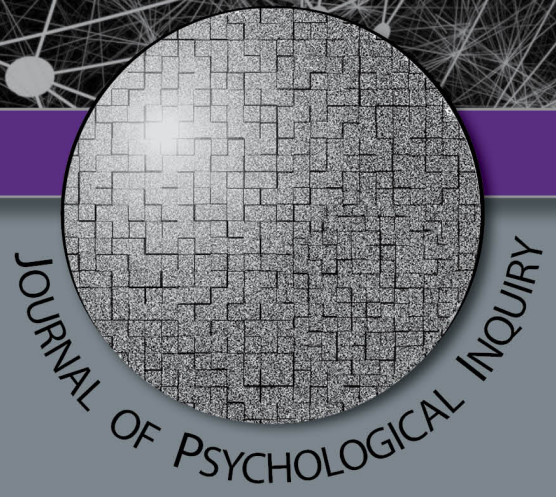




2019

Volume 23, Number 2, Fall

Issn 1085-6641



# **Journal of Psychological Inquiry**

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## FROM THE EDITOR'S DESK

Hello, everyone! Another Fall is upon us, bringing cooler temperatures and the end of summer activities. In addition, the race among hopeful politicians to earn the nomination to run for president as the Democratic candidate is in full swing. The presidential race should be of great interest to anyone interested in human behavior.

After the JPI submission portal went 'live' in the early summer, we have been received lots of terrific manuscripts from authors hoping to publish the results of all their efforts. The Associate Editors listed on page 2 have been working hard to review the submissions.

In addition, I'd like to welcome two new Associate Editors to the board: Christian Hart from Texas Woman's University and Darren Ritzer from Winthrop University generously agreed to join JPI.

I hope everyone has a joyous and restful holiday season, so in the new year you'll be ready to get cracking on your new research projects, and present your results at conferences. If you see me at a conference in the spring, please feel free to introduce yourself.

Ken Sobel  
University of Central Arkansas  
Managing Editor



RECOGNITION OF FACIAL AFFECT:  
DO TRAINING, AUTISM, SEX, EXTRAVERSION, AND AGE MATTER?

MIKAELA MILLSLADGE & WIND GOODFRIEND

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**Abstract** - Individuals who struggle with facial affect recognition (FAR), or the ability to detect emotions in others based on facial expression, often face more difficulty during social interactions. FAR testing methods have been developed to study individual differences in accuracy and ability to recognize emotion in faces, but few studies have experimented with methods of training to see if FAR accuracy can increase. In this study, 206 people completed an online survey measuring demographics and autism symptoms. Half were randomly assigned to complete an online training, then all participants viewed 20 faces and tried to identify the emotion being displayed. While no correlation was found between number of autism symptoms and FAR accuracy ( $p = .212$ ), there was a significant difference between experimental (training) and control (no training) conditions ( $p = .026$ ). In addition, there was difference FAR ability based on either participant sex ( $p = .903$ ) or target face sex ( $p = .849$ ). Finally, both age (for Ps over 60,  $p = .004$ ) and extraversion ( $p = .028$ ) were negatively correlated with FAR. Significant results for the experimental training provide support for the idea that FAR can be improved for people who have difficulty with this task. Further research is certainly warranted.

**Keywords:** Facial affect recognition, autism, sex, extraversion, age

The ability to express emotions and feelings, as well as understand them, is something that is unique to humans. While this affective decoding is experienced in almost all aspects of life, the importance behind facial expression processing has been shown to be linked to great evolutionary advantages (Mattavelli et al., 2014). This skill is also highly important for social communication and the development of relationships for all individuals (Wong, Beidel, Sarver, & Sims, 2012). Some individuals may experience deficits in their capability to both express and identify different emotions, resulting in decreased levels of social relationships and communication. Because of these deficits that may occur, it is important to understand how explicit training may benefit certain individuals in communicating and forming social bonds and relationships. One population that sometimes has trouble with affective decoding is individuals with symptoms of autism spectrum disorder.

The prevalence of autism spectrum disorder has increased over the last few decades. The most recent reports show that 1% of individuals world-wide have been

diagnosed with autism spectrum; one in every 68 children in the United States is diagnosed (Centers for Disease Control, 2015). This statistic is higher than in previous reports, which had indicated that the U.S. prevalence was only 1 in 88 children just two years earlier (Centers for Disease Control, 2015). This increase in prevalence has resulted in a parallel increase in attention and interest in the disorder. Gaining fuller understanding of autistic individuals will help both that population and will help the general population gain perspective and empathy toward them.

One hallmark of autism spectrum disorder is social impairment, often caused by an individual's inability to react in a socially normative manner in social situations. Many studies have shown that social interaction is highly important to the well-being of individuals (Downie, Mageau, & Koestner, 2008). In addition, social interaction has also been shown to benefit relational development. Individuals who have autism and/or social phobia have been shown to have an impaired relationship development skill (Arkush, Smith-

Collins, Fiorentini, & Skuse, 2013; Simonian, Beidel, Turner, Berkes, & Long, 2001; Wong et al., 2012). The importance of relationship skills brings forward questions as to how training and testing might benefit individuals in their ability to interact in social situations.

Research has shown that individuals who have autism spectrum disorders or related developmental impairments have greater trouble with facial affect recognition (FAR; Arkush et al., 2013), which may be one source for their social relationship deficit. Specifically, most individuals on the autism spectrum have a harder time with FAR (i.e., the emotion being expressed). This impairment adds to the trouble individuals with autism spectrum disorder have in communicating and relationship development when compared to the abilities of individuals who are of typical development (Arkush et al., 2013; Faso, Sasson, & Pinkham, 2015; Krebs et al., 2011; Kuusikko et al., 2009; Wallace, Coleman, & Bailey, 2008; Wong et al., 2012). Typical development can be used to describe individuals who do not present intellectual or developmental disabilities or inhibitions (Zaja & Rojahn, 2008). However, further research is needed both to replicate the general finding that people on the spectrum have a deficit in facial recognition and to understand the details regarding how this deficit might translate into specific outcomes. Based on previous research, the first hypothesis of the current study was that when presented with test faces displaying typical emotional affect, participants who report having autism spectrum disorder symptoms would be less likely to accurately identify the emotions displayed, compared to participants who report being of neurotypical development.

Development of software to test facial affect recognition has resulted in numerous databases containing faces that display affect that is recognized cross-culturally. While these resources can be used to test how individuals identify facial affect (i.e., which facial aspects are more commonly used to identify emotions), they also have potential to be used for training. Training with image stills has been shown previously to benefit individuals in their accuracy of identifying facial affect (Bekele et al., 2014; Bolte et al., 2006; Sinzig, Morsch, & Lehmkuhl, 2008).

For example, Bolte et al. (2006) aimed to use FAR training paired with functional magnetic resonance imaging (fMRI) to test for improvements of FAR in participants with autism. The researchers aimed to identify if there were any notable changes in brain function of the participants from before and after the training. Previous research (such as Hubl et al., 2003; Wang, Dapretto, Hariri, Sigman, & Bookheimer, 2004)

had shown that activation of a specific brain region called the fusiform gyrus related to the ability to recognize and process different emotions, allowing for this to be their indicator for success or failure in the study. For this study, participants used the FEFA computer-based program to test and teach participants about basic emotions on different descriptive levels. The brain activity of the participants was also measured and analyzed to determine the success of the FAR training and testing. Findings showed that highly functioning autistic participants were able to highly benefit from the FAR training, showing improvements in their “basic emotion detection skills” (Bolte et al., 2006, p. 214). Based on previous research, the second hypothesis in the current study was that participants who are exposed to facial affect training (randomly assigned to an experimental condition) would be more likely to accurately identify the emotions portrayed on test faces compared to participants who do not undergo the training (control condition). The interaction between diagnosis (autism or neurotypical) and experimental condition (FAR training or control) was also tested.

Beyond developmental differences, there have also been reported differences in the abilities of women and men to accurately identify facial affect in target individuals. While some studies have shown no sex difference in children (Everhart, Shucard, Quatrin, & Shucard, 2001), other studies conducted in adults were able to support that women have better recognition accuracy than men (Sasson et al., 2010). The age difference indicates that perhaps naturally occurring social training helps girls learn facial recognition skills more effectively or more quickly than boys as they go through adolescence and adulthood. These studies support a sex difference in individuals, giving rise to the third hypothesis of the current study: Emotional recognition accuracy will be higher in women than in men, regardless of experimental condition and regardless of spectrum diagnosis (a main effect of participant sex). In conjunction with these previous findings, support has also been given to a strong ability to recognize facial affect displayed by a woman rather than a man (Dimitrovsky, Spector, & Levy-Shift, 2000). The fourth hypothesis of the current study was a replication, expecting to find greater FAR accuracy of facial affect displayed by female target faces compared to male target faces for all participants.

As people grow and develop, senses of perception and awareness become more tuned to the world around them. These developments also include an increase in the FAR ability of those individuals with whom they interact, which allows for proper development of relationships and

interpersonal communication (Carstensen, Gross, & Fung, 1998). Studies have shown that there is a difference in this recognition ability with age (Arkush et al., 2013; Isaacowitz et al., 2007; McDowell, Harrison, Demaree, 1994). This initial positive correlation could be due to exposure of individuals to different forms of facial affect, allowing for a great recognition range. Most of the data support a positive correlation between age and facial affect recognition capabilities until a certain age is reached, when the effect reverses to become a negative correlation. Participants who were older adults (aged 60-85) were less accurate when tested for FAR than middle-aged adults (aged 40-59; Isaacowitz et al., 2007). While the second hypothesis focused on experimental training and experience in facial recognition, this study was also interested in the role of age as an indicator of naturally occurring practice and experience in facial recognition through real-world experiences. Therefore, the fifth hypothesis of the current study was that in general, there would be a positive correlation between the age of the participants and the accuracy of facial affect recognition until age 60, after which there would be a negative correlation (replicating the pattern found in Isaacowitz et al., 2007).

