other (6) _____

Thank you for completing the survey!

Thank you for taking some time to participate in this survey.

The information you provided has been recorded and it will help discover more about deception

and how emotions influence lie detection.

 If you have any questions or concerns about this survey feel free to contact:

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# The Difference between Detecting Emotional and Non-Emotional Deception

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From small white lies to great deceptive schemes, lies exist in every part of the society.

Being surrounded by lies, people constantly judge the veracity of other individuals' statements.

From parents judging if their kids are being deceptive, to trained professionals trying to detect

deception, people can unconsciously use their intuition to catch liars (Brinke, Stimson, &

Carney, 2014; Reinhard, Greifeneder, & Scharmach , 2013). Even if trained professionals learn a

variety of methods to consciously detect deception, unconscious intuition is always a factor that

is present in lie detection because they are also humans. People can unconsciously discover

deception through their ability to feel and see others' emotions (Vrij, Granhag, & Porter, 2010).

However, while unconscious intuition allows individuals to detect some lies, it also misleads

them to misjudge other people's statements because of all the emotional feedback received from

other people. I hypothesize that people will be better at detecting deception if there is a lower

display of emotions that could distract the lie detector.

In any event where there is interaction between two or more individuals, the ability to

detect deception is necessary. Lie detection is important in any profession because being

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deceitful in the professional world could lead to losses. However, one of the most important

situations where lie detection is necessary is in the criminal justice system (Frank & Feeley,

2003). In all the areas of the criminal justice system, the veracity of people's statements is

constantly doubted. Criminals most of the time lie about their deviant actions, their reasons, and

even their own mental sanity. It is up to the police investigators, juries, judges, and many

criminal justice professionals to be able to detect deception and separate it from truthful

statements, and it is a heavy burden because their decision could free criminals into society or

convict innocent citizens.

Even if the importance of detecting deception is important in the criminal justice system,

according to research, lie detection experts' ability to detect deception is not better than the

average (57%) (Bond & DePaulo, 2006; Ekman & O'Sullivan, 1991). Lie detection experts

include, but are not only, law enforcement personnel, judges, mental health professionals,

polygraph examiners, and many others. However, only a few trained personnel have an ability

above average to detect lies (73%), which is not highly accurate (O'Sullivan, Frank, Hurley, &

Tiwana, 2009). However, it is hypothesized that trained professionals perform only above chance

because the amount of feedback received when attempting to detect deception disrupts their

ability. Therefore, participants in this research study should be better at detecting deception if

they have a better knowledge in lie detection, especially if they are detecting videos where there

is a lower display of emotions.

In order to detect deception, people need to understand the different factors that influence

liars, truth tellers, and lie detectors. A lie detector should also understand the various factors of

deceit detection techniques and lies. Deception has various definitions depending on the setting it

is used in. However, in a broad definition, deception or lying is an intentional attempt, without

warning, to create in another individual a belief which the communicator knows to be untruthful

(Vrij et al., 2010). Humans are able to deceive because the area of the brain that controls verbal

communication is located in the forebrain, which is the part of the brain that humans can

consciously control (Navarro & Karlins, 2008).  People lie for different reasons, but not all

people have the same ability to deceive others. There are different individual characteristics that

good liars possess. The best liars are people whose: natural behavior dismantles suspicion; who

do not find it cognitively hard to lie; who do not experience negative emotions such as fear or

guilt while lying; who are good actors and display an honest behavior; whose attractiveness may

lead to an interference with the belief of their dishonesty; and /or those who are "good

psychologists," meaning they have a good insight into others' thought process and emotions

(Vrij et al., 2010).

The ease with which individuals are able to detect deception depends on the other

person's ability to lie, but even among the best liars there are still differences in their behavior

compared to truth tellers. However, any behavioral differences between truth tellers and liars are

typically small, which produces difficulties for lie detectors (DePaulo et al., 2003; Frank, &

Feeley, 2003).  Lie detectors need the motivation to differentiate untruthful from truthful

statements. As a common problem, lies sometimes are undetected because people do not attempt

to uncover the truth, which is known as the ostrich effect (Frank & Feeley, 2003; Vrij et al,

2010). People often believe the untruthful statement they are told because it is more tolerable,

preferred, and/or easier to accept than the possibility that they were lied to (e.g. in a relationship

people may prefer to believe that their partner is not seeing other people, even if they suppose

otherwise). Lie detectors need to possess the motivation to discover the truth, even if the truth is

not what they expect.

