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Prologue

I proudly present this journal full of wonderful research reports written by students in my PSY40400: Advanced Research Methods class in the Spring semester of 2016, as well as of those students who completed their independent thesis projects in the academic year of 2015-2016. If I were to characterize the students and their projects that are featured in this journal, I would say this is one of the most hard working and passionate group of students I have had. The diversity in the areas of research reveals that each student found a topic that mattered to them. A great proportion of students from the PSY40400 class of Spring 2016 also took the initiative to present their work at Lindenwood's in-house Student Research Symposium and Exhibition in April, and a good number of them decided to take further classes that involve conducting research: PSY32400: Psychological Testing, PSY48000: Psychology Research Lab, and PSY48300: Senior Thesis. The students in the PSY40400 class of Spring 2016 had one of the highest rate of participation in the Journal Cover Design competition in history. We ended up with more cover designs to choose from than there were students in the class! The winning design is featured as the journal cover and it was created by the very talented David De la Cruz. Lastly, I would like to thank Madison Vander Wielen, who helped to assemble this journal.

Michiko Nohara-LeClair, PhD

Course Professor

Meditation and Chocolate: Discovering their Effects on Cognitive Abilities

Ryan Dyck[1]

Numerous studies have been conducted on the effects of meditation on long-term meditators. This current study aims to test the immediate effects of meditation on cognition. It is hypothesized that meditation will have a significant effect on cognition in comparison to the control of chocolate. In order to test this hypothesis participants were subject to two conditions: a meditation condition and a chocolate condition. After each condition participants were given a cognition test designed to test their reading comprehension and math skills. Using a related samples *t*-test I conclude that meditation does not have a significant effect on cognition using the given parameters. After the study was completed I noticed that there may have been a carryover effect from the meditation condition. To test this post hoc hypothesis two independent samples *t*-test were run. The first test used the test scores after the chocolate condition and compared individuals who underwent the chocolate condition first with individuals who participated in the meditation condition first. The second test used the same two groups and compared their test scores after the meditation condition. Both tests concluded that there was no significance in the order in which one received the conditions; however, the greatest difference was found when comparing the two groups test scores after the chocolate condition. Thus the overall findings of this study imply that further research needs to be done to determine if an isolated meditative practice can have a significant effect on cognition.

In the modern era of the Western world there is a great interest in how humans can improve their cognitive functioning. The present study aims to determine whether or not

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meditation has a significant immediate effect on cognition. Cognition will be measured by testing one's reading comprehension and mental math skills.

According to Gailliot et al. (2007), glucose plays an important role in self-regulation. Two possible key factors of self-regulation are controlling one's thoughts and directing one's attention. These may also play a significant role in one's test taking abilities. Other research by Gold (1995) has found that when glucose is increased moderately it can enhance one's cognitive functions. For these reasons chocolate will be used as a control to provide a moderate spike in glucose levels which may increase one's test taking ability.

Meditation has been a widely used practice among Asian cultures for centuries, and is recently becoming more common in the Western world. It is now used by a wide variety of people ranging from truck drivers to professional athletes (Murphy, Donavan, & Taylor, 1997). It has been found that diligent, long-term meditation can increase one's selective attention (Lutz, Slagter, Dunne, & Davidson, 2008). Selective attention is the process by which an individual focuses on a given stimulus when there are several others present. This is particularly important as there are often distractions when one is taking a test, such as noises and the anxiety of answering other questions. One's ability to tune out these distractions provides them with a distinct advantage over someone who cannot.

Another powerful benefit of diligent long-term meditation as stated by Lutz, Greschar, Rawlings, Richard, and Davidson (2004), is the self-induced increase in high-amplitude gamma-band activity during meditation. Their research also concluded that long-term meditators have significantly higher baseline gamma-band activity than non-meditators. The increase in gamma-band activity is especially interesting because higher gamma-band levels are associated with attention and memory (Herrmann, Munk, & Engel, 2004).

Although there has not been extensive research on the cognitive effects of short-term meditation two studies are of particular interest. The first study conducted by Schwartz, Davidson, and Goleman (1978) found that in comparison to exercise, meditation significantly decreased cognitive anxiety. With respect to this study, the reduction of cognitive anxiety is important as the ability to reduce cognitive anxiety during a test could substantially improve one's test scores. Furthermore, Tang et al. (2007) found that short term meditators, those who have practiced meditation for a five day period, had significantly better attention and control of stress. Those who have these heightened abilities, due to meditation, may have increased cognitive functioning over individuals do not have them.

The present study, as far as I am aware, is the first to test the immediate effects of meditation on cognition. This is important because immediately improving one's cognition is

extremely valuable for individuals in both the scholastic and commercial setting. It is my belief that meditation will have a significantly greater effect on one's cognitive abilities than chocolate.

To test this hypothesis I will use within-subjects design where in one condition participants will undergo a guided meditation exercise, and in the other they are given chocolate. After each condition, participants were given a cognition test which assessed cognition through the evaluation of reading comprehension and basic math skills. The test scores of each condition were compared to determine if there was a statistically significant difference between the meditation and chocolate conditions.

Method

Participants

There were 18 participants in this study all between the ages of 18-64. Sex of the participants was not asked as it was not pertinent to study. Participants were recruited using two different methods: first, 10 participants were recruited through the Lindenwood Participant Pool (LPP). The LPP is a place where students at Lindenwood, in introductory level behavioral science classes (psychology, sociology, exercise science, athletic training, and anthropology), can sign up to participate in studies and receive credit in the class in which they signed up through. To recruit from the LPP researchers must post an experiment on Sona Systems; from there members of the LPP can sign up for the study. For this particular study LPP participants

received two points of extra credit in their respective course. Second, there were 8 participants recruited through the posting of fliers on bulletin boards around Lindenwood University's campus. Participants recruited through this process received no compensation for their efforts.

Materials

The present study took place in the basement of Young Hall at Lindenwood University. The room was adequately furnished, and resembled a typical small study room on many University campuses. Participants of this study were subject to two conditions, alternating in order for every other participant. One condition was known as the meditation condition. In this condition participants underwent a guided meditation exercise lasting approximately 12 min (TheHonestGuys, 2014). In order to maximize the effectiveness of the meditative experience, the lights in the room were turned off and participants were asked to lie down on a yoga mat and listened to the guided meditation through a set of headphones I provided. The second condition was known as the chocolate condition. In this condition participants ate a snack size piece (20 g) of plain milk chocolate.

After each condition, participants were asked to complete a cognition test. There were two copies of the cognition test which were alternated every two participants to counterbalance any potential differences as one test was slightly (175 words) longer than the other. Each cognition test was comprised of a reading comprehension portion and a basic math portion. The

reading comprehension portion (see Appendix A) is a modified version of the Scholastic Aptitude Test (SAT's) reading comprehension practice test which was accessed through the SAT's website (Scholastic Aptitude Test, 2016) over the course of several weeks (new versions of the test are posted periodically). In order to shorten the length of the test, four questions of equal difficulty (SAT posts difficulty rating of each question) were taken from the two different reading passages. This test was chosen to assess participants' reading comprehension ability because the SAT is a standardized test used for College and University applicants around the United States; therefore, its validity has already been established.

Each math portion of the test (see Appendix B) is comprised of three types of basic math problems: multiplication, division, and fraction reduction. The problems were acquired from Mad Minute worksheets accessed through Mad Minute (n.d.) and Plymouth (n.d.). These worksheets were chosen so that both sections of the test had questions of equal difficulty, and because of the relatively basic math skills required to answer them. The reason for this was so that all participants would be able to answer all questions, and so that those with upper level math classes would not be at an extreme advantage over those with little to no University level math training.

Procedure

Prior to the arrival of participants, the room being used was set up so that the yoga mat, headphones, and iPod, to which the guided meditation would be played from, were at the far end of the room out of the way of the testing area. Upon arrival, participants were given a questionnaire that dealt with whether or not they were allergic to chocolate and/or nuts, and whether or not the participant had practiced meditation previously. If the participant was allergic to chocolate he or she was asked not to participate in the study for safety reasons. If the participant had a nut allergy that conflicted with the traces found in the piece of chocolate, he or she was also asked not to participate for safety reasons. Students in the LPP still received credit for their time even if they did not participate due to their allergy(s).

Upon completion of the questionnaire, participants were asked to participate in either the meditation condition or the chocolate condition. The meditation condition required participants to partake in a guided meditation exercise lasting approximately 12 min. In this exercise participants were asked to lie down on a yoga mat, listen to the exercise, and follows its instructions. The chocolate condition consisted of participants eating a snack sized portion of plain milk chocolate. To counter balance the effects of these conditions every other participant received meditation first. After undergoing the first condition (chocolate or meditation)

participants were administered one sample of the cognition test. There were two samples of the cognition test which were given alternatively to each participant.

Both cognition tests consisted of a reading comprehension portion and a math portion. The reading portion required subjects to read a short passage (between 475-650 words) and answer four multiple choice questions on the passage. The math portion consisted of simple multiplication, division, and fraction reduction problems. Participants were given 2 min per section to answer as many questions as possible with a maximum score of 30 points. After the test was completed, participants were then subjected to the other condition. For example, if the participant was in the chocolate condition first he or she was then to go through the meditation condition and vice versa. After undergoing the second condition participants were then administered the other cognition test (similar in length and composition to the first one).

After the second test was completed, LPP participants were given a participation slip to receive their extra credit and a feedback letter. Non-LPP participants were just given a feedback letter. Prior to leaving all participants were asked if they had any questions about the study, and I answered these questions to the best of my ability. Data from the experiment were then entered into SPSS (a standard data analyzing software program) using non-identifiable subject coding, and a paired samples *t*-test was conducted to determine if there was a significant difference between the chocolate condition and the meditation condition.

Results

I hypothesized that meditation would have a significant effect on one's cognitive abilities. In order to test this, a paired samples *t*-test was conducted and found that there was no significant difference in the test scores after the meditation condition (M = 61.84, SD = 20.00) compared to the chocolate condition (M = 62.64, SD = 21.55), t (17) = .22, p = .4135, thus supporting the null hypothesis.

After the experiment concluded, a post hoc hypothesis arouse stating that the effects of meditation had carried over into the chocolate condition. More specifically, the cognition scores after the chocolate condition would be higher in individuals who had received the chocolate condition second because of the residual effects of the meditation they experienced in their first trial. In order to determine if my data supported this hypothesis, two independent samples *t*-tests were conducted. The first independent samples *t*-test was conducted to see if those who took meditation first (M = 70.64, SD = 24.30) had significantly higher scores after the chocolate condition than those who had the chocolate condition (M = 54.64, SD = 15.86) first. The test concluded that there was no significant difference between the two groups t (16) = -1.653, p = .059.

Finally, a second independent samples *t*-test was conducted to see if participants who received meditation first (M = 62.11, SD = 23.54) had higher scores after meditation than those

who received chocolate first (M = 61.58, SD = 17.19). The analysis concluded that the order in which participants received the condition had no effect on their scores after meditation t (16) = -.054, p = .479

Discussion

This study did not support the hypothesis that meditation has a significant effect on cognition. Moreover, the post hoc analysis concluded that meditation did not have a significant carryover effect.

These results are not in accordance with previous literature. There are several reasons why the results of my study did not tie in with the literature reviewed. First off, all of the studies looked at meditation on a more long term basis, and none of them only looked at one instance of meditation. This is not to say that one instance of meditation cannot have a significant effect on an individual. Evidence for this rests in the second *t*-test that was conducted. Although this test did not find statistical significance for the effects of order on test scores after chocolate, it was within .9% of being statistically significant. Moreover, this test showed a much greater discrepancy between the means than any of the other test conducted. Before stating any possible implications it should be noted that these results could be due to a practice effect as participants had little rest between tests when they received the meditation condition first. However, despite this and the lack of statistical significance there are several possible implications of this test:

first, the cognitive effects of meditation may take longer than a couple of minutes to take full effect. Second, meditation in combination with chocolate may provide a greater increase in cognition over either one of these conditions alone.

The second reason why the results of this study did not line up with previous studies could be due to the type of meditation used. For instance, in another short term meditation study by Tang et al. (2007) meditators took part in integrative body-mind training (IBM), a modern branch of meditation that, as the title states, unifies the body and the mind. Other studies such as the one by Lutz et al. (2004) used meditators who practiced focused attention meditation (FA). This type of meditation requires a lot more focus and is generally regarded as more difficult than pure relaxation meditation. These different meditative techniques could have vastly different impacts on cognitive functioning.

Due to the limited amount of time participants had to complete the study there are several limitations. First in an ideal world participants would partake in one condition on one day, and the other condition on another day to ensure the effects of one condition did not influence the results of the other. Moreover, as previously alluded to, the effects of the conditions may take more than a couple of minutes to really effect the participant's cognitive abilities. To account for this it would have been better to wait a longer period, say 30 min, prior to testing the participant's cognitive abilities. Second, only a deep relaxation form of meditation was used.

Although this type of meditation is very effective for reducing stress, it may not be as effective at increasing cognitive functioning as other types of meditation, such as focused attention and IBMT. Future research may want to experiment with the different effects of varying meditative practices on cognition.

Another limitation of the study maybe the accuracy of the measures being used. Due to the nature of the recruitment process participants of varying levels of intelligence, and English abilities took part in this study. To combat this I used a within-subjects design; however, what I did not anticipate is that some participants would have perfect scores after both conditions. The intelligence level of these individuals was well beyond the realm of the experiment; therefore, I was not able to tell whether or not meditation had a significant effect on their cognitive functioning. On the other side of the scale, there were some individuals whose English skills prevented them from answering any reading questions correctly. This meant that only their math skills could be used to show a measurable difference. Comparatively, their language and overall cognition may have also improved, but due to their lack of English skills, it could not be statistically demonstrated. It is recommended that future studies use a more in-depth cognitive test to allow for measurement on a greater range of intelligences and language abilities.

Finally, it should also be noted that this study was designed to only test the effects of a single meditative experience. None of the participants practiced meditation on a regular basis.

The effects of meditation on cognition could be different for long-term, or at least consistent meditators.

This research is important to the field of psychology because it explored the effects of a single meditative experience on cognition. Despite the fact that it did not yield any statistically significant results it did allude to potential effects with respect to the combination of meditation and chocolate, and to possibility that there may be a delay for the true effects of meditation to be experienced. Finally, it provided useful information for future research on single meditative experiences.

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Appendix A

Reading Comprehension Test A

"Lucy Honeychurch has no faults," said Cecil,
with grave sincerity.
"I quite agree. At present she has none."
"At present?"
"I'm not cynical. I'm only thinking of my pet theory
about Miss Honeychurch. Does it seem reasonable that
she should play piano so wonderfully, and live so quietly?
I suspect that someday she shall be wonderful in both.
The water-tight compartments in her will break down,
and music and life will mingle. Then we shall have her
heroically good, heroically bad—too heroic, perhaps,
to be good or bad."
Cecil found his companion interesting.
"And at present you think her not wonderful as far
as life goes?"
"Well, I must say I've only seen her at Tunbridge
Wells, where she was not wonderful, and at Florence.
She wasn't wonderful in Florence either, but I kept
on expecting that she would be."
"In what way?"
Conversation had become agreeable to them, and
they were pacing up and down the terrace.
"I could as easily tell you what tune she'll play next.
There was simply the sense that she found wings and
meant to use them. I can show you a beautiful picture
in my diary. Miss Honeychurch as a kite, Miss Bartlett

holding the string. Picture number two: the string breaks."
The sketch was in his diary, but it had been made afterwards,
when he viewed things artistically. At the time he
had given surreptitious tugs to the string himself.
"But the string never broke?"
"No. I mightn't have seen Miss Honeychurch rise,
but I should certainly have heard Miss Bartlett fall."
"It has broken now," said the young man in low,
vibrating tones.
Immediately he realized that of all the conceited,
ludicrous, contemptible ways of announcing an engagement
this was the worst. He cursed his love of metaphor;
had he suggested that he was a star and that Lucy was
soaring up to reach him?
"Broken? What do you mean?"
"I meant," Cecil said stiffly, "that she is going
to marry me."
The clergyman was conscious of some bitter
disappointment which he could not keep out of his
voice.
"I am sorry; I must apologize. I had no idea you
were intimate with her, or I should never have talked
in this flippant, superficial way. You ought to have
stopped me." And down in the garden he saw Lucy
herself; yes, he was disappointed.
Cecil, who naturally preferred congratulations
to apologies, drew down the corner of his mouth. Was
this the reaction his action would get from the whole
world? Of course, he despised the world as a whole;
every thoughtful man should; it is almost a test of
refinement.

"I'm sorry I have given you a shock," he said
dryly. "I fear that Lucy's choice does not meet with
60 your approval."

1a) Cecil's remark in line 1 ("Lucy . . . faults") is made in a tone of

(A) great conviction
(B) studied neutrality
(C) playful irony
(D) genuine surprise
(E) weary cynicism

2a) Mr. Beebe asks the question in lines 6-7 ("Does . . .quietly") primarily in order to

(A) raise an urgent concern
(B) anticipate a possible objection
(C) challenge a widely accepted theory
(D) note an apparent inconsistency
(E) criticize a popular pastime

3a) Mr. Beebe's statement, "The water-tight . . . bad" (lines 9-11), suggests that Lucy will

(A) ultimately become a famous and respected musician
(B) eventually play music in a less disciplined fashion
(C) one day begin to live with great passion
(D) soon regret an impetuous decision
(E) someday marry a man who will be the cause of her undoing

4a) For Mr. Beebe, “Picture number two” (line 27)represents

(A) a misleading occurrence

(B) a dangerous gamble

(C) an unlikely development

(D) an anticipated outcome

(E) an avoidable difficulty

Reading Comprehension Test B

Calling it a cover-up would be far too dramatic. But for more than half a century—even in the midst of some of the greatest scientific achievements in history—physicists have been quietly aware of a dark cloud looming on a distant horizon. The problem is this: There are two foundational pillars upon which modern physics rests. One is general relativity, which provides a theoretical framework for understanding the universe on the largest of scales: stars, galaxies, clusters of galaxies, and beyond to the immense expanse of the universe itself. The other is quantum mechanics, which provides a theoretical framework for understanding the universe on the smallest of scales: molecules, atoms, and all the way down to subatomic particles like electrons and quarks. Through years of research, physicists have experimentally confirmed to almost unimaginable accuracy virtually all predictions made by each of these theories. But these same theoretical tools inexorably lead to another disturbing conclusion: As they are currently formulated, general relativity and quantum mechanics cannot both be right. The two theories underlying the tremendous progress of physics during the last hundred years—progress that has explained the expansion of the heavens and the fundamental structure of matter—are mutually incompatible.

If you have not heard previously about this ferocious antagonism, you may be wondering why. The answer is not hard to come by. In all but the most extreme situations, physicists study things that are either small and light (like atoms and their constituents) or things that are huge and

heavy (like stars and galaxies), but not both. This means that they need use only quantum mechanics or only general relativity and can, with a furtive glance, shrug off the barking admonition of the other. For 50 years this approach has not been quite as blissful as ignorance, but it has been pretty close.

But the universe can be extreme. In the central depths of a black hole, an enormous mass is crushed to a minuscule size. According to the big bang theory, the whole of the universe erupted from a microscopic nugget whose size makes a grain of sand look colossal. These are realms that are tiny and yet incredibly massive, therefore requiring that both quantum mechanics and general relativity simultaneously be brought to bear. The equations of general relativity and quantum mechanics, when combined, begin to shake, rattle, and gush with steam like a decrepit automobile. Put less figuratively, well-posed physical questions elicit nonsensical answers from the unhappy amalgam of these two theories. Even if you are willing to keep the deep interior of a black hole and the beginning of the universe shrouded in mystery, you can't help feeling that The hostility between quantum mechanics and general relativity cries out for a deeper level of understanding. Can it really be that the universe at its most fundamental level is divided, requiring one set of laws when things are large and a different, incompatible set when things are small?

Superstring theory, a young upstart compared with the venerable edifices of quantum mechanics and general relativity, answers with a resounding no. Intense research over the past decade by physicists and mathematicians

around the world has revealed that this new approach to describing matter at its most fundamental level resolves the tension between general relativity and quantum mechanics. In fact, superstring theory shows more: within this new framework, general relativity and quantum mechanics require one another for the theory to make sense. According to superstring theory, the marriage of the laws of the large and the small is not only happy but inevitable. Superstring theory has the potential to show that all of the wondrous happenings in the universe—from the frantic dance of subatomic quarks to the stately waltz of orbiting binary stars—are reflections of one grand physical principle, one master equation.

1b) The "dark cloud" mentioned in line 4 refers to an

(A) atypical diagnosis
(B) unsupported hypothesis
(C) unknown threat
(D) evil influence
(E) important contradiction

2b) Which pairing best represents the different models of the universe presented in lines 7-14 ?

(A) Big and little
(B) Old and new
(C) Complex and simple
(D) Verified and undocumented
(E) Theoretical and practical

3b) The author uses the "automobile" (lines 45-46) to represent equations that

(A) demand a professional's attention

(B) are intrinsically unreliable

(C) do not work together effectively

(D) can be easily adjusted if necessary

(E) are based on dated mathematics

4b) The primary reason described for the usefulness of the theory mentioned in line 57 is its ability to

(A) explain new phenomena

(B) replace the theory of general relativity

(C) reinforce the predictions of quantum mechanics

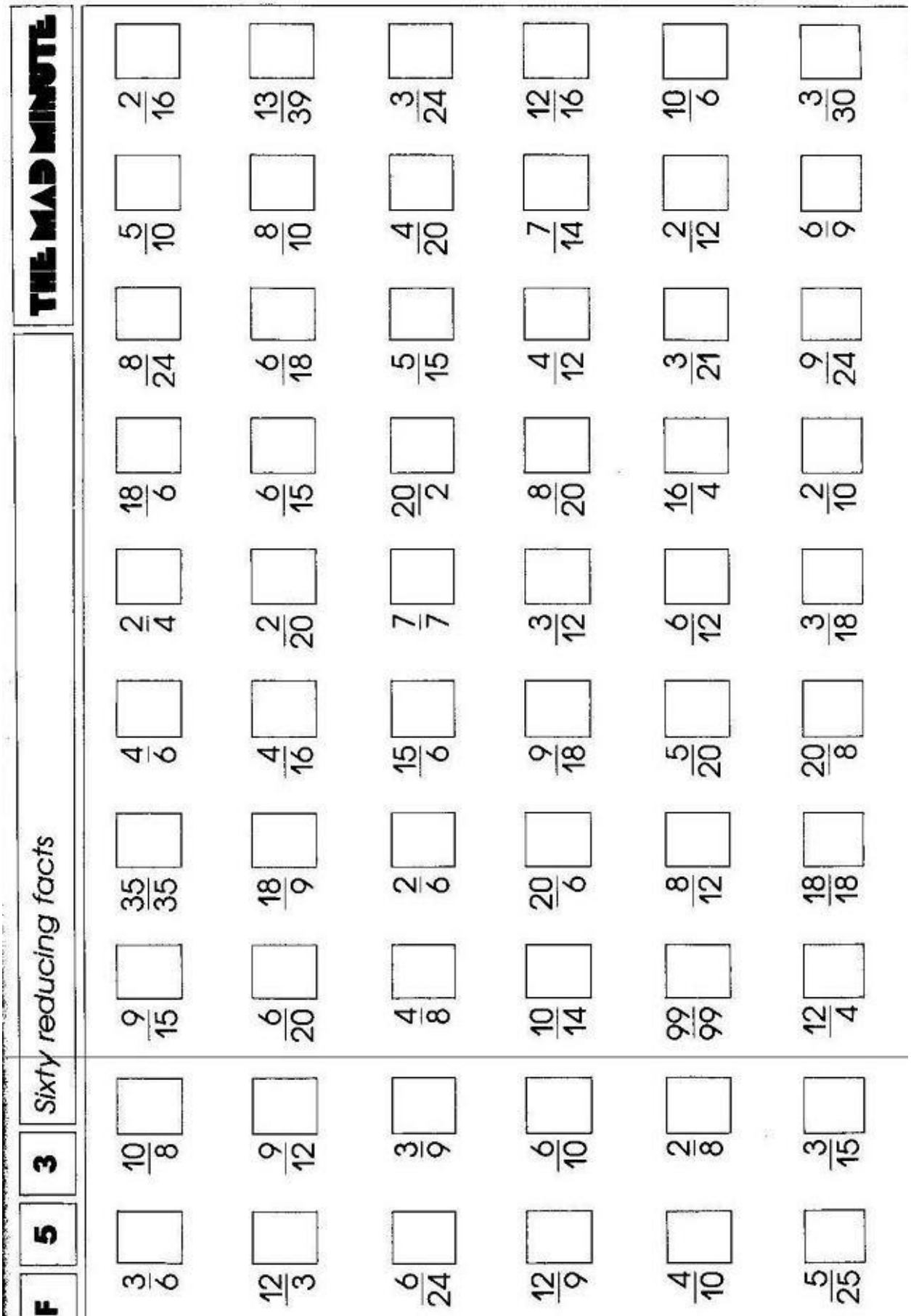
(D) indicate where other theories are inapplicable

(E) reconcile two seemingly contradictory theories

Appendix B

Math Portion of Exam

Sheets were cut in half so that 30 questions of equal difficulty went to test 1 and test 2 of the experiment respectively.


THE MAD MINUTE
F 5 3 Sixty reducing facts
3/6 10/8 9/15 35/35 4/6 2/4 18/6 8/24 5/10 2/16
12/3 9/12 6/20 18/9 4/16 2/20 6/15 6/18 8/10 13/39
6/24 3/9 4/8 2/6 15/6 7/7 20/2 5/15 4/20 3/24
12/9 6/10 10/14 20/6 9/18 3/12 8/20 4/12 7/14 12/16
4/10 2/8 99/99 8/12 5/20 6/12 16/4 3/21 2/12 10/6
5/25 3/15 12/4 18/18 20/8 3/18 2/10 9/24 6/9 3/30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9 × 5
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3 × 8
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3 × 6
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4 × 9
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3 × 0
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F | 4 | 4 | *Sixty division facts* | THE MAD MINUTE

7/63	8/48	9/45	5/45	3/27	2/12	4/36	3/6	4/32	6/54
8/40	7/56	9/54	5/40	6/0	4/28	7/14	5/10	8/72	3/24
5/30	7/49	6/12	8/56	2/18	9/63	6/48	3/21	9/36	5/15
3/18	6/18	5/35	8/32	6/42	7/42	9/27	8/64	3/9	4/12
2/14	4/0	6/24	6/36	3/15	9/18	4/16	7/35	5/20	8/16
4/20	9/9	7/21	8/24	6/30	5/25	7/28	3/12	4/8	2/16

Effects of Music on Puzzle Solving

Roberta Kerosevic[2]

The purpose of this study was to see how listening to different genres of music affects performance on puzzle solving, particularly word searches. Students completed puzzles of equal difficulty and under different genres of music and the absence of music. The three genres of music were instrumental and included classical, heavy metal, and pop music. There was also a round where no music was played. Students had four rounds to do four different word searches; each round consisted of a different word search topic and was given to each person in a different order. During each round, all participants listened to a genre of music or the silence condition. Students had 3 min each round to find as many words possible, for a total of 12 min. After the main experiment, students took a survey about how music affects their daily life and how they felt about the experiment, which took between 5-10 min. The results of this study were conducted using a one-way ANOVA to compare groups under the different order of music and silence presented, and how many words participants solved under each condition. I hypothesized that students would perform better under silence than with background music, and also that between the three genres of music, students would perform better with classical music than heavy metal or pop-- since classical is commonly thought to be used to boost intelligence, pop is used more for leisure, and heavy metal has strong percussion and emotional reactions.

There have been many studies conducted involving background music but not many have used word searches as a task to measure a dependent variable. Most of the studies were conducted to see differences in performance of individuals based on background music, noise, and the silent condition. The hypotheses proposed for this experiment were that participants will find more words under a silent condition and that between the three instrumental musical

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conditions, participants will find more words with classical music in the background rather than heavy metal or pop. Similar findings in studies also show background music affects performance, but different methods were used to collect the performance data.

Ransdell and Gilroy (2001) tested how different types of background music affect the quality and speed of essay writing (using a computer) in college students. Forty-five participants were chosen from a psychology research pool (with participation in psychology classes) and offered extra credit (Ransdell & Gilroy, 2001). They also gave out a questionnaire after the experiment to see if the participant had any musical experience and how often they listened to music when doing school work. The study was a between-subjects design and the procedure involved writing two 10 min essays in two different conditions: silence and then either instrumental music, vocal, or both. The four topics of the essays were counterbalanced (two college-related topics, relationships, and vacation). Afterwards, they were given a group of words and had to write sentences using the words given. Results showed slower writing and fewer words typed during both background music types compared to silence, and those with musical interest wrote longer and more in-depth sentences than those not musically trained (Ransdell & Gilroy, 2001). For the final results, silence yielded the best performance for both the musically talented and non-musically talented participants.

In Singapore, music with lyrics and silence were also used to test performance on writing and word lists, but with more music and test levels. Chew, Yu, Chua, and Gan (2016) wanted to see if unfamiliar and familiar music (popular versus unknown), music with lyrics in someone's first learned language and an unfamiliar language, silence, and performance on math, reading, and word memory were correlated between one another. To do this, they first conducted a pilot study before the actual study, in which they realized they needed to shorten the time for each task and to take out breaks in between, but kept the between-subjects design to prevent negative mood, lack of energy, and getting used to doing the tasks. The 165 participants came from James Cook University (Singapore) and had over 20 more women than men in the study (Chew et al. 2016). There were groups of five participants for each trial, and each group went through a randomized order of the music conditions: familiar English song, the same song sung in Italian, unfamiliar English song, the same song sung in Italian, and silence. Each participant randomly received one of the following tests for each condition: a reading test which involved reading a story from a former SAT passage for 5 min and afterwards has 5 min to answer 7 forced-choice questions, a 10 question math test from a past SAT test with a 15 min time limit (without using a calculator), and a list of 20 words looked at for one minute and then five new words related to the themes of the songs replacing five of the words from the original list (participants had to point this out within three minutes) (Chew et al. 2016).

The results showed that the music conditions affected performance on all the tasks, but the interaction between language versus music or tasks was not significant (Chew et al. 2016). Word memory was the most affected by the music conditions, as familiar music showed more words correctly remembered than in the unfamiliar condition. The math and reading tests showed similar results, yet they were not significant enough compared to the word memory task. However, the highest performance in math and reading was during the "no-song" condition, which was significant. An extra test was performed to see if gender has any relationship with any of the independent variables, and it was found that women did better on the reading exam while men did better on the math exam.