Finally, previous research has shown that a relationship between personality characteristics and emotional processing exists (Canli, 2004). Findings indicated different patterns of neurological stimulation specific to individuals based on (1) their self-reported personality type (extraversion in this case) and (2) the types of emotion being perceived. This study showed that extraverts were better at recognizing positive emotions compared to other individuals, but worse for other emotions tested (including fear, anger, surprise, and disgust; Canli, 2004, Matsumoto et al., 2000). The present study chose to focus on FAR in three emotions: happiness, fear, and anger (neutral affect was also included). Focusing strictly on the personality trait of extraversion, and because two of the three target emotions are negative (fear and anger), the current study presented a sixth hypothesis: Participants who self-report higher levels of extraversion will have lower FAR ability in this particular task than those who report lower levels of extraversion.

### Method

TBI is reportedly the most common type of physical injury sustained by combat soldiers returning from Iraq and Afghanistan. High winds and flying debris

produced by powerful explosions, and exposure to blast pressure waves are identified as the most common mechanisms of injury (Maguen, Lau, Madden, & Seal, 2012; Bush, 2010; Kennedy & Moore, 2010). According to the U.S military casualty statistics for OIF/OEF veterans, there have been approximately 339,400 service members treated within the Veteran's health system for combat-acquired TBI (8,500 of those cases defined as penetrating and severe trauma) since 2000 (Fischer, 2014; U.S. Department of Defense, 2015). A second report suggests that an additional 30,000 veterans are seeking treatment outside of the U.S. Department of Veteran Affairs

### Participants

This study included 206 individuals between the ages of 18 to 93. Participants were 48 men (24.12%) and 151 women (75.88%); ethnicity was 84.42% White/Caucasian, 4.52% African-American, 3.52% Hispanic/Latino, and 3.02% Asian-American (and 4.52% other or declined to answer). Participants for this study were recruited in three major ways: (1) in-class recruiting from general psychology courses at the hosting university, (2) through social media websites such as Facebook and Twitter, and (3) through email recruitment. Those recruited from general psychology courses were offered extra credit deemed appropriate by the instructor for their participation; those recruited from social media websites, chat rooms, and email listservs were simply thanked for their participation.

In an attempt to increase diversity in the sample in terms of age, the survey URL was posted to several Facebook pages specifically designed for older users. The link was also emailed to a group of retired people who participate in free summer courses offered by a large, public university. To recruit individuals on the autism spectrum, the link and a brief overview of the study's purpose were posted to relevant websites (researchautism.net and autism-society.org).<sup>1</sup>

### Predictor Variables

**Autism.** While individuals with autism spectrum disorder were specifically recruited from relevant websites, it is possible that non-autistic people could have seen the same announcements or that people recruited in other ways were on the spectrum. Thus, in order to identify which participants were or were not on the spectrum, a list of 13 symptoms of autism spectrum disorder (CDC, 2015) was provided and participants were asked to check whether each symptom applied to them.

<sup>1</sup> Several attempts were made to recruit through the national organization AutismSpeaks and from a large non-profit company in California called Anova, which provides housing and education for children on the spectrum. However, both of these organizations declined to offer the study to their clients due to concerns about either age (Anova is primarily for people under 18 years) and/or whether they would have the ability to independently complete the materials due to relatively severe symptoms.

Examples include, “I tend to repeat phrases over and over” and, “I tend to get upset by minor changes in my routine.” If a participant checked two or more symptoms, they were classified as being in the spectrum group for all relevant hypotheses; 67 participants (33.50%) reported having at least two symptoms. Number of symptoms in this sample ranged from zero to 10 ( $M = 1.37$ ,  $SD = 1.54$ ).

**Age.** Participants across different age ranges were recruited for this study based on previous research that has shown differences in FAR accuracy in young and older adults. Participants simply self-reported their age, along with the other demographics reported above. The range was 18 to 93 years ( $M = 36.6$ ,  $SD = 18.6$ ).

Individuals were grouped based on age, from 18-59 ( $n = 170$ ) and 60 and older ( $n = 30$ ).

**Extraversion.** Each participant completed an extraversion test adapted from Matsumoto, et al. (2000) and Francis, Lewis, and Ziebertz (2006). Participants were asked to answer either yes or no to thirteen different statements such as, “Are you rather lively?” and, “Do you usually take the initiative in making new friends?” Points are awarded for answers indicating extraversion, creating a possible range of 0 to 12 with higher numbers meaning more extraversion. The mean of this sample was 6.88 ( $SD = 3.88$ ) and internal consistency for this scale was good,  $\alpha = 0.887$ .

### Independent Variable: FAR Training

Participants were randomly assigned to an experimental or control group through the PsycData software used for this study; the program randomly presented one of two conditions. The experimental group received FAR training in which a series of faces depicting different emotions accompanied with written descriptions were shown. Emotions shown and verbally explained were happiness, fear, anger, and neutrality. Participants in this condition were able to study the faces and descriptions for as long as they deemed necessary before moving on with the survey. The participants in the control condition did not receive this training. Example materials for the FAR training can be found in Appendix A. All materials were taken from the Chicago Face Database, a free website providing research materials.

### Dependent Variable: FAR Testing

Each participant completed FAR testing at the end of the survey to measure their FAR accuracy. This was done using a set of 20 faces depicting a discrete emotion, also taken from the Chicago Face Database. For each face, participants had to choose the corresponding emotion on a multiple choice question with four options (happiness, fear, anger, neutral); five faces were shown of each emotion. Participants who correctly recognized the

face’s emotion were assigned 1 point, resulting in a possible range of 0-20. Higher numbers indicate a higher FAR accuracy. The overall mean of this sample was 18.14 ( $SD = 2.54$ ). Examples of the FAR testing materials can be found in Appendix B. All faces in both the training and testing materials were approximately the same age and were White/Caucasian, to avoid adding confounding variables such as race. Faces used for the testing phase were different from those used in the training phase.

### Procedure

All participants were asked to go to a URL link for the survey provided by the software company PsychData, which provides all survey materials online. All participants read through a basic consent form on the first screen, at the bottom of which they were given the option to click “yes” if they wished to participate. Participants who chose to skip this screen or click the “no” option were not given the rest of the survey. Those who completed the consent form and clicked “yes” moved on to the next part of the survey.

Participants who consented completed a demographics questionnaire, then the autism spectrum disorder checklist. Next, half the participants (random assignment) viewed the FAR training material. Participants in the control condition did not receive this training. Next, all participants completed the extraversion and social anxiety scales, then the FAR accuracy test. The last screen debriefed the participants regarding the purpose of the study, provided contact information for anyone with questions, and thanked them for their help. This study was approved by the hosting institution’s IRB committee.

### Results

#### Hypotheses 1 and 2

The first hypothesis stated that individuals who indicate more symptoms on the provided symptoms check list will be less accurate in their ability to identify facial emotion. A t-test was done to test this hypothesis based on two groups of participants, (1) participants who indicated two or more symptoms on the checklist, and (2) participants who indicated one or zero symptoms. Results from the t-test did not support this hypothesis,  $t(109) = 1.06$ ,  $p = .293$ . Participants with at least two symptoms ( $M = 18.29$ ,  $SD = 2.30$ ) had about equal FAR compared to participants with zero or one symptom ( $M = 17.85$ ,  $SD = 2.95$ ). A correlation between number of symptoms and FAR also confirmed this lack of association,  $r(196) = -0.09$ ,  $p = .212$ . Thus, Hypothesis 1 was not supported.

The second hypothesis stated that exposure to FAR training would result in more accuracy. Of those



who received training ( $n = 90$ ), the final scores for the FAR test were significantly higher ( $M = 18.57, SD = 2.14$ ) than those who did not receive the training ( $n = 106, M = 17.77, SD = 2.79$ ). Thus, Hypothesis 2 was supported,  $t(192) = 2.25, p = 0.026$ .

Finally, an ANOVA tested the interaction between spectrum group (0-1 symptoms vs. 2 or more symptoms) and training group; there was no significant interaction between the two [ $F(1, 195) = 0.75, p = .386$ ]. See Table 1 for all condition sizes, means, and standard deviations.

Table 1: Means and Standard Deviations for FAR Testing, by Condition

Condition	<i>M</i>	<i>SD</i>	<i>n</i>
0-1 Spectrum Symptom			
FAR Training	18.55	2.32	66
No Training	18.02	2.25	63
2 or More Spectrum Symptoms			
FAR Training	18.63	1.58	24
No Training	17.42	3.42	43

### Hypothesis 3

Hypothesis 3 stated that women would have higher FAR accuracy than men. However, a t-test revealed no significant difference between men ( $M = 18.17, SD = 1.97$ ) and women ( $M = 18.12, SD = 2.71$ ) participants for the present study [ $t(110) = -0.12, p = .903$ ]. These results showed no support for Hypothesis 3.

### Hypothesis 4

In addition to participant sex differences, the fourth hypothesis stated that the sex of target faces would result in a difference of FAR accuracy with the emotion displayed on female faces being more correctly identified. Participants were able to identify, on average, 9.08 of 10 males faces correctly ( $SD = 1.46$ ) and, on average, 9.06 of 10 females faces correctly ( $SD = 1.31$ ). To test this hypothesis, a repeated measures ANOVA was conducted [ $F(1, 195) = 0.04, p = .849$ ] but showed no significance, not supporting Hypothesis 4.

### Hypothesis 5

The fifth hypothesis was that there would be a positive correlation between age and FAR ability before the age of 60, but a negative correlation after the age of 60. In order to test this, participants were separated into two groups, (1) individuals aged 18-59 ( $n = 170$ ), and (2) individuals aged 60 and older ( $n = 30$ ). A correlation

within the younger group did not show significance between age and FAR ability [ $r(166) = -0.06, p = .472$ ]. However, a correlation within the older group did show a negative association between age and FAR ability [ $r(30) = -0.51, p = .004$ ]. In other words, Hypothesis 5 was partially supported.

### Hypothesis 6

Finally, a correlation tested the relationship between extraversion and FAR ability. The correlation for extraversion showed a significant negative association,  $r(196) = -0.16, p = .028$ . Thus, Hypothesis 6 was confirmed; high extraversion was associated with lower FAR ability.

## Discussion

By conducting this research, it was hoped to better understand the different factors that affect the ability of individuals to recognize facial emotion as a whole. The specific differences between individuals diagnosed with autism spectrum disorder and those of neurotypical development was targeted for this research, as well as the application of a training method to increase FAR ability of participants.