Even if people are motivated to discover lies, they are likely to fail. When judging the

veracity of a statement, people are truth bias and are more inclined to belief others as being

honest. Levine, Park, and McCornack (1999) discover this veracity effect after analyzing lie

detection research and realizing observers tend to get truths corrected more than lies. Due to our

truth bias, we are likely to see liars as being honest. Another advantage for liars is that lie

detectors do not receive adequate feedback after deciding whether others are being truthful or

deceptive (Vrij et al., 2010). Therefore, lie detectors cannot be certain if their lie detection

method is successful in most cases. On the other hand, liars receive feedback after successfully

deceiving others; if their lie was successful, other people will not doubt them.

Research have shown that detecting deception is difficult (Bond & DePaulo, 2006; Vrij et

al., 2010), but studies have also shown that it is not impossible (Ekman & O'Sullivan, 1991;

Navarro & Karlins, 2008; O'Sullivan, et al., 2009). Liars display different emotional and

behavioral cues than truth tellers. However, there is not a cue for deception and some cues are

incorrectly perceived as being deceptive, even if those signals are not correlated with deception

(DePaulo et al., 2003). For example, most people in different studies categorized gaze aversion,

increased fidgeting, anxiety, and even nervousness as being signs of deception. However, none

of those signs are reliable cues of deception. Considering how people's knowledge about

deception cues is not reliable, is not surprising to find average accuracy in lie detection tests. The

belief that some unreliable cues can predict deception could lead to Othello errors, which is a

common error that occurs when lie detectors too readily interpret some signs as deception (Vrij

et al., 2010).

The most common Othello error committed by lie detectors is the failure to consider that

truthful individuals can also display nervousness like liars (Vrij et al., 2010). Lie detectors could

also assume that liars are less likely to exhibit emotions since their statement is not truthful.

However, both truthful and untruthful individuals display emotions when answering for a

question that could elicit emotion (e.g. both may experience sadness when asked about the death

of their father; the only difference is that liars could display sadness because they are consciously

or unconsciously thinking about the death of another person or the idea of their father's death).

There are various reasons liars could also experience the same emotions as truth tellers.

The most likely one is that lies are usually embedded in truths (Vrij et al., 2010). Most untruthful

statements are based on and/or inspired by the truth with minor differences in the details. Lies

embedded in truth are used more than blatant lies because of the lower cognitive load or

necessity to create all of the different details of a lie (DePaulo et al., 1997; Vrij et al., 2010).

Even if people only base their deception on a small portion of a truthful story, the memory or

thought of the truth could elicit the same emotions in the lie.

Considering the challenge of catching liars, there have been many different approaches

created to detect deception. The most common methods involve the use of verbal and nonverbal

communication cues simultaneously (DePaulo et al., 2003). Reading an individual's body

language can be a great source of information to determine if someone is lying or being truthful.

Humans cannot control the nonverbal signals they display because the part of the brain that

controls those signals, the limbic system, reacts instantly and subconsciously (Navarro &

Karlins, 2008). Reading another individual's body language is not an easy task for a variety of

reasons. The main reason is individual differences, each person is different from one another;

meaning their baseline, nonverbal cues, and reactions are different (e.g. people can react

differently to the same stimulus).

Humans show a variety of different cues when they are lying, mainly negative signs, like

discomfort or guilt, but there is no a specific body language signal that characterizes lying

(DePaulo et al., 2003; Navarro & Karlins, 2008; Vrij et al., 2010); and truth tellers could also

display the same signs. According to Navarro and Karlins (2008), the best approach to catch liars

is to create a baseline before attempting to detect his/her lies, and once the baseline is created to

notice any sudden changes not previously present. By seeing and distinguishing nonverbal cues,

and at the same time considering other factors, like the setting, the baseline nonverbal behavior,

and others, the likelihood of distinguishing lies from truths should increase. However, emotions

are still present in both liars and truth tellers, which could consciously or unconsciously disrupt

lie detection (e.g. seeing that a person is sad when talking about a death pet does not necessarily

implies that the statement is truth).