Most studies have provided the music for the participants, but there does not seem to be many studies that test the participant's choice against a given task. Lesiuk (2005) conducted a study to see if work performance in quality and speed for software designers increased positively with the addition of background music. The workers chose their genre of music, either from a music library with 65 CDs or they were allowed to listen to from their own music collection. Participants were asked how much musical training they had in years, which varied between 0 and 15 years. A background and trait questionnaire was given prior to the actual study to see how positive and negative their thinking was (mood during work) and their musical background. The results showed that listening to music did increase productivity if it was a genre they enjoyed

listening to, but older participants (the oldest was 55 years old) preferred no music (Lesiuk 2005). For example, during a certain week when music was not allowed during the trial, older participants said they liked that part of the five-week trial the best, yet they performed the worst during that time. Some participants also explained this dislike towards music in the mood section of the questionnaire, but those who liked choosing their own genre to listen to expressed more of a happy mood. This study shows that music one likes listening to can help in elevating mood, but with choosing one's own music, the silent condition is still more effective with performance on the task.

Background music seems to affect mood in a definite matter, and adding noises as another independent variable could further test whether others feel and concentrate better on a certain task. Schlittmeier and Hellbrück (2009) conducted a study to see what type of "noise" people seemed to prefer while waiting in an office that is also full of sounds such as conversations between employees, phone calls, and keyboard typing. Two types of music were used and defined by whether they were staccato (short and choppy) or legato (long and flowing), and then continuous noise was the second controlled independent variable added to the other independent variable of office noise (Schlittmeier & Hellbrück, 2009). During the presentation of these independent variables and their levels, one-person trials were conducted. A group of numbers was presented on a computer screen and participants were told to click them in the

order they were presented after they disappeared in 10 s. After the task, four questions were asked that pertained to how the background music made the participants feel, which one they preferred while working (if any), and if they like a certain music style better than the other. This was their main experiment, but they also reference a previous experiment within this study. In the past study, they used the same variables but with the same types of music, silence, and office noise as levels of one independent variable. The task was also the same, but they only measured performance of the memory task rather than asking follow up questions.

The results for the main experiment had shown more noise with the office noise was less distracting by opinion, but data displayed worse recall of the numbers compared to silence (Schlittmeier & Hellbrück, 2009). Overall, participants preferred no background sound while working, but with the music presented, staccato was preferred over legato music. The data showed office noise was the most distracting to memory recall, and staccato being presented with or without the office noise was second most distracting. The experiment referenced within the main experiment had the same results, with the office noise by itself producing just as much negative recall of the numbers as the office noise with or without the continuous noise and/or background music added.

Another study also used noise, music, and silence as their conditions, but the researchers were trying to see if there was a correlation between neuroticism, background conditions, and

intelligence measured using various tests (Reynolds, Mcclelland, & Furnham 2013). The study was conducted at a college in London that included 70 students. The independent variables included noise (everyday noise such as construction, car sirens), music (different dance music remixes), and silence. There were three different and nearly equal groups who experienced the background conditions in different orders (Latin Square Design) and each group's task was to complete five different tests individually (Reynolds et al. 2013). The tests included a 12 min algebra and geometry test (WPT), 12 min to define the correct pairing of sentences (Baddeley's sentence checking test), 15 min of mental math (add, subtract, multiply, divide), 15 min to pick the missing piece of an object from eight options (Raven's advanced progressive matrices), and 15 min to answer questions that have a scale that measures neuroticism (NEO-Five Factor Inventory). All of the tests were during one condition except the mental math and Raven's were done during one of the remaining two conditions. The results showed that neuroticism and mental ability were negatively correlated, and that was the only significant relationship involving neuroticism (Reynolds et al. 2013). In regards to the background conditions, silence was better than sound or music as well as music just being better than sound for the WPT test. Otherwise, none of the other tests reached significance or had no correlation.

Cassidy and Macdonald (2007) conducted a similar study, but they wanted to see if there was a difference in cognition between introverted and extroverted individuals. They used four

different background noise conditions in which the participants listened to music that causes high arousal and negative affect (such as metal music), music that causes low arousal and positive affect (such as classical music), and also noise and silence. Participants completed five cognitive tests during one of these four conditions in groups of ten. Questionnaires were given to see if they were more introverted or extroverted, what kind of music they liked, and how music influenced their studying. The extroverted individuals performed worse on all the tests except for the Stroop (which involved reading the names of colors printed in the incorrect color) and said they liked the high arousal music more, while the introverted individuals were the opposite and performed the best with the Stroop (Cassidy & Macdonald, 2007). Participants defined as introverted performed better than those defined as extroverted in all the conditions except for the high arousal music. In conclusion, introverted people prefer silence or slower music when studying compared to extroverted people who preferred intense music and some kind of background noise when studying.

Patston and Tippett (2011) also did a similar experiment about how background sound affects musicians and nonmusicians, but they used incorrect piano playing, correct piano playing, and silence as testing conditions. The two activities completed under each condition were correcting sentences grammatically and identifying differences in two images with an 8 min time limit. Participants had to identify the number of sentences that were incorrect and correctly state

differences between the images (Patston & Tippett, 2011). After just the two piano playing conditions, the question of whether the piano music played was correct or incorrect during that trial was asked. In conclusion, musicians performed better on both tasks under nearly all the background conditions, except for when the piano was played incorrectly (Patston & Tippett, 2011). Silence was the best choice for their performance in both tasks, with incorrect music being the worst. In regards to whether the piano was played correctly or not, nonmusicians had a harder time telling the difference between the two conditions or were more incorrect with their guesses. However some musicians even could not recognize the differences between the two conditions correctly, although far less often than the nonmusicians.

My study involves different conditions of instrumental background music and silence and the amount of words found in a word search puzzle is the measure for the dependent variable. The genres of music used were heavy metal, pop, and silence, and the order of these conditions presented varied by group and their time and date the experiment took place. The four topics of the word searches were animals, college, ice cream flavors, and summer as they mostly provoke good emotions or feel related to the participant. Each participant got a different order of the word searches and did one during one of the music conditions (or silence). The word searches had 20 words to find in 4 directions and the time limit was 3 min. A survey was taken afterwards to see

what music the participants liked, what activities they used it for, where they got their music from, and their opinions on the music presented in the study.

Method

Participants

Seven Lindenwood University students between the ages of 18 and 29 participated in this study. Participants came from two sources: the Lindenwood Participant Pool (LPP) program, which is offered to the majority of social sciences students, or by flyers (see Appendix A) posted in three classroom buildings and one dormitory building on campus. The majority of participants came from the LPP, and each received one extra credit towards a class participating in the program while those recruited through the flyer received no compensation. LPP participants signed up for the study through an online portal called Sona Systems, and got to choose the date and time they wished to participate in the study. There were different dates and times for participants to sign up for online, with a maximum of 12 students possible per timeslot (date and time available). Both groups could contact the researcher through the researcher's email address provided from the source they signed up through (Sona Systems for LPP participants), but flyer participants had to contact the researcher directly through email or by phone number in order to set up their appointment.

Materials and Procedure

A room booking request form in the form of an Excel spreadsheet (see Appendix B) was emailed to the LPP office to secure a place for the study. A classroom that can fit up to 30 students and 1 computer was secured. A group of students (two groups of two; different days and one participant was ill and could not show up during a group of three) showed up at their appropriate room and timeslot when signed up through flyer or Sona Systems. When they arrived, students signed in on a participant sign-in sheet (see Appendix C) to show they were present during the experiment. Each student sat down in a desk, with at least one unoccupied desk between each student. When all of the students showed up, each were given two consent forms (see Appendix D) to fill out before beginning the experiment, and one was given to the researcher while the other was kept by the student. The experiment commenced after the consent form was given to the researcher.

Four different word search puzzles, each with 20 words total that could go across, diagonal, backwards, vertical, and horizontal (see Appendices E-H), were created using https://www.superteacherworksheets.com/generator-word-search.html. A different theme was incorporated into each puzzle, which included animals, ice cream flavors, college life, and summer. Students were asked to bring a writing utensil such as a pen or pencil with them to the experiment, as one would not be provided by the experimenter. Each student did one puzzle at a

time in a 3-min span, which meant each student did all four puzzles. Even though students were spaced out, they were all given a different order of the puzzles to account for possible order effects because of slight differences in difficulty level in each of the puzzles.

Meanwhile, a different genre of instrumental music was played which was either heavy metal (Barnes, 2013), classical (MacLeod), or pop (Sweet, 2012). Each song was accompanied with one puzzle, as well as one puzzle being done in complete silence. All students listened to the same music at the same time, or for the one round, no music at all at the same time. After time was up with the puzzles, students were given a paper survey (see Appendix I) that asked them about how music affects their daily life and their thoughts on the experiment. This took 5 to 10 min depending on the responses of each student. After the survey was filled out, the student turned in their puzzles and survey, received a thank you letter for their participation (see Appendix J), and was free to leave. If the student was part of the LPP, they filled out a participant receipt (see Appendix K) after turning in their papers, and then were allowed to leave.

Results

Each participant received the four word searches in different order, with each word search containing 20 words to find. They had a 3 min time limit for each word search. There were also four different groups, each tested during a certain date and time but all having 30 min to partake in the word searches and time to finish the survey. Each group had a different order of

the background music conditions, and two participants in each group (except group three just had one person). Group one was classical, heavy metal, pop, and then silence; group two was heavy metal, silence, classical, and pop; group three was pop, classical, silence and heavy metal; group four was silence, pop, heavy metal, and then classical music.

A one-way ANOVA was conducted through SPSS to see if there was an effect of music genres (and silence) in the amount of words found for the word searches. The first hypothesis was that silence would show better performance than the other three genres of music in amount of words found by participants. Other than metal music, pop and classical proved to be better than the silence condition, so the first hypothesis was shown to be false $F(3,24) = .03$, $p > .05$; $n^2 = .004$. The second hypothesis stated that classical (M = 7.29) would result in more words found in the word searches than metal (M = 6.85) and pop (M = 7.14) out of all the genres, and that was supported by the data collected.

The survey results indicated that music is a very important part in a college student's daily life, and certain genres are preferred for certain activities. Music is played a lot at the place of residence-- whether a commuter or a campus resident (57%), and rap is a very popular genre to listen to for a variety of activities (71%). Music is most often used during homework (71%) and any kind of physical workout (86%). All use music applications, and most of them are found on smart phones. All participants tend to use their phones as their main source of music, while

computers are used slightly less. The only solid opinion about the music heard during the study was that the majority enjoyed the pop music played, while classical and heavy metal had mixed reviews.

Discussion

The results of the study support that silence is not a good background sound compared to two out of the three genres, but classical music did produce the most words found out of the three genres of music (Cassidy & Macdonald 2007). The word searches might have been slightly different in difficulty, since certain lists had longer or shorter words than others, so this could have skewed the data. The word search topics were also randomly generated by the experimenter, and may have evoked different emotions in each participant that affected their ability to find the words; the same for the different background conditions (Cassidy & Macdonald 2007; Lesiuk 2005). The 3-min time limit during the word searches may have made some participants nervous, and the opposite may have occurred during the survey. The survey was not timed and some students might have rushed to finish or they gave false answers. However, the other studies presented in the background information did present silence as a more favorable condition, which was not the case for my experiment (Cassidy & Macdonald 2007; Chew et al. 2016; Lesiuk 2005; Patston & Tippett 2011; Randsell & Gilroy 2001; Reynolds et al. 2013; Schlittmeier & Hellbrück 2009).

There was also an issue of having a lack of participation which led to a small sample size. If there were more trials with larger groups of people, the results might have agreed with the studies presented in the introduction. Even with flyers posted in three campus buildings with classes and one dormitory building, the reception on the flyers was very low, as only two participants were obtained by the researcher through email. If this experiment were planned and conducted earlier, then more timeslots and better advertising could have been possible.

However, it was interesting to see the results even with a small number of participants, as performance and survey opinions differed between each participant and group. Once larger groups of participants are obtained, this study could provide more favorable data. As mentioned previously, mood might have influenced the performance, as well as how distracted they were by the music, so scales (possibly Likert) or questions could be used to measure this in the future.

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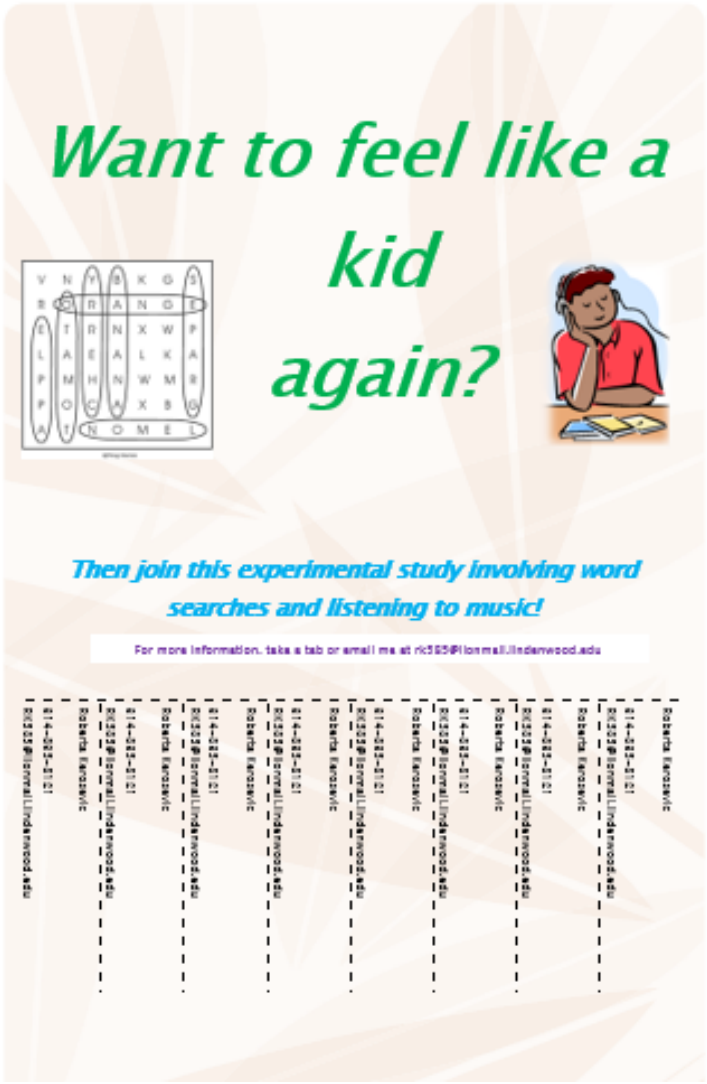
Appendix A

Recruitment Flyer



Appendix B

Adult Consent Form

Consent form signed by all participants

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 while listening or not listening to music, and taking a survey about music's effect on my lifestyle. I understand that I should be able to complete this project within 20 minutes. I am aware that I am free to refuse to listen to the music, not do the word search puzzles, and skip any questions in the survey in the unlikely event that I feel uncomfortable. 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. If not, I realize I will still receive LPP credit if I am enrolled in an LPP participating class and have a parental consent form filed with the LPP office, but will not be able to actively participate in this experiment.

_____ Date: _____

(Signature of participant)

_____ Date: _____

(Signature of researcher obtaining consent)

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Appendix C

Word Search: Animals

Animals

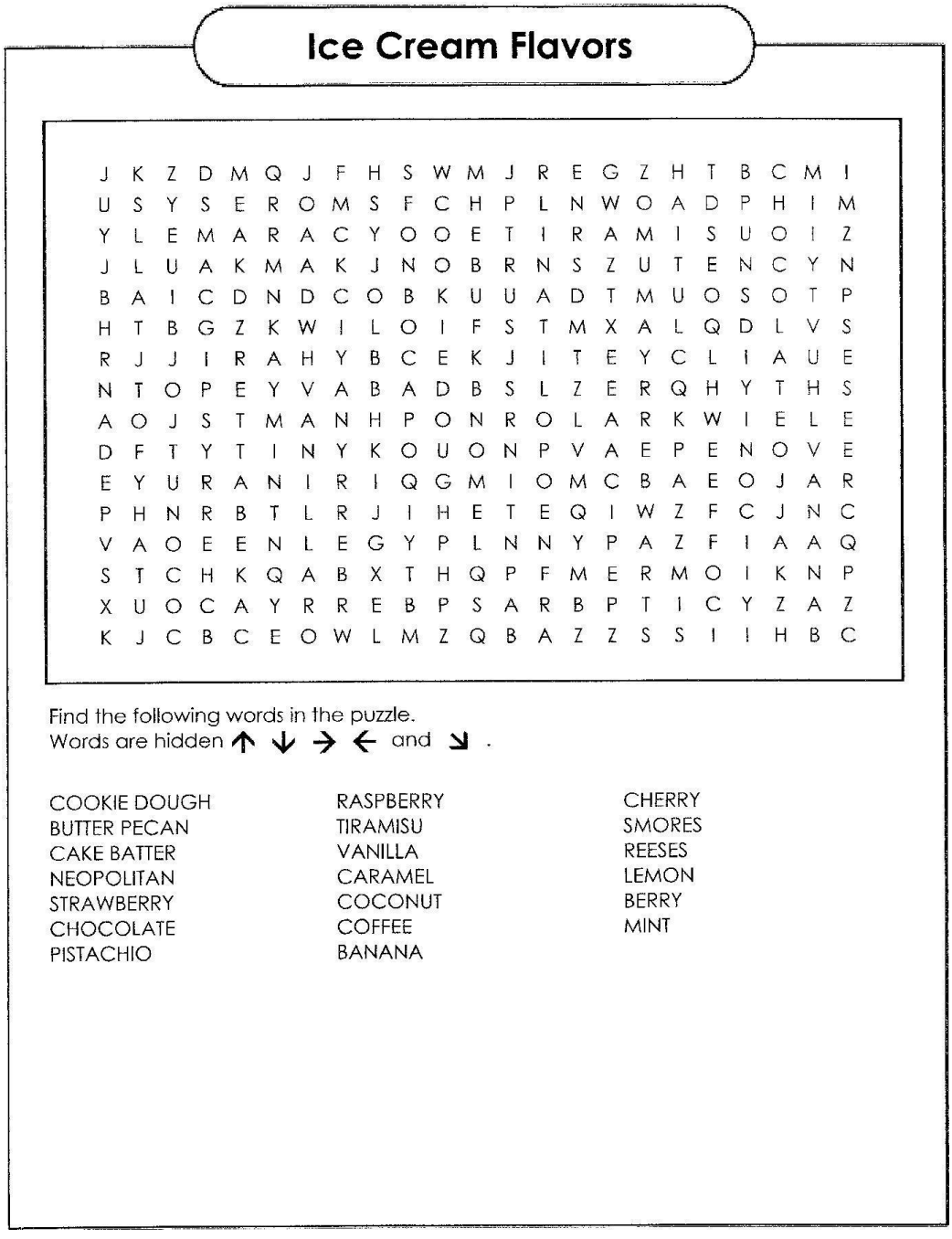
S G N R V G V W A L R U S X D Z O H O L U Y F
P A R R O T K C P U Y T S V I Z F T J B O S R
S O F Y V L N R X R L G Y Q P E N G U I N L O
C Z L L K I E F F O C V E V K U I Q M A J R G
O W F A N N A L E O P A R D R O D U C K E A N
N L W K R A F O R G O D E I R I A R P C L Y E
N P V T K B U F F A L O O 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 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
POLAR BEAR
CROCODILE
KANGAROO
ELEPHANT
FLAMINGO
PENGUIN
LEOPARD
DOLPHIN
BUFFALO
GIRAFFE
CHICKEN
PYTHON
PARROT
WALRUS
RABBIT
KOALA
FROG
DEER
DUCK

Appendix D

Word Search: Ice Cream Flavors



Ice Cream Flavors

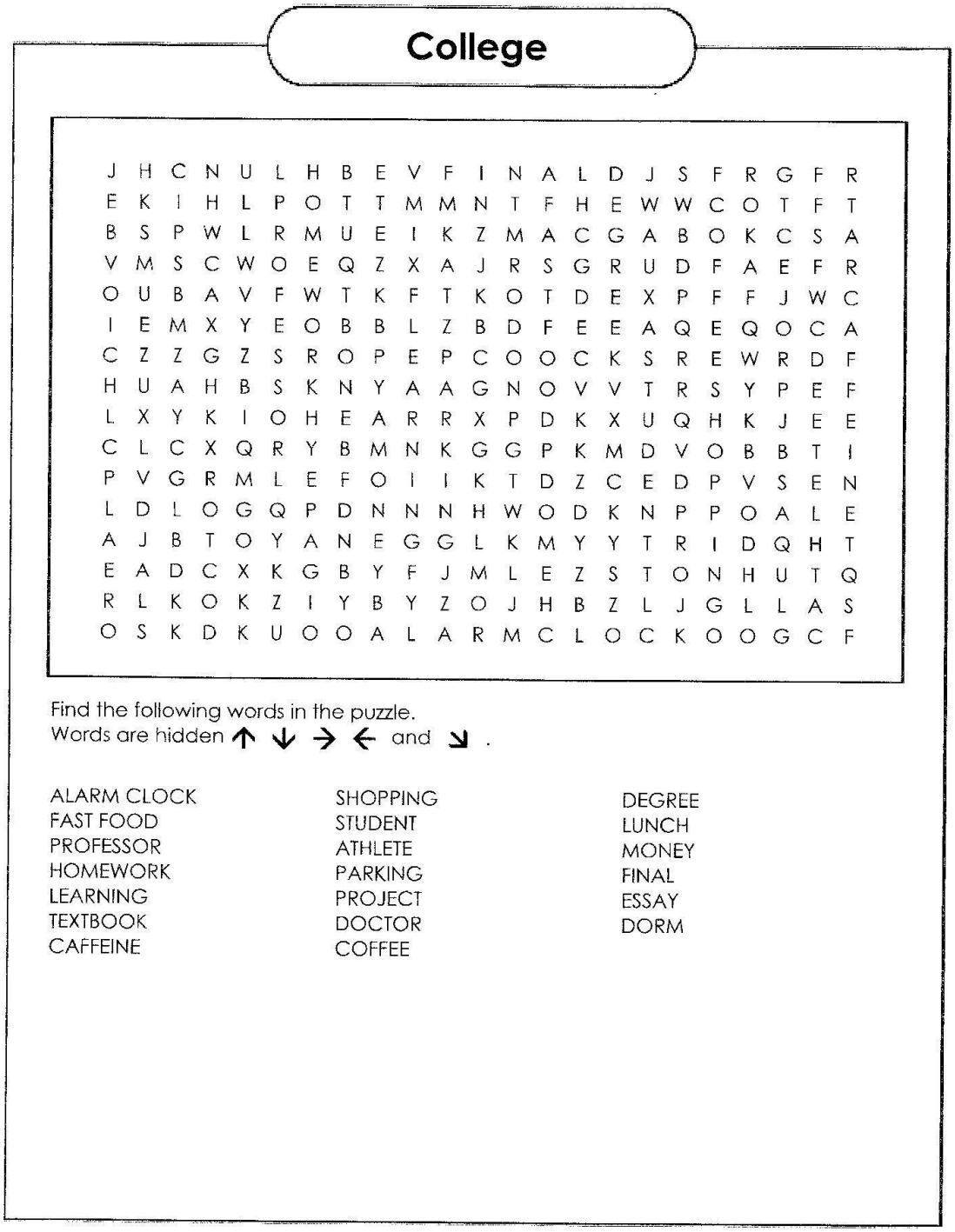
J K Z D M Q J F H S W M J R E G Z H T B C M I
U S Y S E R O M S F C H P L N W O A D P H I M
Y L E M A R A C Y O O E T I R A M I S U O I Z
J L U A K M A K J N O B R N S Z U T E N C Y N
B A I C D N D C O B K U U A D T M U O S O T P
H T B G Z K W I L O I F S T M X A L Q D L V S
R J J I R A H Y B C E K J 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
BUTTER PECAN
CAKE BATTER
NEOPOLITAN
STRAWBERRY
CHOCOLATE
PISTACHIO
RASPBERRY
TIRAMISU
VANILLA
CARAMEL
COCONUT
COFFEE
BANANA
CHERRY
SMORES
REESES
LEMON
BERRY
MINT

Appendix E

Word Search: College Life



Appendix F

Word Search: Summer

Summer

O X N U N S Y Q R K S U N N Y O Y O J N W M N
G S W C M T I O L J I B G U F C T Q Z J N N C
T U E N Y H Y W W D E P L X C E C J R R S V O
I R D B E A C H W H C D W N S A A F G Y U Q O
U F A D U W E U C E B R A B H N U L D J N I D
S I N I J D F Q G N I E E S T H G I S Y S B Y
M N O V T N P Q D B X G N I N N A T E Q C S J
I G M I R V A V R E L A X A T I O N U E R W I
W W E N A F L I P F L O P S P S Z Y T T E I C
S H L G V O J Q Q C V A C A T I O N G W E M E
O O C E E A L L E R B M U Y E H K O D S N M C
C D E O L H F U R J S N O T K J W B I F Q I R
D Z T O I N E L T S A C D N A S L K V Z Y N E
Q M W T N G Y U C K O M S H S A N D A L S G A
B I F T G H U W X F C D R Z E X C W H F Z I M
Z Q A Q P K Z F P X N E M R Q V O C Q C C D Y

Find the following words in the puzzle.
Words are hidden ↑ ↓ → ← and ↘ .

SIGHTSEEING
RELAXATION
FLIP FLOPS
SANDCASTLE
ICE CREAM
SUNSCREEN
TRAVELING
VACATION
UMBRELLA
VACATION
LEMONADE
SWIMSUIT
SWIMMING
SANDALS
SURFING
TANNING
DIVING
OCEAN
BEACH
SUNNY

Appendix G

Music Survey

Survey taken after word puzzles are complete.

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. Do you use music for specific activities?

YES NO (please skip to question 6)

5. If yes, please list the activities you participate in while listening to music and include what genre of music you listen to for each activity.

Activities	Genre of Music

6. What devices do you use to listen to music (phone, radio, etc.)?

7. What sources do you get your music from (radio, apps, CDs, etc.)?

8. Did you like the heavy metal music you heard today?

YES NO

Please state why you liked or disliked the heavy metal music you heard.

9. Did you like the classical music you heard today?

YES NO

Please state why you liked or disliked the classical music you heard.

10. Did you like the pop music you heard today?

YES NO

Please state why you liked or disliked the pop music you heard.

Appendix H

Thank You Letter

Letter thanking all participants for being in the study.

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 solving. The hypothesis is that having no background music will produce more positive results than any background music, and that more words would be found 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. If you would like to see the results of this study, please visit this URL (http://mnlresearch.weebly.com/). Results will be posted by the end of August. Our contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sincerely,

Principal Investigator:

Roberta Kerosevic 314-835-8121 (rk585@lionmail.lindenwood.edu)

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

The Effects of Stress on False Memory

Claire Van Vranken[3]

This study looks at the impact of stress on the creation of these false memories, using the Deese-Roediger-McDermott paradigm (DRM). A false memory is a memory of an event that never really occurred, but is believed that it occurred by the person remembering it. In a typical DRM study, participants are given a list of words that fall under the same category. When the participants are later asked to recall the words on the list, 40% of the participants recall a word that was not on the list with a high rate of confidence (Roediger & McDermott, 1995). Stress has been linked to the creation of false memories in previous studies. One such study revealed that stress can potentially increase the likelihood of false memory recollection; however another similar study reported stress did not affect the incidence of false memory but, that men were found to falsely recall more words than women. In the present study, half of the participants were given a stress inducing task, which consisted of standing up and completing mental math problems, whereas the other participants were asked to color for 5 min. Following these tasks, the participants were given a DRM task, on the computer. I hypothesized that participants that completed the stress-inducing task will be more likely to show false memory and that men will be more susceptible to the impact of stress on the formation of false memories.

False memories are memories of events that never really occurred, but the person that remembers the event strongly believes that the event was real. This study looks at the impact that stress has on the impact on the formation of false memories. One way of clinically inducing false memories is through the Deese-Rodiger-McDermott (DRM) paradigm. The first time that this phenomenon was observed was by James Deese in 1959. Deese (1959) gave participants in his study 36 lists of words, each list consisting of 12 words each falling under a specific category.

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The participants were then asked immediately to freely recall the words that they had just seen. Free recall is when a person is asked to list off, in this case the words that they had just seen without any prompts. It was found that 44% of the participants recalled seeing words that were not on the list, but rather was the category of the overall list (Deese, 1959). This paradigm that Deese discovered was not researched further until 1995 when Henry Roediger and Kathleen McDermott confirmed Deese's findings. More research on the paradigm was done by Gallo, Roberts, and Seamon (1997); they found that even when the subject knew that the researcher was looking for false memories, the participant was still susceptible to falsely remembering the words on the list they had seen. Even with the forewarning, the DRM paradigm was able to induce false memories in the participants (Gallo, et al., 1997).

Similar studies to the present study have been conducted in the past with mixed results. A study conducted by Payne, Nadel, Allen, Thomas, and Jacobs (2002) found a positive correlation between stress and the increased formation of false memories. However, another study by Smeets, Jelicic, and Merckelbach (2005) found no evidence of a correlation between stress and the formation of false memories. However, they did find that men were more susceptible to the DRM paradigm than women (Smeets, et. al, 2005). Yet another study conducted by Mohamed (2011) also determined that there was no significant impact of stress on false memories. All three

studies used the Trier Social Stress Test. The Trier Social Stress Test uses elements of public speaking and mental math to induce stress in subjects.

The study of how stress can impact false memory is important for the use in eyewitness testimony, in court cases. A study conducted by Deffenbacher, Bornstein, Penrod and McGorty (2004) determined that the impact of stress on eyewitnesses negatively impacted the accuracy of the memory of the eyewitness. Currently, eyewitness testimony is used frequently in identifying suspects in criminal cases. Knowledge of how stress impacts these eyewitnesses' memories is profoundly important to more accurately represent what took place at the time of the event. Eyewitnesses at crime scenes and other traumatic events are going to be under stress, so understanding how stress impacts memories, specifically false memories can be helpful. As humans our memories are malleable and susceptible to suggestion, when this happens, that is a false memory, this frequently happens during interviews by the police following a crime or other stressful event.

The current study was conducted in a similar manner as the studies by Payne et al (2002) and Smeets et al. (2006). A version of the Trier Social Stress Test was used to induce stress in participants, although in this study a measure was taken following the induction of stress to ensure that the measure had been effective. Another variation from the previous studies is that in the current study a computer system was used to display the words in a consistent manner to the

participants. The current study was most similar to the Smeets et al. (2006) study as they also used math in their version of the Trier Social Stress Test.

Method

Participants

There were a total of 20 participants in the study. They were recruited through advertisement from the researcher, Sona Systems, and the Lindenwood Participant Pool. Compensation provided for participating in the study included extra credit from their corresponding professors, those that were not part of the Lindenwood Participant Pool, were given compensation in the form of chocolate.