While no differences were found between individuals with spectrum symptoms and neurotypical individuals (Hypothesis 1 was not supported), other statistical analyses reinforced the idea that training is beneficial for individuals to show better overall FAR abilities (Hypothesis 2 was supported). While a previous study (Sasson et al., 2010) found that women participants had higher emotional recognition ability than men, the current study did not support this. Virtually no sex differences were found for participant sex, and contrary to the findings of previous research (Dimitrovsky et al., 2000), the sex of the target faces did not have an effect either. Due to these outcomes, neither Hypothesis 3 nor Hypothesis 4 were supported.

In addition to these findings, however, age did prove to be a factor later in life (from the age 60 and over), with a negative correlation to FAR ability. These findings could be due to multiple explanations, including brain deterioration with age or other diseases not identified within the survey. There was no correlation found for participants aged 18-59, resulting in Hypothesis 5 being only partially supported. In short, FAR ability is only associated with age in the later stages of life. Furthermore, extraversion was associated with lower test scores overall, replicating and extending findings from previous research (Canli, 2004). Thus, the current study provided several important replications and new insights into why any given individual may be skilled or challenged in facial affect recognition.

### Limitations and Future Research

While this study found no significant difference in FAR ability between participants with neurotypical development and those deemed to be within the range of autism, it should be noted that a limitation arises from the lack of participants clinically diagnosed as being on the autism spectrum. Measures were taken in order to recruit individuals on the spectrum from multiple avenues, but due to the desire to protect this vulnerable population, it was not possible to obtain proper numbers of participants for the present study. This alone was the reasoning for the inclusion of the autism symptom checklist from the CDC (2015) to attempt to understand the relationship between the disorder and FAR ability. This limitation holds back the current study from its potential, but also poses an opportunity for future research to focus specifically on training mechanisms and individuals who have been diagnosed on the autism spectrum.

Beyond the inability to recruit autistic participants, other limitations hindered the ability of the study to gather data and support many of the hypotheses. For example, this study was limited to adult participants only, ruling out an important population in terms of emotional recognition development and understanding of FAR ability. Inclusion of minors in the study could have expanded the age hypothesis to include more than two groups of individuals, as well as tested replications of previous research on sex differences in children in terms of FAR ability (Everhart et al., 2001). In terms of older adults, while a strength of the study was inclusion of 30 people aged 60 or over, all of these participants accessed the materials electronically. Thus, this particular sample had at least some comfort and familiarity with technology and had either active Facebook accounts or were engaged in an active group of retired people attending summer university courses. Thus, generalizability of the results to older individuals who are not as engaged or comfortable with technological advances may be questionable.

Looking at the demographics data provided in the method section, it should be noted that women made up two-thirds of the entire study. The lack of men who participated is a limitation that could have influenced the results of the study, which did not find support for a sex difference in FAR ability. In addition to the sex ratio issue, it should be explicitly stated that a large majority of the sample was White/Caucasian (84.42%). This could have influenced the results based on the fact that faces used in the training and testing were all Caucasian, and some participants were international individuals of different ethnicities. While all emotions and faces used were deemed to be cross-culturally identifiable, it is

possible that results were influenced due to cultural differences of participants. Previous research from Zhuoying, Ho, and Bonanno (2013) has shown that this cultural difference exists between Chinese and American individuals in relation to alterations of intensity of the emotions displayed. Furthermore, it has been noted that only four emotions were used for this study (happiness, fear, anger, and neutral). Previous studies have used more cross-culturally determined emotions. It is possible that the narrow variety of emotions used for this study hindered the outcomes and findings.

Finally, the software program used to collect data online did not track from where each participant was recruited. Thus, it is impossible to statistically compare, for example, results from the college students to results from people who found the study through social media.

This issue could be easily resolved in future studies by adding a question in the online survey regarding how participants found the web link. Even more ideally, future studies would run all participants under more controlled and consistent settings, to avoid potential confounds such as different environments.

As already noted, in future studies replication is needed with children, more diversity in terms of sex and age, more controlled environments, older individuals not as familiar with technology, and with individuals experiencing more severe spectrum symptoms. It would also be informative to design a procedure testing how long any benefits of FAR training might last. The current study tested for effects of training only minutes after that training occurred; thus, knowledge is still lacking regarding any possible longitudinal advantages. Future research could continue to measure FAR abilities over time to better understand whether benefits from training can last over time and whether additional training sessions can maintain any improvements.

### Strengths and Applications

In terms of strengths, the present study offers research surrounding the relatively understudied relationship between extraversion and emotional recognition and perception. Many studies in the past have focused on personality traits and emotional perception within the workplace (for example, Canli, 2004). No studies to the researchers' knowledge have noted relationships between personality and FAR ability or looked into how personality may interact with other characteristics, such as age, sex, and development. These characteristics may ultimately affect an individual's abilities to interact in social environments and perceive the emotions of others, and thus these traits need to be taken into consideration within future research.

Additionally, further development of the FAR training materials could be done to meet different needs of participants (e.g., videos created to make up for inability to read or comprehend emotions beyond still images). Development of the training could help focus research on other disorders or diseases that affect social functioning and relationship formation, such as social anxiety/phobia or attention deficit disorders. Aiming research on different populations would help to refine the training methods. Because neurological research has shown differences in brain function for autistic individuals when attempting to perceive facial affect (Bölte et al., 2006), training methods would benefit most from focusing on memorization tasks to overcome these brain function differences. Future research incorporating this information could allow for a different pathway to be formed for emotional perception, and recognition could provide the tools necessary to make up for the previously identified FAR disability in individuals with autism (Arkush et al., 2013).

One potential application of this study could be using FAR training in elementary schools. Teachers, parents, and clinical professionals could identify children who are displaying spectrum symptoms and/or appearing to have difficulty with FAR. Teachers could then offer FAR training to these children in a classroom environment, in after-school programs, or in whatever manner is convenient for the individual child. To maintain interest, the training program could even be designed as a game in which children earn points or rewards for correct facial recognition. Future research could explore the most effective ways to implement this type of training in convenient, inexpensive, and effective ways in school settings.

### Conclusion

Despite identified limitations of this research, its value is noteworthy and aids in the ongoing conversation surrounding FAR ability and training methods that are being developed. Although three of the six hypotheses were not supported, the results lacked essential input from target populations (autism) and there was a disparity in the sex of participants. However, the current study does suggest a multitude of additional avenues for future research, as well as supports the development of training methods to aid in FAR ability of individuals. Certainly numerous people are affected each and every day by their ability to perceive emotion and interact socially, so the importance of FAR training cannot be stressed enough. While it is important to note that differences in this ability rely highly on several factors, including development, personality, and age as current and previous research has shown, development of

training is inevitably needed for people who are challenged in their FAR ability. Future research on this topic is certainly warranted.

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## Appendix A

### FAR Training Materials Example

#### FAR Training

Below are example pictures of different types of emotions that are commonly expressed. Please read through the descriptions and study the images to understand key features and indicators of each emotion.

\*All images were adapted from the Chicago Face Database

#### HAPPINESS

Key features of happiness include:

- Tightened muscles around the eyes
- Raised cheeks
- Lip corners raised diagonally
- Mouth can be opened or closed

Examples:





Appendix B

FAR Testing Material Examples

For each of the following images, please indicate which emotion is being shown.



- Happiness
- Fear
- Anger
- Neutral



- Happiness
- Fear
- Anger
- Neutral



- Happiness
- Fear
- Anger
- Neutral

USING VISUAL SEARCH TO INVESTIGATE WHETHER  
COGNITION DIRECTLY AFFECTS PERCEPTION

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**Abstract** - Do thoughts and expectations directly influence the way the world looks? To investigate the interaction between cognition and perception we manipulated the congruity between numerical and physical size in a visual search task. In the typical numerical comparison experiment, participants view two numerals that have different physical and numerical sizes and select the numeral that is physically (or numerically) larger (or smaller). Response times are generally faster when the target's physical and numerical sizes are congruent—e.g., the target is physically and numerically larger than the other numeral—than when they are incongruent. We adapted the size congruity effect to visual search for a target defined by a conjunction of physical and numerical size. Participants searched for a congruent target which in one condition was physically and numerically small and in the other condition was physically and numerically large. In both conditions non-target distractors were incongruent, with some sharing the target's physical size (e.g., physically large but numerically small numerals) and the remainder sharing the target's numerical size (e.g., physically small but numerically large numerals). Holding the total number of distractors fixed and manipulating the ratio between the two distractors' set sizes enabled us to distinguish between two hypotheses: physical and numerical size are encoded into (1) the same mental representation, or (2) separate mental representations. Response times increased linearly with the number of distractors that shared the target's physical size, suggesting that participants could limit their search to the set of items that shared the target's physical size but not to the items that shared the target's numerical size. These results support the second hypothesis, that numerical and physical size are processed separately.

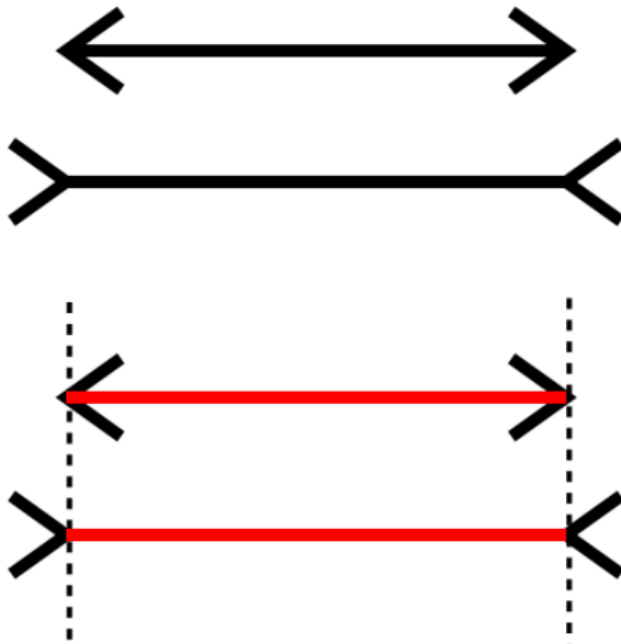
*Keywords:* visual search, size congruity effect, numerical Stroop, cognitive penetrability of perception

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Do thoughts and expectations directly influence the way the world looks, sounds, tastes, and smells? Popular culture abounds with stories suggesting they do. In *Blink*, Malcom Gladwell (2005) describes the perceptual bias faced by women who aspire to play classical music professionally. Until about 30 years ago few female musicians played in orchestras. Conductors claimed to be readily able to distinguish between a male and female musician due to the softness and flexibility of the female style. Over the past few decades orchestra musicians have fought for blind auditions in which they play their instruments behind a screen concealing them from the judges. Since the establishment of these new rules the number of women in orchestras has increased fivefold, forcing conductors to recognize that their expectations about differences between male and female musicians were self-fulfilling prophecies. Although the effect of blind auditions suggests that thoughts and ideas

directly influence perception, another possibility is that prior to the advent of blind auditions, symphony conductors fully intended to enact blatantly sexist hiring practices, and as a cover to hide their true motives, some conductors crafted the myth that female musicians were inferior to males. Indeed, the visual appearance of many well-known optical illusions suggests that thoughts and expectations do not affect visual perception.