The focus of lie detection has been in the emotions experienced and displayed by truthful

and untruthful individuals. However, this approach has limitations because, as previously

described, both truth tellers and liars display the same emotions (DePaulo et al., 2003). The

misreading of any emotion could lead to Othello errors that could influence the entire perception

of the veracity of the statement. Othello errors could lead to confirmation bias, which is the

tendency to look for information that confirm existing beliefs, and to another phenomenon called

belief perseverance, which is the disregard of new evidence because it disconfirms a false belief

(Vrij et al., 2010). A single incorrectly perceived emotion could disrupt any future information

lie detectors obtain from other people, which is why having less emotional and behavioral

signals presented to lie detectors should increase their accuracy in detecting deception.

Another approach to detect lies is the premise of cognitive load. The argument of

cognitive load refers to the notion that being deceitful is mentally more demanding that being

truthful (Ekman & O'Sullivan, 1991). When people lie, they use more cognitive process, which

causes deceivers to lose focus easier while conducting various tasks. By making liars perform

various tasks, their ability to create deception will decrease and eventually they will commit a

mistake. There are also other methods for lie detection that are learned, such as the statement

validity assessment. This method to detect deception is a criteria-based content approach that

analyzes a list of 19 criteria argued to be present more in truthful statements than in untruthful

ones (Vrij, 2005). However, learning different methods to detect deception is difficult and time

consuming, and it requires motivation from the learner to master (Vrij et al., 2010); which is why

verbal and nonverbal cues, emotions, and intuitions are mostly used by people to detect lies, even

if there are various factors that interfere with these lie detection techniques.

An intuitive response could prevent lie detectors from consciously processing other

feedback presented by other, and lower their chances of correctly detecting deception. When

humans interact with others, many different conscious and unconscious brain processes occur

simultaneously; one of these processes is our ability to empathize with others (Decety &

Jackson, 2004). People can perceive how others feel on an unconscious level through nonverbal

signals, and that feeling can give people the ability to feel deception, or notice a difference

between others' verbal statements and nonverbal cues. Intuition makes people able to detect

some lies without training, but it also makes trained professionals unable to accurately

distinguish some statements (Albrechtsen, Meissner & Susa, 2009). People who are trained to

detect deception apply their knowledge in body language, cognitive load, and other strategies to

detect lies. However, since they are still humans, their intuition can easily affect their judgment.

Intuition for lie detection depends on the ability to empathize with others, and empathy depends,

in part, on the emotional nonverbal signals others display (Albrechtsen et al., 2009; Decety &

Jackson, 2004).

Research on how the unconscious affects lie detection varies. According to a research

study conducted by Reinhard et al. (2013), individuals using their unconscious processes were

better at detecting lies than individuals who use their conscious processes. According to the

researchers, humans have an innate ability to detect lies; however, conscious thinking and focus

on unreliable cues disrupt unconscious lie detection (Reinhard et al., 2013). Brinke et al. (2014)

also found in their two different experiments that people's ability to detect liars is better when

done unconsciously. However, this claim was later debated by Franz and Luxburg (2015), who

argued that a significant difference does not imply accurate classification.  Albrechtsen et al.

(2009) also studied how intuition, an unconscious process, is more accurate than deliberative

process. Even if in some studies there were findings suggesting people's unconscious ability to

detect lies is better than their conscious lie detection ability, their unconscious ability was not

highly accurate. People can unconsciously feel others' emotions, which could allow them to

detect deception, but perhaps the same unconscious process is disrupting a more logically based

method to detect lies, because both truth tellers and liars can experience the same emotions.

There are various methods used to detect deception. However, unconscious and uncontrollable factors, such as emotions, empathy, and intuition are always present when interacting with others, therefore affecting people's ability to detect lies. By perceiving more emotional feedback, unconscious factors could make individuals to wrongly categorize the veracity of others. People can detect other individuals' emotions through their empathy, which gives them an intuitive response of how others are feeling. The ability to know other people's emotions is an advantage as well as a disadvantage in lie detection. Every emotion is displayed in both liars and truth tellers. Therefore it is hypothesize that since the overflow of emotions prevents lie detectors from making an accurate judgment because categorizing each emotion as truthful or deceitful is not possible, participants will be better at detecting other's veracity if there is a lower emotional feedback. If there is a lower display of emotions, lie detectors could concentrate in other elements displayed by others, such as voice tone, body language, and story content.