The sample was made up of 6 men and 14 women. There were 5 freshmen, 4 sophomores, 3 juniors, and 8 seniors. The age range of participants was from 18 to 27 the mean age was 21.05. The number of participants had English as their first language was 11 and 5 stated that English was not their first language. There was a wide range of majors, 9 in total, they included psychology, biology, international relations, criminal justice, legal studies, finance, philosophy, studio art, and marketing.

Materials and Procedure

Room Young 105 Skinner was used for conducting this study. In this room, a desk, chair, computer and writing utensil was provided so that the participant could comfortably sit and have

a place and writing utensil to answer the surveys. The room used was in Young Hall, and located in Lindenwood University, in the Psychology Research Labs.

The participants were asked to fill out two informed consent forms (see Appendix A). One consent form was to be kept by the participants, and the other to be kept by the experimenter. Both parties were to fill out information including full name, signature, and date the study took place. The informed consent form is to ensure that the participants in the study was taking part in the study voluntarily, that they understood what taking part in the study required, and that in the event that they felt uncomfortable, they had the option of skipping a question or stopping participation in the study at any time. The participant was also made aware that any information or data obtained from their participation would be kept confidential, and that they were free to contact the researcher at any point in time. The informed consent form is only form that the participants placed their name on. Informed consent forms were kept separate and untraceable to any other data collected.

After filling out the informed consent form, participants were asked to complete a brief demographic survey (see Appendix B). The demographic survey was a self-report survey used to have the participant describe him or herself as accurately as possible questions created by the researcher. In this particular study, the participant was asked for gender, with the options of male, female, transgender, or other; age, where they must write how many years old they are;

current status in college, with the options of "freshman," "sophomore," "junior," "senior," or "not sure," if English is their first language, with the options "yes" or "no," and what the participants major was. Only the participant's subject non-traceable ID number generated by the researcher was placed on this survey. No identifying information will be on the demographic survey.

Participants were randomly assigned to a group; they received a stress inducing measure or was put in the control group, who received no stress. The group of participants that received the stress inducing measure was asked to stand up and complete mental math problems until they completed all 14 problems (see Appendix C). The other group was given a coloring page (see Appendix D). Each participant that received the control measure was asked to color leisurely for 5 min with colored pencils that were provided for the participant.

Following the manipulation, each participant received a survey, The Positive and Negative Affect Schedule (PANAS) to assess their level of stress (see Appendix E) to determine if the stress inducing measure was effective. In the case of this study, the PANAS survey was used as it assesses current state of stress, whereas, the more commonly used PSS assess stress over the past two weeks. The survey asked about the participant's current state of stress. The survey included 20 questions, asking the participant to rank him or herself on a scale of 1 to 5, 1 being very slightly, 5 being extremely. The survey was scored by adding together items 1, 3, 5,

9, 10, 12, 14, 16, 17, and 19 to find the positive affect score. Following that score, items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20 were added together to obtain the negative affect score. In the case of this study, I was more interested in the negative affect score to ensure the stress measure was effective. The higher the positive affect number was the more stress the participant was under, the lowest possible negative affect score was 10 while the highest possible was 50.

Participants were given a list of words (see Appendix F) on the computer system ePrime, to memorize. Participants were then asked to freely recall (see Appendix G) words that they saw on the computer screen. Free recall is when participants are asked to remember items without cues to call on. They were then asked to recognize the words that they had originally seen on the ePrime system again. This second test of memory used recognition; this type of memory is when cues are used to trigger memories.

The feedback letter (see Appendix H) was given to participants at the end of the study to thank them for volunteering their time to participate in the study and debrief them on what the experiment was looking at. It was noted that individual results are not processed in this study, but rather, overall findings were of interest, and that it is not possible for the researcher to trace each participant's response on an individual basis. The letter reiterated that the participant is free to contact the researcher conducting the study at any time.

Results

The hypothesis, those under the stress manipulation would be more susceptible to the DRM Paradigm than those under the control measure, was not supported. When all of the data was collected and an independent samples t-test was run, $p = .226$ meaning no statistically significant correlation was found. The secondary hypothesis, men would be more susceptible to false memories through the DRM than women also proved to be incorrect. An independent samples t-test was run for this data set as well, $p = .133$, showing no statistical significant correlation. The only data that were found to be statistically significant was the negative affect score for those under the stress manipulation, an independent samples t-test was run and $p = .049$.

Discussion

The results of this study were limited by the small sample size. Twenty participants was a rather small pool. It would also be better if there were a more even distribution of men and women. Potentially with a larger sample size and a more even distribution of men and women, the hypotheses within this study could hold true. In future studies, I would administer the PANAS survey before and after the control or stress manipulation to ensure that the stress manipulation was effective. As I was scoring the PANAS surveys I noticed that participants were bringing stress in with them. I think that it is vital to ensure that the stress measure is effective by

administering the PANAS survey twice. It also would be interesting to see how other stress manipulations, such as the cold pressor task would be at inducing stress, which would affect the DRM Paradigm more.

A follow up to this study would be to see how stress impacts eyewitness testimony, as this has a multitude of real world applications. Understanding how stress can impact false memory and memory formation in general can be vital to police investigations and other real world applications. False memory is an important subject to study, because the more we understand memory, the more we understand that it is malleable and imperfect.

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Appendix A

Informed Consent Form

I, _____ (print name), understand that I will be taking part in a research project that requires me to take a memory test after completing a task that may or may not induce a mild level of stress. I will also be completing questions assessing my stress level and answer basic demographic question on a survey. I understand that I should be able to complete this project within 30 minutes. I am aware that I am free to skip any questions in the unlikely event that I feel uncomfortable answering any of the items on any of the surveys or feel uncomfortable completing the stress task. I am also aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete the study. I understand that the information obtained from my responses will be analyzed only as part of aggregate data and that all identifying information will be absent from the data in order to ensure anonymity. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher(s) involved to my satisfaction. Finally, I verify that I am at least 18 years of age and am legally able to give consent or that I am under the age of 18 but have on file with the LPP

office, a completed parental consent form that allows me to give consent as a minor. I understand that I will be receiving extra credit through the LPP, if not recruited through the LPP, I understand that I will not receive extra credit.

_____ Date: _____

(Signature of participant)

_____ Date: _____

(Signature of researcher obtaining consent

Student Researcher's Name and Number:

Claire Van Vranken

(616)-299-9668

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Appendix B

DEMOGRAPHIC QUESTIONNAIRE

SUBJECT ID NUMBER: _____ (Assigned by Researcher)

1) What Gender do you identify with?

MALE FEMALE TRANSGENDER OTHER

2) How old are you? _____

3) What year are you in school?

FRESHMAN SOPHOMORE JUNIOR SENIOR OTHER

4) Is English your first language?

YES NO

5) What is your major? _____

Appendix C

MENTAL MATH:

Participants will be given the math problems, verbally and asked to respond verbally.

2583- 300 = 2283

2283+ 1200 = 3483

3483 – 90 = 3393

3393 – 800 = 2593

2593 + 85 = 2678

2678 – 650 = 2028

2028 – 600 = 1428

1428 + 1155 = 2583

2583 + 900 = 3483

3483 – 98 = 3385

3385 – 300 = 3085

3085 + 450 = 3535

3535 – 1500 = 2035

2035 + 548 = 2583

Appendix D

Appendix E

PANAS Questionnaire

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
Very Slightly or Not at All	A Little	Moderately	Quite A Bit	Extremely

_____ 1. Interested

_____ 2. Distressed

_____ 3. Excited

_____ 4. Upset

_____ 5. Strong

_____ 6. Guilty

_____ 11. Irritable

_____ 12. Alert

_____ 13. Ashamed

_____ 14. Inspired

_____ 15. Nervous

_____ 16. Determined

_____ 7. Scared

_____ 8. Hostile

_____ 9. Enthusiastic

_____ 10. Proud

_____ 17. Attentive

_____ 18. Jittery

_____ 19. Active

_____ 20. Afraid

Appendix F

Word Lists:

REST	SODA	CHILLY
BED	BITTER	HEAT
NAP	PIE	ICE
DOZE	HEART	HOT
TIRED	GOOD	SNOW
AWAKE	COCOA	FROST
SNORE	TOOTH	WET
PILLOW	SUGAR	ARCTIC
DREAM	HONEY	WARM
PEACE	TART	WINTER
DROWSY	CANDY	AIR
SNOOZE	TASTE	FREEZE
YAWN	NICE	WEATHER
BLANKET	SOUR	FRIGID
SLUMBER	CAKE	SHIVER
Sleep - Category Word	Sweet – Category Word	Cold – Category Word

Appendix G

FREE RECALL

Please list all words that you can recall seeing on the list displayed to you.

1._____	2._____	3._____
4._____	5. _____	6._____
7. _____	8._____	9._____
10._____	11. _____	12._____
13. _____	14._____	15._____
16._____	17._____	18._____
19._____	20. _____	21. _____
22. _____	23. _____	24. _____

25. _____ 26. _____ 27. _____

28. _____ 29. _____ 30. _____

31. _____ 32. _____ 33. _____

34. _____ 35._____ 36. _____

37. _____ 38. _____ 39. _____

40. _____ 41. _____ 42. _____

43. _____ 44. _____ 45. _____

Appendix H

Feedback Letter

Thank you for participating in my study. The present study was conducted in order to determine whether an increase in stress increases the production of false memories. False memories are, memories of an event that never really occurred, but is believed, with a high degree of certainty, that it occurred by the person remembering it. In this experiment, false memory occurs when a person recalls a word that was not on the original list.

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 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, 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,

Claire Van Vranken

Principal Investigator:

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Different Personality Traits between Athletes and Non-athletes

Sam Schoonover[4]

It has been suggested that there are personality trait differences between athletes and non-athletes. I hypothesized that athletes would possess different personality traits than non-athletes. I used the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) as my tool for assessing the difference in personality traits between athletes and non-athletes. An athlete is someone who engages in a sport for an element such as a title or rank. My sample was composed of a total of 123 participants; there were 41 athletes and 82 non-athletes. The participants were in the age range of 18 to 74; there were 29 men and 90 women. I conducted my online study by posting my survey on Facebook as well as on Sona Systems, which allowed members from the Lindenwood Participant Pool to complete my study. The participants were first asked to complete five demographic questions. Then, the subjects were asked to complete the 70 questions of the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) as my tool to determine their personality traits in regards to extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceiving. I analyzed the difference in personality traits between athletes and non-athletes, male athletes and non-athletes, female athletes and non-athletes, and athletes who participate in team and individual sports. The only significant difference that I found was between athletes and non-athletes in regards to judging versus perceiving, $\chi^2_{(1)} = 6.845$, $p = 0.009$. More athletes were found to have the perceiving personality trait in comparison to non-athletes.

There is a belief that individuals who are athletes possess different personality characteristics than individuals who are not athletes. The present study was designed to determine whether this is true. This could be a worthy line of investigation because people will

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be able to learn about the difference in personality traits that exists between athletes and non-athletes. The findings of this research could benefit coaches of competitive sport teams. If these coaches are trying to recruit athletes and build a team that is cohesive and works well together, then they may want to have their athletes complete a personality test. As a result of taking the personality test, the coaches will be able to see if their athlete has similar personality traits to the athletes that participated in this study. This does not mean that an individual is going to be encouraged or discouraged to participate in athletics as a result of their personality traits. These findings are only a tool that coaches can use to help them build a cohesive team.

Kanniyan, George, and Valiyakath (2015) found that men who participate in sports have a higher level of self-assurance in comparison to men who are sedentary. The purpose of their research was to identify different personality traits that are associated with men who play sports and men who do not play sports. Based off of their results, Kanniyan et al. (2015) found that men who are athletes revealed moderately higher scores in comparison to men who are not athletes in the majority of personality traits such as control, aggressiveness, realism, radicalism, and apprehension. Kanniyan et al. (2015) conducted their study by distributing the 16 personality factor questionnaire to a random sample of 32 men from different sports and 12 men who do not play sports. This study provided evidence that there is a difference in personality traits between men who play sports and men who do not play sports.

Malinauskas, Dumciene, Mamkus, and Venckunas (2014) used a random sample of 169 young adult male athletes and 207 young adult male non-athletes to study the relationship between athletic capacity and personality traits. They found that men who are athletes have higher levels of conscientiousness in comparison to men who are not athletes. These researchers also found that men who participate in sports that are team-based have higher levels of extroversion in comparison to men who are endurance athletes. Malinauskas et al. (2014) conducted their study using the NEO Five-Factory Inventory to assess the major Big Five personality traits; they also measured the exercise capacity of their participants by measuring 26 different exercises within the parameters of their lab. The results of this study provided evidence that there is a difference in personality traits in regards to athletes and non-athletes.

Vealey and Perritt (2015) conducted a study in order to research the relationship of flow in athletes with the personality traits of hardiness and optimism. They distributed the Dispositional Flow Scale, The Personal Views Survey-11, and the Life Orientation Test-Revised to 197 collegiate track and field athletes; these athletes were students at six different universities located in the Midwestern region of the United States (Vealey & Perritt, 2015). They found that college athletes have an increased amount of optimism and bravery because these two characteristics are necessary in helping athletes to achieve what they desire to accomplish.

Burdzicka-Woeowik and Goral-Radziszewska (2014) conducted a study to identify different personality traits that women who engage in combat sports possess in comparison to women who do not engage in sports. They found that the women who engage in combat sports possess more masculine personality traits and they have lower levels of emotional and sensory reactivity in comparison to women who do not participate in combat sports (Burdzicka-Woeowik & Goral-Radziszewska, 2014).

Reiter, Liput, and Nirmal (2007) conducted a study to examine the different personality differences between college student-athletes and non-athletes. They conducted their study using the Myers-Briggs Type Indicator. These researchers gathered their data from a random sample of 91 college students. Although they did not find any significant statistical differences from their results, they did find other notable results. Based on their results, Reiter et al. (2007) found that 62% of the non-athletes scored higher on the intuition scale while 51% of the athletes scored higher on the sensing scale. They found that 70% of athletes scored higher on the extroversion scale in comparison to the 60% of non-athletes that scored higher on the introversion scale. Furthermore, they also found that non-athletes were more common than athletes to have either the ENFP (Extroversion-Intuition-Feeling-Perceiving) or the INFP (Introversion-Intuition-Feeling-Perceiving) personality types (Reiter et al., 2007).

I hypothesize that there will be a difference in personality traits between athletes and non-athletes. Studies such as the one that Kanniyan et al. (2015) conducted endorse the idea that there are differences in personality traits that athletes possess in comparison to non-athletes. In terms of the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) and based off of the study that Reiter et al. (2007) conducted, athletes may be higher in extroversion and non-athletes may be higher in intuition. I obtained my participants from the Lindenwood Participant Pool as well as from Facebook. I asked the subjects to complete an online survey that contained questions from the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015).

Method

Participants

I obtained a total of 123 participants for my study; I gained 27 participants from the Lindenwood Participant Pool (LPP) and 96 from Facebook. All of the people who participated in my study voluntarily chose to click on my survey link in order to complete my survey. Each participant that I attained from the LPP came from a class that is associated with the LPP. The classes that are associated with the LPP are entry-level courses in the fields of psychology, athletic training, anthropology, sociology, and exercise science. After receiving permission from the LPP office, I uploaded my survey to Sona Systems; this allowed the participants the

opportunity to complete my survey in order to receive bonus points for one of their classes through the LPP.

The 96 participants recruited from Facebook are individuals who are Facebook members and they willingly volunteered to complete my survey. I posted the link to my survey on my personal Facebook page; four of my Facebook friends shared my survey on their personal pages in order to make my survey available to more people. These participants did not receive any type of compensation in exchange for their completion of my survey.

While completing my survey, the participants were asked to answer five demographic questions concerning their sex, age, if they are an athlete, what type of sport they play, and if they are currently a college student. Of the 123 participants, 29 were men, 90 were women, and 4 chose not to answer. The participants ranged in age from 18 through 74. There were 41 participants who answered that they are an athlete; the other 82 participants answered that they are not an athlete. The participants who are athletes mentioned that they participate in sports such as swimming, synchronized swimming, softball, soccer, basketball, cycling, and tennis. There were 41 participants who were currently college students and 82 participants who were not currently enrolled in college.

Materials and Procedure

I conducted my study in order to see if there are personality differences between athletes and non-athletes. I created my survey through SurveyGizmo. My survey consisted of an informed consent statement, 75 survey questions, and a thank you statement (see Appendix A for Survey). After receiving approval from the Institutional Review Board (IRB) to conduct my study, I posted my study to Facebook and to Sona Systems by uploading the link to my survey through each of these websites.

Participants were first presented with a consent statement to read, understand, and either agree or disagree to upon opening the link to participate in my survey. If the participants decided to click the button stating that they did not wish to participate in my survey, then they were re-directed to the "Thank you" portion of my survey where they were told why I was conducting my survey and where I will be presenting my research findings. If the participants chose to click the button stating that they wish to participate in my study, then they were re-directed to the page where they could begin answering my survey questions.

The first questions that the participants answered were the five demographic questions in regards their sex, age, if they are an athlete, what type of sport they play, and if they are currently a college student. Then, the participants answered 70 questions that came from the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015). I used the questions from the Myers-

Briggs Type Indicator (Briggs & Briggs-Myers, 2015) as my tool for identifying whether different personality traits exist between athletes and non-athletes. I chose to use this test because I was interested in identifying the personality differences that may appear as a result of using this test. Based on the responses given on the 70 questions from the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015), the participants' personality types were evaluated. There are 16 different personality types that an individual could have. These 16 different personality types are composed of a four-letter code that is configured by how an individual answers the survey questions. Each code is composed of personality traits such as extroverted versus introverted, sensing versus intuition, thinking versus feeling, and judging versus perceiving. After completing my survey questions, the participants were directed to the "Thank you" portion of my survey where they were told why I was conducting my survey and where I will be presenting my research findings.

After the participants completed my survey and I obtained all of the results, I analyzed my results using both SPSS and Excel to see if there are differences in personality characteristics between athletes and non-athletes. I scored the results of the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) survey questions by using a scoring sheet that came with Myers-Briggs Type Indicator test (see Appendix B for Scoring Sheet). After all of the participants' data

were accounted for and organized, chi-square analyses were conducted to compute the significant difference between the athletes' and the non-athletes' personality traits.

Results

I conducted the present study to identify the differences in personality traits that exist between athletes and non-athletes. The results of the chi-square analyses regarding the data acquired from this study revealed that that there were no substantial differences in personality traits between athletes and non-athletes.

In regards to my hypothesis, I compared athletes and non-athletes on the traits of extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceiving. There was not a significant difference between whether an individual was an athlete or a non-athlete and whether they were extroverted or introverted, $\chi^2_{(1)} = 0.798$, $p = 0.372$. The introversion or extroversion traits were not associated with whether an individual was an athlete or a non-athlete. There was not a significant difference between athletes and non-athletes in regards to sensing or intuition, $\chi^2_{(1)} = 0.017$, $p = 0.897$. These two traits were not indicators of athlete status. There was no difference between thinking and feeling and whether an individual was an athlete or a non-athlete, $\chi^2_{(1)} = 0.000$, $p = 1.000$. Athletes and non-athletes are similar in regards to the traits of thinking and feeling. There was a significant difference between athletes and non-athletes and the personality traits of judging and perceiving, $\chi^2_{(1)} =$

6.845, $p = 0.009$. There are more athletes who are perceiving than there are non-athletes who are perceiving.

Male athletes and non-athletes and female athletes and non-athletes can possess different personality traits. Athletes who participate in team sports can have different personality traits than athletes who participate in individual sports. I compared male athletes and male non-athletes, female athletes and female non-athletes, and athletes who play team sports and athletes who play individual sports in regards to the traits of extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceiving. There were no statistically significant differences in personality traits as a result of separating the data by sex and type of sport (see Table 1 for details).

Discussion

Since it has been suggested that athletes and non-athletes possess different personality traits, I hypothesized that there would be a difference in personality traits between athletes and non-athletes using the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) as my tool to assess these differences. The results of the study only revealed significant differences between athletes and non-athletes in regards to the traits of judging and perceiving. Non-athletes were found to be more judging than athletes. If an individual is higher in the trait of judging, this means that they prefer a more structured environment and a lifestyle that is more decided. If an

individual is higher in the trait of perceiving, this means that they prefer more of a flexible environment and a lifestyle that is more adaptive. Athletes could be more perceiving than non-athletes because athletes may have to be more adaptable to certain situations that they may face while competing in their sport. Athletes cannot plan or practice for every instance that they may face while they are competing, therefore they have to be more open to altering their course of action to fit the challenges that they are facing in their competition.

These results did not relate to any of the previously mentioned studies. Contrary to the findings reported by Kanniyan et al. (2015) or Malinauskas et al. (2014), I did not find any significant differences between male athletes and non-athletes. Similarly, unlike the findings reported by Burdzicka-Woeowik and Goral-Radziszewska (2014), I did not find any significant differences between female athletes and non-athletes. Reiter et al. (2007) found that non-athletes scored higher in the trait of perceiving, while I found that athletes were more perceiving that non-athletes. This difference could be based off of the samples that were used for both of these studies. Reiter et al. (2007) conducted their research based off a sample that was composed of college students who were either athletes or non-athletes. My sample consisted of athletes and non-athletes from different age groups.

Although I did find a difference between athletes and non-athletes in regards to the traits of judging and perceiving, I was expecting to find other differences as well such as within the

traits of extroversion and introversion. One reason why I may not have found as many differences between athletes and non-athletes is that I did not have as many athletes in my sample as I did non-athletes. I also did not have as many men participate in my study as I did women. Another factor could have been that my online survey was rather lengthy; the participants may have experienced the fatigue effect and grown tired of answering the questions, so some of the participants may have randomly selected answers without truly answering the question.

For future studies, I would increase my sample size. I would try to receive a larger number of athletes in comparison to non-athletes. I would also attempt to receive a larger number of men in comparison to women. I may even consider limiting my sample to solely college student athletes and non-athletes. I decided to use the Myers-Briggs Type Indicator (Briggs & Briggs-Myers, 2015) because it has not been used as frequently in other studies. However, if I were to further my research on this topic, I would consider using another personality test to measure other potential personality trait differences between athletes and non-athletes such as conscientiousness, hardiness, and openness.

This research could be beneficial for society because society could learn about the different personality characteristics that are more commonly found in individuals who are athletes versus individuals who are not athletes. For instance, sporting coaches that coach for

completive sport teams could benefit from this study. If these coaches are trying to recruit athletes and build a team that is cohesive and works well together, then they may want to have their athletes complete a personality test. As a result of taking the personality test, the coaches will be able to see if their athlete has similar personality traits to the athletes that participated in this study. This does not mean that an individual is going to be encouraged or discouraged to participate in athletics as a result of their personality traits. This is just a tool that coaches can use to help them build a cohesive team.

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Appendix A

Survey

Different Personality Traits between Athletes and Non-athletes

(UNTITLED)

Page exit logic: Page Logic**IF:** Question "If you do not wish to participate in this research study, or are not at least 18 years of age, please decline participation by clicking on the "I choose not to participate" button.
" #1 is one of the following answers ("I choose to participate in this study.") **THEN:** Jump to page 2 - Survey

Page exit logic: Page Logic**IF:** Question "If you do not wish to participate in this research study, or are not at least 18 years of age, please decline participation by clicking on the "I choose not to participate" button.
" #1 is one of the following answers ("I do not choose to participate in this study.") **THEN:** Jump to page 3 - Thank You!

ID: 5Informed Consent Statement

This survey is about the possible personality trait differences that exist between athletes and non-athletes. Sam Schoonover created this survey as part of a research project in the department of psychology at Lindenwood University. This survey contains questions asking how you would act or feel in a certain situation as well as how you view yourself.

This survey will take approximately 10 to 12 minutes to complete. Although your participation may not result in direct benefits to you, information from this study may help provide insight into the different personality traits that may exist between athletes and non-athletes. There are

no correct answers to these questions. Answer the questions honestly; do not over analyze any of these questions. Please read the information below before deciding whether or not to participate.

Your responses will be anonymous. No information that identifies you personally will be collected. The principal investigator will not be able to identify your answers as belonging to you; your data will be grouped with the athletes or non-athletes, depending on your situation, and all analyses will be conducted based on these groupings only, and not on an individual basis.

- Your participation is completely voluntary. You may discontinue taking the survey at any time. If you choose not to participate or stop participating before the end of the survey, you will not be penalized in any way. You are allowed to skip any question that you do not feel comfortable answering.
- The results of this survey will be used for scholarly purposes only. If you have any questions about the survey itself, please contact the principal investigator, Sam Schoonover, at 636-614-9278.

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "agree" button below indicates that:

- You are currently a college student or you have completed some college
- You have read the above information
- You voluntarily agree to participate
- You are at least 18 years of age

ID: 8

1) If you do not wish to participate in this research study, or are not at least 18 years of age, please decline participation by clicking on the "I choose not to participate" button.
***

( ) I choose to participate in this study.

( ) I do not choose to participate in this study.

SURVEY

ID: 11

2) Are you

( ) Male

( ) Female

ID: 12

3) Are you currently a college student?

( ) Yes

( ) No

ID: 85

4) What is your age?

_____

ID: 14

5) Are you an athlete? An athlete is a person who participates in athletics at the competitive level. Rather than engaging in a form of physical activity or a sport for leisure, the individual is competing in the sport for an element such as a title.

( ) Yes

( ) No

ID: 91

6) If you are a competitive athlete, what sport do you play competitively? (If you are not a competitive athlete, you can either skip this question or type "none" in the box.)

_____

_____

_____

_____

ID: 15

7) At a party do you:

( ) Interact with many, including strangers

( ) Interact with a few, known to you

ID: 16

8) Are you more:

( ) Realistic than speculative

( ) Speculative than realistic

ID: 17

9) Is it worse to:

( ) Have your "head in the clouds"

( ) Be "in a rut"

ID: 18

10) Are you more impressed by:

( ) Principles

( ) Emotions

ID: 19

11) Are more drawn toward the:

( ) Convincing

( ) Touching

ID: 20

12) Do you prefer to work:

( ) To deadlines

( ) Just "whenever"

ID: 21

13) Do you tend to choose:

( ) Rather carefully

( ) Somewhat impulsively

ID: 22

14) At parties do you:

( ) Stay late, with increasing energy

( ) Leave early with decreased energy

ID: 23

15) Are you more attracted to:

( ) Sensible people

( ) Imaginative people

ID: 24

16) Are you more interested in:

( ) What is actual

( ) What is possible

ID: 25

17) In judging others are you more swayed by:

( ) Laws than circumstances

( ) Circumstances than laws

ID: 26

18) In approaching others is your inclination to be somewhat:

( ) Objective

( ) Personal

ID: 27

19) Are you more:

( ) Punctual

( ) Leisurely

ID: 28

20) Does it bother you more having things:

( ) Incomplete

( ) Completed

ID: 29

21) In your social groups do you:

( ) Keep abreast of other's happenings

( ) Get behind on the news

ID: 30

22) In doing ordinary things are you more likely to:

( ) Do it the usual way

( ) Do it your own way

ID: 31

23) Writers should:

( ) "Say what they mean and mean what they say"

( ) Express things more by use of analogy

ID: 32

24) Which appeals to you more:

( ) Consistency of thought

( ) Harmonious human relationships

ID: 33

25) Are you more comfortable in making:

( ) Logical judgments

( ) Value judgments

ID: 34

26) Do you want things:

( ) Settled and decided

( ) Unsettled and undecided

ID: 35

27) Would you say you are more:

( ) Serious and determined

( ) Easy-going

ID: 36

28) In phoning do you:

( ) Rarely question that it will all be said

( ) Rehearse what you'll say

ID: 37

29) Facts:

( ) "Speak for themselves"

( ) Illustrate principles

ID: 38

30) Are visionaries:

( ) somewhat annoying

( ) rather fascinating

ID: 39

31) Are you more often:

( ) a cool-headed person

( ) a warm-hearted person

ID: 40

32) Is it worse to be:

( ) unjust

( ) merciless

ID: 41

33) Should one usually let events occur:

( ) by careful selection and choice

( ) randomly and by chance

ID: 42

34) Do you feel better about:

( ) having purchased

( ) having the option to buy

ID: 43

35) In company do you:

( ) initiate conversation

( ) wait to be approached

ID: 44

36) Common sense is:

( ) rarely questionable

( ) frequently questionable

ID: 45

37) Children often do not:

( ) make themselves useful enough

( ) exercise their fantasy enough

ID: 46

38) In making decisions do you feel more comfortable with:

( ) standards

( ) feelings

ID: 47

39) Are you more:

( ) firm than gentle

( ) gentle than firm

ID: 48

40) Which is more admirable:

( ) the ability to organize and be methodical

( ) the ability to adapt and make do

ID: 49

41) Do you put more value on:

( ) infinite

( ) open-minded

ID: 50

42) Does new and non-routine interaction with others:

( ) stimulate and energize you

( ) tax your reserves

ID: 51

43) Are you more frequently:

( ) a practical sort of person

( ) a fanciful sort of person

ID: 52

44) Are you more likely to:

( ) see how others are useful

( ) see how others see

ID: 53

45) Which is more satisfying:

( ) to discuss an issue thoroughly

( ) to arrive at agreement on an issue

ID: 54

46) Which rules you more:

( ) your head

( ) your heart

ID: 55

47) Are you more comfortable with work that is:

( ) contracted

( ) done on a casual basis

ID: 56

48) Do you tend to look for:

( ) the orderly

( ) whatever turns up

ID: 57

49) Do you prefer:

( ) many friends with brief contact

( ) a few friends with more lengthy contact

ID: 58

50) Do you go more by:

( ) facts

( ) principles

ID: 59

51) Are you more interested in:

( ) production and distribution

( ) design and research

ID: 60

52) Which is more of a compliment:

( ) "There is a very logical person."

( ) "There is a very sentimental person."