Müller-Lyer (1889) described an optical illusion that has become a classic in which two equally long lines appear to be different lengths. One line is Y-terminated while the other is arrow-terminated, as in Figure 1. Even when the observer knows that the lines are equally long, the Y-terminated line appears to be longer than the arrow-terminated line. The Müller-Lyer and other illusions that persist in spite of knowledge to the contrary suggest that perception is not influenced by knowledge, or in other words perception is cognitively impenetrable



*Figure 1.* The Müller-Lyer illusion (1889). An optical illusion in which two lines of the same length appear to be different lengths. Even when the observer knows that the lines are equally long the Y-terminated line appears to be longer than the arrow-terminated line.

(Pylyshyn, 1999). Firestone and Scholl (2014) argue that thoughts can only influence judgments and other mechanisms that lie outside perception per se. In this paper we describe an experiment designed to test whether cognition directly influences perception.

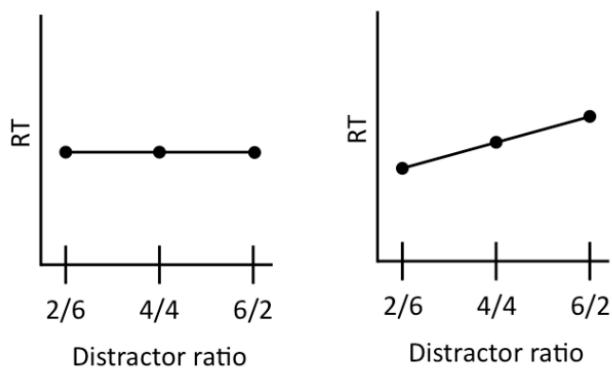
A common experimental method for investigating the interaction between perception and cognition is the numerical comparison task. In the traditional experiment (Besner & Coltheart, 1979; Henik & Tzelgov, 1982), participants view two numbers that have different physical and numerical sizes, and select the physically (or numerically) larger (or smaller) number. In some trials the target's physical and numerical size are congruent (e.g., a physically and numerically large target, such as a physically large 9) while in other trials physical and numerical size are incongruent (e.g., a physically large but numerically small target, such as a physically large 2). Response times are generally faster when the target's physical and numerical size are congruent than when they are incongruent. Such a result, which is called the size congruity effect, implies that the processing of physical and numerical size interact (Santens & Verguts, 2011), but there is some debate about where the interaction occurs.

According to the early interaction account (Schwarz & Heinze, 1998; Walsh, 2003), physical and numerical size are initially mapped onto a single mental construct, and they remain integrated throughout the entire mental processing sequence. The late interaction account (Santens & Verguts, 2011; Faulkenberry, Cruise, Lavarro, & Shaki, 2016) states that physical size and numerical size proceed along separate parallel pathways that only interact later, at the decision level. In the early interaction account, perception is cognitively penetrable because each digit's numerical size influences the perceptual processing of its physical size, but in the late interaction account, perception and cognition proceed independently. We are inclined to prefer the late interaction model because physical size can be directly extracted from a digit's visual appearance, but determining numerical size requires an extra step: a comparison between a visual stimulus and symbols stored in memory. The extra step required to determine numerical size suggests that physical (perceptual) and numerical (cognitive) size are processed separately. To gather evidence supporting the late interaction model, we adapted the size comparison task to a visual search paradigm.

Visual search is a widely used experimental technique (reviewed in Wolfe, 1998) for investigating how visual attention selects items of interest (targets) from all other visible items (distractors). In conjunction search tasks, the target is defined by a combination of two features, and each of two types of distractor shares one feature with the target. For example, participants may search for a red horizontal target among some distractors that share the target's color (red vertical) and other distractors that share the target's shape (green horizontal). The independent variable is the number of distractors and the dependent variable is response time (RT). A common way to determine if search can be restricted to one of the distractor subsets is to manipulate the ratio between the two distractor set sizes (Bacon & Egeth, 1997; Poisson & Wilkinson, 1992; Sobel & Cave, 2002; Zohary & Hochstein, 1989). For example, if the total distractor set size were fixed at eight items, some trials would have displays containing two target-color distractors and six target-shape distractors, some displays would contain four of each, and some displays would contain six target-color distractors and two target-shape distractors. Responses are typically faster when either distractor group is small than when the distractor groups are equal, suggesting that participants restrict their search to whichever distractor set happens to be smaller (Poisson & Wilkinson, 1992; Sobel & Cave, 2002).

In our experiment the target was defined by a conjunction of numerical and physical size. The target's physical and numerical size were congruent so in one condition the target was physically and numerically small and in the other condition it was physically and numerically large. Each search display contained one target and eight distractors, and the ratio of one distractor type to the other varied between trials. In some displays two distractors shared the target's physical size and six shared the target's numerical size, in some displays there were four of each distractor type, and in some displays six distractors shared the target's physical size and two shared the target's numerical size.

We hypothesized two patterns of response time as a function of the distractor ratio as depicted in Figure 2. If physical and numerical size are initially loaded into a single representation as in the early interaction model, every display would contain eight (physically or numerically) large sizes and eight (physically or numerically) small sizes, regardless of distractor ratio. As a result, response times should be insensitive to distractor ratio, yielding the flat response time function of distractor ratio as in the left panel of Figure 2. If instead physical and numerical size are processed separately as in the late interaction model, participants should restrict their search to the set of items that shares a visual feature (i.e., physical size) with the target. As a result, response times should increase linearly with the number of distractors that share the target's physical size, as in the right panel in Figure 2.



*Figure 2.* Hypothesized patterns of RT as a function of distractor ratio. For the three ratios along the x-axis, the numerator represents the set size of distractors that share the target's physical size and the denominator represents the set size of distractors that share the target's numerical size. The flat function in the left panel would result if physical and numerical size were mapped onto a shared mental representation. The increasing linear function in the right panel would result if search were restricted to the set of items that has the target's physical size.

## Method

### Participants

Permission was obtained from the Institutional Review Board at the University of Central Arkansas (UCA) to conduct this experiment. Participants were treated in accordance with the ethical guidelines of the American Psychological Association (2010). A total of 12 UCA undergraduate students (eight female, four male) between the ages of 19 and 28 (mean = 20.7) volunteered for the experiment in exchange for credit in their psychology courses.

### Apparatus

A MacBook computer connected to a CRT monitor with a screen resolution of 1024 x 768 pixels was used to perform this experiment. A program written in Real Studio Basic presented displays to the monitor and collected responses from the keyboard.

### Stimuli

All search displays contained eight distractor numerals and one target numeral. Each numeral consisted of three digits in which the first digit was a 2, 3, 8, or 9, and the other two digits were randomly generated. Each digit was constructed from line segments and arranged in a circle like a clock face as in Figure 3. The digits appeared in white text against a black background. The target digit appeared on either the left or right side of the screen.

### Procedure

The experiment began by displaying a series of instructional windows on the monitor that participants could read at their own pace then click a "Next" button to advance to the next set of directions. Participants were randomly assigned to one of two conditions and informed they would be searching for a number less than 500 and physically small in one condition, or a number greater than 500 and physically large in the other condition.

At the beginning of each trial the display appeared and remained visible on the screen until participants responded by pressing either the "z" key to report that the target appeared on the left side of the display or the "/" key to report that the target appeared on the right side of the display. The time between the onset of the stimulus and the participant's keypress was recorded for each trial. When participants responded correctly the stimulus array disappeared and the screen remained blank for 750 ms, then the display for the next trial appeared. If participants responded incorrectly a white screen with the word "Incorrect" would appear for 750 ms, then the blank screen appeared for 750 ms until the display for the next trial appeared. Halfway through the experiment the program invited the participant to

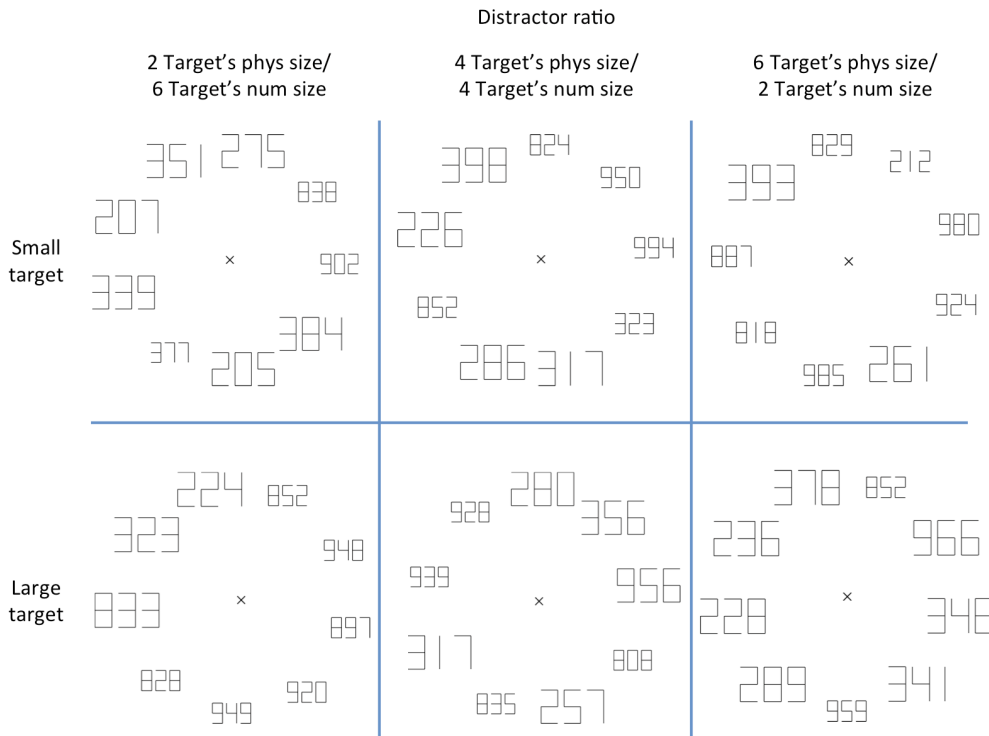


Figure 3. Screenshots of the visual displays. The target is physically and numerically congruent among incongruent distractors. The three distractor ratios represent the number of distractors that share the target’s physical size divided by the number of distractors that share the target’s numerical size.