## Method

### Participants

A total of 118 participants were recruited for this study. Of these participants, 28% were male and 72% were female. The mean age of the participants was 21.2 years ($SD = 7.8$ years). Participants were recruited through Facebook, an online social site and the Lindenwood Participant Pool (LPP), were Lindenwood students can sign for studies through Sona Systems.

The ethnicity of the participants was 69% Caucasian, 7.5% African American, 8.9% Asian, 10.4% Hispanic/ Latino, and 4.2% other. There were not any participants excluded from this study. All participants were 18 years or older and had at least a basic English level that allowed them to fully understand the study and the videos displayed. Individuals who participated in this study gained knowledge about body language and lie detection. Participants recruited through the LPP also received extra credit for their class.

## Materials

**Videos.** The videos used in this study were created by the principal investigator to guarantee more control over the subjects and location in the videos, the questions asked, and the length of each video (see Appendix A). The emotional and non-emotional questions were created and surveyed by the principal investigator and faculty members to optimize both categories (see Appendix B). The questions that were either classify as making the models have a low or non-emotional response or a high emotional response were used. There were 32 videos involved in this study. A total of eight models were recorded both responding falsely and truthfully to the investigator questions. The subjects were proportionally from four different ethnic groups (Caucasian, African American, Asian, and Hispanic/Latino). All models responded twice to emotional questions which had the goal of making the models display emotions regardless of their answer (truth or lie); and twice to non-emotional questions which had he goal to create the less emotional responses as possible, regardless of the models answer (truth or lie).

To obtain the most natural response possible, subjects were not informed of the questions before they were recorded. The videos were recorded with specialized cameras in order to demonstrate the subjects' body signals and micro expressions. Each video lasted from 20 s to 35 s. Subjects were instructed to respond to each question with an answer of at least 10 s; this instruction was required to avoid short answers, which would lower the feedback that participants could observe before assessing if the subject in the video is lying or telling the truth. In order to avoid any lies in their "truth" answers due to embarrassment, the subjects were not forced to answer any question that made them uncomfortable.

**Survey**. A consent statement informing the participants about the research they were going to participate in was used (see Appendix C). The Toronto Empathy Questionnaire (Spreng, McKinnon, Mar & Levine, 2009) was used to measure participants' empathy level. The Toronto Empathy Questionnaire consists of 16 questions used to measure empathy, and has demonstrate great validity in demonstrating people's empathy (Spreng et al., 2009). The principal investigator also created 10 multiple choice questions assessing the participants' knowledge of lie detection and their misconceptions about it. Finally, five demographic questions were added to understand the culture, ethnicity, age, sex, and backgrounds of the participants. A statement thanking individuals for their participation appeared at the end of the survey, as well as each participant's lie detection score was also made.

**Procedure**

The study was conducted online and was approximately 10 to 15 min long. Participants were first required to read and agree a consent form. Participants then responded to the Toronto Empathy Questionnaire (Spreng et al., 2009) and completed a quick survey about their current knowledge of lie detection. After completing both questionnaires, participants watched a total of eight videos previously created by the principal investigator.

Participants were required to analyze the videos and answer whether they believe the models in the video were being deceptive or honest. To avoid any possible fatigue or practice effects, the order of the videos was randomized. Each participant saw a different model in each video. From the eight videos the participant watched, two displayed a model answering an emotional question with the truth; two displayed a subject answering an emotional question with a lie; two displayed a subject answering a non-emotional question with the truth; and two videos displayed a subject answering a non-emotional question with a lie. After watching each video, participants used a scale to answer how much intuition or observational skills they believed they used to detect the veracity of the video. Participants completed five demographic questions after watching the eight videos. After completing the study participants received their lie detection score and a thank you statement.

## Results

Participants' average lie detection score was 4.45 over 8, which is a 55.62% accuracy

rate. This result is expected in lie detection studies, because people's ability to detect lies is only

slightly above chance. However, this study was looking at the differences between detecting

emotional and non-emotional lies. Therefore, participants' lie detection score was divided in the

emotional and non-emotional categories. In order to test if people are better at detecting

deception if there is a lower display of emotional feedback, a paired sample $t$-test was conducted

comparing participants' lie detection score on the emotional and non-emotional videos. The

results of the paired $t$-test revealed that people were better at detecting non-emotional lies (M =

2.37, SD = 0.891) than emotional lies (M = 2.07, SD = 0.967), $t(117) = 2.032$, $p = .042$.