ID: 61

53) Do you value in yourself more that you are:

( ) unwavering

( ) devoted

ID: 62

54) Do you more often prefer the

( ) final and unalterable statement

( ) tentative and preliminary statement

ID: 63

55) Are you more comfortable:

( ) after a decision

( ) before a decision

ID: 64

56) Do you:

( ) speak easily and at length with strangers

( ) find little to say to strangers

ID: 65

57) Are you more likely to trust your:

( ) experience

( ) hunch

ID: 66

58) Do you feel:

( ) more practical than ingenious

( ) more ingenious than practical

ID: 67

59) Which person is more to be complimented – one of:

( ) clear reason

( ) strong feeling

ID: 68

60) Are you inclined more to be:

( ) fair-minded

( ) sympathetic

ID: 69

61) Is it preferable mostly to:

( ) make sure things are arranged

( ) just let things happen

ID: 70

62) In relationships should most things be:

( ) re-negotiable

( ) random and circumstantial

ID: 71

63) When the phone rings do you:

( ) hasten to get to it first

( ) hope someone else will answer

ID: 72

64) Do you prize more in yourself:

( ) a strong sense of reality

( ) a vivid imagination

ID: 73

65) Are you drawn more to:

( ) fundamentals

( ) overtones

ID: 74

66) Which seems the greater error:

( ) to be too passionate

( ) to be too objective

ID: 75

67) Do you see yourself as basically:

( ) hard-headed

( ) soft-hearted

ID: 76

68) Which situation appeals to you more:

( ) the structured and scheduled

( ) the unstructured and unscheduled

ID: 77

69) Are you a person that is more:

( ) routinized than whimsical

( ) whimsical than routinized

ID: 78

70) Are you more inclined to be:

( ) easy to approach

( ) somewhat reserved

ID: 79

71) In writings do you prefer:

( ) the more literal

( ) the more figurative

ID: 80

72) Is it harder for you to:

( ) identify with others

( ) utilize others

ID: 81

73) Which do you wish more for yourself:

( ) clarity of reason

( ) strength of compassion

ID: 82

74) Which is the greater fault:

( ) being indiscriminate

( ) being critical

ID: 83

75) Do you prefer the:

( ) planned event

( ) unplanned event

ID: 84

76) Do you tend to be more:

( ) deliberate than spontaneous

( ) spontaneous than deliberate

THANK YOU!

ID: 1

Thank you for participating in my study. This study was conducted in order to tell if there are any personality trait differences between athletes and non-athletes.

Please note that I am not interested in your individual results; rather, I am only interested in the overall findings based on athlete status. 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 contact me now or in the future. I will present this project at The Third Annual Student Research Symposium and Exposition (SRSE) that Lindenwood University is hosting on April 20, 2016. I will publish my results in the class journal that Dr. Michiko Nohara-LeClair will publish at the end of the Spring 2016 semester. My contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sam Schoonover

SKS110@lionmail.lindenwood.edu

Dr. Nohara-LeClair

Mnohara-leclair@lindenwood.edu

Email action: Confirmation Email (ARM study)

To: Sam Schoonover (sks110@lionmail.lindenwood.edu)
From: SurveyGizmo (notifications@surveygizmo.com)
Subject: New Response Notification

Appendix B

Scoring Sheet

Scoring

	Col 1			Col 2			Col 3			Col 4			Col 5			Col 6			Col 7	
	A	B		A	B		A	B		A	B		A	B		A	B		A	B
1			2			3			4			5			6			7		
8			9			10			11			12			13			14		
15			16			17			18			19			20			21		
22			23			24			25			26			27			28		
29			30			31			32			33			34			35		
36			37			38			39			40			41			42		
43			44			45			46			47			48			49		
50			51			52			53			54			55			56		
57			58			59			60			61			62			63		
64			65			66			67			68			69			70		
	Copy to									Copy to						Copy to				

	E	I		S	N		T	F		J	P

1. Copy your answers to this answer key carefully.
2. Count the number of checks in each of the A and B columns, and total at the bottom.
3. Copy the totals for Column 2 to the spaces below the totals for Column 3. Do the same for Columns 4 and 6.
4. Add totals downwards to calculate your totals.
5. Circle the letter with this highest score. This is your type.

Table 1

Personality Traits by Sex and Type of Sport

Sex/Athlete type	Personality traits	Statistical significance
Male athletes vs. Male non-athletes	Extroversion vs. Introversion	$\chi^2_{(1)} = 0.358$, $p = 0.550$
	Sensing vs. Intuition	$\chi^2_{(1)} = 1.081$, $p = 0.298$
	Thinking vs. Feeling	$\chi^2_{(1)} = 0.083$, $p = 0.774$
	Judging vs. Perceiving	$\chi^2_{(1)} = 3.440$, $p = 0.064$
Female athletes vs. Female non-athletes	Extroversion vs. Introversion	$\chi^2_{(1)} = 0.935$, $p = 0.334$
	Sensing vs. Intuition	$\chi^2_{(1)} = 0.623$, $p = 0.430$
	Thinking vs. Feeling	$\chi^2_{(1)} = 0.002$, $p = 0.962$
	Judging vs. Perceiving	$\chi^2_{(1)} = 1.888$, $p = 0.169$
Team athletes vs. Individual athletes	Extroversion vs. Introversion	$\chi^2_{(1)} = 0.002$, $p = 0.967$
	Sensing vs. Intuition	$\chi^2_{(1)} = 0.132$, $p = 0.717$
	Thinking vs. Feeling	$\chi^2_{(1)} = 0.109$, $p = 0.471$
	Judging vs. Perceiving	$\chi^2_{(1)} = 0.744$, $p = 0.388$

Correlation between a Students' Academic Performance and Caffeine Intake

Mary Bindbeutel[5]

On most college campuses around the country, one would find it difficult not to run into a coffee cart or a vending machine chock-full of caffeinated beverages. The purpose of this study was to determine whether or not there is a correlation between a student's academic performance and their daily intake of caffeine. I hypothesized that there would be a negative correlation between these variables. That is, I predicted those who reported low levels of caffeine intake would have higher levels of academic performance. This study consisted of 17 participants who were surveyed over their daily caffeine intake and their academic performance. Once analyzed, the results revealed no support for my hypothesis. Participants who reported high levels of academic performance also reported moderate to high levels of caffeine intake. The positive correlation from the results could be due to students' tolerance for caffeine. After so many years of drinking the substance on a day to day basis, many could see less of the effects that caffeine has on them.

It is estimated that 90% of adults in North America consume some form of caffeine in their daily lives, therefore, causing caffeine to become one of the most widely used psychoactive substances (Olsen, 2013). While taking a stroll through a college campus, one is likely to see a multitude of students sipping on some form of caffeinated beverage. Many students use this substance as a quick energy boost to help them with their academic endeavors. However, does caffeine improve academic performance enough to compensate for all of the negative side effects?

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In 2007, a study was conducted by Malinauskas, Abey, Overton, Carpenter-Abey, and Barber-Heidal (2007), researching what percentages of college students consume caffeine and for what reasons. Among the 253 participants, it was found that 67% used caffeine to manage insufficient sleep and 65% used caffeine for energy boosts. Nevertheless, 29% of students reported weekly crash episodes, 22% experienced headaches, and 19% suffered from heart palpitations (Malinauskas et al., 2007).

In a study done by Blakeslee (1991), caffeine, in large doses, has been shown to produce sleeping and panic disorders. Caffeine is nearly identical to Adenosine, a compound that is used by the brain to produce and regulate energy. When a person consumes caffeine, the caffeine molecules block the passageways for the adenosine (Blakeslee, 1991). The person remains on a caffeine "high" for a few hours and then begins to come down. In the meantime, the body supplements for the lack of adenosine by producing more. This is what causes regular users sleep patterns to fluctuate.

Similarly, Petit and Debar (2011), discuss additional side effects that come with regular caffeine consumption. These effects can range anywhere from elevated blood sugar and glucose levels to dehydration and complete dependency in college students. In more severe cases, some have experienced, "tachycardia, myocardial infarction, seizure, coma, and renal and musculoskeletal" issues (Petit & Debar, 2011, p. 335).

In the course of their study, Petit and Debar (2011) found that as stress increases, college students gravitate towards caffeine to help them with their studies. More notably, they showed that upperclassmen (i.e., juniors and seniors) showed more caffeine consumption than the underclassmen (i.e., freshman and sophomores). Because of the additional stress upperclassmen face, they become more susceptible to gravitating toward caffeine for help with their academics.

Mitchell and Redman (1992), conducted a study where they distributed caffeine capsules (196mg to 388mg) to participants, then tested them on various cognitive tasks, one of those being a short term memory task. Here, they found that there was no significant difference in performance between those given the low dose and those given the high dose of caffeine.

Similar to this, Paulus, Roth, Titus, Chen, Bridges and Woodwayard (2015), conducted a study where the divided college students into either a placebo (flour) or one of the three caffeine treatment groups (5-hour Energy Shot, Starbucks Double Shot, or caffeine powder), then tested them five hours later over their cognitive function and their current mood. They then completed a series of Stroop and memory tests to determine their cognitive skills. All treatment groups saw an increase in cognitive skills and had quicker times on the Stroop Tests. The 5-hour Energy Shot group, however, had the best times out of any of the others (Paulus et al., 2015).

The purpose of the present study was to examine the correlation between college students' academic performance and their regular caffeine intake. While the studies above have

looked at the correlation between caffeine and cognitive skills, none have examined the relationship between caffeine and academics. Through the use of an online survey, participants were asked a serious of questions that delved into their academics and the amount of caffeine they consumed. The hypothesis was that students who reported high consumptions of caffeine would have lower academic success than those who occasionally or never consume caffeine.

Method

Participants

Participants consisted of 19 graduate and undergraduate students from various universities. There were 12 women and 5 men whose ages ranged from 19-53. The mean age of participants was 26. Of the 17 participants, 2 reported they were sophomores, 4 reported they were junior, 3 reported they were seniors, and 8 reported they were in graduate school. This study originally had 30 participants, however, only 17 could actually be used because the other 13 reported they were not college students; therefore, they were disqualified from taking part.

The participants were recruited through the Lindenwood Participant Pool (LPP), a site for researchers to gain participants and also give students in entry level courses a way to earn bonus points, and also through Facebook. The survey was posted on Sona Systems, a site where Lindenwood students can sign-up for ongoing studies, allotting any students who are a part of the LPP have the ability to click on the link and take the survey. On Facebook, a non-coercive

message was posted explaining the study with the link to the survey. Students who took the survey through the LPP were awarded extra credit by either their Psychology, Sociology, Anthropology, Athletic Training, or Exercise Science professors. Other than this, no incentives were awarded for participation in this study.

Materials and Procedure

Materials used in this study were a computer and an online survey that was created on SurveyGizmo, an online survey platform (see Appendix A). Since participants were able to take the survey wherever they liked, location for this study was dependent upon each individual participant.

Participants began by clicking on either the link on the Lindenwood Participant Pool or Facebook. After this, they were directed to SurveyGizmo. Here, they read through the informed consent and clicked on either, "I am at least 18 years old and wish to participate" or "I am not 18 years old or do not wish to participate" (see Appendix A). If they chose that they were not 18 or did not wish to participate, they were immediately directed to the thank you letter.

Once participants gave their consent, they answered three short questions about their demographic information. Next, they answered 20 questions pertaining to the type and amount of caffeine they regularly consumed and their academic performance. Some of the questions included were: whether the participants achieved mostly As, Bs, Cs, Ds, or Fs in their classes,

how hard they feel they work for their grades, whether or not they drank caffeine, how much caffeine they drank daily, and whether or not they felt they needed caffeine to get them through their classes. Of the 19 participants, 18 answered "Yes" to the question of whether they drank caffeine or not and only 1 answered "No."

This survey took approximately 10-15 min to complete. Finally, once participants finished the survey, they were able to read through the thank you page and feedback letter (see Appendix A). This outlined the hypothesis of the study and also provided each participant with the principal investigator's contact information in case they had any further questions. Finally, SPSS, a program where one is able to complete statistical analyses of collected data, was used to compute a Spearman's *r* to determine whether or not there was a negative correlation between the two variables.

Results

The hypothesis, students who have a lower daily caffeine intake would have higher academic performance, was not supported. The results of a Spearman's *r*, which is used to assess relationships between ranked and ratio measures revealed that the relationship between caffeine intake and academic performance was not statistically significant, $p = .188$. The analysis showed that, while small, students who have a higher level of daily caffeine intake report higher levels of academic performance, which is directly contrary to my hypothesis.

Discussion

The hypothesis to this study stated that students who have a lower daily caffeine intake would have higher academic performance. However, once the data were analyzed, the hypothesis was not in support of my hypothesis, in that, students with high daily caffeine intake also had high academic performance. Thus, showing a positive correlation between the two variables or $p = .188$.

While a positive correlation existed, it was not significant enough to tell whether there is a relationship between caffeine and academic performance. A more in depth study should be done to tell whether caffeine truly impacts academic performance or not. A possible study would be one where participants are administered caffeinated beverages, each with differing levels of caffeine, and then are given a test focusing over various subjects related to school; very similar to study done by Mitchell and Redman (1992) and their administration of caffeine pills. A researcher could analyze the data and see whether or not caffeine, and its amount, had an impact on participant's performance.

Another suggestion for further research would be advertise participation for the study on college campuses rather than using Facebook. While it is not certain whether this can be attributed to the use of Facebook, advertising on a college campus would better ensure participants would be college students.

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Appendix A

Correlation between Academic Performance and Caffeine Intake

Informed Consent Statement

This survey is about the possible correlation between academic performance and a student's caffeine intake. Mary Bindbeutel created this survey as part of a research project for the Lindenwood University psychology department. This survey contains questions measuring ones academic performance and the amount of caffeine they regularly consume.

This survey will take approximately 10 to 15 minutes to complete. Although your participation may not result in direct benefits to you, information from this study may help provide insight into the overuse of caffeine in one's daily life. There are no correct answers to these questions. Answer the questions to the best of ones' ability; do not over analyze any of these questions. Please read the information below before deciding whether or not to participate.

Your responses will be anonymous. No information that identifies you personally will be collected. The principal investigator will not be able to identify your answers as belonging to you. The data collected is looking at the cumulative results of academic performance compared to caffeine consumption, rather than individual.

Your participation is completely voluntary. You may discontinue taking the survey at any time. If you choose not to participate or stop participating before the end of the survey, you will not be penalized in any way. You are allowed to skip any question that you do not feel comfortable answering. The results of this survey will be used for scholarly purposes only. If you have any questions about the survey itself, please contact the principal investigator, Mary Bindbeutel, at (636)-515-7792 or meb490@lionmail.lindenwood.edu. 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.

1) ELECTRONIC CONSENT: If you do not wish to participate in this study, or are not 18 years of age, please select the "I am not 18 years old or do not wish to participate" option below.*

( ) I am at least 18 years old and wish to participate

( ) I am not 18 years old or do not wish to participate

---

2) I am currently some form of college student (graduate, undergraduate, or other).*

( ) Yes

( ) No

---

3) I am a:

( ) Male

( ) Female

4) What is your class level?

( ) Freshman

( ) Sophomore

( ) Junior

( ) Senior

( ) Graduate School

5) What is your age?

_____

---

6) In school, I achieve:

( ) Mostly A's

( ) Mostly B's

( ) Mostly C's

( ) Mostly D's

( ) Mostly F's

7) When it comes to school:

( ) I get good grades, but don't need to work hard.

( ) I get good grades, but really have to work for them.

( ) I don't get good grades and still work hard.

( ) I don't get good grades, but I also don't work very hard.

8) Do you drink caffeinated beverages?

( ) Yes

( ) No

9) What type of caffeinated do you normally drink?

( ) Energy Drinks (i.e., Red Bull, Monster, etc.)

( ) Coffee/ Tea

( ) Energy Boosters (i.e., 5 Hour Energy)

( ) Soda

( ) Other - Write In: _____

10) I don't think I could do as well in school without consuming caffeine.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

11) I often feel I need caffeine to help me concentrate in class.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

12) I often feel I do not have enough energy to complete my school work.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

13) I often procrastinate when it comes to school work.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

---

14) I drink the most caffeine during this time of the day.

( ) Morning

( ) Afternoon

( ) Evening

( ) Night

15) How many caffeinated beverages do you drink a day?

_____

16) I feel I need caffeine to get me through my day.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

17) I often choose beverages with high amounts of caffeine.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

18) I drink more caffeine when I have a lot of school work due.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

19) I often drink caffeine when doing homework.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

20) I feel I could accurately accomplish school work without caffeine.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

21) I feel caffeine helps me with.

[ ] Sustained energy

[ ] Better mood

[ ] No difference

[ ] Other - Write In: _____

22) I struggle more with school when I do not drink caffeine.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

23) I drink the most caffeine during this time of the semester.

[ ] Beginning

[ ] Middle (Mid-Terms)

[ ] End (Finals)

24) I feel that I have an addiction to caffeine.

( ) Strongly Agree ( ) Agree ( ) Neutral ( ) Disagree ( ) Strongly Disagree

---

THANK YOU!

Thank you for your interest in my study. This study is being conducted in order to tell if there is any correlation between a student's academic performance and their caffeine consumption.

I hypothesized that there would be a negative correlation between academic performance and caffeine consumption. Meaning, that as caffeine consumption increases, academic performance will decrease.

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 contact me now or in the future. I will potentially present this project at The Third Annual Student Research Symposium and Exposition (SRSE) that Lindenwood University is hosting on April 20, 2016. The results of the study will also be available in the Advanced Research Method's class journal (www.mnlresearch.weebly.com) Dr. Michiko Nohara-LeClair will publish at the end of the Spring 2016 semester. My contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

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The Ability to Detect Lies and Personality

David De la Cruz[6]

To detect if someone else is being deceptive is an important ability that all humans possess. However, not much is known about the factors that influence this ability. In previous studies, there have not been any results supporting a relationship among lie detection and sex, occupation, or age. However, I hypothesize that there might be a personality factor involved. In this study, individuals' ability to detect lies is correlated with their level of extraversion/introversion in order to discover personality differences in people's ability to detect deception accurately. I hypothesized that introverted individuals will be better at detecting deception because they do not spend as much time focusing on verbal communication, but rather focus more on nonverbal communication. As described in this research paper, nonverbal communication is always honest, and therefore maybe a reliable source of information at the time of detecting deception. The results revealed that introverted individuals are slightly better at detecting lies than extroverted individuals, however, the results were not statistically significant. Unconscious and conscious lie detection could affect how people detect lies, but there are also other factors that affect people's ability to detect deception, such as their personality.

Lying is a part of being human. Since an early age, individuals acquire the ability to create stories that may not be completely true or true at all. From innocent white lies to great deceptions, people can lie because they can consciously control the area of the brain responsible for verbal communication. However, individuals cannot control their nonverbal communication, because it occurs in the limbic system of the brain, which is the part of the brain that reacts to the

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world subconsciously and instantaneously (Navarro & Karlins, 2008). People are unable to control their limbic system, and therefore, they cannot control those reflexive, emotional responses that occur while they interact with other individuals. These involuntary movements make it possible for humans to detect deception. However, what factors makes an individual good at catching liars?

Even if liars show deception, not all individuals can differentiate lies from the truth. Even for trained individuals, like law enforcement agents, detecting lies is a difficult task (Ekman, & O'sullivan, 1991). According to research data, the rates of detecting deception are only slightly greater than chance (Klein & Epley, 2015). However, all humans possess the ability to detect lies even at a subconscious level (Brinke, Stimson, & Carney, 2014). When people "feel" or have some kind of "instinct" others are lying, it may not be some mysterious and irrational feeling, but rather a signal from the mind or unconscious part of the brain that perceives something else. Brinke et al. (2014) test the human capacity for unconscious lie detection by allowing some participants time to consciously think about the veracity of the statement provided by the researcher, while other group of participants were required to immediately respond whether the statement was true or false. The group of participants who were required to quickly respond whether the statements were truthful performed slightly better than the group of participants who had time to think about the veracity of the statement (Brinke et al, 2014). Even if people do not

consciously perceive everything that their eyes see, human eyes can notice micro nonverbal expressions, which their brain receives and processes. Micro expressions are nonverbal signals that can occur in less than a second, which make it hard for untrained individuals to notice those changes (Navarro & Karlins, 2008). Maybe is not humans' physical capabilities what allow unconscious lie detection, but rather the mind perceiving these signals.

There is not a specific nonverbal signal for the behavior of lying (Vrij, Granhag, & Porter, 2010). To detect lies, trained professionals make an educated guess by observing the combination of an individual's verbal communication with possible negative nonverbal expressions, like discomfort (Navarro & Karlins, 2008). Even though it is difficult to know whether or not a person is lying, some individuals are more accurate in catching the liar through nonverbal feedback and verbal cues, which allow the individual to better, understand facial expressions (Ekman, & O'sullivan, 1991). There has not been any conclusive evidence that supports any relationship among the ability to detect lies, and other variables such as age, sex, or job experience (Ekman, & O'sullivan, 1991). Nonetheless, it is possible that the individual differences in the ability to read body language and detect lies are in an individual's personality traits, rather than in the job experience, age, or sex.

According to the "big five" model of personality structure, extraversion is a trait commonly seen in individuals who are assertive, sociable, and have a tendency to seek

stimulation with others (Digman, 1990). In contrast, introversion is a personality trait commonly seen in people that do not exhibit extraverted characteristics to such extent, or at all (Digman, 1990). For example, as individuals with an extraverted personality enjoy sociable settings with many people, an individual with introvert characteristics prefer a sociable setting with fewer people. Even if extraverted people are more involved with other individuals in social settings, which give them more opportunities to practice their deceptive behavior and detection of lies in others, there is no evidence that individuals with extraverted traits are better at detecting lies than individuals with introverted traits (Aamodt & Custer, 2006). Participants in a study were asked to self-rate their own ability to detect deception; individuals with extraverted traits rated their ability as being better than average, as opposed to participants who displayed introverted traits and rated their own ability as being average or below average (Elaad & Reizer, 2015).

However, there is the view that extraverted individuals spend more time focusing on verbal communication, not on nonverbal communication in their social setting. Introverted people on the other hand, do not concentrate on verbal communication as much as extraverts (Digman, 1990). My hypothesis is that introverted people preference to "observe" the world allows them to notice more nonverbal cues, and therefore, make them better at distinguishing deception through nonverbal signals than extroverted individuals, who spend more time focus in verbal communication. To determine if the hypothesis of this study is correct, the relationship

between the participants' ability to detect lies will be correlated with their level of extraversion/introversion.

Method

Participants

The research was conducted on 50 participants, 40% of them were male, and 60% female. However, 10 individuals were omitted from the study because there was not sufficient data. Only the results of 40 participants were used to calculate the results and determine whether or not there is a correlation. All participants volunteered to take part in the online study and were not excluded by any means, except if they were less than 18 years old, the legal age of consent. Before starting the study, volunteers were asked to agree to participate in the study and stating they were 18 years old or more. The mean age of the participants was 22.4 years (SD = 2.2 years). Participants were recruited through Facebook, a popular online social media site; they were able to access the survey by clicking on the provided link. Participants received extra information about body language and lie detection, if they were interest in the topic.

Materials

The informed consent statement at the beginning of my online survey informed the participants about the research and stated that the participant needed to be 18 years old or older in order to participate in the study (See Appendix A). The personality survey was constructed in

Qualtrics by the research from questions found in different Big Five personality inventories online (IPIP Big-Five Factor makers; Personality Type Assessments; Self-Test Personality). Only questions pertaining extraversion/introversion were used. When choosing questions simplicity was taken into consideration, in order to avoid participants from misunderstanding the question. There were only 20 questions chosen from all the pool of questions in order to avoid the participant to lose interest in the study (see Appendix B).

The videos employed in this research were developed by Klein and Epley (2015). There were 10 videos, lasting between 20 to 60 s. In each video there is a different individual previously told to answer the following question with a truthful or deceptive response (Epley, Klein, Zhou, DelViscio, & Storoz, 2015). The individuals did not know the question before hand, which did not allowed them to create a lie or story in advance, and therefore, showing a more natural response. The individuals in the video are from different ethnic groups and they clearly show body language signals when answering the question. The videos can be seen online at (http://www.nytimes.com/interactive/2014/03/21/science/can-you-spot-the-liar.html). A five-questions demographic survey was also created by the researcher to discover more about the participants. The demographic questions were based on common information including participants: gender, age, occupation or major, ethnicity, and self-rate of their ability to detect lies (see Appendix C). A thank you note for the participants and extra information about

detecting deception through nonverbal communication was also included in the survey (see Appendix D).

Procedure

Participants could complete the online survey in their own selected environment. After reading and agreeing to the consent statement the participants commenced the study. Participants were asked 20 multiple choice questions in order to measure their extraversion/introversion level. Each page contained five questions, which appeared in a random order. Participants were then instructed to watch 10 online videos that followed and decide if the individual in the video was responding with a lie or with the truth. The order of the videos was randomized in order to overcome practice and video order effect. After the participants watched the videos and responded to the question following each of the 10 videos, they answered five demographics questions. After finishing responding the demographic section, the participant received a thank you note and additional information.

Results

The extraversion/introversion personality test scores ranged from 20 (lowest) to 100 (highest). The participants were not considered fully extravert or introvert due to their results, but rather the extraversion/introversion level variable was considered a continuous variable. The lower the score, the more introverted the participant, the highest the score, the more extraverted

the participant. The number of extraverted and introverted participants in this study was almost equal. In average participants' score were only slightly more introvert or extrovert, with only a few participants' scores being extremely extravert or introvert (*M*= 59.21, *SD*= 9.12). Each correct answer after a video was worth 1 point, with the highest being 10 and the lowest 0, the participants' ability to detect lies was also a continuous variable (*M*= 6.23, *SD*= 1.56). According to the participants' self-rate of their ability to detect lies, it was interesting to find that most participants perceive their own ability to detect lies lower as it truly was (*M*= 5.45, *SD*= 2.69).

Using the Pearson's correlational analysis, the participants' level of extraversion/introversion was correlated with their number of correct answers in the video section. The results did not show any statistically significant correlation, however, there was a small negative correlation suggesting that the more introverted an individual is, the better their lie detection score, $r = -0.228$, $p < 0.79$. Multiple correlational tests were conducted with the acquired data in order to confirm Ekman and O'sullivan (1991) results that did not support any relationship among the ability to detect deception, and other variables. Participants' level of extraversion/introversion was correlated with their age, sex, and ethnicity, in order to discover if any of the demographic factors may be related to the ability to detect deception. As the results from Ekman and O'sullivan (1991), the results from this study did not showed any correlation between the ability to detect lies and other variables, such as age, sex, and ethnicity.

Discussion

Even if the research hypothesis results was not statistically significant and could not be supported with the acquired data, the results suggested that people with introverted personality traits are slightly better at reading body language and detecting deception than individuals with extraverted personality traits. More data should be collected in order to test the hypothesis that the level of introversion/extraversion affects an individual ability to detect lies. In order to fully measure people's ability to detect lies, the participants should be instructed to avoid guessing if the response seen in the video is the truth or a lie. When assessing the videos, participants could use unconscious intuition or conscious thinking to detect lies (Albrechtsen, Meissner, & Susa, 2009). Intuition is a factor that could affect the results, as seen in the study conducted by Brinke et al. (2014) participants who used intuition to detect deception were slightly better than participants who used cognitive processes. In order to obtain more accurate results, the participants should only use one approach to detect lies. Participants consciously detecting deceptive behavior have time to use previous knowledge obtain from other sources, while participants' unconsciously detecting lies rely on their intuition. By timing participants, allowing them to watch the videos only once, and forcing them to detect deception fast, unconscious lie detection could be measured. To measure conscious lie detection, the participants should be advised to watch the video more than once, and take their time before deciding of the veracity of

the statement. Whether personality factors are related to participants' conscious or unconscious lie detection abilities is unknown.

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Appendix A

Informed Consent form

Thank you for your interest in this research project. If you agree to participate, you will be asked to respond some questions about your personality and demographics. You will also view some brief 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.

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 to 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.

Agree Disagree

Are you 18 years or older?

Yes No

Appendix B

In conversations or at meetings, I plan what I'm going to say before speaking.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I present myself in ways that are very different from who I really am.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

When I go out socially, it's usually with a large group of friends.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I eagerly share my thoughts and feelings with other people.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I enjoy spending time alone.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I tend to be reserved when dealing with people I don't know very well.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I get uneasy when pressed to come up with a response to something or someone on the spot.

- Most of the time

- Often
- Sometimes
- Rarely
- Almost never

I feel uneasy in situations where I am expected to display physical affection.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I am very talkative.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

Before making a decision, I need a lot of time to think things through.

- Completely true
- Mostly true

- Somewhat true
- Mostly false
- Completely false

When conversing with someone, I reveal personal facts about myself.

- Most of the time
- Often
- Sometimes
- Rarely
- Almost never

I enjoy small-talk.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

I'm a private person.

- Completely true
- Mostly true
- Somewhat true

- Mostly false
- Completely false

I feel comfortable talking to strangers.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

I enjoy meeting new people.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

It’s important to me to have an active social life.

- Completely true
- Mostly true
- Somewhat true
- Mostly false

- Completely false

I tend to think “out loud”.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

I consider myself an outgoing person.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

I like to attend gatherings where I can meet new people.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

When I'm really sad or down, I seek the company of others.

- Completely true
- Mostly true
- Somewhat true
- Mostly false
- Completely false

Please watch the following videos and answer the question:
Is the person in the video lying or telling the truth?

Appendix C

What is your gender?

- Male
- Female

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?

Poor			Average						Excellent	
0	1	2	3	4	5	6	7	8	9	10

What is your ethnicity? (Check all that apply)

- White/Caucasian
- African American
- Hispanic
- Asian
- Native American
- Other

Appendix D

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 whether there is a relationship between the ability to read body language and an individual's level of introversion/extroversion.

If you are interested to know more about body language, clicking the link below will take you to a webpage with some of the most common nonverbal signs.
http://www.enkivillage.com/body-language-examples.html
If you have any questions or concerns about this survey feel free to contact:

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College Intimate Relationships and Parents' Marital Status

Jessica Baynes[7]

This study looks specifically at college students' intimate relationships and if there are correlations regarding their parents' marital status and/or perceived happiness of their parents' marriage and the participants' intimate relationships. The findings reported in the literature are mixed as to whether parents' marital status is an indicator for their offspring's intimate relationships. I strictly focused on the participants views on their relationships with their parents (if it is negative or positive), if the participants' parents are perceived to be happy in their relationships, and if they feel successful about their intimate relationships. Originally, I felt there was a discrepancy in relationship length and parents' marital status. I thought children of divorced parents' would have shorter relationships. I asked questions concerning students' intimate relationship length. The results of this study showed there is a statistically significant correlation between parents' marital status and peoples' relationship with their father or father figure. Furthermore, I found statistically different responses between participants whose parents are divorced and those whose parents are not in their views on future marriage, the effort both parents make to be involved in the participants' life, and the need to constantly be in a relationship.

I have always been interested in the correlation between parents' relationship attitudes and their children's beliefs about relationships. In the present study, I am looking to see if there is a correlation between the parents' intimate relationship status, the parent child relationship, and the child's relationship status to see if there is any statistically significant relationship between the variables. Studies that have been conducted concerning parental divorce have mixed

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results. There are so many relationship attributes and personality differences that affect each result; it is hard to come to a blanket result.

For instance, Knox (2004) stated that strong parental relationships whether divorced or re-married are crucial for success in the children. He researched not only the relationship between parent relationships, but also in how parent's choices such as withholding visitation from a parent and how the child might react. If children are deprived of seeing a parent, they have more difficulties with connecting to others, peers especially. This concept is coined as parental alienation syndrome which was developed by (Bone & Walsh 1999).