take a short break. Each participant carried out 12 replications of every combination of target location (left or right side of the display), distractor ratio (two with targets physical size / six with target’s numerical size; four with target’s physical size / four with target’s numerical size; and six with target’s physical size / two with target’s numerical size), and target number (the leading digit being a “2” or “3” for small targets, “8” or “9” for large targets). Each combination of display factors (12 replications of two target locations, three distractor ratios, and two target numbers) was presented in random order without replacement. The first six trials overall and the first six trails after the break were practice, for a total of 156 trails (144 experimental + 12 practice), requiring about 15 minutes to complete.

**Results**

Mean correct response times (depicted in Figure 4) were submitted to a 3 x 2 ANOVA with distractor ratio as a within-subjects variable and target size as a between-subjects variable. The main effect of distractor ratio was significant,  $F(2, 20) = 18.4, p < .001, \eta_p^2 = .65$ . Contrasts confirmed that the linear trend was significant for small targets,  $F(1, 20) = 13.3, p < .001, \eta_p^2 = .40$ , and for large

targets,  $F(1, 20) = 24.1, p < .001, \eta_p^2 = .55$ . The main effect of target size and the distractor ratio x target size interaction were not significant, both  $ps > .1$ .

**Discussion**

The main effect of distractor ratio and significant linear trends support the hypothesis that numerical and physical size are processed separately. This is consistent with the general claim that perception is cognitively impenetrable (Pylyshyn 1999), and the more specific claim that any apparent influence of cognition on perception is better explained as judgments executed outside of perceptual processing (Firestone & Scholl, 2014).

One limitation of our experiment is that while we found one kind of perceptual processing (physical size of numerals) that is impenetrable to one kind of cognitive processing (numerical size of numerals), perhaps our conclusion does not generalize to other kinds of perceptual and

cognitive processing. Returning to the example that began our paper, even though we showed that the physical and numerical size are processed independently, it may nevertheless remain the case that music sounds

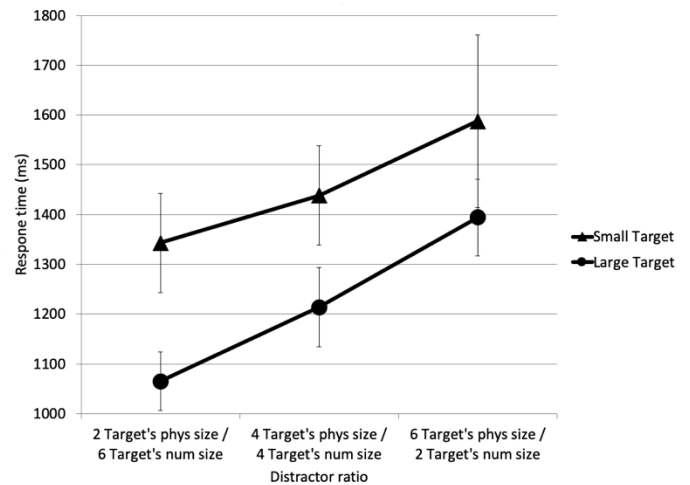


Figure 4. Response times as a function of distractor ratio. Error bars represent standard error of the mean.



differently based on whether the listener believes the musician is male or female. However, Firestone and Scholl (2014) argue that the classic perception-cognition divide is one of the foundations of cognitive science, and that the discovery of any persuasive evidence that cognition *does* penetrate perception would revolutionize the study of perception. Furthermore, the authors have recently (Firestone & Scholl, in press) undertaken a monumental effort to collect any purported examples of cognitively penetrable perception, and provide alternative explanations that are consistent with the foundational notion that perception is cognitively impenetrable. Although our result is narrowly defined, it fits well with Firestone and Scholl's overall project as yet another piece of evidence that supports the classic perception-cognition divide.

While we showed that physical and numerical size are processed separately, a second limitation of our experiment is the alternative hypothesis that physical size differences may have been much more salient than the numerical size differences. Perhaps participants would have processed physical and numerical size together if the two kinds of size differences were matched for salience. One way to address this limitation in a follow-up experiment would be to increase the differences in numerical size between the small and large numbers. However, we had already tried to boost numerical size differences by using three-digit numerals; that is, for three-digit numerals the average difference between small and large numbers is  $((800 + 900) / 2) - ((200 + 300) / 2) = 600$ , whereas for one-digit numerals the average difference between small and large numbers is 6. Instead, a better way to attempt to match the salience of physical and numerical size differences would be to *decrease* the physical size differences.

Another factor that may have influenced the relative salience of physical and numerical size is that we used just two different physical sizes (physically small digits and physically large digits), but four different numerical sizes for the leading digit of target and distractors (i.e., 2, 3, 8, and 9). To address this limitation, in future experiments we should use four physical sizes as well as four numerical sizes. Although our neglect of the relative salience of physical and numerical size is a limitation of the current experiment, it reveals a possible direction for further research.

In conclusion, adapting the size congruity effect to visual search for a target defined by conjunction of physical and numerical size allowed us to distinguish between two hypotheses: physical and numerical size are encoded into (1) the same mental representation (early interaction model), or (2) separate mental

representations (late interaction model). The main effect of distractor ratio and significant linear trends support the hypothesis that numerical and physical size are processed separately. Because Firestone and Scholl (2014) argue that any evidence showing that perception is cognitively penetrable would revolutionize cognitive science, our results will further postpone the date of the revolution.

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LIMITED THEORY OF WILLPOWER AND INCREMENTAL THEORY OF ABILITY:  
PREDICTORS OF PROCRASTINATION

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**Abstract** - Procrastination is a common issue among college students and often has a negative impact on academic performance. Students' implicit beliefs about the malleable nature of ability and the limited nature of willpower have been found to be related to procrastination. In the current study we attempted to determine which implicit beliefs, limited or non-limited beliefs about willpower or entity or incremental beliefs about ability, is the better predictor of procrastination. Students ( $N = 80$ ) from a small midwestern college completed a survey that included measures of procrastination, implicit beliefs of willpower and implicit beliefs of ability. Using multiple regression, we found a limited belief about willpower to be the better predictor of procrastination overall and that an incremental belief about ability adds to the prediction of procrastination. Implications for reducing procrastination are discussed.

*Keywords:* procrastination, implicit theories about willpower, implicit theories about ability

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Procrastination is a common problem, especially among college students, and is associated with low GPA and poor academic achievement (Senécal, Koestner, & Vallerand, 1995; Rabin, Fogel, & Nutter-Upham, 2011 respectively). Greater procrastination occurs in students who have low conscientiousness, low self-control, highly distractibility, and high achievement motivation (Steel, 2007). But personality characteristics are not the only predictor of procrastination. People's beliefs may also predict procrastination and may be easier to change than personality traits. Differences in beliefs concerning the malleable nature of ability and the limited nature of willpower have also been found to be related to procrastination (Howell & Buro, 2009; Job, Dweck, & Walton, 2010 respectively). The purpose of the present study is to identify the beliefs about ability and willpower that best predict procrastination.

### **Procrastination**

It is apparent that procrastination is harmful as it leads to decreased academic performance and can also lead to increased levels of stress and anxiety (Schraw, Wadkins, & Olafson, 2007). Given these negative consequences, why do students continue to procrastinate? Steel (2007) demonstrated that characteristics of both the task and of the individual contribute to procrastination. In terms of task characteristics, procrastination is more likely when the

task is particularly aversive and when the rewards for completing the task are further in the future. In terms of individual characteristics, procrastination is more likely when one has low self-efficacy, high distractibility, impulsiveness, and lack of self-control. To integrate these different characteristics within one theoretical model, Steel developed Temporal Motivation Theory.

According to Steel's (2007) Temporal Motivation Theory, the desirability of engaging in a particular behavior, such as writing a paper for class, is a function of four things: expectancy, value, delay, and delay sensitivity. In terms of writing a paper, a student that expects that he or she can successfully write the paper, that is, a student with high self-efficacy, should be less likely to procrastinate on writing the paper. The value of a task is lower if the task is perceived as aversive; thus, if a student dislikes writing papers, procrastination will be more likely. The value of a task is also influenced by the students' need for achievement, because students high in a need for achievement are likely to feel greater pleasure from finishing the paper. Thus, students high in need for achievement should also be less likely to procrastinate.

In Steel's (2007) Temporal Motivation Theory, delay refers to how long the time between the task and the possible rewards or punishments is. If the reward of completing a task, such as writing a good paper and getting a good grade is particularly valued,

procrastination will be less likely. This effect is augmented by a person's sensitivity to delay i.e. how easily they become distracted. If the delay is great, that is if the reward or punishment is far in the future, procrastination is more likely. According to Steel the greater people's sensitivity to delay, that is the easier they are distracted, the more impulsive they act, and the less self-control they have, the more they are likely to procrastinate. Temporal Motivation Theory thus provides a useful framework for considering the ways in which people's beliefs about ability and willpower could be related to procrastination by examining how they are related to expectancy, value, delay and sensitivity to delay.