To test whether the other two hypotheses of this study were supported, a Pearson's $r$

correlational analysis was conducted between empathy, lie detection knowledge, and non-

emotional and emotional accuracy score. The second hypothesis was that participants' empathy

score will be negatively related to their ability to detect emotional lies. It was hypothesized that

participants will be more likely to emphaticize with models regardless of the veracity of the

statement if there are more emotions display, and therefore, empathy will affect their judgment.

However, this hypothesis was not supported, $r(115) = -0.16$, $p < 0.873$. Participants with higher

empathy were not worse at detecting the veracity of emotional videos. Further analysis showed

that empathy was not correlated with the ability to detect non-emotional videos, $r(115) = 0.078$,

$p < 0.429$, or with lie detection accuracy, $r(115) = -0.045$, $p < 0.646$.

The third hypothesis was that there will be a positive correlation between participants' lie

detection knowledge score and their ability to detect the veracity of the videos, especially the

non-emotional video category. This was hypothesized based on previous research findings that

participants with more knowledge in lie detection are slightly better at detecting deception. Since

in this study, participants with more knowledge could concentrate only on known signs of

deception instead of emotions, a positive correlation between non-emotional videos and

deception detection knowledge was expected. However, this hypothesis was not supported,

$r(115) = -0.012$, $p < 0.899$.

## Discussion

In this study empathy and lie detection knowledge did not have any significant

correlation with emotional and non-emotional videos. However, this study supported the

hypothesis that it is easier to detect deception if there is a lower display of emotional feedback.

More research in this idea could help to further support this hypothesis and create methods to

help law enforcement agents and other individuals improve their lie detection accuracy. For

example, a lie detection method were only non-emotional questions are asked in order to create a

baseline could be implemented in police interrogations to increase their possibility of detecting

deception.

Since this was an online study, some variables in lie detection could not be controlled. The time spent by participants to judge the veracity of the videos could have an impact on detecting emotional and non-emotional lies. A fast, intuitive, unconscious response could be a sign that the participant used emotions to detect the veracity of the videos. Because of it, is almost impossible to avoid others from showing emotions, even with non-emotional questions, there is a chance participants still relied on emotions to detect deception. To control for this variable, in this study participants were required to select how much intuition they believed they used to detect the veracity of the video, and how much truthful or untruthful cues they believed they noticed in the video. However, future studies should be timed to measure the time participants spend judging each video.

Whether participants unconsciously or consciously detect deception, there was a significant difference between detecting the veracity of emotional and non-emotional questions. For future studies, high stake emotional and non-emotional lies should be used because those types of lies are more likely to appear in society. A bigger and more diverse sample of participants should be used. Even though this study had 118 participants, the ethnicity and age of the participants was not diverse. In this study, participants only watched four emotional and four non-emotional videos. Ideally, for future studies, these numbers should be increased. Another suggestion is to measure how emotional the model's response is, in order to determine the amount of emotional cues necessary to disrupt people's ability to detect deception.

This is the first known research study where emotional and non-emotional lie detection is

studied. More research should be conducted in order to validate the findings of this study. By

further examining the impact of emotions on lie detection, we may be able to discover more

effective ways to detect lies, which can be applied to many instances, such as improving criminal

justice personnel's ability to detect lies with accuracy.

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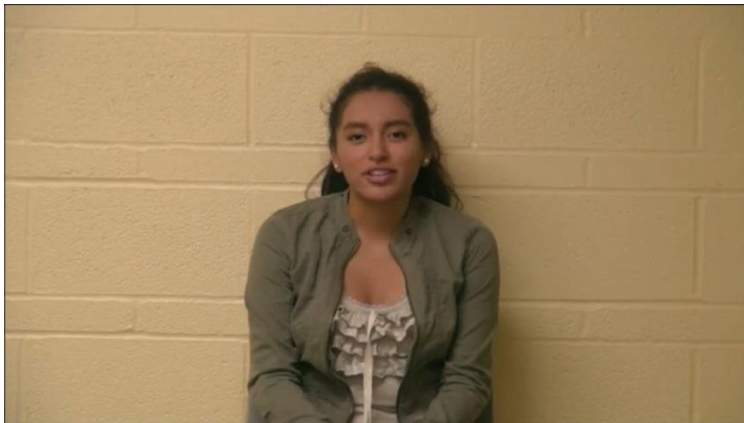lie detection. *Psychological Science in the Public Interest, 11*(3), 89-121. doi:

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**Appendix A**

Screenshots of how the participants view each video.