Other researchers focused on if the parents were more invested in their intimate relationships. The children reported having a more negative relationship with their parent if the parent put more effort into their new relationships, (Orbuch, Thornton, & Cancio, 2000). To be more in-depth about this concept, some researchers I found talked in detail about relationship attributes reported by college adults such as mutual love, kindness, and commitment. Usually, college women with poor relationships with their father's report having a stressful intimate relationship, (Jacquet & Surra 2001; Nielsen, 2007).

A study in New Orleans looked into many different categories such as personality attributes, specifically, trust, sexual behaviors and neediness, recognition of divorce as an option, cohabitation, and gender to how it relates to healthy adult relationships. In the group of adults

with divorced parents, they were more likely to experience hardship in intimate relationships due mainly to fear of abandonment, (Christensen & Brooks, 2001). Men and Women who experience fear of abandonment do not attach in a healthy way and may be seen as clingy or needy. It is important to my research, that this study looked into the early intimate relationships of those with divorced parents and found these men and women lost their virginity at much younger ages than those with parents who are intact, (Christensen & Brooks 2001).

Some sources report most children of divorced parents are likely to report lower satisfaction in marriage and more likely to end up divorced within three to five years of marriage (Ottaway, 2008; Whitton, Rhoades, Stanley, & Markman 2010;). As according to one source, divorce is a cycle that families can get stuck in if they do not seek professional help to deal with the uneasy feelings of abandonment and distrust, (Amato & DeBoer 2001).

Parenting styles are also an important factor for their children's view of healthy relationships. Parents that convey a healthy co-parenting style has positive effects on the children's intimate relationships later on. (Amato & Booth 2001). Long-term effects are hard to determine based solely on parents' marital status. Other major factors include personality traits, personal confidence, and education level (Christensen & Brooks 2001).

Since my study does not have a set hypothesis, I am looking for different correlations between satisfaction with the participants themselves and how that may connect to their intimate

relationships. I also am looking for correlations including relationships with participants and their parents and the parents' intimate relationships to see if there is significance there as well. This study was conducted with an online survey through the website SurveyGizmo. The survey has different parts to it depending on how the participant answers the questions regarding their parents' marital status.

Method

Participants

I had 73 participants to begin with. 11 participants were omitted for whatever reason. My participants were 23 male and 39 female participants. After getting rid of the incomplete data, I was left with 62 complete surveys. All of the participants were able to voluntarily take this survey through my Facebook page. The URL to the survey was posted on my Facebook page so that people who could view my posts. I also posted the survey on the LU marketplace. This is where students specific to Lindenwood University are able to share information about material items as well as conceptual items like ideas about classes or help for a math test. The ages ranged from 18-25 and all of my participants were college students.

Materials and Procedure

The participants took an online survey with 27 content questions and 1 demographic question (see Appendix A). I created the survey using an online survey platform SurveyGizmo. My demographic question asks about gender identity. The content questions differed depending

on how the participants answered the questions about their parents' marital status. If the participants' parents were divorced, the survey would shift them to a different set of questions than for the participants who indicated their parents were married. The content questions were a variety of Likert scale, open-ended, and closed ended questions. This survey could take anywhere from 15-20 min. After collecting all of my data, I coded my answers numerically to conduct statistical analysis.

Results

I had 57.1% participants with married parents and 32.1% with divorced parents. I did add a third category, which 10.7% participants reported other. The mean age of entering into intimate relationships was 15.8 years old. The different analysis I conducted were frequencies for my descriptive statistics like my demographic question, and my questions pertaining to the individual categories like married vs. divorced parents' questions. I performed Chi-square analysis to compare the married vs. divorced parents on questions about how they feel about relationships and closeness with their parents. There was a significant difference between parents' marital status and relationship with their father, χ^2 (1) = 9.212, p = .002. Do you want to get married eventually as compared to parents' marital status, χ^2 (1) = 5.504, p = .019. The last statistically significant finding was if both parents make an effort to be in the child's life compared with parents' marital status χ^2 (1) = 7.907 p = .005.

Discussion

I expected to have significant findings from the different marital status groups. I was surprised there were no significant findings for intimate relationship differences. The children of different marital groups according to past research would view intimate relationships differently. My sample size was relatively small. If I were to further this research, I would look at college and non-college young adults to compare not only marital status of their parents' and sex, but also education level.

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Appendix A

Jessica Baynes: College Students Intimate Relationships

INFORMED CONSENT

Page exit logic: Page Logic**IF: THEN:** Disqualify and display: "Thank you for your time, this survey is for college students ages 18-25. "

Page exit logic: Page Logic**IF:** QUESTION NOT FOUND! is one of the following answers [NO OPTIONS SET] **THEN:** Disqualify and display: "Thank you for your time and patience, this survey is for college aged students from ages 18-25."

Page exit logic: Page Logic**IF:** QUESTION NOT FOUND! is one of the following answers [NO OPTIONS SET] **THEN:** Disqualify and display: "Thank you for your time "

1. You are invited to participate in a research study conducted by Jessica Baynes for a class project in the department of Psychology at Lindenwood University, under the guidance of Dr. Michiko Nohara-LeClair. The purpose of this research is to see if there is a relationship between parents' marital status of college students and the intimate relationships students have.

2. Your participation will involve completing this anonymous online survey. The amount of time involved in your participation will be approximately 15-20 minutes. Approximately 99 participants will be involved in this research.

3. Taking this survey could result in some distressing feelings, like guilt, confusion, frustration, or sadness for some participants, but these feelings are not expected to exceed what one experiences in everyday life. If you find taking the survey causes you significant discomfort and you would like assistance, please stop participating and contact the Lindenwood Student Counseling and Resource Center at 636-949-4889. If you are not a Lindenwood student, contact the course instructor, Dr. Nohara-LeClair, for community counseling referrals at 636-949-4317.

4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about intimate relationships in college and their parents' marital status which may help society.

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.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, (Jessica Baynes, 636-293-0641) or the Supervising Faculty, Dr. Michiko Nohara-LeClair, at 636-949-4317 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.

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.

*1) If you are not between the ages of 18-25 or do not wish to participate in this survey please select the "I choose not to participate" button. **

( ) I choose to participate.

( ) I choose not to participate.

RELATIONSHIP QUESTIONS

*2) Are you currently enrolled in college?**

( ) Yes

( ) No

Logic: Show/hide trigger exists.

3) What is your biological parents' marital status?

( ) Married

( ) Divorced

( ) Single

( ) Widowed

( ) Other

4) Do you feel you have a close relationship with your mother or mother figure?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Married")

5) If your biological parents are married, are they happy in their relationship?

( ) Yes

( ) No

( ) N/A

6) Do you feel you have a close relationship with your father or father figure?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Married")

7) If your biological parents are married, do you want a relationship like theirs?

( ) Yes

( ) Maybe

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

8) If your parents have divorced, has your mother re-married?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

9) If your parents are divorced, is your father re-married?

( ) Yes

( ) No

Logic: Show/hide trigger exists.

10) Are you currently involved in an intimate relationship of 6 months or longer?

( ) Yes

( ) No

Logic: Hidden unless: Question "Are you currently involved in an intimate relationship of 6 months or longer?" #10 is one of the following answers ("Yes")

11) How often do you feel the need to consistently be in long term relationships (defined as 6 months or longer)?

( ) Never

( ) Rarely

( ) Sometimes

( ) Frequently

( ) Always

12) Do you fear being without a significant other?

( ) Yes

( ) No

Logic: Hidden unless: Question "Are you currently involved in an intimate relationship of 6 months or longer?" #10 is one of the following answers ("No")

13) If you are not in a committed relationship at the moment, how do you feel about not be in a committed relationship?

( ) I'm grateful to be without the commitment

( ) I could be interested in a relationship but I'm fine if that doesn't happen soon

( ) I really wish I was in a committed relationship

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Married")

14) Do your parents argue constantly?

( ) Yes

( ) No

15) Do both of your parents' make an effort to be in your life if they are able to?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

16) If your biological parents are divorced, how many years have your parents been divorced?

_____

17) Do you want to get married eventually?

( ) Yes

( ) No

18) Are you interested in having children someday?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

19) If your parents are divorced, how do you feel about it?

_____

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

20) If you have a step-mom do you have a communicative relationship with her?

( ) Yes

( ) No

Logic: Hidden unless: Question "Are you currently involved in an intimate relationship of 6 months or longer?" #10 is one of the following answers ("Yes")

21) If you are in a committed relationship of 6 months or longer, how satisfied do you feel with the relationship?

( ) Satisfied

( ) Somewhat Satisfied

( ) Not Satisfied

( ) N/A

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

22) If you have a step-dad do you have a communicative relationship with him?

( ) Yes

( ) No

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

23) Do you feel your parents' divorce has an effect on your intimate relationships?

( ) Yes

( ) Maybe

( ) No

24) Have you been in an intimate relationship?

( ) Yes

( ) No

25) At what age did you first enter into an intimate relationship?

_____

Logic: Hidden unless: Question "What is your biological parents' marital status?" #3 is one of the following answers ("Divorced")

26) How often do your biological parents fight?

( ) Never

( ) Rarely

( ) Sometimes

( ) Frequently

( ) Always

27) Do you prefer to be in committed relationships of 6 months or longer, or shorter-term relationships?

( ) Committed Relationships

( ) Shorter term relationships

( ) No Relationships

DEMOGRAPHIC QUESTIONS

28) What is your gender identity?

( ) Male

( ) Female

( ) Transgender

( ) Other - please specify: _____

THANK YOU!

Thank you for taking time out of your day to complete this survey constructed for my Advanced Research Methods class at Lindenwood University. Research has mixed findings about whether there is a connection between young adults' relationship quality and their parents' marital status. There is no hypothesis for my research; I am simply surveying students to see if there is an connection.

If you found that taking the survey caused you emotional distress and you would like assistance, please contact the Lindenwood Student Counseling and Resource Center at 636-949-4889. If you are not a Lindenwood student, contact the course instructor, Dr. Nohara-LeClair, for community counseling referrals at 636-949-4317.

If you would like to see the results of my survey after May 13, 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 Relationship between Emotional Well-being and a Lack of Closure with Ex-partners

Nolan R. Hendrickson and Karolina Štětinová[8]

Breakups and troubles with a past romantic partner have long been known to be a major source of emotional distress in people. However, what is not commonly known are the exact reasons for the vast variability in rates of emotional recovery from a breakup and the effects an ex-partner may have on an individual's well-being post-breakup. Previous research has indicated that the strongest predictors of decline in well-being from a breakup are due to having personal investments with the other person and length of time since the breakup occurred. The current research used online surveys to investigate correlations between scores on the Warwick-Edinburgh Mental Well-being Scale and various Likert scale items related to uncertainty and a feelings of having lack of closure with an ex-partner. Results showed that declines in well-being after a breakup that occurred within the last year were related to having feelings of uncertainty about the decision to breakup (for those that initiated the breakup), and having uncertainty about why the breakup occurred (for those that did not initiate the breakup) were not statistically significant. Larger sample sizes are needed to make conclusions. Frequency of having thought about an ex-partner was moderately correlated with a decline in well-being. Additionally, uncertainty related to the decision to breakup was highly correlated with having thoughts about an ex-partner.

Keywords: breakups, uncertainty, Warwick-Edinburgh Mental Well-being Scale, closure

When it comes to a breakup between a person and his or her romantic partner, there has yet to be a consistent explanation for why so many people experience a decline in their well-being. It is a consistent finding that after a breakup with a romantic partner, there usually follows

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a decline in well-being, which can sometimes lead to significant life adjustment problems (Rhoades, Kamp Dush, Atkins, Stanley, & Markman, 2011; Simpson, 1987; Sweeper & Halford, 2006). In one of the largest studies done on breakups and well-being, researchers found that 43% of people who had recently broken up experienced a decline in their well-being (Rhoades et al., 2011). The overarching theme of the current study is to shed light on the following questions: what factors associated with a breakup can predict a decline in well-being, and, why do some people have a hard time getting over a breakup while others do not? Coming closer to answering these questions is important because it may provide insight as to what people can do following the termination of a relationship to make themselves feel better.

Previous researchers who attempted to find correlations between factors associated with a breakup that relate to well-being have led to the development of many different theories. Cognitive theory holds that our thoughts directly influence our feelings, and so upon termination of a romantic relationship, it is our thoughts about our ex-partners that can strongly predict well-being. Brenner and Vogel (2015) tested thought content by examining thoughts of rumination about their ex-partner. They defined positive content valence as having thoughts that tend to evoke positive emotion, such as thinking about the good memories, while negative content valence as related to thinking about the times your ex emotionally hurt you. The results showed that having a higher positive content valence (focusing on positive aspects of the relationship)

was actually associated more strongly with difficulty recovering from a breakup than having negative content valence about the relationship (Brenner & Vogel, 2015). While this was only correlational research, it still puts into question the merits of cognitive theory as a valid explanation for the distress that follows a breakup.

Control theories have also been proposed to explain the wide variability of distress people can experience after a breakup. Control-based theories of post-relationship distress hold that people who perceive control in their ability to manage stress and negative emotion will be better off than those who do not perceive such control. One study provided support for the control theory and showed that those who perceived more control over their ability to alleviate negative moods predicted a lower rate of depression immediately following a breakup (Mearns, 1991). Mearns (1991) did not find a correlation between perceived control (as measured by the negative mood regulation scale) and long-term rates of depression.

Research has also been done on attachment styles as they relate to breakup distress. Attachment theory holds that people have a certain tendency toward how they handle their relationships with other people. In the event of a breakup, attachment theory would suggest that people with differing attachment styles will exhibit unique coping behaviors and experience different levels of distress (Davis, Shaver, & Vernon, 2003). Among the types of adult attachment styles that are thought to exist, those who exhibit an anxious-preoccupied insecure

attachment style would be most likely to react adversely to the termination of a relationship due to their tendency to self-blame and seek high levels of intimacy; meanwhile, those who have a secure attachment style would be more likely to deal with the termination of a relationship successfully. Evidence in support of the attachment theory from Davis et al. (2003) showed that insecurely attached individuals were more likely to resort to the use of drugs and alcohol to cope with breakup distress. Additionally, their research revealed that attachment-related anxiety (a trait by which people have a tendency to worry about the responsiveness of their partners) was correlated with having more intense emotional and physical distress reactions toward a breakup (Davis et al., 2003).

Finally, commitment theories hold the idea that the more invested a person is in his or her partner, such as living together, having children, or working together, the more intense the feelings will be after a breakup. Consistent with commitment theories, Rhoades et al. (2011) found evidence that suggests that plans for marriage and cohabitation were predictors of emotional distress in a breakup; however, having children was not. Despite these results, as Rhoades et al. (2011) point out, the effect size for each factor was marginally small.

Research designed to find specific factors related to people and their ex-romantic partners which would predict relationship distress provided a mixture of findings. Numerous sources have supported the finding that length of time since the breakup occurred was inversely correlated

with a rise in well-being, implying that time is likely to be the strongest predictor of well-being post-breakup (Rhoades et al., 2011; Simpson, 1987). In a large correlational study, Simpson (1987) found that 3 out of his 10 factors predicted emotional distress to a breakup: 1) closeness to the partner, 2) duration of relationship, and 3) ease of finding another partner. Simpson (1987) concluded that people who did not think they would easily be able to find a desirable replacement for their ex-partner experienced more distress than those who thought they might be able to do so. Not surprisingly, Simpson (1987) also found that these same factors predicted relationship stability as well. Contrary to these logical findings, Rhoades et al. (2011) found some specific factors that were not associated in any way with breakup distress that one might intuitively think. The quality of the relationship, desire to end the relationship, continued contact after the relationship terminated, and dating someone new after the breakup each did not have any significant correlation to breakup distress (Rhoades et al., 2011).

Until recently, there has been little to no research done on examining the effects of closure in a relationship and feelings of uncertainty of getting back together with an ex-partner as it relates to psychological well-being. The power of having feelings of uncertainty has been shown in studies, but has not as of yet been related to relationships. In one study, researchers found that controlling for the levels of uncertainty of what would happen to characters in a movie was enough to significantly affect the viewer's emotional reactions to events shown in the film

(Bar-Anan, Wilson, & Gilbert, 2009). Inspired by these findings, we were curious to see if the emotional distress that follows a breakup could be amplified or related in any way to having feelings of uncertainty about why a significant other broke up with them, having feelings that they might still get back together with their ex-partner, or uncertainty as to whether or not they made the correct decision to break up.

Furthermore, the rationale behind this study comes from the theoretical idea that it can be difficult for people to live their life genuinely and with full enjoyment if they have lingering uncertainties about what to do about an ex-partner. In other words, if a person has unresolved conflicts with an ex-partner, his or her subconscious thoughts about getting back together with an ex-partner may, in theory, be influencing his or her ability to live freely and whole-heartedly. Catharsis, or an alleviation of psychological distress, has often been described as a reduction of uncertainty within a person's life toward an interpersonal relationship (Guerin, 2001). If unresolved tensions and uncertainty toward an ex-partner can be related to catharsis, then it would be expected that those who still have tensions and uncertainty would be less psychologically well than those who have come to terms with their past relationships.

It is also worth mentioning, that measures of well-being have often been put under scrutiny for their validity as a measure. Often times, scores on well-being measures get used as a benchmark for what types of behaviors should be avoided, without good reasoning. Ryff (1989)

points out in one of her studies that various elements of well-being indexes, such as measures of positive functioning, are not consistent with each other, thus questioning what well-being is actually measuring.

In order to shed light on some of these concepts, we devised a correlational study to see if we could find a relationship between a person's psychological well-being during the past two weeks and various factors that attempt to measure feelings of a lack of closure toward a former romantic partner. Our research does not focus specifically on breakups, but rather attempts to isolate a participants' feelings about a person who they did experience a breakup with in the past. To measure feelings of a lack of closure, surveys asked participants questions about how they currently feel toward one of their ex partners. Our study separated people into two main groups: those who initiated the breakup, and those who did not initiate the breakup. A lack of closure for those who did initiate the breakup was measured by their subjective feelings of uncertainty about their decision to break up. For those who did not initiate the breakup, a lack of closure was measured by feelings of not being sure why the other person initiated the breakup as well as their desire to try and work out things with their ex-partner.

The broad goal of the research results is to find factors related to a breakup that can predict well-being. For our study, we hypothesized the following: 1) For people who initiated their breakup, having feelings of uncertainty about their decision to breakup with their ex-partner

will be associated with a lower score on the well-being measure, 2) For people who did not initiate their breakup, having feelings of being unsure about why the breakup occurred will be associated with a lower score on the well-being measure, 3) Higher amounts of time spent thinking about an ex-partner will be associated with a lower well-being score, 4) Higher amounts of time spent thinking about an ex-partner will be moderately associated with both feelings of uncertainty about their decision to break up (for those who initiated the breakup) and feelings of being unsure why their breakup occurred (for those who did not initiate the breakup). All of these hypotheses share the idea that a person's well-being can be predicted by gauging the level of uncertainty they feel toward their past relationship. In addition to this, in relation to breakup distress, this study hopes to reveal a stronger for well-being than predictor than length of time since breakup.

Method

Participants

In total, 87 participants took part in our research. Of the 87 participants, complete demographic information (both sex and age) could not be gathered for 14 participants. This was due to both participant failure to report and methodological flaws. Among the 75 participants for whom sex demographic information was obtained, there were 55 women and 20 men. Among

the 73 participants for whom ages data was obtained, the ages ranged from 18 to 51 years (M = 21, SD = 4.45).

There were two methods of participant recruitment: the Lindenwood Participant Pool (LPP) and Facebook social media. A portion of our sample of participants came from the LPP, which is an institutional program for ethical participant recruitment. Participants from the LPP included only undergraduate university students from selected general education and entry-level classes that participate with the research program. Both native and international students can be part of the LPP program. Recruitment for participants from the LPP occurred through an advertisement of our study through the Sona Systems website, which provided a direct link to the online study. The remaining portion of our sample consisted of users of Facebook website who voluntarily decided to participate in the study. Recruitment for participants through Facebook social media occurred by posting statuses on the researcher's private Facebook pages with direct links to the online study. The participants recruited through Facebook social media, while anonymous, were most likely to be college-aged adults and people who personally knew one of the researchers. Additionally, the participants that were recruited through Facebook may include a diverse sample of either American or non-American people.

For members of the LPP, one extra credit point was offered for their respective classes as an incentive to participate in any research study conducted through the LPP. Participants who

were not recruited through LPP, but rather through the researchers' private Facebook pages were not offered any incentives for participating.

Materials and Procedure

The study was conducted as an online survey which was created through the SurveyGizmo website (see Appendix A). All participants were informed through the recruitment information that the survey would take roughly 10-15 min to complete. Also, since our study was in online form, the participants had the opportunity to take the survey at their own schedule and location. The survey was open to be taken at any time of the day.

The online survey was divided into three parts. After the participants became familiar with the conditions of the study and agreed to participate, which was confirmed by checking "Yes" at the end of the informed consent statement, they were presented the first part of the survey measuring emotional well-being. Part one consisted of 14 questions which were, with the permission of the authors, adopted from The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant et al., 2007). The WEMWBS measure was the preferred measure of well-being in our study for a few reasons. First, the WEMWBS is considerably shorter in length than other established well-being measures, making the study shorter and thus making our survey more likely to be taken by busy college students. Second, the WEMWBS focuses on measuring well-being as levels of happiness, productivity, and feelings of being loved, which is precisely

what we believe might be correlated in some way with having a lack of closure or uncertainty in a previous relationship. Similarly, the WEMWBS focuses only on how a person feels during the past two weeks, making the score more dynamic than other well-being measures that have scores that vary very little over the course of time, and thus it is more likely that we can find a correlation between well-being and feelings of a lack of closure or uncertainty toward a previous partner. Finally, the WEMWBS was chosen because it is a validated and reliable measure that has been used in previous research, which made it easier for us to make comparisons from our data to that of other research that featured the WEMWBS. Each question on the well-being part of our survey appeared in the form of a Likert scale ranging from 1 to 5 (1 being "None of the time" and 5 being "All of the time"). It is also important to mention that the well-being measure was purposefully placed before the part concerning an ex-partner, because we did not want thoughts of an ex to influence the scores on the well-being measure.

Part two was a set of questions developed by the researchers which consisted of 11 questions focusing on the participants' subjective feelings toward one of their past relationships. The relationship survey included seven Likert scale questions with the range from 1 to 5, three "Choose the best option" questions, and one "Fill-the-blank" question. The third and final part of the survey consisted of two demographic questions asking about the participants' sex and age.

Scoring of the participants' responses to the WEMWBS was done according to the WEMWBS scoring key (see Appendix B) (Stewart-Brown & Janmohamed, 2008). Statistical analysis of the collected data was done by using MiniTab 17 software.

Results

Data Management

Well-being measure. All participants who did not complete the necessary components of the relationship survey or were missing at least two scores on the well-being measure were excluded from analysis. For those participants who missed only one item on the well-being measure, a filler item was placed in order to get a reasonably accurate total well-being score so that the data could be used. The filler item was created by the average score amongst the remaining items.

Data Analyses

In order to see how variables related to an ex-partner predict well-being, we conducted a series of correlations on the 75 participants who met the criteria for having at least one ex-partner. For data analysis purposes, we separated the participants into two groups: 1) those who initiated the breakup, and 2) those who did not initiate breakup. However, some participants reported that their breakups were rather "mutual" or "unclear" instead of having a clear initiator. Of the 75 participants, 29 reported initiating their breakup, 30 reported the other person initiated

the breakup, 7 reported the breakup was mutual, and 9 reported the breakup initiator was unclear. To account for this and make sure all data was useable for running the statistics, for those who answered that their breakups were "mutual" were regarded as having taken part in the initiation of their breakup, and those who answered that the initiation of their breakup was "unclear" were counted as being part of the group who did not initiate the breakup. Justification for this classification is appropriate, because the main reason for the separation of groups was to see if having control over the breakup was an important factor as it may relate to well-being. Participants who reported that the initiator of their breakup was "unclear" as opposed to "mutual" were regarded as being less likely to have been a part of the decision to breakup, since the term unclear implies that there was little to no decision that was made in the first place.

In testing our original hypotheses, we wanted to run correlational analysis on the participants both with and without filtering for those who broke up in the last year. On one hand, we wanted to see if overall well-being was related to any variable specific to an ex-partner. On the other hand, by including data analyses that are filtered for people who broke up only within one year, we hoped that stronger correlations could help reveal possible variables that could be related to a decline in well-being following a breakup.

We conducted an initial test in order to see if well-being scores differed between people who have had an ex-partner before and those who have never had an ex-partner. An independent

two-samples *t*-test yielded no significant effect of having an ex-partner on well-being, $t(13) = -0.58$, $p = 0.574$.

Uncertainty and well-being. Hypothesis 1 predicted that for people who initiated (or contributed to the initiation of) their breakup, uncertainty about their decision to breakup would be associated with a lower well-being measure. A Spearman's rank correlation to test hypothesis 1 yielded a statistically non-significant negative correlation, $r(34) = -0.219$, $p = 0.2$. Filtering hypothesis 1 for breakups that happened only within the last year yielded a strong, but statistically non-significant negative correlation, $r(8) = -0.509$, $p = 0.133$.

Lack of closure and well-being. Hypothesis 2 predicted that for people who did not initiate their breakup, having an uncertainty about why their breakup occurred (lack of closure) would be linked with lower well-being scores. A Spearman's rank correlation to test hypothesis 2 yielded no correlation between closure and lower well-being scores, $r(37) = 0.003$, $p = 0.95$. Filtering hypothesis 2 for breakups that happened only within the last year also yielded no correlation, $r(19) = -0.021$, $p = 0.362$.

Time spent thinking about an ex-partner. Hypothesis 3 predicted that higher amounts of time spent thinking about an ex-partner will be related to a lower well-being score regardless of who initiated the breakup. A Spearman's rank correlation was consistent with hypothesis 3, yielding a weak, statistically significant, negative correlation, $r(73) = -0.285$, $p = 0.013$. Further

filtering for only breakups that happened within the last year yielded a moderate and statistically significant moderately strong negative correlation, $r(29) = -0.429$, $p = 0.016$.

Hypothesis 4 predicted that for those who initiated the breakup, uncertainty about their decision about breaking up with their ex-partners (indecisiveness) would be moderately correlated with amount of time spent thinking about their ex-partner. A Spearman's rank correlation exceeded the hypothesized expectations and found a very strong correlation between indecisiveness and time spent thinking about an ex-partner, $r(34) = 0.712$, $p < 0.001$. Filtering even further for breakups that occurred only within the last year yielded a similar relationship, although the sample size was much smaller, $r(8) = 0.661$, $p = 0.03$. However, a Pearson's product-moment correlation comparing time spent thinking about an ex-partner (filtered for 12 months or less) to time since the breakup did not yield as strong of a relationship, $r(8) = 0.361$, $p = 0.306$. Admittedly, for both of these samples that were filtered, a sample size of 10 participants is not enough to accurately claim whether indecisiveness or time since the breakup is more strongly related to how often people think about their ex-partners.

In a similar nature, hypothesis 4 also predicted that uncertainty on behalf of the people who did not initiate the breakup in the form of not being clear on reasons for the breakup (lack of closure) would also be associated with time spent thinking about an ex-partner. A Spearman's rank correlation failed to support this hypothesis and showed a weak, statistically non-significant

correlation, $r(37) = 0.238$, $p = 0.145$. Even after a filter for breakups within the last year, the results were still statistically non-significant, $r(19) = 0.264$, $p = 0.248$.

Additional analyses. In addition to our original four hypotheses, we were also interested in finding out which factor related to a breakup would best predict well-being. To do so, we ran multiple Spearman's rank correlations to check how each variable related to well-being. For this particular test, we did a filter for people who broke up only within the last 12 months to limit the many other variables that could influence well-being over the course of time. The results revealed that for those who did not initiate their breakup, the degree to which they felt bothered by the fact that they are not in contact with their ex yielded the strongest relationship to well-being, $r(17) = -0.701$, $p = 0.001$. Other variables were far less strong (see Table 1). For those who did initiate their own breakup, however, the sample size was too small ($N = 10$) to make any definitive judgments.

We were also interested to see whether or not being currently in a relationship can have moderating effects on the variables that might predict well-being. Filtering our sample of 75 participants for only the people who were currently in a relationship revealed that the correlations between well-being and likelihood of getting back together with an ex-partner, time spent thinking about an ex-partner, having anxiety-provoking thoughts about an ex-partner, and the degree it bothers the individual that they are no longer in contact with their ex-partner all

revealed smaller correlations (see Table 2).

Discussion

The results from the analyses have shown that within the first year of a breakup, for those who did not initiate their breakup, well-being most strongly correlated with the degree that it bothers a person that they are not currently in contact with their ex-partner. For the people that did take part in initiating their breakup that occurred in the last year, having feelings of indecisiveness about their decision to breakup was also strongly correlated with a lower well-being (r = -0.509), but was unfortunately not significant due to a very small sample size. Thoughts of an ex-partner were correlated strongly with lower well-being scores for all participants in the study (r = -0.285), and thoughts of an ex-partner was very highly correlated with levels of indecisiveness about their decision to breakup for those who initiated their breakups in the last year (r = 0.712). Results of hypothesis 3 failed to support the idea that a lack of closure is related to lower well-being scores.

Before looking deeper into the specific findings, we should mention that participant dropouts and/or surveys that were not completely filled out did not appear to be related to a purposeful withholding of information in any way. Rather, we believe that due to the nature of the online format of the study and the apparent randomness by which questions were not answered (meaning that no single question was often avoided) the data are likely still reliable,

despite having an occasional gap in the responses.

In regards to the analyses that were conducted, a major setback for finding significant results in this study was due to a lack of participants. There were not many participants who broke up within the last 12 months– especially for the group that did not initiate the breakup. However, despite the low numbers, we still found that indecisiveness about the decision to breakup was a stronger predictor than length of time since breakup, leaving open the possibility that indecisiveness plays a major role in a decline in well-being post-breakup in many individuals. Furthermore, the finding that indecisiveness about the decision to breakup was a stronger predictor to well-being than length of time since the breakup might imply that the correlations due to indecisiveness on well-being were not confounded or otherwise explained by how long it has been since the breakup occurred.

We were surprised that hypothesis 2, a lack of closure being correlated with well-being, showed almost no correlation at all. What makes it particularly interesting, however, was that the lack of closure did not show the same type of correlations as did other variables that were on the surface very similar. The results might suggest that immediately following a breakup, the change in well-being that people experience is almost certainly not due to not knowing the reasons for the breakup alone.