### **Implicit Beliefs About Ability and Their Relation to Procrastination**

According to Dweck (1999) people's implicit beliefs of ability vary in terms of how fixed and how malleable they view ability to be. The extent to which people view ability as fixed is known as an entity belief about ability. On the other hand, the extent to which people view ability as changeable and that ability can change with increased effort is known as an incremental belief about ability.

When students with an entity belief are faced with a task they believe requires greater ability than they have, they have no reason to put forth effort toward accomplishing that task. In contrast, students with an incremental belief about ability have good reasons to put forth effort to accomplish a challenging task: it will increase their ability. Empirical evidence supports this contention: In the face of failure, students with an incremental belief about ability are less likely to give up (Robins & Pals, 2002) and more likely to seek remedial help (Hong et al., 1999). College students in challenging circumstances who were led to have an incremental belief about ability earned a higher GPA the following semester than those not led to have an incremental belief (Aronson et al., 2002). A meta-analysis of procrastination and implicit beliefs about ability revealed that an incremental belief about ability was associated with fewer helpless strategies, more mastery strategies (i.e., behaviors that are directed toward achieving the goal), fewer negative emotions, and greater expectations of success (Burnett, O'Boyle, VanEpps, Pollack, & Finkel, 2013). The one important caveat is that the benefits of having an incremental belief occur primarily when people experience a setback or failure (Burnett et al., 2013).

Because people with an incremental view of ability believe that effort can increase ability so they can successfully complete the task, they are more likely expect they can complete the task successfully and thus

demonstrate greater expectancy and self-efficacy (Steel, 2007, Baird, Scott, Dearing, & Hamill, 2009). This should make people with an incremental belief about ability less likely to procrastinate, and research has found this (Howell & Buro, 2009). Howell and Buro (2009) examined the relationship between entity and incremental beliefs about ability and procrastination habits and found that implicit beliefs about ability accounted for a small but significant amount of variance in procrastination tendencies.

The more students endorsed an entity belief about ability, the more they tended to procrastinate, while the more students endorsed an incremental belief about ability, the less they tended to procrastinate (Howell & Buro, 2009; Rickert, Meras, & Witkow, 2014). Thus we expect to find results similar to those found by Howell and Buro (2009) and Rickert et al. (2014); we expect to find that the more students endorse an entity belief about ability the more they will procrastinate, and the more students endorse an incremental belief about ability the less they will procrastinate.

### **Implicit Beliefs About Willpower and Their Relation to Procrastination**

Implicit beliefs about willpower involve how people view the availability of mental energy (Miller et al., 2012). Willpower is commonly thought of as mental energy or the energy available to complete mental tasks. People's implicit beliefs of willpower vary in terms of how limited or non-limited they view willpower (Job et al., 2010). If people believe that willpower is not limited or even that using mental resources is invigorating rather than draining, they have a non-limited belief about willpower (Job et al., 2010). If people believe that willpower is highly restricted or limited, and that using mental energy on tasks such as homework leaves less mental energy for subsequent tasks, they have a limited belief about willpower (Job et al. 2010).

Because they believe that willpower is highly limited and there is not enough to allow them to successfully complete a task, people with a limited belief about willpower are more likely to give in to distractions and impulsive behavior and less likely to show self-control (Steel, 2007). This should make people with a limited belief about willpower more likely to procrastinate, and research has found this.

Students' mindsets of willpower have been linked to a number of important academic behaviors including procrastination habits (Miller et al., 2012). Students with a non-limited belief about willpower showed greater sustained learning in a challenging task over time than people with a limited view of willpower (Miller et al., 2012). Students with a limited belief about willpower take

more and longer breaks, and procrastinate more and earn lower grades when under a heavy course load, than do people with a non-limited view of willpower (Job, Walton, Bernecker, & Dweck, 2015). Job et al. (2010) investigated this relationship between procrastination and beliefs about willpower and found evidence towards a causal relationship between endorsing a limited belief about willpower and increased habits of procrastination. Based on these past findings we predict that the more students endorse a limited belief about willpower, the more they will procrastinate, and the more students endorse a non-limited belief about willpower the less they will procrastinate.

### Predictions

This article is unique in the sense that no article to date has investigated procrastination with both implicit beliefs of ability and implicit beliefs of willpower. Knowing that possessing an entity belief about ability positively correlates with procrastination and possessing an incremental belief about ability negatively correlates with procrastination, combined with the knowledge that people with a limited belief about willpower procrastinated more than people with a non-limited belief about willpower (Howell & Buro, 2009; Job et al., 2010 respectively), we expect to find these same correlations in the present study. Since Howell and Buro (2009) reported weak but significant correlations between procrastination and implicit beliefs of ability and implicit beliefs of ability can be related to expectancy or self-efficacy, a predictor of procrastination, while Job et al. (2010) reported strong and significant correlations between procrastination and implicit beliefs of willpower and implicit beliefs of willpower can be related to a sensitivity to delay, such as distractibility impulsivity and self-control, which are also predictors of procrastination we expect both implicit beliefs of ability and willpower to predict procrastination (Steel, 2007). However because implicit beliefs of willpower are related to a greater number of procrastination predictors and has been shown to have a stronger relationship with procrastination we expect implicit beliefs of willpower to be the better predictor (Steel, 2007; Job et al., 2010).

### Methods

#### Participants and Procedure

For this study, 80 participants (23 men, 56 women, and 1 prefer not to answer) with an average age of 20 ( $SD = 3.110$ ) were recruited from a small Midwestern college. Extra credit was provided for participants who were taking a psychology course.

### Procedure

Participants completed an online survey described below that was distributed via email.

### Materials

To measure procrastination we used the 20 items on Lay's (as cited in Rabin et. al., 2011) General Procrastination Scale. Participants answered items such as "I do not do assignments until just before they are to be handed in" on a 5-point Likert scale. For the sake of consistency, the endpoints of the scale were modified from the original extremely uncharacteristic and extremely characteristic to strongly agree (1) to strongly disagree (5). This measure had strong internal reliability ( $\alpha = .917$ ).

To measure beliefs about ability we used the 8 items from Implicit Beliefs of Intelligence Self-Theory Scale (De Castella & Byrne, 2015). Participants answered 4 items such as "With enough time and effort I think I could significantly improve my intelligence level" to measure one's incremental belief about ability, and 4 items such as "I don't think I personally can do much to increase my intelligence" to measure one's entity belief about ability, both on a 5-point Likert scale with strongly agree (1) to strongly disagree (5). The measure of incremental and entity beliefs had good reliabilities ( $\alpha = .865$  and  $\alpha = .858$  respectively).

To measure beliefs about willpower we used the 12 items from Implicit Beliefs of Willpower Test (Job et. al., 2010). Participants answered 6 items such as "Strenuous mental activity exhausts your resources, which you need to refuel afterwards (e.g. through taking breaks, doing nothing, watching television, eating snacks)" to measure one's limited belief about willpower and 6 items such as "When you have been working on a strenuous mental task, you feel energized and you are able to immediately start with another demanding activity" to measure one's non-limited belief about willpower. Both measured used a 5-point Likert scale with strongly agree (1) to strongly disagree (5). The measures of limited and non-limited beliefs both had good reliability ( $\alpha = .847$  and  $\alpha = .833$  respectively).

### Results

In order to test the hypothesis that implicit beliefs of willpower are the stronger predictors of procrastination than implicit beliefs of ability we examined the correlations of implicit beliefs of ability and of willpower to procrastination. As seen in Table 1, both limited and non-limited beliefs about willpower are strongly correlated with procrastination. Neither entity nor incremental beliefs about ability were significantly correlated with procrastination, however incremental belief about ability did approach significance. These



Table 1  
Correlations among Procrastination and Implicit Beliefs

	1	2	3	4
1.Non-limited Theory of Willpower	1			
2.Limited Theory of Willpower	-.635***	1		
3.Incremental Theory of Ability	.009	.071	1	
4.Entity Theory of Ability	.008	-.051	-.792***	1
5.Procrastination	-.342**	.420***	.216†	.061

† $p < .06$  \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

correlations suggest that implicit beliefs of willpower are better correlated with, and thus are better predictors of, procrastination than implicit beliefs of ability. This supports our hypothesis that implicit beliefs of willpower are the better predictors of procrastination.

According to the correlations in Table 1 implicit beliefs of willpower, both limited and non-limited, were both correlated with procrastination. The correlation between procrastination and incremental belief about ability approached significance and entity belief about ability was not correlated with procrastination. We next examined these relationships further with the hierarchical multiple regression shown in Table 2 . Table 2 demonstrates that a limited belief about willpower has the highest correlation to procrastination of the two beliefs about willpower and is thus the better predictor of the two. Table 2 also shows a significant change in  $R^2$  ( $F[2,75]=4.697, p=.012$ ), which suggests that model 2 predicts procrastination better than model 1. In model 2 an incremental belief about ability was a better predictor of procrastination than an entity belief but still was not as strongly related to procrastination as limited belief about willpower was. Together this suggests that while a limited

Table 2  
Hierarchical Multiple Regression for Implicit Beliefs predicting Procrastination

	$R^2$	$\beta$	$p$
Model 1	.186		
Non-limited Theory of Willpower		-.127	.343
Limited Theory of Willpower		.339	.013
Model 2	.276		
Non-limited Theory of Willpower		.096	.454
Limited Theory of Willpower		.378	.004
Entity Theory of Ability		-.298	.068
Incremental Theory of Ability		-.478	.004

$R^2$  change was significant thus model 2 does predict procrastination better than model 1  $F(2,75)=4.697, p=.012$

belief about willpower best predicts procrastination, adding an incremental belief about ability improves the prediction of procrastination.

**Discussion**

This study examined the relationships between procrastination and implicit beliefs, demonstrating that limited belief about willpower is the best predictor of procrastination and that incremental belief about ability increases the prediction of procrastination. By examining the relationships between individual implicit beliefs and procrastination, it is apparent that implicit beliefs of willpower, both limited and non-limited, are related to procrastination and incremental belief about ability is related to procrastination to a lesser extent. However, when all four implicit beliefs are examined, limited belief about willpower is most closely related to procrastination of the two implicit beliefs of willpower and incremental belief about ability strengthens the relationship between implicit beliefs and procrastination.