Non-Emotional Truth



Emotional Lie

**Appendix B**

How emotional will the response from these questions be?

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

-5        -4        -3        -2        -1        0        1        2        3        4        5

-5= strong negative emotional response.

-3= average negative emotional response.

-1= little negative emotional response.

0- non emotional response.

1- little positive emotional response.

3- average positive emotional response.

5- strong positive emotional response.

1. Briefly describe your best vacations? __
2. What did you wanted to be when you were young, and why? __
3. What were you scared of when you were younger, and why? __
4. What is your favorite movie about? Why? __
5. Briefly describe your best friend in high school? __
6. Briefly describe your best experience in high school? __
7. What inspired you to follow your career path? Why? __
8. Have you ever been in a physical fight? How was it? __
9. What did you do yesterday? __
10. Do you miss your high school times? Why? __
11. If you could gain any extraordinary ability, what would you choose and why? __
12. Briefly describe what do you usually cook by yourself? __
13. What was your best romantic relationship like? __
14. What is your family like? __
15. Briefly describe what did you eat today? __
16. What is your favorite type of food? Why? __
17. Briefly describe what assignment you have due tomorrow? __
18. What is the last movie you saw about? __
19. What did you do last weekend? __
20. Briefly describe your last pet? __
21. What do you usually do after class? __

22. What extracurricular activity did you do more after high school? Why? __

23. How much do you know about computers? __

24. Who is your favorite super hero? Why? __

25. What is the most unnecessary thing you had bought? Why? __

**Appendix C**

Emotional/Non-Emotional Lie Detection

Consent Informed Consent Statement

Thank you for your interest in this research study. If you agree to participate, you will be asked to respond to some questions about how you relate to others and about your basic demographic information. You will also view some short videos and determine whether the person depicted is lying or telling the truth. You are free to skip any questions you feel uncomfortable addressing.    Your participation in this study is strictly voluntary and you may choose to withdraw from the study at any time without any penalty or prejudice. The project should take between 10-15 minutes of your time. The information obtained from your responses will be analyzed only as part of aggregate data and all identifying information will be absent from the data in order to ensure anonymity.  Your responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. In order to participate in this study you need to be 18 years old or older.

 Questions about the Research

If you have questions regarding this study, you may contact the principal investigator, David De la Cruz at dad991@lionmail.lindenwood.edu or the course professor, Dr. Nohara-LeClair at mnohara-leclair@lindenwood.edu Clicking on the "Agree" button below indicates that you have read and agreed with all the information previously mentioned, and you are legally 18 years old or more.

○ Agree

○ Disagree

Display This Question:

    If Informed Consent Statement    Thank you for your interest in this research study. If you agree to... <span style="font-size:16px;"><span style="font-family:arial,helvetica,sans-serif;">Disagree</span></span> Is Selected

No Thank you for taking the time to read my consent statement!

If Thank you for taking the ti... Is Displayed, Then Skip To End of Survey

Q11 When someone else is feeling excited, I tend to get excited too

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never


Q13 It upsets me to see someone being treated disrespectfully

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never


Q14  I enjoy making other people feel better

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never


Q15 I have tender, concerned feelings for people less fortunate than me

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never

Q16 I can tell when others are sad even when they do not say anything

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never

Q17 I find that I am "in tune" with other people's moods

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never

Q18 I get a strong urge to help when I see someone who is upset

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never

Q19 When I see someone being taken advantage of, I feel kind of protective towards him\her

○ Always

○ Often

○ Sometimes

○ Rarely

○ Never

Q20 Other people's misfortunes do not disturb me a great deal

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q21 I remain unaffected when someone close to me is happy

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q22 When a friend starts to talk about his\her problems, I try to steer the conversation towards something else

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q23 I do not feel sympathy for people who cause their own serious illnesses

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q24 I become irritated when someone cries

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q25 I am not really interested in how other people feel

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q26 When I see someone being treated unfairly, I do not feel very much pity for them

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q27 I find it silly for people to cry out of happiness

❍ Always

❍ Often

❍ Sometimes

❍ Rarely

❍ Never

Q40 Please watch the following videos and answer the question: Is the person in the video lying or telling the truth?