The results from hypothesis 4 are mostly relevant from a theoretical point of view. From

one theoretical ideology that is held by various forms of psychotherapy (psychodynamic for one), it is indecisiveness and unresolved tensions that fuel thoughts. In particular, as outlined by Guerin (2011), unwanted thoughts are sometimes thought of as a subconscious motivation to reduce uncertainty toward an interpersonal relationship (including a past relationship) in order to gain clarity and direction in life.

Knowing that there is a very strong relationship ($r = 0.712$) between frequency of thoughts about ex-partner and the level of indecisiveness about the decision to breakup for those who did initiate their breakup could be relevant for people who are "haunted" by unwanted repetitive thoughts about their ex-partners. From this theoretical perspective, if causation were to exist between level of indecisiveness and frequency of thoughts about one's ex-partner, we may suggest that collapsing the uncertainty about the decision to breakup or embracing a conversation to reduce uncertainty with the other person may help reduce the amount of unwanted thoughts.

The finding that the strongest predictor of well-being for the population of people who did not initiate their breakup was "degree to which the person feels badly about not being in contact with their ex" is not so surprising. It could be the case that this question is synonymous to asking a question such as "the degree to which I miss my ex" or "degree to which I want to talk to my ex." All things considered, it is simply very likely that anyone post-breakup would answer a higher degree to such a question. For this reason, we do not believe this finding to be

very relevant to building an understanding of why people feel badly after a breakup or what people should do to help alleviate post-breakup distress. With that said however, there is still a reasonable possibility that the strong correlation could include the idea that people may want to talk with their ex-partners, but are not doing so for some reason. From this perspective, it could be said that not talking to the other person when one truly wants to is living "non-genuinely," and as the desire to talk to one's ex-partner goes up but one is not, one's well-being will go down.

It may not be all that surprising that people who were currently in a relationship showed smaller correlations between the research variables with well-being. This could imply that being in a relationship acts as a moderator to help people separate themselves from their ex-partner and help them cope. Also, as the data would suggest, being in a relationship is closely related to having lower levels of uncertainty, although it is only speculation as to whether or not having lower rates of uncertainty toward an ex-partner directly affects well-being. However, we believe that the most likely explanation for the difference is due to the significant differences in who initiated the breakup. Looking at the data revealed that the participants currently in a relationship were far more likely to have reported that they took part in the initiation of their breakup, while the participants who are single were far more likely to have reported that their ex-partner initiated the breakup. Evidence for this conclusion comes from the observation that, in general,

the correlations were smaller for those who initiated the breakup to the predictor variables of well-being when compared to the group of participants who did not initiate their breakup.

Taken altogether, the results from these differing analyses indicate that there are variables that are better predictors of emotional well-being than length of time since breakup. Future directions for research on the relationship between a lack of closure and uncertainty and emotional well-being should include a longitudinal design that can track for changes of levels of uncertainty throughout the course of time. If a longitudinal study were to be conducted, better insight could be gained regarding how closely indecisiveness or a lack of closure varies alongside well-being. Furthermore, if it could be shown that a sudden change in indecisiveness led to an immediate change in well-being, there would be good evidence to support the effects of uncertainty/lack of closure on well-being.

Finally, there is reason to believe that the WEMWBS measure of well-being was not the optimal choice. Out of curiosity, we ran a matrix of correlations to see if the individual items on the well-being measure correlated well with each other (similar to a test for inter-item reliability). Numerous items on the measure did not correlate at all with other items suggesting that at least for our population of participants, the measure may not have been a valid measure of well-being.

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Table 1

Initiator of Breakup and Correlations Between Well-being and Relationship Variables

	Initiated breakup		Did not initiate breakup	
Variables	Well-being	Well-being ≤ 12 months[e]	Well-being	Well-being ≤ 12 months
	(N = 36)	(N = 10)	(N = 39)	(N = 21)
Closure (Q#20)			-0.003	-0.210
Work it out (Q#21)			-0.295	-0.438*
Indecisive (Q#22)	-0.219	-0.509		
Contact (Q#23)	-0.011[a]	-0.273[b]	-0.431*[c]	-0.701*[d]
Likelihood (Q#24)	-0.036	-0.561	-0.253	-0.185
Time Thinking (Q #25)	-0.036	-0.388	-0.390*	-0.438*
Valence (Q#26)	-0.232	-0.542	-0.334*	-0.483*
Time (Q#27)	-0.067	0.169	0.293	0.426

Notes. Spearman's rank correlations were ran for all Likert scale measures when correlated with well-being scores. Time was the only variables that used a Pearson correlation when correlated with well-being scores.
[a](N = 29).
[b](N = 7).
[c](N = 36).
[d](N = 18).
[e]This indicates that the well-being scores were used only if the breakup happened within the last 12 months.

* $p < .05$

Table 2

Relationship Status and Correlations Between Well-being and Relationship Variables

	In relationship		Single	
Variables	Well-being (N = 43)	Well-being ≤ 12 months[e] (N = 11)	Well-being (N = 26)	Well-being ≤ 12 months (N = 13)
Contact (Q#23)	-0.222[a]	-0.499[b]	-0.407*[c]	-0.634*[d]
Likelihood (Q#24)	0.004	-0.347	-0.087	-0.063
Time Thinking (Q #25)	-0.126	-0.274	-0.281	-0.328
Valence (Q#26)	-0.239	-0.763*	-0.457*	-0.553*
Time (Q#27)	-0.036	0.043	0.118	0.247

Notes. Spearman's rank correlations were ran for all Likert scale measures when correlated with well-being scores. Time was the only variables that used a Pearson correlation when correlated with well-being scores.

[a](N = 39).

[b](N = 10).

[c](N = 22).

[d](N = 11).

[e]This indicates that the well-being scores were used only if the breakup happened within the last 12 months

* $p < .05$

Appendix A

The Online Survey from SurveyGizmo

The Connection between a Past Relationship and Emotional Well-being

INFORMED CONSENT STATEMENT

Page exit logic: Page Logic**IF:** Question "ELECTRONIC CONSENT: You verify that you have read the above information and agree to voluntarily participate in this study. *" #1 is one of the following answers ("Yes") **THEN:** Jump to page 2 - The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) Flag response as complete

Page exit logic: Page Logic**IF:** Question "ELECTRONIC CONSENT: You verify that you have read the above information and agree to voluntarily participate in this study. *" #1 is one of the following answers ("No") **THEN:** Disqualify and display: "Thank you for taking the time to carefully consider the information provided before making your decision."

You are invited to participate in a research study conducted by Nolan R. Hendrickson and Karolina Štětinová for a class project in the department of Psychology at Lindenwood University, under the guidance of Dr. Michiko Nohara-LeClair.

Please read the information below before deciding whether or not to participate.

I understand that I will be taking part in a research project that requires me to complete a survey consisting of two parts: 1) A measure that is aimed to gauge my emotional well-being during the past two weeks (The Warwick Edinburgh Mental Well-Being Scale), and 2) Questions regarding a past relationship of mine.

It should take me approximately 10-15 minutes to complete this survey.

If I am a member of Lindenwood University Participant Pool (LPP), I will receive one LPP bonus credit toward a LPP participating course of my choice by participating in any part of this study. I will also gain experience taking part in an on-line survey study and possibly gain some insight into how psychological research is conducted.

I am aware that I am free to skip any questions in the unlikely event that I feel uncomfortable answering any of the items on either the Warwick Edinburgh Mental Well-Being Scale or the part concerning ex-partners. I am aware that some of the questions are personal in nature and could evoke emotions that I may not feel comfortable with. I am also aware that if I feel distressed in any way because of the nature of the questions, I am free to contact the experimenters about any of my concerns. Also, if I am a Lindenwood University student, and I find that taking the survey causes me significant discomfort, and I would like assistance, I am welcome to stop participating and contact the Lindenwood Student Counseling and Resource Center at 636-949-4889.

After the survey is completed, I am aware that I will be given information regarding the purpose of the study and freedom to inquire about the results of the study once completed. I am also aware that my participation in this study is strictly voluntary, and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete

the study. I understand that my participation in the study is completely anonymous, and that the information obtained from my responses will be analyzed only as part of aggregate data. 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 researchers, whose contact information are provided at the end of this document. Finally, I verify that I am at least 18 years of age, and I am legally able to give consent.
(If you are a LPP student under the age of 18 years, unfortunately, you will not be able to take part in our survey. However, you will still receive bonus credit toward a LPP participating course of your choice for signing up for the study.)

For more information feel free to contact:

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ELECTRONIC CONSENT: *Please select your choice below.*

Clicking on the "Yes" button below indicates that:

- You have read the above information.
- You voluntarily agree to participate.
- You are at least 18 years of age.

1) ELECTRONIC CONSENT: You verify that you have read the above information and agree to voluntarily participate in this study. **
( ) Yes
( ) No

THE WARWICK-EDINBURGH MENTAL WELL-BEING SCALE (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks.

2) I've been feeling optimistic about the future

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

3) I've been feeling useful

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

4) I've been feeling relaxed

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

5) I've been feeling interested in other people

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

6) I've had energy to spare

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

7) I've been dealing with problems well

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

8) I've been thinking clearly

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

9) I've been feeling good about myself

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

10) I've been feeling close to other people

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

11) I've been feeling confident

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

12) I've been able to make up my own mind about things

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

13) I've been feeling loved

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

14) I've been interested in new things

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

15) I've been feeling cheerful

( ) 1- None of the time ( ) 2- Rarely ( ) 3- Some of the time ( ) 4- Often ( ) 5- All of the time

---

THE PART CONCERNING PAST ROMANTIC PARTNERS

16) Are you currently in a relationship?

( ) Yes

( ) No

( ) It's complicated / Other

Page exit logic: Page Logic**IF:** Question "Do you have any ex-boyfriends/girlfriends or ex-husbands/wives?" #17 is one of the following answers ("No") **THEN:** Jump to page 15 - Thank You!

17) Do you have any ex-boyfriends/girlfriends or ex-husbands/wives?

( ) Yes

( ) No

Page exit logic: Page Logic**IF:** Question "In your relationship, who initiated the breakup? " #18 is one of the following answers ("Mutual") **THEN:** Jump to page 7 - Q:20

Page exit logic: Page Logic**IF:** Question "In your relationship, who initiated the breakup? " #18 is one of the following answers ("Me") **THEN:** Jump to page 8 - Q:21

For the remainder of the survey, you will be asked questions regarding a former partner of yours (an "ex"). For information gathering purposes, we ask that you select just one ex when considering your answers for the following questions. It would be best to select the ex of yours that you had the most significant relationship with, and one that you are not currently in a relationship with. The questions that will be asked are aimed at gathering information about your current thoughts toward your past relationship, rather than how you felt in the past about your relationship situation.

If you have any confusion regarding some of the questions on the survey, please simply use your best judgement or feel free to skip the question/s.

18) In your relationship, who initiated the breakup?

( ) Mutual

( ) Me

( ) The other person

( ) Unclear

19) Please rate on a scale of 1 to 5, how clear were you about the reasons why the breakup took place?

( ) 1- Absolutely certain

( ) 2- Pretty certain

( ) 3- I have some idea

( ) 4- Pretty uncertain

( ) 5- Totally uncertain

Page exit logic: Page Logic**IF:** (Question "In your relationship, who initiated the breakup? " #18 is one of the following answers ("Mutual") AND Question "Please rate on a scale of 1 to 5, how strong is your desire to talk about the possibility of working things out with your ex." #20 is one of the following answers ("1- No desire at all","2- A slight desire","3- A moderate desire/ Maybe","4- A strong desire","5- An intense desire")) **THEN:** Jump to page 8 - Q:21

Page exit logic: Page Logic**IF:** (Question "Please rate on a scale of 1 to 5, how strong is your desire to talk about the possibility of working things out with your ex." #20 is one of the following answers ("1- No desire at all","2- A slight desire","3- A moderate desire/ Maybe","4-

A strong desire","5- An intense desire") AND Question "In your relationship, who initiated the breakup?
" #18 is one of the following answers ("The other person","Unclear")) **THEN:** Jump to page 9 - Q: 22

20) Please rate on a scale of 1 to 5, how strong is your desire to talk about the possibility of working things out with your ex.

( ) 1- No desire at all

( ) 2- A slight desire

( ) 3- A moderate desire/ Maybe

( ) 4- A strong desire

( ) 5- An intense desire

21) Please rate on a scale of 1 to 5, the degree to which you have been indecisive/unsure about your decision to breakup (meaning, thoughts of whether or not you made the right choice, or thoughts of getting back together).

( ) 1- Extremely sure about my decision

( ) 2- Quite sure about my decision

( ) 3- Somewhat unsure about my decision

( ) 4- Quite unsure about my decision

( ) 5- Extremely unsure about my decision

22) Please rate on a scale of 1 to 5, how much it bothers you that you are no longer in contact with your ex.

( ) 1 – It doesn't bother me at all

( ) 2 – It sometimes bothers me

( ) 3 – It bothers me

( ) 4 – It really bothers me

( ) 5 – It bothers me immensely

( ) I am in contact with my ex.

23) Please select one of the following choices that best describes the likelihood that you might get back together with your ex.

( ) 1- Not going to happen

( ) 2- Small chance, but possible

( ) 3- Possible

( ) 4- Very possible, but not certain

( ) 5- It's probably going to happen

24) Ranking from 1 to 5, how often would you say that you think about your ex?

( ) 1- Never

( ) 2- Rarely

( ) 3- Sometimes

( ) 4 - Often

( ) 5- Very often

25) How often do you experience anxiety when thinking about your ex?

( ) 1- Never

( ) 2- Rarely

( ) 3- Sometimes

( ) 4- Often

( ) 5- Very often

26) Approximately, how long it has been since the relationship ended (in months)?

_____

DEMOGRAPHIC INFORMATION

27) Sex:

( ) Male

( ) Female

28) Age:

_____

THANK YOU!

Thank you for participating in our study. Your response is very important to us.

The goal of our study is to find factors associated with a breakup that predict emotional well-being (the state of being happy, productive, and feeling loved). More specifically, we are interested in gathering information hoping to find possible links between how a person currently feels toward their ex-partner and their emotional well-being during the past two weeks.

We hypothesize that all people who feel as though they are unclear about why their breakup occurred, or feel that they had uncertainty about their decision to breakup with their ex-partner will show a lower score on the well-being measure. Additionally, we hypothesize that the more time spent thinking about one's ex will be strongly correlated with a lower emotional well-being.

Please note that we are not interested in your individual results; rather, we are only interested in the overall findings based on aggregate data. The study is completely anonymous and no identifying information about you will be associated with any of the findings, nor will it be possible for anyone to trace your responses on an individual basis. As a reminder, if you are a Lindenwood University student and you feel that you have experienced any distress from the survey, you are welcome to contact the Lindenwood Student Counseling and Resource Center at 636-949-4889.

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 us know now or in the future. Our contact information is to be found at the bottom of this letter.

Thank you for your valuable contribution to this study.

Sincerely,

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Appendix B

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) Scoring Key

8. Using WEMWBS

WEMWBS is free to use but permission needs to be sought. Further information is included in Appendix i.

Data Collection
To date, WEMWBS has been administered in a self-completion format. This has been either via CASI (computer assisted self interviewing) whereby respondents are invited to enter their responses directly into the CAPI (computer assisted personal interview) machine (Well? survey and HEPS) or by the self-completion of paper formats of the scale (student samples and focus groups). WEMWBS can be assumed to be robust using either of these methods.

WEMWBS has not been tested in interview situations where an interviewer reads out the items to respondents and fills in their responses for them. We do not therefore know if WEMWBS is robust in these situations.

Scoring
Each of the 14 item responses in WEMWBS are scored from 1 (none of the time) to 5 (all of the time) and a total scale score is calculated by summing the 14 individual item scores (Table 5). The minimum score is 14 and the maximum is 70.

Table 5: Example: Scoring of WEMWBS - with responses highlighted in green

Statements	None of the time	Rarely	Some of the Time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5
Scores	0	0	4 x 3 = 12	4 x 4 = 16	6 x 5 = 30

Total Score = 0 + 0 + 12 + 16 +30 = 58

Predicting Factors of Generosity

Carlo Barth[9]

The purpose of this study was to investigate factors (e.g. religiosity, sex, race, income, marital status, and education level) that best predict generosity. The level of a participant's religiosity was measured with a questionnaire examining different self-reported factors, such as attendance of religious events, personal devotion, prayer and community life and scored on a self-devised scale. Generosity was operationally and separately defined as the actions of financial giving and volunteering. Also recorded were participants' reactions to various scenarios, to better understand how helpful they are, as an additional measure of generosity. The scenarios exposed them to situations such as encountering a person begging for money, a homeless person, and a person who might need assistance after an accident. Separate multiple regression analyses were conducted with the two different measures of generosity as the dependent variable and religiosity, gender, race, annual income, marital status and education level as the independent variables. No statistical significance was found for either giving (r = .357, r^2 = .128) or volunteering (r = .314, r^2 = .098). Moderate correlations between marital status (e.g. being married) and giving (r = -.257, p = .014) and volunteering and religiosity (p = .254, p= .015) were found.

Keywords: generosity, predicting factors of, giving, volunteering, religiosity, race, multiple regression, pro-social, altruism

Definition of Generosity

Collett and Morrissey (2007) cite from Notre Dame's Center for the Study of Religion in Society's (CSRS) definition and describe generosity as "disposition of freely giving ones' time, talents, and treasures to others." (p. 1) This seems to be a good starting point, but does not

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distinguish a lot from pro-social behavior or altruism in attitude. While there may be considerable overlap between these three concepts, it is paramount that unique aspects of generosity be identified, as opposed to the two others, especially in action as opposed to attitude. Burwell and Huyser (2014) explicitly state generosity is more than just pro-social behavior; they especially critique the minimization of generosity to an act of monetarily giving. They quote Spencer and his definition of generosity as "the predisposition to love open-handedly" (Burwell and Huyser, 2014). Spencer (2010) also strives to broaden the view of generosity and sees a generous person as someone who, when faced with a need, has an honest desire to help, and within reason proceeds to positively respond to requests. In studying generosity, many researchers looked at different variables, such as religiosity, gender or race, but it is rare for research to focus on numerous different factors that could be helpful in predicting generosity.

Introduction to the Virtue of Generosity

Gray, Ward and Norton (2014) found that generosity or greed received were met and reciprocated alike. This means a person will act generously when having been treated generously, as he or she will act greedily when having been dealt with greedily. When studying these actions more in depth, they found that greed and negative treatment received was reproduced more so than a positively perceived action (Gray et al., 2014). Effectively, people who have been treated greedily or poorly will act upon that more so than people who have been

treated friendly or generously. This highlights the importance of generosity and also the benefit of acting generously, since it is likely to recur, not only directed towards the original author of the action, but to uninvolved parties as well (Gray et al., 2014).

Factors that May Influence Generosity

Will and Cochran (1995) found dramatic differences in generosity, defined as financial giving, between different groups of religiously affiliated people. Income, gender and denomination were other factors used as variables in the analysis, all of which did relate to giving. They also found women to be more generous than men, Non-Caucasian people to be more generous than Caucasian people, and people with lower incomes to give proportionately more than those with higher incomes. In comparison, race made the biggest difference, with Caucasian people giving 25% less than Non-Caucasian people. Religious denominations and subgroups differed up to 16% in their giving, with those classified highly religious Catholics being the most generous, and moderate Protestants being the least generous (Will & Cochran, 1995).

Regnerus, Smith and Sikkink (1998) found religious people to be twice-as-likely to give to the poor than non-religious people. They started with analyzing data from the 1996 Religious Identity and Influence Survey, funded by the Pew Charitable Trusts. In their investigation, the dependent variable was giving, whereas the independent variables were religious location (as

defined by factors such as denominational affiliation and religious activities), political location (e.g., their political beliefs and orientation) and demographics (e.g., race, gender, education, age, income, number of dependents, county population size, southern residence, and marital status). This study included the most extensive collection of predicting factors I was able to find and some of these factors, such as race, sex, education, income and religiosity, seem to be named in other studies as helpful predictors of generosity.

A recent meta-analysis by Galen (2012) examined a relationship between religiosity and pro-sociality. Galen (2012) worked through a broad array of pro-social experiments, surveys and self-reported measures. In his examination of the literature exploring whether religious belief promotes pro-sociality, Galen (2012) found increased pro-social behavior in planned actions (e.g., giving), but no effect in spontaneous situations (e.g., encountering people asking for money). This why it is particularly interesting to bring both financial giving and spontaneous reactions to different scenarios into one study to investigate reactions of both religious and non-religious participants.

In their study of the relationship between religious over secular giving, Hill and Vaidyanathan (2011) examined both religiously or secularly motivated giving as well as giving to religious and secular causes. They found different demographic factors helpful in predicting people's likelihood to give. Specifically, religiosity was measured by religious

participation and giving and then compared to secular giving. They did find marital status, employment, education and denomination to make for significant differences in giving as well.

Researchers from the Netherlands looked at factors contributing to generosity from a resources perspective. They asked whether generosity was as high as expected when resources were present as opposed to absent (Wiepking, 2009). Influencing factors Wiepking (2009) examined were the impacts of broad groups, such as a social versus a religious network and formal education. Specifically values like church attendance, network size, education, income, age, gender, marital status and other demographics were studied. Findings attested the highest number of donations in any financial manner to church attendance, which the authors explained with the high frequency of requests for donations. Other big predictors for financial generosity were a high number of solicitations (outside of religious institutions), an empathetic concern, and whether the person volunteered in any function (Wiepking, 2009).

Piff, Kraus, Côté, Cheng, and Keltner (2010) hypothesized and found that members of the lower social classes are more generous than members of higher classes. They also stated that religious affiliations could explain higher generosity. Even after controlling for age, religiosity and ethnicity, members of lower socio-economic backgrounds were more generous (Piff et al., 2010). This stands in contrast with Wiepking's (2009) findings in which he claimed that people with higher formal education were more generous because of their greater amount of financial

resources. Wiepking (2009) claims a positive correlation of both higher household incomes and formal education to charitable causes, which could possibly be explained by merely a higher amount of donations in total numbers and not by percent of total income.

Factors that are seldom mentioned in the same sentence as generosity are expectations of reciprocity and that some people might not be selflessly or altruistically generous. Jones, Doughty and Hickson (2006) found in a field experiment that 85% of their participants complied with providing a quarter when given an exchange of equal value in pennies, but only 35% complied when not offered the exchange. While mainly investigating the exchange issue, the second question that was asked concerned the income of the participants. Here it was found that participants earning more than $60,000 per year were more unlikely than participants who earned less than that to participate in the exchange. Similarly, Cox and Deck (2006) discussed differences in male and female generosity and compared previous studies that concluded either gender to be more giving. One of their findings was that men were looking for reciprocal behavior and their giving was dependent upon that. Since in many cases, there is no direct benefit or reciprocal effect in charitable giving, women are generally seen as more generous (Cox & Deck, 2006). Borch, Thye, Robinson and West (2011) also looked at a form of reciprocity as they examined religious claims on future reward in relation to giving. They found different demographics, such as education and marital status predictive of giving.

Examples of Generosity in Different Contexts

A contrast to the voluntary contributions in the scope of this work, Islamic societies practice mandatory giving called zakat (Singer, 2013). The set sum that Muslims have to contribute is measured by their income. They can, however, participate in another form of alms that is not forced onto them. Unfortunately, Singer (2013) does not have specific numbers that allow comparing giving to other circumstances, such as the ones in the U.S.

The system of welfare states in many European countries can be seen as practical manifestation of generosity. Koster (2008) explores the relationship of the sustainability of this generosity practiced in these social expenditures and the globalization of markets. He finds that the effects of globalization that include social and political openness might have a negative impact on generosity as practiced in welfare states. Kenworthy (2009) deepens this research with his study on the effect of public opinion on social policy generosity. The work lacks to find empirical evidence that the disposition of the public has a definite influence on generous social policy, while several authors he cites still infer that a more generous public desires and leads to a more generous social system. His thesis correlates with that, assuming the more generous the people, the more generous the system. This leads to the question of the system that underlies these assumptions. A meritocratic system compensates on the basis of their individual ability, position, and merit, whereas an egalitarian system compensates people in an equal fashion. In a

social system, people who earn significantly less than the population mean are supported by the state, as are people who are unemployed and people who are unable to work. Riyanto and Zhang (2014) find interesting results in their study of the benefit of both systems. Low-income families that receive additional income by redistribution are significantly more generous, and contrary to expectation, high-income earners are not less generous than before the income redistribution. It seems like there is a factor in which generosity positively (or at least not negatively) impacts all sides in this deal. This whole discussion seems to move away from the study of the original, simplistic value of generosity but the further study of it as a virtue can lead to further reaching implications than previously thought.

What Impacts Does Generosity Have and How Can it be Promoted?

As far as the impact of generosity is concerned, different studies report different, but thoroughly positive findings. Research on the topic is done in the hope of leading to more than just concrete results; not only is it paramount to have empirical descriptions of findings, but to also productively think about their applications. Study and therein-gained understanding should help inspire people to lead a group, a community, or culture into desirable behavior. Beneficiaries of generosity are often motivated to be generous themselves.

Vo (2014) studied what results from gratitude to perceived generosity. Among others, she recounts her experience with the Peace Corps, during which she received warm generosity and

humbling hospitality from her poor neighbors. Even though she was there to "develop" the towns, she learned more through the generosity of the people and was changed and inspired to more generosity on her own part by what she received.

Several scholars report the impact of practicing generosity in marriage to factors such as marital quality and the success of marriages. Dew and Wilcox (2013) found generosity as they defined it was positively correlated with marital satisfaction and negatively correlated with marital conflict and perceived likelihood of divorce. These findings are in line with Einof and Philbrick's (2014) findings, that state that marriage in general encouraged greater financial giving, but also that health and happiness were positively correlated with these actions.

One very interesting study explained how, when people see themselves as small in an attitude of awe, directed towards the vastness of the world, the greatness of the stars, or generally perceive themselves as little pieces in a big puzzle, their generosity is positively affected by that (Piff et al., 2015). They made a connection to religiosity, alleging that people who believe in the presence of a god perceive themselves as smaller and less significant and tend to be more generous (Piff et al., 2015). Kradin (1999) reports of therapeutic benefits of generosity, as the counselor teaches the counselee by exemplifying generosity and leading to minimization of super-ego and narcissistic tendencies.

Hypotheses

All of these different findings lead to the rationale for this proposed study, which combines many aspects of different previous studies into one big survey. The purpose of the study at hand is to predict which demographic has the biggest impact on generosity. Among the many demographic factors I propose to include (e.g., religiosity, marital status, income, gender, race, and educational level), I predict that religiosity would be the strongest predictor of generous behavior. I propose to examine both planned as well as spontaneous giving in one study, thereby conducting possibly the first comprehensive study linking different demographic factors to generosity in different contexts.

For conducting a multiple regression analysis, I came up with five hypotheses to cover five different areas or demographics. Religiosity was expected to be the strongest predictor for generosity, for the other four (marital status, sex, income, race, and education) there was no prediction made, except the hypotheses listed below. The first one states that religiosity will be the biggest factor in predicting all measures of generosity; as Regnerus et al. (1998) stated, they found a twofold likelihood for religious people to give as compared to non-religious people. Secondly I expect women to be more generous than men; Cox and Deck (2006) find men to be looking for reciprocal giving, so I hypothesize that women will be more generous than men. Thirdly, non-Caucasian people are expected to be more generous than Caucasian people; non-white ethnicities gave 25% more than their white counterpart (Will & Cochran, 1995). The

fourth hypothesis states that people who earn more give proportionately less than people who earn less income; which is what Piff et al. (2010) suggested and I expect to find the same. Lastly, there will be a negative correlation between education level and generosity. Research suggested different conclusions about the formal educational achievement of an individual and their giving. Wiepking (2009) claims that more resources equal more giving, while Piff et al. (2010) disagree and argue for the empathy and communal orientation of the lower socio-economic classes being indicative of generosity. This latter one seems to outweigh the former in terms of percent given of the actual income.

Method

Participants

Participants for the study at hand were being recruited out of the Lindenwood Participant Pool (LPP), which is an ethical way of recruiting participants who in turn earn extra-credit for some General Education classes (e.g., Intro to Psychology, Sociology, Anthropology, Criminology, Athletic Training and Exercise Science), over the PI's email address book, and through the PsiChi's Internet presence.

Many of the participants were college students, since a significant part of the recruitment took place through the LPP, which engages mostly traditional college-aged students. The age range of participants spanned from 18 to 75, 29 of which identified as male and 67 as female.

From the standpoint of diversity, people identified as members of the following races, native Hawaiian/ Pacific Islander: 2, Asian: 6, African American/ black: 3, Latin American: 5, White: 70, Multiracial: 4, and other: 5. Income ranged from 0 to $300,000. The highest educational level was at the doctoral level, and there were some participants who did not attain a high school degree. Twenty subjects were married or widowed and 76 participants were single (e.g., never married, divorced, or separated).

Materials and Procedure

Several recruitment scripts that were appropriate for the different outlets were used. There was one script that was used for PsiChi (see Appendix B), one for emails (Appendix C), and a third one for Lindenwood University's Participant Pool (Appendix D). The different scripts attempted to explain as much as needed, while trying to prevent participants from guessing the purpose of the study or leading them a certain way in answering the survey.

Information and the informed consent processes were handled on the first couple of pages of the SuveryGizmo questionnaire, where the study was hosted. The online nature of the study helped make access convenient for people from diverse backgrounds and also helped protect the respondent's identity. The questionnaire included 36 steps, which included the informed consent process and all conditional questions. It had three different tools that tested religiosity, generosity (which included role-play scenarios) and lastly collected demographic information, which was

the main source of predicting factors for generosity. Several generosity questions were evaluated on a Likert scale to assess dispositions, with a few items with yes/ no decisions. In the survey, a number of questions were included that were conditional, meaning they would only be asked in case the participant answered a preceding question with a specific answer or in a specific way. Some questions that were conditional were for example whether people volunteered or donated money; if those questions were answered "yes," several follow up questions were asked to specify in detail how much people donated or where they volunteered. After the completion of the survey, the participant was transferred to a debriefing page that explained the purpose of the survey and encouraged the participant to reach the PI in case of questions or concerns.

Measures

To measure generosity (as dependent variables), both financial giving as well as volunteering were measured. For both of these a numerical value was recorded, which made analysis easier. The independent variables were religiosity (see section below), sex, income, education, race, and marital status. All of these were quantified for analysis. For most of them, a number was assigned to each category, such as one for married and two for not married, enabling statistical analysis of predictability in the multiple regression analysis and further correlational analyses. The same was possible for ordinal categories, such as education, where a higher number meant a higher formal achievement.