The stronger correlation between a limited belief about willpower and procrastination compared to an incremental belief about ability and procrastination may be due to how closely related implicit beliefs of willpower are to procrastination. As stated earlier implicit beliefs of willpower are more logically related to procrastination because both have to do with regulating mental stores of energy whereas implicit beliefs about ability are more general and have to do with whether or not it is believed that any type of ability or attribute can change. It is possible that the stronger relationship between limited belief about willpower and procrastination versus non-limited belief about willpower and procrastination is due, in part, to the fact that these students are college students and the college atmosphere itself may be promoting increased procrastination habits; so while students endorsing a non-limited belief may procrastinate less they are still college students and will still procrastinate some, this pattern of behavior could then lessen the strength of the correlation between non-limited belief about willpower and procrastination.

Prior to this study no research addressed which measure of the four examined is the best predictor of procrastination, this was the unique aim, and major strength of this study. Up until this point it was unknown whether or not one sort

of implicit belief was better at predicting procrastination than the other let alone which implicit belief was the best predictor and which aids in predictive ability. Now we have this information.

What still remains unknown however is the effects high self-regulatory demands have on these findings and whether the predictive ability of limited belief about willpower and incremental belief about ability are altered or enhanced when students are under high or low self-regulatory demands. It is possible that willpower is the better predictor of procrastination because ability is really relevant to procrastination when people doubt they have enough ability and many students come to college and find it is not too difficult but many come instead to find the amount of work, and thus the amount of time they spend on classwork, is much larger than expected. Previous research has shown that when students are under high self-regulatory stress, such as when they have a heavy course load, they tend to perform better in their academics and procrastinate less if they endorse a non-limited belief about willpower (Job et al., 2015; Job et al., 2010). For example, Job, Walton, Bernecker, and Dweck (2015) measured college students' procrastination and self-regulatory demands five times over the course of the second half of a semester and found that students who reported higher self-regulatory demands in the coming weeks procrastinated more if they had a limited belief about willpower than students with a non-limited belief about willpower. However researchers also found that implicit beliefs about willpower were not related to procrastination when reported self-regulation demands were low. Future research should examine whether or not high self-regulatory demands, such as intense course loads, changes or enhances the results of this study.

Previous studies have also demonstrated a causal link between limited and non-limited beliefs about willpower and procrastination where endorsing a limited belief about willpower over a non-limited belief about willpower leads to procrastination, as well as a predictive link between incremental and entity beliefs about ability predict procrastination (Job et al., 2010; Howell & Buro, 2009 respectively). Future research should investigate whether or not a causal link can be found between implicit beliefs of ability and procrastination.

Ultimately these findings have practical implications for students and teachers. Students or professors could use measures of limited belief about willpower and incremental belief about ability to predict procrastination. The students who demonstrate a limited belief about willpower and an incremental belief about ability along with teachers and professors, who have a

high number of these students in class, could use this information to take action against procrastination. These students, teachers, and professors could, for example, set a higher number of intermediate deadlines for assignments to work against procrastination (Ariely, & Wertenbroch, 2002). Professors and students could also work together to try to alter the students' implicit beliefs so the students begin to endorse an incremental belief about ability and not a limited belief about willpower (Miller et al., 2012). College students in challenging circumstances who were led to have an incremental belief about ability earned a higher GPA the following semester than those not led to have a growth mindset (Aronson et al., 2002). Attempting to alter students' implicit beliefs long term however might not work as there is no evidence indicating that altering mindsets in studies has lasting effects.

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We would like to thank Mari Silliman and Mikayla Wilson for their collaboration in creating the survey and collecting data. Correspondence concerning this article should be addressed to Sal Meyers, Department of Psychology, Simpson College, Indianola, IA 50125. E-mail: sal.meyers@simpson.edu

THE MISINFORMATION EFFECT ON MEMORY ACCURACY:  
DO CREDIBILITY, ORDER, AND CONSCIENTIOUSNESS MATTER?

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**Abstract** - Crimes happen spontaneously and anyone can become a witness unexpectedly. Even though eyewitness testimony is often distorted, juries find vivid eyewitness recollections persuasive (Leippe, 1985) and they find it hard to ignore a confident witness (Loftus, 2011). This project further investigated the misinformation effect, credibility of a witness, order effects, and the personality trait conscientiousness in the contexts of a fictional crime. Participants watched a short video of a woman being mugged and were asked to recall details afterward. They were also asked to read a police report containing misinformation (errors regarding what actually occurred). As expected, memory accuracy was worse when the misinformation was presented after the event compared to before. Surprisingly, credibility of the witness (an off-duty police officer or a young boy) had no influence on memory accuracy. Finally, conscientiousness was positively correlated with memory accuracy (as hypothesized), but this trend was not statistically significant. Implications, limitations, and future research are discussed.

*Keywords:* Memory, eyewitness testimony, misinformation effect, recency effect

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When crimes occur, witnesses are an essential part of the investigation and trial procedures. They are interviewed and asked detailed questions about what they saw. Police, judges, and other officials rely on witnesses' memory to be accurate, and juries find vivid eyewitness testimony extremely persuasive (Leippe, 1985). Unfortunately, eyewitness testimony is not perfect; in many cases, memory is distorted, falsified, or misconstrued. In spite of these flaws, juries find it hard to ignore a confident witness, even when that person's testimony is proven to be useless or irrelevant (Loftus, 2011). The purpose of the current study was to further understand the reliability—or lack of reliability—in eyewitness testimony. It included an investigation of source credibility, an experimental manipulation of when participants are exposed to inaccurate information, and the importance of witness conscientiousness for memory accuracy. This study contributes to the present literature by combining these variables in a novel way.

**The Misinformation Effect**

One error that is a common problem in erroneous eyewitness testimony is when false information replaces or overpowers the original, true

memory; the “misinformation effect” happens when a person's memory becomes less accurate or produces errors due to exposure to false, post-event information (Loftus, 1991). When this effect occurs, witnesses may report inaccuracies without realizing that their memory has been corrupted. Many studies have investigated the misinformation effect in memory accuracy (e.g., Eakin, Schreiber, & Sergent-Marshall, 2003; Lampinen & Smith, 1995; Loftus, 1991; Loftus & Hoffman, 1989).

A typical procedure to test for the misinformation effect follows a standard paradigm: First, one experiences the event; second, one receives new (incorrect) information about the event; and lastly, one is tested on memory accuracy for the event (Lampinen & Smith, 1995; Loftus, 1991). If the witness incorrectly remembers the false information, the misinformation effect has occurred. Several theoretical explanations for the misinformation effect have been debated (see, for example, Ayers & Reder, 1998; Rantzen & Markham, 1992; Weingardt, Loftus, & Lindsay, 1995; Zaragoza & Koshmider, 1989). Elizabeth Loftus, the most well-known researcher in this area, initially suggested that the effect is due to changes in participants' memories for the original event as the new misinformation replaces the

original memory (e.g., Loftus, 1982; Loftus, Donders, Hoffman, & Schooler, 1989; Weingardt et al., 1995). One alternative idea is that participants are exposed to both the actual event and the misinformation and that they maintain two separate memories for each (Lindsay & Johnson, 1989). However, when they are given a memory test they simply cannot distinguish which memory came from the actual event and which came from the post-event information; thus, they make mistakes on the test.

There are several factors that can influence the likelihood of the misinformation effect. Loftus (1991) lists several of these factors, such as the nature of the event (e.g., how vivid or emotional it is, whether it is presented live or through media such as video, whether there is distraction in the background), the amount of time between event and recall, age of witness, and warnings that misinformation may appear between the original event and the memory test. The misinformation effect can also occur after an event if people talk to others about the event, if they overhear new (and false) information from others, or if they obtain new, false information from other sources such as the media (Loftus & Hoffman, 1989). In short, many studies have established circumstances or environmental factors that influence when the misinformation effect is more or less likely to occur.

### Credibility

Another influential factor in how witnesses may be influenced after they see an event unfold is their exposure to post-event information from either high-credibility or low-credibility sources. The source can be anything that provides information, such as newspapers, articles, teachers, speakers, books, and media, and each source's author will be held to certain standards by the audience. Specifically, sources who are perceived to be experts, or more credible sources, are more likely to persuade the audience (Hovland & Weiss, 1951; Kelman & Hovland, 1953; Lorge, 1936; see Petty & Cacioppo, 1996 for a review). Certainly, it is predictable that higher-credibility sources are more persuasive, but research has explored the details in which credibility may combine with other variables to be more or less relevant to memory accuracy. For example, in an early study by Hovland and Weiss (1951), they found no difference in the amount of correct information recalled by participants based on source credibility alone. However, in the same study, credibility interacted with time delay: Immediately after witnessing an event and being exposed to high- versus low-credibility sources, participants rated the high-credibility source as more trustworthy than the low-credibility source. In contrast, after four weeks had passed, there was a decrease in agreement with the high-

credibility source and an increase in agreement with the low-credibility source. Therefore, time made credibility less important in terms of how much it mattered to participants.

The tendency for higher credibility in sources to be more influential is a natural instinct, according to Petty and Cacioppo (1996). When a source of information is perceived as credible, it is also perceived as more trustworthy and therefore more persuasive. The delay effect discussed above may also be relatively tenuous; one study (Kelman & Hovland, 1953) showed that credibility can be reinstated. When participants were reminded of the source of a communication three weeks later, it increased their acceptance for the positive (trustworthy, well-informed) and decreased acceptance for the negative (untrustworthy, poorly-informed) communicator.

The expertise and credibility of a source makes a significant difference in participants' susceptibility to misinformation (Smith & Ellsworth, 1987). For example, Smith and Ellsworth (1987) point out that in most experimental paradigms for the misinformation effect, the false information is presented by the experimenter him- or herself (e.g., as part of the memory "test" itself). Participants are likely to see the experimenter as a highly credible source who is familiar with the information. Few studies have experimentally manipulated the credibility of the source when misinformation is presented to participants. This study will combine both misinformation and credibility in an eyewitness situation, after which participants will take a memory test for accuracy.

Based on the research above, **Hypothesis 1** for the current study was that participants would be more likely to remember misinformation from a high-credibility source, leading to lower memory accuracy for an event, compared to misinformation from a low-credibility source.