ANL

❍ True

❍ Lie

ANT

○ True

○ Lie


AEL

○ True

○ Lie


AET

○ True

○ Lie


Display This Question:

    If A NE Lie True Is Selected

    Or A NE True True Is Selected

    Or A E Lie True Is Selected

    Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior


Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If Click to write the question text Lie Is Selected

    Or A NE True Lie Is Selected

    Or A E Lie Lie Is Selected

    Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to 50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If A NE True True Is Not Displayed

BNT B NE True

&#9711; True

&#9711; Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A NE Lie True Is Not Displayed

BNL B NE Lie

&#9711; True

&#9711; Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A E Lie True Is Not Displayed

BEL B E Lie

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A E True True Is Not Displayed

BET B E True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A NE Lie True Is Selected

Or A NE True True Is Selected

Or A E Lie True Is Selected

Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to 50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

If Click to write the question text Lie Is Selected

Or A NE True Lie Is Selected

Or A E Lie Lie Is Selected

Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to 50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

If A NE Lie Lie Is Not Displayed

And B NE Lie True Is Not Displayed

CNL C NE Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A NE True True Is Not Displayed

And B NE True True Is Not Displayed

CNT C NE True

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A E Lie True Is Not Displayed

And B E Lie True Is Not Displayed

CEL C E Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A E True True Is Not Displayed

And B E True True Is Not Displayed

CET C E True

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A NE Lie True Is Selected

Or A NE True True Is Selected

Or A E Lie True Is Selected

Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to 50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If Click to write the question text Lie Is Selected

    Or A NE True Lie Is Selected

    Or A E Lie Lie Is Selected

    Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior


Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.


Display This Question:

    If A NE Lie True Is Not Displayed

    And B NE Lie True Is Not Displayed

    And C NE Lie True Is Not Displayed

DNL D NE Lie

❍  True

❍  Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A NE True True Is Not Displayed

    And B NE True True Is Not Displayed

    And C NE True True Is Not Displayed

DNT D NE True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A E True True Is Not Displayed

    And B E True True Is Not Displayed

    And C E True True Is Not Displayed

DET D E True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A E Lie True Is Not Displayed

    And B E Lie True Is Not Displayed

    And C E Lie True Is Not Displayed

DEL D E Lie

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A NE Lie True Is Selected

    Or A NE True True Is Selected

    Or A E Lie True Is Selected

    Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If Click to write the question text Lie Is Selected

    Or A NE True Lie Is Selected

    Or A E Lie Lie Is Selected

    Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

     If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

ENL E NE Lie

○  True

○  Lie

ENT E NE True

○  True

○  Lie

EET E E True

○  True

○  Lie

EEL E E Lie

○  True

○  Lie

○  Display This Question:

○  If A NE Lie True Is Selected

○  Or A NE True True Is Selected

○  Or A E Lie True Is Selected

○  Or A E True True Is Selected

○  A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

○  _____ I feel it (Intuition)

○  _____ I observed truthful signs or behavior

○

○ Display This Question:

○ If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to 50

○ What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

○

○ Display This Question:

○ If Click to write the question text Lie Is Selected

○ Or A NE True Lie Is Selected

○ Or A E Lie Lie Is Selected

○ Or A E True Lie Is Selected

○ A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

○ _____ I feel it (Intuition)

○ _____ I observed deception signs or behavior

○

○ Display This Question:

○ If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to 50

○ What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

   If E NE True True Is Not Displayed

FNT F NE True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E NE Lie True Is Not Displayed

FNL F NE Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E E Lie True Is Not Displayed

FEL F E Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E E True True Is Not Displayed

FET F E True

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If A NE Lie True Is Selected

Or A NE True True Is Selected

Or A E Lie True Is Selected

Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

   If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

   If Click to write the question text Lie Is Selected

   Or A NE True Lie Is Selected

   Or A E Lie Lie Is Selected

   Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

   If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

   If E NE True True Is Not Displayed

   And F NE True True Is Not Displayed

GNT G NE True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If E NE Lie True Is Not Displayed

    And F NE Lie True Is Not Displayed

GNL G NE Lie

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If E E Lie True Is Not Displayed