Religiosity Scale

In order to quantify religiosity for further tests, a scoring system was devised. It ranked participants activities in four areas and assigned a score from zero to four to them in each of them. This enabled a score from 0 to 16, the higher the more religious. So for example, praying daily would result in a score of four, praying several times a week would be three, once a week would be two, a couple times a month would be one and less than that would result in a score of zero. Similar scales were applied to church attendance, the frequency with which religious texts were studied and participation in community groups.

Results

Out of 104 total participants, there were 73 respondents that contributed data that was complete enough for analysis. A multiple regression analysis was conducted in order to determine which of the predetermined factors (e.g. religiosity, race, sex, income, education, and marital status) best predict generosity as defined as financial giving and volunteering (individually). The regression for predictors in financial giving was statistically non-significant (r = .357, r^2 = .128); predictors in the second regression for volunteering were even weaker (r = .314, r^2 = .098). Out of the sample of 73 resulted the following values: The average giving was $860.07 ($SD$ = $2637.601), ranging from $0 to $15,000 (0-100% of a person's income). Volunteering ranged from 0 to 700 hr, with a mean of 47.19 hr (SD = 100.454). Religiosity,

which was scored as explained above, where higher church attendance, participation in prayer and religious study materials resulted in a higher number, ranged from 0 to 15 on a scale from 0 to 16, averaging at 4.6 (*SD* = 4.561). Even though correlations, as shown in Table 1, were mostly statistically non-significant, two showed moderate relationships. First, married people were more likely to give, as they were the lower value in the correlation, -.257 (p = .014). Second, religious people were more likely to volunteer, .254 (p= .015).

Discussion

Findings suggest that first there was no direct and reliable predictor in the given sample. Secondly, correlations were mostly weak or insignificant. Taking into consideration the previous research done, either strong correlations or significant predictability in the multiple regression analysis had been predicted and expected. Since none has been found, there needs to be a different explanation. Again considering previous research findings, it seems that the amount of such would merit an assumption that the sample at hand is not representative of the population. It is to determine what factors might have had an impact on the findings and what made them different from previous insights.

Two of the correlations showed statistical significance, hence some focus should be given as to why that might be. Married couples showed a moderate correlation to giving. A possible explanation could be that these couples have more financial means than other non-married

individuals, resulting in higher giving. Secondly, there was a moderate correlation between religiosity and volunteering. For this, it seems possible that college students (since the sample consisted mostly of students) may be able to donate time when they lack the financial means for other donations. This is a finding that is in line with previous research.

One limitation and certainly possible reason for the weakness of the findings are the demographics of the sample, containing a high number of college students, many of them being full-time students. The financial strain of getting an education might have a strong influence on donations and giving, as might the time commitment of many who work and study on volunteering. There were also a fairly high number of participants who were not born in the U.S., this could mean different cultural or religious practices, and also if they do not live in the U.S. maybe different standards. In many cultures volunteering is a given and would not be recorded, or even recognized as such, but just acted out.

Several weaknesses in the research design were found when scoring results. The high number of college students might have obscured data, as many of them work and earn money, but have to pay for cost of living and education, which does not go into giving, even if they would feel compelled to give. Weaknesses on the level of the survey were two lacking questions. First, there should have been a question as to whether a participant had retired; second, there should have been a question to record whether the participant was a U.S. resident. Both questions

would have served the purpose of describing the sample better, and understanding how representative it was of different populations. There needs to be some way to more appropriately explain questions for a cross-cultural sample such as this, since international participants and American participants might read or understand questions differently, based upon language and societal or cultural norms.

For future research, there would need to be more recruiting from diverse places, in order to ensure the diversity of the sample concerning professional background and also to study a sample of people who are not college students. The findings of this study only showed that for this sample of mostly college students there were no reliable predictors for generosity in forms of giving or volunteering. Neither were there factors that correlated strongly with either of these, except for religiosity, which correlated moderately with volunteering, $r = .254$, $p = .015$, and marital status which correlated negatively with giving, $r = -.257$, $p = .014$, meaning that participants who are married were more likely to give. This seems to suggest that, given the high number of college students, if they indeed are inhibited from giving financially, they could still give in time, but this is speculation at best.

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Appendix A

Table 1

Correlations for Demographic Factors and Dependent Variables

Pearson Correlation	Religiosity	Sex	Income	Race	Education	Marital Status
Giving	.171	.014	.191	-.127	.017	-.257
Sig. (1-tailed)	.074	.453	.053	.143	.442	.014
Volunteering	.254	-.005	-.031	-.140	.107	-.175
Sig. (1-tailed)	.015	.484	.398	.118	.183	.069

Appendix B

Psi Chi:

Study Title	**Study Area**	**Study Description**	**Study URL**
Predicting Factors of Generosity	Social/ Behavioral	How do you spend your time and money? What influence do your gender, race, income and religious belief have on your generosity?	Submission Link

Appendix C

Email script:

Dear friend, professor, colleague, or classmate!

As part of wrapping up my BA in psychology at Lindenwold University I am conducting research for a Senior Thesis. I hereby invite you to help me finish strong in my last semester by partaking in this study.
The topic being studied are different factors that might influence generosity and I am also exploring how free-time and spending habits play into this.
The questionnaire will take about 15 minutes to complete and no personal data will be recorded. Your participation will be completely anonymous. If you are not interested in this, please disregard this message and I apologize for the inconvenience.

Thank you and here is the link! https://www.surveygizmo.com/s3/2010620/Spending-habits

Carlo Barth

Appendix D

Lindenwood University Participant Pool script:

Dear Participant, This survey about the possible relationships between spending habits and religious activities is part of a study conducted by Carlo Barth in the department of Psychology at Lindenwood University. This survey contains questions pertaining to both these areas and will help to set the bar for further investigations in the direction of decision-making and persistence in how these beliefs are acted upon. The two different components are basic variables for how you tend to spend your money, and how involved you are in different religious activities or communities. This survey will take approximately 10-15 minutes to complete. Your participation may not result in direct benefits to you; it is anticipated however, that your awareness about spending habits and your religious habits and preferences could be increased. Also, information from this study may help provide additional insight into spending habits in a broad sense and religious activities as they relate to spending.

Appendix D

Spending habits

Page One

Dear Participant,

This survey about the possible relationships between spending habits and religious activities is part of a study conducted by Carlo Barth in the department of Psychology at Lindenwood University. This survey contains questions pertaining to both these areas and will help to set the bar for further investigations in the direction of decision-making and persistence in how these beliefs are acted upon.

The two different components are basic variables for how you tend to spend your money, and how involved you are in different religious activities or communities.

This survey will take approximately 10-15 minutes to complete. Your participation may not result in direct benefits to you; it is anticipated however, that your awareness about spending habits and your religious habits and preferences could be increased. Also, information from this study may help provide additional insight into spending habits in a broad sense and religious activities as they relate to spending.

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.

Your participation is completely voluntary. You may discontinue taking the survey at any time. If you choose not to participate or stop participating before the end of the survey, you will not be penalized in any way; LPP participants will still receive extra credit.

The results of this survey will be used for scholarly purposes only. If you have any questions or concerns about the survey and the background of the study it is used in itself, please do not hesitate to contact the primary investigator, Carlo Barth at 636-634-1042 or at cb705@lionmail.lindenwood.edu

Some of the questions on the survey may make some respondents feel uncomfortable. Please feel free to skip any questions that you are uncomfortable answering. If you are feeling significant discomfort, please contact the researcher using the contact information provided above, or contact my supervisor, Dr. Michiko Nohara-LeClair at mnohara-leclair@lindenwood.edu or 636-949-4371.

ELECTRONIC CONSENT: Please select your choice below. Checking "Yes" 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 part of the LPP and have a parental consent form filed with the LPP Office.

Please make sure you also uncheck the "No" field.

If you do not wish to participate in the research study, or are not at least 18 years old, please decline participation by selecting “No”. *
( ) Yes
( ) No

1) Are you a student?
( ) Yes
( ) No

MONETARY CLUSTER

2) Do you give or donate in any form? (This includes both money and other goods you give away)
( ) Yes
( ) No

3) In your best estimate, how much do you give or donate per year? *
$/year: _____

4) In case you give differently than monetarily, please explain what you give!
_____

_____

_____

_____

5) What kinds of organizations, charities or ministries do you donate to? (Select appropriate fields)

Organization type

[ ] Ministries (Faith based organizations)

[ ] Charities (Goodwill, homeless shelters)

[ ] Other

If other, please specify.

_____

_____

_____

_____

SERVICE CLUSTER

6) Do you volunteer?*

( ) Yes

( ) No

7) How many hours do you estimate you volunteer per year?*

_____

8) Where do you volunteer? (Please mark all that apply)

[ ] Church, ministry, faith-based or religiously-affiliated charity

[ ] Non-profits

[ ] Charity

[ ] Other

WHAT WOULD YOU DO?

9) How would you respond to a stranger who approached you asking for money? What would you be likely to do?

_____

_____

_____

_____

10) Imagine the following situation: You are downtown in the middle of the winter, and the temperatures are around zero degrees. On the side of the road, you see a person who appears to be homeless and cold. How would you react to this person?

_____

_____

_____

_____

11) Imagine you have just witnessed someone you do not know trip and fall. How likely is it that you help him/ her or ask whether he or she is okay?

( ) Very Unlikely ( ) Unlikely ( ) Likely ( ) Very Likely

12) Imagine the following situation. You are driving home from work (or school). At a small intersection close to your house you see a car crash. You cannot tell how bad it is at this point, only that the cars look very damaged. The way home for you is not blocked, and you could pass without anyone noticing. How likely is it that you would get out of your car and check on the people involved in the accident?

( ) Very Unlikely ( ) Unlikely ( ) Likely ( ) Very Likely

RELIGIOUS ACTIVITY

13) In the last 12 months, have you attended religious services of any kind?*

( ) Yes

( ) No

( ) I wish not to say

14) How often do you attend such services?

( ) Daily

( ) Multiple times a week

( ) Twice a week

( ) Once a week

( ) Twice a month

( ) Once a month

( ) A couple times a year

( ) Other

15) How often do you pray or meditate in private?

( ) Multiple times a day

( ) Daily

( ) Multiple times a week

( ) Once or twice a week

( ) A couple times a month

( ) Less than the afore mentioned

16) Do you privately study religious materials or scriptures of your religion or belief system?

( ) Yes

( ) No

17) How often do you study your religion's or belief system's scriptures?

( ) Daily

( ) Multiple times a week

( ) Once or twice a week

( ) A couple times a month

( ) Once or twice a month

( ) Less than that

18) How many minutes do you study your religion's or belief system's scriptures when you study them?

Minutes: _____

19) Do you take part in any study or community groups? Community groups are Bible studies or other scripture studies, prayer or meditation groups, or any other form of service group that regularly meets and originates out of a religious community.

( ) Yes

( ) No

20) Do you participate in any secular community or service groups?

( ) Yes

( ) No

21) How often do you meet for these groups and or studies?

( ) Once a month

( ) Twice a month

( ) Once a week

( ) Twice a week

( ) Other

22) Since you selected "other" please specify.

_____

_____

_____

_____

23) Are you partaking in any form of religious activity outside of the aforementioned?

( ) Yes

( ) No

24) Please specify.

_____

_____

_____

_____

DEMOGRAPHIC INFORMATION

These data does not necessarily have to do with the subject under investigation, the information you provide is still important to describe the participants of this research accurately. Please answer as accurately as possible. Since this survey is completely anonymous, you do not need to be afraid of your data being misused.

25) How old are you?*

Age in years: _____

26) What is your sex? (If would like to skip this question, please do so)

( ) Female

( ) Male

27) What is your annual income?

$/year: _____

28) How would you describe your racial/ethnic identity?

( ) American Indian/Alaska Native

( ) Native Hawaiian/ Pacific Islander

( ) Asian or Asian American

( ) Black or African American

( ) Hispanic or Latino

( ) White or Caucasian

( ) Multiracial/Multiethnic

( ) Other

29) Are you born in the U.S.?

( ) Yes

( ) No

30) How would you describe your religious affiliation, if any?

( ) Buddhist

( ) Catholic

( ) Hindu

( ) Jewish

( ) Mormon

( ) Muslim

( ) Protestant

( ) Other

( ) Unaffiliated

31) Is there any denomination or group you claim affiliation to within your religion or belief system?

_____

32) What is your highest level of educational attainment?

( ) Some high school, no diploma

( ) High school diploma or equivalent (GED)

( ) Some college, no degree

( ) Associate's (2 year) degree

( ) Bachelor's (4 year) degree

( ) Master's degree

( ) Doctoral or professional degree

33) What is your marital status?

( ) Married or in a domestic partnership

( ) Divorced

( ) Widowed

( ) Separated

( ) Never Married

34) Are you currently employed?

( ) Yes

( ) No

35) Are you a full-time college student?

( ) Yes

( ) No

36) How many hours do you work every week?

_____

THANK YOU!

Effect of Picture Size on Natural Category Learning and Metacognition

Carlee M. DeYoung[10]

Metacognitive judgments are crucial sources of information for students during self regulated learning. This is because these judgments are used by students to make decisions about what strategies to use during study, how long to study, and what to study. Previous research (Kornell & Bjork, 2008) has found that, compared to massing, interleaving exemplars from multiple categories leads to superior category learning. However, a majority of participants believed massing to be more beneficial for learning than interleaving. An increased sense of perceptual fluency created by massing of same category exemplars was speculated to be the cause of this metacognitive illusion. Recent research on fluency found that learners think words in a large font are easier to remember because of an increased fluency (Rhodes & Castel, 2008). The proposed study would investigate how manipulating fluency by varying picture size would affect natural category learning and participants' metacognitive assessments of their own learning using pictures of tropical fish.

Keywords: category learning, fluency, judgments of learning (JOLs), metacognition, metacognitive illusions

Recent research has shown that perceived fluency influences the judgments people make about their memory for recently learned information. These finding are relevant and have important implications for education, specifically self-regulated learning. These implications are due to the influence metacognitive judgments have over important decisions students make about study strategy use and study time allocation for multiple subjects. These factors serve crucial roles in the overall success of students during self-regulated learning inside and outside

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classroom settings. Therefore, any research that attempts to further the current understanding of the effects of fluency on metacognition and memory would be valued.

Due to the importance of fluency as a cue for metacognitive judgments, perceptual fluency has been studied under a wide array of manipulations. Rhodes and Castel (2008) manipulated fluency, via font size, for to-be-remembered words during study. Rhodes and Castel (2008) were interested to see if judgments of learning (i.e., JOLs) would be sensitive to the manipulation of font size, even though they cited in their work that previous research by Begg et al. (1989) and Mazzoni and Nelson (1995) indicated that word size was not a salient predictor for memory performance. In their experiment, participants were presented with words for study in two different font sizes, a large, more perceptually fluent 48-point font size or a smaller, less perceptually fluent 18-point font size. After the presentation of each word, participants made a metacognitive judgment rating their confidence for later recall of the word. Rhodes and Castel (2008) found that while font size did not have any significant effect on memory performance, it did affect the confidence judgments such that, words presented in 18-point font received confidence ratings significantly lower than those presented in 48-point font.

Rhodes and Castel (2008) conducted another experiment in which they decided to include item relatedness as an additional source of variance among items. This was done to see if doing so would eliminate the effect of fluency on JOLs. Therefore showing that the effect of fluency on

JOLs is only present in situations where variance in fluency is the only available cue. In this experiment they were interested to see if fluency was a more important cue for JOLs or if item relatedness would trump fluency, thus leading to more accurate JOLs even when fluency during study is low. Rhodes and Castel (2008) participants still gave significantly lower confidence judgments for items with low fluency even when item relatedness was available as a cue. This suggested that fluency might affect metacognitive judgments in more complex real world situations where fluency is not the only available cue.

More recently, Yue, Castel, and Bjork (2013) investigated the effects of presenting words in a disfluent (e.g., not fluent), blurred font. Using a procedure similar to that used by Rhodes and Castel (2008), participants were presented with words for study in a disfluent, blurred font or normal font. After each word was presented, participants rated their confidence for later recall of the word. This process was completed for 4 wordlists each containing 26 words. Yue et al. (2013) found that words with non-blurred font were remembered only marginally more than words presented in the more disfluent, blurred format. These results contrast the results found by Rhodes and Castel (2008) who found no significant effect on memory performance when words were presented in a smaller, less fluent font. Additionally, Yue et al. (2013) found that participant JOLs for disfluent words became more accurate with each additional wordlist. This

suggested that participants were appropriately adjusting their JOLs for disfluent words as they progressed through the four wordlists.

Similarly, research by Magreehan, Serra, Schwartz, and Narciss (2015) also investigated how perceptual fluency affects people's JOLs. In one of their experiments, they manipulated perceptual fluency in un-related and related word pairs. In each pair one of the presented words was disfluent (32-point, italicized font) and the other fluent (56-point, boldfaced font). JOLs for disfluent and fluent items did not differ significantly (Magreehan et al., 2015). However, when JOLs for related and unrelated word pairs were compared the difference was significant, such that, JOLs for related word pairs were higher than those for unrelated pairs. These results suggested that during this experiment participants did not use perceptual fluency as a cue for their JOLs, but instead used item relatedness (Magreehan et al., 2015). It is important to note that these results contrast those found by Rhodes and Castel (2008) in their investigation of fluency. This inconsistency among similar manipulations indicates that more research needs to be conducted investigating cue utilization during the formation of JOLs.

Ariel, Dunlosky and Toppino (2014) recently conducted a study investigating the educational implications of low perceived fluency during learning. In this study, participants studied synonym word pairs from the Graduate Record Examination (GRE). Eye tracking software and apparatus were used to track the amount of time participants fixated on individual

words in each pair. Each word pair was shown for 1 s. After each word pair participants made the decision to either mass, space, or end their study of that word pair by selecting one of three options: study now, study later, or done (Ariel et al., 2014). Results showed that when participants did not fixate on the entire pair during initial study they chose massing (e.g., study now) most often. Thus, when participants' perception of the entire pair was degraded or the pair was only partially encoded they chose to mass study more frequently (Ariel et al., 2014).

The effect of participants' knowledge about massed and spaced study on their JOLs was investigated by Logan, Castel, Haber, and Viehman (2012). These researchers thought that providing participants with knowledge about the effectiveness of spacing and massing would increase the accuracy of their JOLs. In one of their experiments participants studied three wordlists, in which words were either massed or spaced. In massed presentation words appeared for study, and then immediately reappeared for an additional study period (Logan et al., 2012). Words that were spaced were presented after a lag of three word presentations (Logan et al., 2012). JOLs were provided after each item during study. After the learning phase for each list, participants then tried to recall as many words as possible. Participants graded their own recall sheets, which provided them with feedback. Participants then received a sheet with all of the words from the list divided up according to which condition they were presented in (e.g., massed or spaced) (Logan et al., 2012). Participants then tallied up the number of words they correctly

recalled for each condition. This procedure was repeated for two more lists to see if participants would update their JOLs after receiving feedback. Logan et al. (2012) found that providing participants with feedback led to small, significant increases in the accuracy of JOLs for spaced items across the three lists.

While many experiments have investigated the effects of fluency on JOLs and memory performance, very few have investigated the effects of fluency during category or concept learning. Most of the category learning literature thus far has focused on effects of different study schedules. Most notably, Kornell and Bjork (2008) studied the effects of different study conditions on participants' learning of various artists' painting styles. Paintings from 12 artists were presented under either massed or spaced conditions. During massed study, paintings by one artist were presented consecutively, and in spaced study paintings by various artists were interleaved, such that, no two paintings by the same artist were ever presented successively. To test participants' learning, new, unstudied paintings from each of the 12 artists were presented for categorization during the test phase of the study. Participants also completed a posttest survey indicating whether they believed massing or spacing to be more beneficial for their learning. Kornell and Bjork's (2008) results showed that spacing paintings during study led to better test performance than massing. However, posttest survey results indicated that a majority of participants believed massing to be more beneficial then spacing. Kornell and Bjork (2008)

speculated that an increased sense of fluency during massed study might be cause of their posttest survey results.

In a similar investigation, Wahlheim, Dunlosky, and Jacoby (2011) replicated the work of Kornell and Bjork (2008) by having participants learn different categories of bird species. The procedure was identical with the addition of JOLs collected at item- and category-levels during study. Wahlheim et al. (2011) found JOLs made at the item- and category-level were sensitive to the benefit of spacing. However, retrospective evaluations collected in the posttest survey did not indicate any sensitivity to the benefits of spacing, similar to previous research (Kornell & Bjork, 2008).

Recent category learning literature has questioned the use of the term "spacing" in previous studies (cf. Kornell & Bjork, 2008; Wahlheim et al., 2011). Studies by Kang and Pashler (2012) and Zulkiply and Burt (2013) investigated the cause of spacing benefits during learning. Both studies were conducted to test whether the temporal aspect of spacing benefitted memory, or if it was the interleaving of exemplars that was causing the effect (Kang & Pashler, 2012; Zulkiply & Burt, 2013). Both studies replicated the procedure from Kornell and Bjork (2008) with the addition of a between participant manipulation of temporal spacing. Both Kang and Pashler (2012) and Zulkiply and Burt (2013) found that the "interleaving" of exemplars from different categories caused the benefit of "spacing." Therefore Kang and Pashler (2012) and

Zulkiply and Burt (2013) advised that future mentions of studies, such as, Kornell and Bjork (2008) and Wahlheim et al. (2011) should use the term "interleaving" in place of "spacing" because it is more representative of the actual cause of the reported effect.

As previously mentioned, very little literature can be found in which the effects of fluency during category learning have been assessed. Only one known study has researched this topic. This study, conducted by Oppenheimer and Frank (2008), tested whether the perceived fluency of words would affect category judgments. In this experiment participants were presented with a target category (e.g., mammal) and a set of exemplars. Participants then ranked how well each exemplar "fit" the target category using a 1 - 9 scale (Oppenheimer & Frank, 2008). In the low-fluency condition, the target category as well as exemplars were listed in small, hard to read font. In the control condition these items were presented in standard 12-point Times New Roman font. Oppenheimer and Frank (2008) found that when exemplars were presented in the low-fluency format participants ranked exemplars as worse category members than when they were presented in the more fluent control format. This suggested that fluency is used as a cue when participants are ranking the relatedness of items (Oppenheimer & Frank, 2008).

The present proposal aims to investigate the effects of perceived fluency on performance and metacognitive judgments during category learning for non-word material. The proposed

research aims to answer the following: Does picture size have any effect on performance or judgments during a category-learning task using tropical fish species?

Proposed Method

Participants

The participants for the proposed study will be recruited from a Midwestern University using an online recruiting and scheduling program. A sample of at least 60 undergraduate participants will be achieved. Participants will receive adequate compensation upon completion of the study.

Materials

The materials for the proposed study are comprised of pictures of 120 different tropical fish species. All pictured fish belong to 1 of 12 fish families (see Appendix A for sample pictures and family names) with 10 different fish species pictured from each. Diverse and uncommon species from each family were selected to create samples of fish that would be challenging, yet still possible to categorize. Pictures were collected from online sources (e.g., Wikipedia's list of marine aquarium fish species), and most appear to have been taken by professional or amateur wildlife photographers. Inclusion criteria for each picture included, high-resolution image quality, no watermark, full side view of fish, and only one fish per picture. Additionally, all

picture backgrounds will be removed using professional photo editing software and pictures will be cropped as closely as possible to fish to ensure uniformity among pictures.

One of the variables manipulated in this proposed experiment is picture size. Of the 10 pictures from each fish family, 6 pictures will be used for study (72 total), and 4 will be reserved for testing (48 total). During the study portion of the experiment, pictures from half of the 12 fish families (36 total) will be presented in a large picture format (5 *in* height) and the other half (36 total) will be presented in a small picture format (1.25 *in* height). During the test all pictures will be presented in a midsize format (2.75 *in* height). A visual explanation of the picture resizing procedures used can be found in Appendix B.

Experimental Design

The procedure of the proposed study was adopted from Kornell and Bjork (2008). However, this procedure has been modified so that fluency (small and large picture size) will be manipulated in addition to study condition (massed and interleaved). Therefore the proposed experiment will use a 2 (study condition: interleaved and massed) × 2 (picture size: small and large) factorial design. For a table breakdown of the proposed procedure see Appendix C.

Procedure

Prior to beginning the experiment participants will read and sign an informed consent document (see Appendix D for informed consent). Additionally, any questions participants may

have will be answered by the experimenter during this time. Next, participants will begin the experiment by reading a page of general experiment instructions presented by the experimenter. These instructions will explain the general nature of both the study and test portions of the experiment (see Appendix E for instructions). The experimenter will then request that the participant verbally reiterate what the experiment entails to ensure that participants have a clear understanding of procedural expectations.

Next, participants will view and study a total of 72 pictures of fish over the course of 12 study blocks, each containing 6 pictures. Six study blocks will be massed (M) and 6 will be interleaved (I). In massed blocks participants will view all 6 species from a given family consecutively. In interleaved blocks 1 picture from each of the 6 fish families designated for interleaved presentation will be shown (see Appendix C for table breakdown of each block). The study blocks will be presented in the following order M,I,I,M,M,I,I,M,M,I,I,M. The specific order in which the massed blocks and interleaved blocks are presented will be counterbalanced.

After the study phase of the experiment the participant will be prompted to make a metacognitive judgment for each studied fish family (see Appendix F judgment prompts). Participants will then complete a test in which they will be asked to categorize the remaining 32 fish pictures by selecting the correct family name from the full list of families for each picture (see Appendix G for sample test item). Then participants will be informed of the differences

between massing and interleaving and asked to make a retrospective judgment indicating if they found massing or interleaving to be more beneficial during the study (see Appendix H for retrospective judgment survey). Finally, participants will be debriefed and given an information sheet (see Appendix I for information sheet).

Projected Results and Discussion

The purpose of this study is to replicate previous work by Kornell and Bjork (2008), but also to see how fluency will affect participants later test performance, and their metacognitive judgments. Since no results have been collected I can only speculate what I may find. I believe that I will find a trend in the metacognitive judgments similar to those found in previous research. Fish families presented during massed study in the large format would have the highest fluency and therefore best judgments of confidence, and small-interleaved fish families would receive the lowest judgments of confidence.

Additionally, I predict that when performance on the categorization test for small and large fish families are compared, I will find results different from previous research. I predict that I will find that participants perform better when pictures are small. This is because the diagnostic feature for each fish family is not the finer details, but instead more broad features like body shape. By making the pictures smaller it makes less important details such as color pattern less accessible increasing the possibility that participants will focus on the more

diagnostic feature of body shape. If this is found it will be a novel contribution to the category learning literature.

However, since these results would be dependent on the material, all have broader defining features future research should conduct the same experiment with categories where finer details are more diagnostic of category membership than more broad ones.

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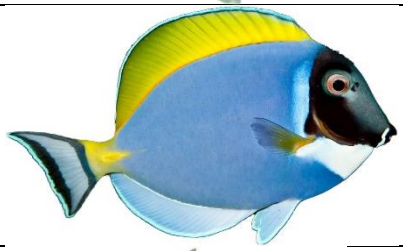
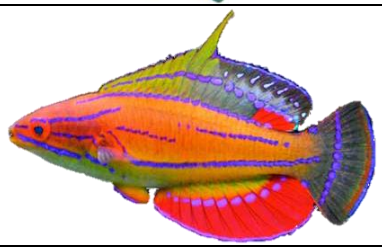
Appendix A

This table contains a sample item for each fish family.

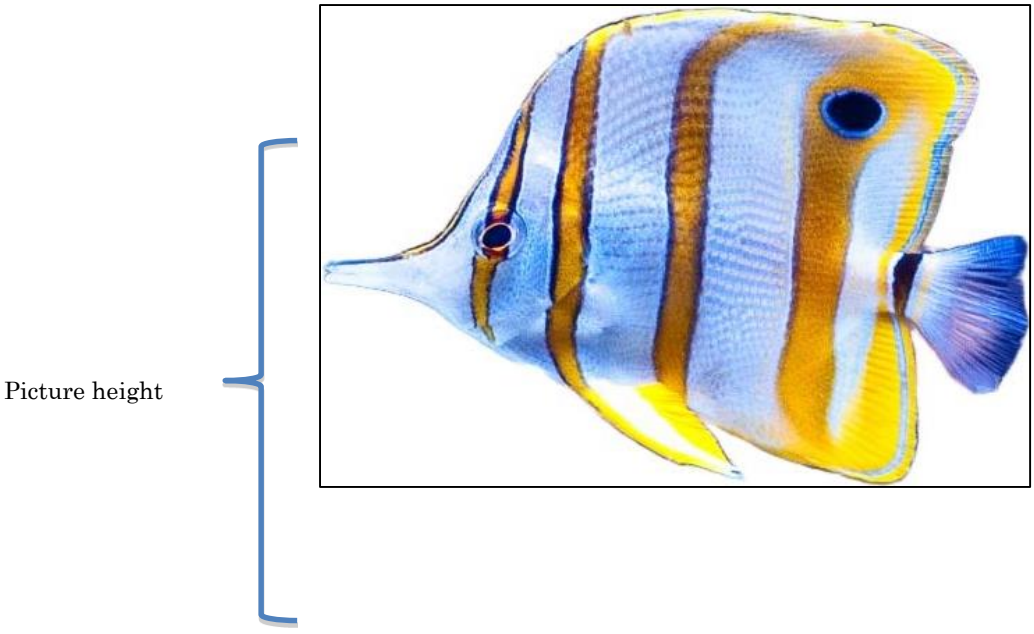
Family Name	Sample Exemplar
Angelfish	
Anthias	
Blenny	
Butterfly	
Cardinal	
Chromis	

Appendix A continued

Family Name	Sample Exemplar
Damsel	
Groupers	
Goby	
Tang	
Trigger	
Wrasse	

Appendix B

The width of pictures varied due to differences in fish length, so only the height of each picture was manipulated. However, to ensure that pictures were not distorted, the width of each picture was also changed, so that it remained proportionate to the height. Therefore the width of pictures for a given size classification (small, large, and midsize) may vary, but the height will not.



Appendix C

Massed													
	Large (5 *in* height)						**Small (1.25 *in* height)**						
Block 1	A_1	A_2	A_3	A_4	A_5	A_6	B_1	B_2	B_3	B_4	B_5	B_6	Block 7
Block 2	C_1	C_2	C_3	C_4	C_5	C_6	D_1	D_2	D_3	D_4	D_5	D_6	Block 8
Block 3	E_1	E_2	E_3	E_4	E_5	E_6	F_1	F_2	F_3	F_4	F_5	F_6	Block 9
Interleaved													
	Large 5 *in*	**Small 1.25*in***	**Large 5 *in***	**Small 1.25*in***	**Large 5 *in***	**Small 1.25*in***	**Large 5 *in***	**Small 1.25*in***	**Large 5 *in***	**Small 1.25*in***	**Large 5 *in***	**Small 1.25*in***	
Block 4	G_1	H_1	I_1	J_1	K_1	L_1	G_4	H_4	I_4	J_4	K_4	L_4	Block 10
Block 5	G_2	H_2	I_2	J_2	K_2	L_2	G_5	H_5	I_5	J_5	K_5	L_5	Block 11
Block 6	G_3	H_3	I_3	J_3	K_3	L_3	G_6	H_6	I_6	J_6	K_6	L_6	Block 12

Each letter (A – L) represents a fish family. Each subscript indicates a specific fish species. Each horizontal row represents a study block, which is a period of continuous viewing of fish pictures designated for that block.

Appendix D

Informed Consent Form

I, _____ (print name), understand that I will be taking part in a research experiment where I will be asked to study pictures of fish, take a test, and make judgments about my experience. I understand that I should be able to complete this project within 60 minutes. I am aware that I am free to skip any questions in the unlikely event that I feel uncomfortable answering any of the items on the test or survey. I am also aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty. Additionally, I should not incur any penalty or prejudice because I am not physically able to 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

_____ Date: _____

(Signature of participant)

_____ Date: _____

(Signature of researcher obtaining consent)

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Appendix E

General Experiment Instructions

In this experiment you will be asked to study pictures of fish and their corresponding family names. This experiment has two phases, the study phase and test phase. During the study you will view pictures of 72 different fish with their corresponding family names appearing directly below each picture. Each picture and family name will appear on the screen for 3 seconds. At the end of the study phase, before beginning the test phase you will complete a survey in which you will make judgments about your memory for each studied fish family. You will then take a test where you will be asked to categorize pictures of new, unstudied fish from the same fish families studied earlier. Lastly, you will make judgments about your overall learning.

Appendix F

Please indicate on a scale from 8% (guessing) to 100% (absolutely certain) how likely it is that you will be able to correctly identify a new fish from each of the following families during the test phase? Write the actual percentage where it should fall on the scale. Also please be sure to use the full scale.

Angelfish

8%	54%	100%
Guess		Certain

Anthias

8%	54%	100%
Guess		Certain

Blenny

8%	54%	100%
Guess		Certain

Appendix F continued

Please indicate on a scale from 8% (guessing) to 100% (absolutely certain) how likely it is that you will be able to correctly identify a new fish from each of the following families during the test phase? Write the actual percentage where it should fall on the scale. Also please be sure to use the full scale.

Butterfly

8%	54%	100%
Guess		Certain

Cardinal

8%	54%	100%
Guess		Certain

Chromis

8%	54%	100%
Guess		Certain

Appendix F continued

Please indicate on a scale from 8% (guessing) to 100% (absolutely certain) how likely it is that you will be able to correctly identify a new fish from each of the following families during the test phase? Write the actual percentage where it should fall on the scale. Also please be sure to use the full scale.

Damsel

8%	54%	100%
Guess		Certain

Grouper

8%	54%	100%
Guess		Certain

Goby

8%	54%	100%
Guess		Certain

Appendix F continued

Please indicate on a scale from 8% (guessing) to 100% (absolutely certain) how likely it is that you will be able to correctly identify a new fish from each of the following families during the test phase? Write the actual percentage where it should fall on the scale. Also please be sure to use the full scale.

Tang

8%	54%	100%
Guess		Certain

Trigger

8%	54%	100%
Guess		Certain

Wrasse

8%	54%	100%
Guess		Certain

Appendix G

Sample test item

What family is this fish a member of?

Angelfish	**Anthias**	**Blenny**	**Butterfly**	**Cardinal**	**Chromis**
Damsel	**Grouper**	**Goby**	**Tang**	**Trigger**	**Wrasse**

Appendix H

Retrospective Judgment

Adopted from Kornell and Bjork (2008)

During **massing** items from the same category are presented consecutively.

During **interleaving** items from various categories are presented in a mixed order, and items from the same category are never presented consecutively.

Which do you think helped you learn more, massed or interleaved study?

Massed	**Interleaved**

Appendix I

Information Letter

Thank you for participating this study. The present study was conducted in order to investigate how picture size affects the judgments students make about their learning as well as their performance on a category learning task.

Previous research has suggested that text shown in smaller font size decreases the ease at which individuals process material. This experiment hoped to find the same effect for pictures. Additionally, it was predicted that by decreasing picture size performance on the category-learning task would actually increase because the smaller, less important features would be less apparent and the larger features, which are more defining for each category, would be easier to focus on. This study is applicable to everyday life because understanding how and what influence the judgments is critical for creating material that promotes more accurate judgments.

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, please do not hesitate to let us know now or in the future. Our contact information is found at the bottom of this letter. Additionally information for the Student Counseling Resource Center has been provided for the occasion that this experiment caused you distress of any kind.

Thank you again for your valuable contribution to this study. Sincerely,

Principal Investigator: Carlee DeYoung, 636-459-5524 (CMD472@lionmail.lindenwood.edu)

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

The Relationship between Punctuality, Optimism, and Time Perception

Madison Vander Wielen[11]

This study looked at both the relationship between a persons' punctuality and their perception of time passing and the correlation between a persons' punctuality and their optimism level. Punctuality was measured in two different ways: when the participant arrived to the scheduled study slot and then again when they took a punctuality survey. I measured the participants' perception of time by having them estimate when two minutes had passed while completing a Sudoku puzzle. The point of time when they thought 2 min had passed was compared to the actual amount of time that passed. The puzzle assured that the participants were not keeping track of time in their heads but rather rely on their own perception of time. Optimism was measured by the Revised Life Orientation Test by Scheier, Carver, and Bridges (1994). It was predicted that people who are more punctual will underestimate the amount of time that has passed whereas those who are not punctual will overestimate the amount of time that has passed. I ran a chi-square analysis and found no significant relationship between punctuality and time perception. Based on natural groups of punctuality, participants were grouped by whether they were punctual (i.e., early or on-time) versus unpunctual (i.e., late). It was expected that those in the unpunctual group will be more optimistic but my results showed no significance in optimism and punctuality.

Harrison and Prince define being unpunctual or late as arriving after the time of a scheduled event (as cited in Werner, Geisler, & Randler, 2014). When someone arrives late to an arranged meeting time, it is easy to assume this person is inconsiderate, lazy, and unorganized. The opposite of late would be punctual, or the act of arriving before or just at the arranged

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scheduled time. We attribute punctuality as a controllable, behavioral trait. But what if a person's punctuality is in reality an uncontrollable trait, a biological trait, that stems from a person's perception of time and internal clock? Le Poidevin (2015) described the perception of time as perceiving changes or events in time. Is it fair to put controllable blame on someone who psychologically perceives time passing at a slower rate than others?

One of the main aspects of the study I conducted looked at a person's perception of time. I was interested in seeing if the accuracy with which a person perceives time is a predictor of punctuality. The perception of time is hard to define. As explained by St. Augustine, our perception of time passing is merely just us remembering a memory (as cited in Le Poidevin, 2015). Few studies in the past have focused on time perception and punctuality. Levine, West, and Reis (1980) took participants from Brazil and the United States and compared their perception of time. They looked at many things, including the accuracy with which the different cultures kept time, the rate at which the cultures were late to appointments, and the participants' opinions about another person's punctuality. One of the things that Levine et al. (1980) found was that Brazilians were more often late (less punctual) to arranged meeting times than Americans were. Interestingly, they also found that Brazilians rated people who are constantly late as being more likeable and happier. Brazilians perceived a person's lateness is externally caused (Levine et al., 1980). The research study stated that participants from the United States

attributed unpunctuality to be controlled by people. My idea is that punctuality is not controllable, but in actuality, it is something that is linked with our perception of time.

Hill, Block, and Buggie (2000) wanted to look at the idea of time in comparison to different cultural and racial groups. They collected data from White Americans, Black Americans, and Black Africans. The groups were from separate areas and each participant fit into one of the three racial categories. After passing out the questionnaires, the researchers concluded that all three racial groups shared similar ideas about time. If different beliefs about time were influenced mostly by culture, then the researchers predicted that they would see similar results from the White American and Black American participant results. Similarly, the researchers thought that if the ideas about time were mainly influenced from biological, race-related aspects of people then the results from the Black Americans and the Black Africans would be more similar. Surprisingly, the results showed that all of the groups were pretty similar in their results with Black Americans being the most different. Hill et al. (2000) stated that their results supported the hypothesis that culture and genetics can be the main factor of a person's time beliefs is not entirely right.

Kanekar and Vaz (2001) looked at the difference in gender and views on punctuality. The researchers wrote out different scenarios of subjects arriving late to an interview and the participants in the study had to rate the subjects' behavior. The ratings that the participants

completed included the likelihood that the subject would be late again in a similar circumstance and how likely they would recommend the subject to stop being late in similar circumstances. Results stated that female participants' recommendations were stronger when the subject in the scenario was male. There was not a significant relationship between the two rating questions (Kanekar & Vaz, 2001). This means that the participants' expectations about punctuality were different from their recommendations about punctuality.

There have also been studies that focused on perceptions of people based on punctuality. Leach, Rogelberg, Warr, and Burnfield (2009) looked at the different characteristics of meetings in relation to the overall opinions about effectiveness from the attendees. Specifically focusing on the punctuality results, the researchers found that the punctuality of the meeting (did it start and end on time?) was a considerable predictor of effectiveness for meetings. The researchers discussed ways to give a more effective meeting and one of their suggestions was to be more aware of the punctuality of meeting times. These results tie in with the idea that there is negative judgment placed on people based upon their punctuality.

There are potential negative consequences that come along with being unpunctual. There has been some research conducted by Koslowsky, Sagie, Krausz, and Singer (1997) that found job loss, criticism from other employees, and low job commitment as possible outcomes for people who are less punctual. Punctuality has been researched in the past as a negative predictor

of bad behaviors. These researchers focused their meta-analysis study on the connection between an employee's lateness behavior and their withdrawal from work. Withdrawal from work includes low performance and social loafing. The data used for their research analysis came from previous studies that targeted lateness as a variable. The information was analyzed and the results showed that there was a correlation between lateness and withdrawal from work. Dishon-Berkovits and Koslowsky (2002) went on to create a new study to look at employee punctuality and the characteristics that go along with it. The researchers sent out a questionnaire to a company in Israel. The sample size was 158 participants and focused on time urgency, organizational commitment, and the age of the employee's oldest child. Research in the past have found results on certain factors that could be an indicator for punctuality, so then why are people still showing up late?

If what I am thinking is true, that punctuality is uncontrollable; could punctuality be defined as a personality trait rather than a behavioral trait? Richard and Slane (2001) wanted to investigate whether peoples' punctuality styles are consistent overtime. In their study, the participants' punctuality was measured in four different ways; a self-reported punctuality style, reported arrival time, actual arrival time, and a stopwatch task. The results showed that the participant's style of punctuality was consistent across the different measures. My implication that punctuality is a personality trait rather than a behavioral trait is stronger with the support of

these results. Not much research has declared what could be the cause of a person's punctuality style but researchers in the past have investigated the relationship between punctuality and personality traits.

The terms punctual and unpunctual are not the only personality trait terms associated with time. Anthropologists believe that people can be either monochronic or polychronic. These two terms describe different ways that people organize their time. Kaufman-Scarborough (2003) explained that monochronic time is compared to money; it is saved and budgeted similarly to money. A person who is monochronic would prefer to do one thing at a time and always follow through with the plan. In contrast, polychronic people can multitask and are known to be more flexible when it comes to changing activities or plans. These labels (monochronic and polychronic) enhance my research by allowing me to better understand the different ways that people organize and perceive time.

A study conducted by Furnham and Bramwell (2006) looked at personality traits from the five factor model or Big 5 as predictors for absenteeism in the workplace. The personality traits in the five factor model include openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism. Fifty-four workers at a company in the United Kingdom completed the NEO Five-Factory Inventory. The participants' degree of absence was retrieved

from the company's records. The results supported the researchers' hypothesis that extraversion is a positive predictor of absence (Furnham & Bramwell, 2006).

I have chosen the personality trait optimism as a variable in for the study at hand. I have always wondered if people who are late are just more susceptible to believing that they can fit a numerous number of tasks into a small time period. In the end, they are not able to and as a result they are late to their scheduled plans. But what is optimism? Is it different from the concept of hope? Researchers Bryant and Cvengros (2004) conducted a research study to answer this question. They created self-report questionnaires and handed them out to 351 undergraduate students. One of the measures used was the Life Orientation Test which is the same scale used in the present research study to measure the participants' optimism levels. After comparing the results from the questionnaires, Bryant and Cvengros (2004) defined hope as the focus on direct personal attainment of specific goals and optimism as the focus on broad qualities of future outcomes. The study at hand is focused on optimism, a more broad focus about the future, and how it relates to a person's punctuality.

Another group of researchers looked at different personality traits in comparison to punctuality. Back, Schmukle, and Egloff (2006) also looked at personality in comparison to traits from the five factor model. The researchers had participants complete a personality questionnaire on their free time and then had them meet for a psychological group experiment a few days later.

The whole point of the psychological group experiment was to measure the participants' punctuality to the arranged time. The results showed that individual personality traits from the five factor model were related to individual aspects of punctuality. Back et al. (2006) found that there was a significant relationship between agreeable people and people who arrived early or on time. They also found that conscientiousness was related not only to people who arrive early but also to people who arrive on time and late. Another group of researchers looked at personality and punctually. James and Fleck compared punctuality with extraversion and found that extraversion was inversely related to punctuality meaning that if a person was unpunctual they were more likely to be extraverted (as cited in Werner et al., 2014). Another five factor model term, conscientiousness, was also looked at by a few research teams. Both Werner et al. (2014) and Back et al.'s (as cited in Werner et al., 2014) research results showed that conscientiousness was related to punctuality in a positive way: people who were punctual were seen as being conscientious. The studies just mentioned found results that would suggest that people who are more punctual are also introverted, agreeable, and conscientious. One could assume then that if a person was unpunctual then they would also be extroverted, stubborn, and careless.

Previous research conducted by Werner et al. (2014) argued that punctuality is its own personality trait that depends on situational factors. The researchers looked at the personality trait of morningness in relation to punctuality. Werner et al. (2014) define morningness-eveningness

(M/E) as the personal time of day preference for sleep times and activities. The researcher expected to see a relationship between students who arrive early to class and the preference of morningness. The Composite Scale of Morningness was used to asses M/E. The participant's punctuality was assessed by self-report and by observation when they arrived to the scheduled class time. The results suggested that there is a relationship between morningness and punctuality. Specifically, morning oriented students were more likely to arrive early to class.

Since the researchers were able to state that morningness was a predictor to a person's punctuality, what else affects a person's punctuality? A recent study looked at the association between diagnostic sleep disorders and punctuality (Spiegelhalder et al., 2012). The researchers took 148 participants diagnosed with primary insomnia and 487 participants diagnosed with other sleep-related disorders and compared their punctuality to the appointment at the sleep center. Primary insomnia is described by Spiegelhalder et al. (2012) as a diagnosis of poor sleep that is not caused by medical or substance factors. The researchers hypothesized that participants with insomnia would be more likely to arrive earlier than the participants with other sleep related diagnoses. What they found was that there were too many confounding variables in the study. The results of their study showed that certain demographic characteristics predicted a participant's punctuality but not the sleep related diagnoses. The participants who were older, had a lower level of education, were female, and had an appointment scheduled later in the day

were more likely to be more punctual (Spiegelhalder et al., 2012). There was no relationship between punctuality rates and people who are diagnosed with sleep disorders.

I wanted to measure the participant's perception of time by having them complete a task (Sudoku puzzle) and rely on their time perception to estimate when 2 min has passed. I found a previous study that looked at the differences in puzzle types and the perceived duration of time to make sure that the Sudoku puzzle was not be a third variable in a correlation. Choe (2013) had participants of a variety of age groups complete different levels of challenging tangram puzzles and then answer a list of questions that applied to the puzzles (i.e. how interesting was the puzzle, how difficult was the puzzle to complete, how focused the participant was on the puzzle, and how long it took to complete the puzzle). The results showed that the more interesting puzzles were perceived to have taken a longer duration of time to complete.

My research study could add to these previous research ideas by studying not only the relationship between punctuality and the perception of time but also the relationship between punctuality and optimism. I hypothesize that a person's degree of punctuality is related to his/her perception of the duration of time that has passed and that it is also related to the person's level of optimism. Specifically, I predict that people who are more punctual tend to underestimate the amount of time that has passed whereas those who are often less punctual have a tendency to overestimate the amount of time that has passed. I am focused on the connection between

punctuality and the personality trait of optimism and I hypothesize that if a person is punctual they will measure low on the optimism scale.

Method

Participants

There were a total of 32 participants for my research study. There were 17 males and 15 females who took part in the study. Participants were recruited from the Lindenwood Participant Pool (LPP), Facebook, and from fliers (see Appendix A) located around Lindenwood University's campus. The LPP allows students in certain classes to sign up online for research studies put on at Lindenwood University. These participants were compensated with extra credit in a specific qualifying class. The age range for the participants was 18-64 years old. There were no participants with visual impairments that disabled them from completing the Sudoku puzzle.

Materials

Research was conducted both in the psychology lab at Lindenwood University and at the St Charles County Library, the O'Fallon location. The participants completed a survey packet consisting of a demographic survey (see Appendix B), a Revised Life Orientation Test (see Appendix C), and a Punctuality survey (see Appendix D). The participants attempted to complete a Sudoku puzzle (see Appendix E). I chose a beginner level puzzle to make sure that the puzzle was neutral and would likely not be too mundane or overly interesting for some

participants and not others. Instructions for the Sudoku puzzle was provided for all of the participants (see Appendix F) along with written instructions for the study (see Appendix G). All of my electronic calculations will be stored in a password-encrypted file on my personal laptop.

Procedure

Participants were recruited from the Lindenwood Participant Pool (LPP), fliers posted and given out around Lindenwood University, and posts made on Facebook. First, the participant's punctuality to the pre-determined meeting time for the study was recorded. Then, each participant filled out two informed consent forms (see Appendix H): one for the participant to keep and one was for my possession. The participants were given the chance to read over instructions for a Sudoku puzzle before attempting to complete the puzzle. Next, I verbally explained that the participants will have to tell me to stop my watch when they think 2 min have passed while they are working on the Sudoku puzzle, regardless of whether they are able to finish the Sudoku puzzle or not. About halfway through the study, I decided to print up the instructions for the participants so that way they could visually read what I want them to do instead of only relying on verbal instructions. I then notified the participants to let me know when they were ready to begin and started my stopwatch when they were ready. When the participants felt that 2 min had passed and they stopped working on the puzzle, I stopped my stopwatch and recorded the actual amount of time on my data sheet. After the timed puzzle

portion of the study was completed, the participants completed a survey packet that includes the Life Orientation Test scale, the punctuality test, and the demographic survey. The study ended with each participant receiving a feedback letter (see Appendix I) and signing a second consent form (see Appendix J). The second consent form was required in order to use the participants' punctuality that was recorded before the participants agreed to take part in the study.

All of the surveys and data collected from this survey are anonymous and stored in my personal locked file cabinet. All electronic statistics and data are being kept on my personal laptop in a locked folder. There was no reason for any of the participants to write their name on any of the surveys or scales in the study. All documents affiliated with the participant were assigned a number for organization.

Results

Based on natural groups of punctuality, participants were grouped by whether they are punctual (i.e., early or on-time) versus unpunctual (i.e., late). I conducted a chi-square analysis to see if there was a correlation between the participant's punctuality observed when they arrived and their time perception. I hypothesized that people who arrived on time or early would underestimate the amount of time that has passed whereas those who were not punctual would overestimate the amount of time that has passed. There was no significant relation between the

two variables, $X^2(2, N = 32) = 0.68$, $p > .05$. The percentage of participants that were punctual did not differ based on their time perception.

I also ran a correlation between the punctuality survey scores and the participants' time perception. I had the same hypothesis as stated before that people who scored higher on the punctuality survey would underestimate the amount of time that has passed whereas those who scored lower on the punctually survey would overestimate the amount of time that has passed. There was no significant relationship between punctuality and time perception, $r(30) = .22$, $p > .05$.

I also conducted a correlation to determine if there was a relationship between punctuality and the participant's optimism level. There was no significant relationship between the variables, $r(30) = -.0062$, $p > .05$.

Discussion

There were limitations that may have had an effect on the results of this study. The data collected for punctuality and optimism was self-report data. The participants could have been answering the surveys in ways that would present them as being more punctual and optimistic since society deems these characteristics as more positive for a person to have. Going forward, it would be more reliable to measure optimism differently such as having a friend measure the participant's optimism levels or observing the participants in a way to gauge their optimism.

Punctuality was measured two different ways: observed when the participants arrived and self-report through the punctuality survey that the participants filled out. I realized that the data was skewed when punctuality was measured when the participants arrived because of external variables. All of the participants who were recruited from the LPP were punctual and all of the unpunctual participants were recruited from my personal Facebook page which required them to meet me at a local library. The LPP requires participants to be on time to the studies whereas the participants from Facebook were not required to be punctual. I also had some of the participants mention that they were punctual because a class got let out early. This takes away the participants' control on their punctuality.

The other limitation I ran into was my sample size. With only 32 participants, my results were not a good representation of the population. In the future if I were to replicate the study, I would collect participants over a larger time period to potentially get more participants to better represent the population.

The results suggest that there is no relationship between optimism and time perception. Future research could correlate different personality traits to punctuality and time perception. Since Levine et al. (1980) found that Brazilian participants rated unpunctual people as being more likeable and happier; it would be interesting to correlate a person's overall happiness with his or her punctuality to see if it matches with the Brazilians' opinions.

Since there was an insignificant, weak positive correlation between time perception and punctuality, a new hypothesis could be proposed with new data to see why. The results suggest that the participants who were punctual were more likely to overestimate the time. A new hypothesis to consider could question if a person's perception of how long it takes to do certain tasks is related to their punctuality? More research on this subject could answer the following question; is the concept of time and time perception something we are genetically ,biologically programmed to know, or is it something we culturally or socially learn (Hill et al., 2000)?

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Appendix A

Participants Needed!

Come take part in a research study focused on the relationship between one's time perception, punctuality, and optimism. The study takes less than 20 minutes to complete and includes surveys and a Sudoku puzzle. The results are anonymous. All participants will be compensated with Hostess snack cakes!

Contact Madison Vander Wielen:
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Appendix B

Punctuality, Optimism, and Time Perception

Demographic Questionnaire

1) What is your gender? (circle one) **MALE** **FEMALE** **OTHER**

2) Age: _____ Years old.

3) Compared to your friends, are you more or less likely to arrive on time to a set date?

(**Circle one**)

More likely Just as Likely Less likely

Appendix C

Revised Life Orientation Test (LOT-R)

Instructions:

Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

(0) = strongly disagree
(1) = disagree
(2) = neutral
(3) = agree
(4) = strongly agree

Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

____ 1. In uncertain times, I usually expect the best.

____ 2. It's easy for me to relax.

____ 3. If something can go wrong for me, it will.

____ 4. I'm always optimistic about my future.

____ 5. I enjoy my friends a lot.

____ 6. It's important for me to keep busy.

____ 7. I hardly ever expect things to go my way.

____ 8. I get upset too easily.

____ 9. I rarely count on good things happening to me.

____10. Overall, I expect more good things to happen to me than bad.

Scoring:

1. Reverse code items 3, 7, and 9 prior to scoring (0=4) (1=3) (2=2) (3=1) (4=0)
2. Sum items 1, 3, 4, 7, 9, and 10 to obtain an overall score.

Note: Items 2, 5, 6, and 8 are filler items only. They are not scored as part of the revised scale.

Reference:

Scheier, M. F., Carver, C.S., and Bridges, M.W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, *67*, 1063-1078

Appendix D

Punctuality Survey:

Created by Madison Vander Wielen

Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

1. Rate your reputation for timeliness:

   1 2 3

   Always Punctual Sometimes Punctual Never Punctual

2. Thinking about classes or meetings, you normally arrive:

   1 2 3

   Early On-time Late

3. Thinking about a date, do you normally arrive:

   1 2 3

   Early On-time Late

4. When you have a definite appointment with a doctor or dentist, you usually arrive at the office:

   1 2 3

   Early On-time Late

5. When do you usually return borrowed/rented things like books and movies?

   1 2 3

Early	On-time	Late

6. You normally start work/class at 9:00am, but today you are giving a presentation at work/class at 8:30am. You arrive…

1	2	3
Early	On-time	Late

7. When mapping out a direction, I usually round up the estimated time of arrival (i.e. from 27 minutes to 30 minutes)?

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

8. It is important for me to be on-time to work or class:

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

9. I find it acceptable to be 5 minutes late to work or a class:

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

10. It aggravates me when I am late to work or class:

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

11. Occasional tardiness to work or class is acceptable:

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

12. I feel guilty when I am late to work or class.

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree

Scoring key:

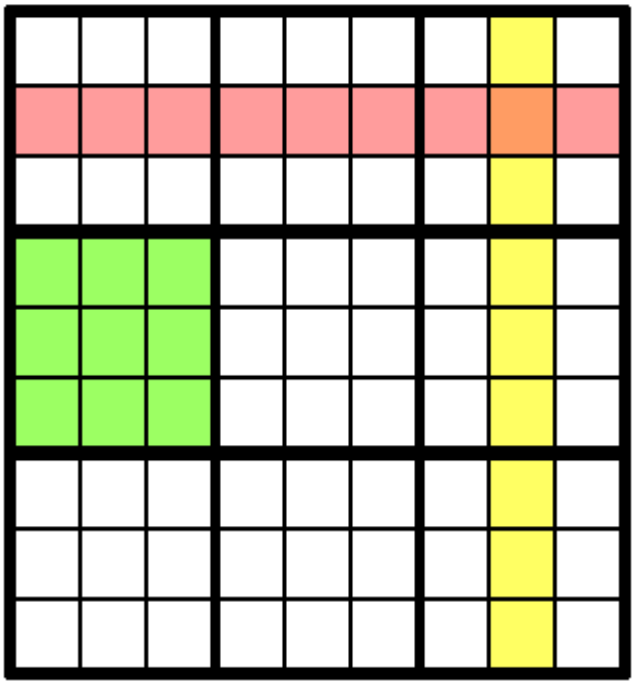
3. Reverse code items 9 and 11 prior to scoring (1=4) (2=3) (3=2) (4=1)
4. Sum items 1-12 to obtain an overall score.

Appendix E

				4			7	8
		2	7	8		1		4
4		8			1	6		
7				6	2	9		1
		5	1		4		8	
8	2	1	9	7		4	3	
1			3		9			7
2					7	3		
	4	7	6	5	8	2	1	9

Appendix F

Sudoku Instructions/Rules:



The objective of Sudoku is to enter a digit from 1 through 9 in each cell, in such a way that:

1. Each horizontal **row** (shown in pink) contains each digit exactly **once**
2. Each vertical **column** (shown in yellow) contains each digit exactly **once**
3. Each subgrid or **region** (shown in green) contains each digit exactly **once**

- Solving a Sudoku puzzle does **not** require knowledge of mathematics; simple logic suffices. (Instead of digits, other symbols can be used, e.g. letters, as long as there are nine **different** symbols.)

- The puzzler's job is to fill the remainder of the grid with digits – respecting, of course, the three constraints mentioned earlier.

Appendix G

Punctuality, Optimism, and Time Perception: Part I Instructions

For this part of the study, the goal is not to finish the Sudoku puzzle but to think about how long you have been working on it.

When you are ready to begin working on the Sudoku puzzle, I am going to start my stopwatch. While you are working on the puzzle, think about how much time has passed. When you think 2 minutes has passed, let me know and I will stop my stopwatch. Your goal is to get as close to 2 minutes as you can. Please put any cell phone or watches away.

Appendix H

Informed Consent

I _____ (print name), understand that I will be participating in a research project that requires me to partake in a Sudoku puzzle and complete a packet of surveys that includes an optimistic/pessimistic scale, a punctuality scale, and a demographic survey. I understand that I should be able to complete the entire study within 20 minutes. I understand that I am allowed to skip any question that makes me feel uncomfortable answering. I understand that my participation in this study is voluntary, and I can withdraw from the research at any time without penalty. I understand that the information obtained from my responses will be analyzed only as part of cumulative data, and that identifying information will be absent from the data in order to ensure anonymity. I understand that my responses will be kept confidential and that the data collected from this study will be available for research and educational purposes. I verify that I do not have a visual impairment that could restrict me from participating in a Sudoku puzzle and a survey. Lastly, I verify that I am at least 18 years of age and am legally able to consent or that I am under the age of 18 but have completed parental consent form that allows me to give consent as a minor.

_____ Date: _____

(Signature of participant)

_____ Date: _____

(Signature of researcher obtaining consent)

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Appendix I

Feedback letter

Thank you for participating in my research study. The study was conducted in order to determine whether perception of time reflects a person's punctuality and optimism level. There was a packet of survey questions that measured your optimism level, punctuality level, and recorded your demographics. The perception of time was measured by timing you while completing the Sudoku puzzle and comparing the actual time lapsed to the time after which you thought 2 min had passed.

Levine, West, and Reis (1980) conducted a study that wanted to look at the United States and Brazil and the perception of time and punctuality in the two countries. Levine et al. (1980) found that the participants in Brazil were less punctual than participants in the United States. Brazilians felt that people who are less punctual are friendlier and happier compared to people who are punctual. These same participants who rated themselves as not punctual were also more likely to estimate the wrong time when asked what time it was (Levine et al., 1980). I hypothesize that a person's degree of punctuality is related to his/her perception of the duration of time that had passed and that it is also related to the person's level of optimism. Specifically, I predict that people who are more punctual tend to underestimate the amount of time that has passed whereas those who are often less punctual have a tendency to overestimate the amount of time that has passed. Furthermore, I believe that a person's trait of punctuality is negatively correlated with his/her trait of optimism. It is my own thought that a person is who is constantly late is optimistic about what they are able to accomplish or complete in a time period before a scheduled meeting.

Please remember, I am interested in the overall findings based on cumulative data. No information about you will be associated with any of the findings, nor will anyone be able to trace your responses on an individual basis.

If you are interested in obtaining the final results of this study based on cumulative data, or if you have any questions or concerns regarding any portion of this research study, please feel free to let me know now, or in the future. My contact information is found at the bottom of this page.

Thank you again for your valuable contribution to this study.

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Appendix J

Informed Consent

I _____ (print name), understand that my time of arrival was observed and recorded before I consented to participating in this research project. By voluntarily signing this consent form, I am allowing the data collected to be used in this research project. If you object to allowing the collected data to be used in this research project, then return this form, unsigned and all data collected before you signed the first consent form will be discarded.

_____ Date: _____
(Signature of participant)

_____ Date: _____
(Signature of researcher obtaining consent)

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