    And F E Lie True Is Not Displayed

GEL G E Lie

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If E E True True Is Not Displayed

    And F E True True Is Not Displayed

GET G E True

○ True

○ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

    If A NE Lie True Is Selected

    Or A NE True True Is Selected

    Or A E Lie True Is Selected

    Or A E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If Click to write the question text Lie Is Selected

    Or A NE True Lie Is Selected

    Or A E Lie Lie Is Selected

    Or A E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

    If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

    If E NE True True Is Not Displayed

    And F NE True True Is Not Displayed

    And G NE True True Is Not Displayed

HNT H NE True

○  True

○  Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E NE Lie True Is Not Displayed

And F NE Lie True Is Not Displayed

And G NE Lie True Is Not Displayed

HNL H NE Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E E Lie True Is Not Displayed

And F E Lie True Is Not Displayed

And G E Lie True Is Not Displayed

HEL H E Lie

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

If E E True True Is Not Displayed

And F E True True Is Not Displayed

And G E True True Is Not Displayed

HET H E True

❍ True

❍ Lie

Condition: True Is Displayed. Skip To: End of Block.

Display This Question:

> If H NE Lie True Is Selected
>
> Or H NE True True Is Selected
>
> Or H E Lie True Is Selected
>
> Or H E True True Is Selected

A ANS True By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video.

_____ I feel it (Intuition)

_____ I observed truthful signs or behavior

Display This Question:

> If By using the slider below indicate the extend to which you relied on intuition and observation when judging the truthfulness of the model in the video. I observed truthful signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Display This Question:

> If Click to write the question text Lie Is Selected
>
> Or H NE True Lie Is Selected
>
> Or H E Lie Lie Is Selected
>
> Or H E True Lie Is Selected

A ANS Lie By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video.

_____ I feel it (Intuition)

_____ I observed deception signs or behavior

Display This Question:

   If By using the slider below indicate the extend to which you relied on intuition and observation when judging the deception of the model in the video. I observed deception signs or behavior Is Greater Than or Equal to  50

What Signs Great job. Which signs and/or behavior did you noticed in the video? For example, eye movement, tone of voice, or any signs you observed.

Q28 A deceptive person is likely to avoid direct eye contact when asked a question.

◯  True

◯  False

Q29 People who are nervous or show fear when answering a question are lying.

◯  True

◯  False

Q30 Which of the following is the least reliable indicator of deception?

◯  Vocal quality

◯  Facial micro expressions

◯  Emotions display

Q31 When someone says a phrase like "To be honest…" or "To tell you the truth…" in response to a direct question:

◯  It indicates he is likely telling the truth

◯  It suggests he is lying or omitting something

Q32 Fake smiles can be identified because of the lack of action in which muscles?

◯  Muscles orbiting the eye

◯  Muscles at the corners of the mouth

◯  Muscles around the nose

Q33 When a person is lying, the mistakes that can reveal his deception are more likely to be found in:

❍  The words of his story

❍  The nonverbal behavior

❍  The voice tone

Q34 When asked the direct question "At what time did you arrived home yesterday?" a person being deceptive is more likely to respond by:

❍  Repeating the full question before answering

❍  Repeating just a few words of the question before answering

Q35 When asked a question, a person answering with a detail prologue is likely telling:

❍  A truthful story

❍  A deceptive story

Q36 When asked a question, a person who answers by using a strict chronological order is likely telling:

❍  A truthful story

❍  A deceptive story

Q37 When asked a question, a person who answers by sharing giving many details about the main event is likely telling:

❍  A truthful story

❍  A deceptive story

D1 What is your gender?

❍  Male

❍  Female

D2 What is your age?

D3 What is your occupation or major?

D4 How would you rate your ability to tell whether someone is lying or telling the truth?

❍ 0

❍ 1

❍ 2

❍ 3

❍ 4

❍ 5

❍ 6

❍ 7

❍ 8

❍ 9

❍ 10

D5 What is your ethnicity? (Check all that apply)

❑ White/Caucasian

❑ African American

❑ Hispanic

❑ Asian

❑ Native American

❑ Other _____

End

Thank you for completing the survey!

Thank you for taking some time to participate in this survey. The information you provided has been recorded and it will help discover more about deception and how emotions influence lie detection.

 If you have any questions or concerns about this survey feel free to contact:

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