### Other Predictors: Oder Effects and Personality

A majority of studies involving misinformation present an event, then present misinformation (e.g., Lampinen & Smith 1995; Paz-Alonso, Goodman, & Ibabe 2013; Porter, Bellhouse, McDougall, ten Brinke, & Wilson, 2010; Smith & Ellsworth, 1987; Wang, Paterson, & Kemp, 2014). Few studies have investigated whether presenting misinformation *before* an event has a differential effect, compared to presenting it afterward. One of the only exceptions (Eakin et al., 2003) showed that the misled-reverse group (misinformation presented before the event) had higher recall accuracy for the actual event, compared to the "typical" misled group (misinformation after event). If the misinformation effect does occur because participants cannot distinguish

between what facts came from the actual event versus the post-event information (as suggested by Lindsay & Johnson, 1989), then a recency effect is more likely to influence their answers on a memory test, leading participants to make errors in favor of the latter, incorrect information.

**Hypothesis 2a** for the current study was therefore that memory accuracy would be worse if the misinformation is presented after the event, compared to when it is presented before the event (participants would remember whatever came second, a recency effect). Because the combination of source credibility and order effects has not been previously studied in the context of misinformation, an interaction was also expected.

**Hypothesis 2b** was that participants in the condition where misinformation is presented by a highly credible source after the event has been observed would have the lowest memory accuracy (i.e., misinformation would be most influential in these circumstances), compared to the other three conditions (high-credible source before event, or either condition with a low-credibility source).

In addition to the order of when misinformation is presented, other variables may affect memory accuracy in eyewitnesses to crime. Personality, for example, may influence the way individuals perceive events. Personality is defined as “an individual’s characteristic mode of thinking, feeling, and acting” (Terry, 2006, p. 382). Perhaps the most popular approach to studying personality in the field of psychology has been the trait approach, which identifies several foundational characteristics that seem to describe people’s behaviors across a variety of situations (Cattell, 2004; McCrae & Costa, 1997).

Some research has investigated how personality is related to memory. For example, Howarth (1969) investigated the traits of introversion and extroversion. According to Howarth, introverts will do worse than extroverts if the given situation produces a high level of physiological arousal (which may be relevant to witnessing crimes; e.g. fear of being victimized).

Another personality trait that may be related to memory and relevant to crime witnesses is conscientiousness. People high in conscientiousness have characteristics such as good organization, efficiency, and dependability (Goldberg, 1990). Although these aspects of conscientiousness seem like they would influence memory accuracy, previous research has questioned this basic association. For example, when participants in one study were exposed to two different types of misinformation, conscientiousness was not significantly correlated with ability to accurately distinguish real versus false information (Liebman, McKinley-Pace,

Leonard, Sheesley, Gallant, Renkey, & Lehman, 2002). This is one of the only studies to examine the link between conscientiousness and the misinformation effect. Thus, additional exploration of this topic seems warranted.

Many aspects of conscientiousness (e.g., attention to detail and motivation to achieve) seem predictive of a potential participant’s attempt to succeed in a research task presented to them, including being a good eyewitness. Although Liebman et al. (2002) did not find an association between memory accuracy and conscientiousness, a single study is not enough evidence to draw conclusions. Recall that one potential explanation for the misinformation effect is that participants maintain two, separate memories—one for the actual event and one for the incorrect information—and are not able to distinguish which set of facts came from which source (Lindsay & Johnson, 1989). This lack of “source monitoring” may be more likely in individuals who are not detail-oriented. In other words, it is possible that individual differences in source monitoring ability are tied to variation in the trait of conscientiousness. Thus, **Hypothesis 3** for the current study was that higher scores on conscientiousness would be correlated with better memory scores. This hypothesis was tested through both memory for general items and for items relating to misinformation to which participants were exposed.

In sum, previous research has identified the misinformation effect as a potential problem relating to errors in eyewitness testimony (e.g., Loftus, 1991). Several factors might contribute to the extent of the misinformation effect; one variable is source credibility (Smith & Ellsworth, 1987). Another variable that might influence amount of misinformation recalled is an order effect regarding when people are exposed to the misinformation (Eakin et al., 2003). Finally, little research has been conducted regarding personality and memory, and what has been done questioned whether conscientiousness plays a role in memory accuracy (Liebman et al., 2002). The current study further investigated each of these lines of inquiry and combined them in a novel way.

## Method

### Participants

The original sample size was 164, but 38 participants were removed from the study either because they had already taken another eyewitness survey in the last six months (and therefore may have already seen the experimental materials) or they stopped their participation before completion. The final sample was 126 people, including 50 men and 76 women. Race was as

follows: 73.81% White, 8.73% Black, 6.35% Latino, 5.56% Asian, 1.59% two or more races, and 3.97% other. The average age was 20.57 ( $SD = 3.25$ ; range was from 18-45 years).

Participants were recruited in two ways. First, most people participated in exchange for extra credit in introductory psychology courses from the hosting university. These students completed the study in small classrooms with individual chairs and desks and were in groups between 15-20 people. Six sessions were run, resulting in approximately 100 participants from the university. In an attempt to gain more diversity in the sample, the second method of recruitment was through public solicitations on Facebook. These participants simply followed the provided URL for the study materials and received no compensation. Participants in the second group completed the materials in an environment of their choosing (e.g. their homes, coffee shops) and thus their experience in the study was less controlled. The software used to collect data did not track whether participants were from the traditional college-aged sample or from the public solicitations, as all participants began the study simply by following the online link provided. This study was approved by the hosting university's Institutional Review Board and all participants were treated ethically.

### Stimuli and Measures

**Conscientiousness.** Conscientiousness was measured using the scale from Goldberg (1990). Participants rated 20 items on a 9-point scale (1 = *Extremely Inaccurate*; 9 = *Extremely Accurate*). Ten of the twenty items were reverse scored, then all the items were averaged. Possible scores could range from 1-9; higher scores mean higher levels of conscientiousness. Some of the items include "efficient," "neat," and "careful." Some of the reverse-scored items include "disorganized," "inconsistent," and "impractical." The mean score of this sample was 6.50 ( $SD = 1.08$ ). Internal consistency for this scale was good,  $\alpha = .92$ .

**Credibility of source.** Building from previous research on the importance of source credibility (Smith & Ellsworth, 1987), participants read a police report created by the authors where the credibility of the source was manipulated (see Appendix A). The two reports used were identical in the information provided about the event, but varied who was being interviewed by the police for the report. Participants were randomly assigned to read information supposedly reported by either an off-duty police officer witness (high credibility) or a 10-year old boy witness (low credibility). Examples of misinformation were the appearance of the perpetrator and what the victim was holding in her hands.

**Order effect.** Again, expanding on extant research on order effects (Eakin et al., 2003), participants were first randomly assigned to conditions by the computer program. Half of the participants first read the police report then saw the video of a fictional crime, and the other half first saw the video then read the police report.

**Memory accuracy.** The dependent variable, recognition memory accuracy, was measured through questions based on the video participants watched (see Appendix B for the video URL and Appendix C for sample memory test questions). This procedure is similar to previous studies (e.g., Loftus & Palmer, 1974). Each question was a forced alternative choice item (multiple choice) with 2-4 choices for answers. Thirteen items tested memory accuracy in general and were not based on misinformation to which participants had been exposed earlier in the study. In addition, eight items assessed whether misinformation had affected memory accuracy by specifically testing memory for the video versus the incorrect information that had been provided in the police report. Thus, two separate memory scores were calculated for each participant. First, their overall memory score for the general items was assessed; correct answers gained the participant one point, resulting in a possible range of 0-13 points ( $M = 7.52$ ,  $SD = 1.48$ ), with higher scores indicating better accuracy. The second score was for the questions containing misinformation. Participants again gained one point for correct answers (meaning they were not misled by the witness but instead accurately remembered the video), with a possible range of 0-8 points ( $M = 5.33$ ,  $SD = 1.68$ ). Across all possible 21 memory questions, the participants remembered an average of 12.85 answers correctly, based on the actual video ( $SD = 2.48$ ).

### Procedure

All participants were asked to go to a URL for the study provided by the software company PsychData, which offered all study materials online. Participants first read basic consent information. At the bottom of that screen, they were asked to click on "yes" if they wished to participate. If they tried to skip this question or if they clicked "no," they were not taken to the rest of the materials. Next, participants saw all the materials which included: demographics, crime video, police report, memory test, conscientiousness scale, and a short debriefing. Note that the order of materials varied based on experimental condition. Participants were randomly assigned to either see the video first then read the report, or vice versa.

The video was taken from YouTube and edited for the purposes of the project; the authors requested



permission to use the video from the person who originally posted it online. The video lasted 45 seconds and showed a man trying to take a woman's purse. Participants were told to pay attention because they could only watch the video once and because there would be a memory test of the video later. They also read a police report about the event which came from either the high-credibility or low-credibility source. For both of the police reports, eight pieces of information were not accurate and were items of misinformation.

After seeing both the video and police report (in random order), participants completed a memory test based on information in the video, then the conscientiousness scale. Finally, all participants saw a screen at the end of the survey stating that the survey was completed. They were then provided with a short debriefing about the study, which included the use of misinformation in the police report and the manipulation of credibility.

## Results

### Hypotheses 1 and 2

Hypotheses 1 and 2 both focused on factors that would influence likelihood of a participant being misled through witness misinformation. The first hypothesis was that misinformation from a high-credibility source would lead to lower memory accuracy for an event, compared to misinformation from a low-credibility source. The second hypothesis was that (a) memory accuracy would be worse if the misinformation were presented after the event, compared to before the event, and (b) memory accuracy would be worst of all for the high credibility condition when the misinformation was presented after the event. A two-way ANOVA tested both main effects (credibility: high versus low and order of misinformation: before or after) and the interaction, with the dependent variable as the number of items correctly remembered in spite of misinformation (possible range of 0-8).

For Hypothesis 1, the average memory score was 5.34 ( $SD = 1.66$ ) for those in the high credibility condition and 5.32 ( $SD = 1.73$ ) in the low credibility condition,  $F(1, 122) = .01, p = .924$ . Thus, Hypothesis 1 was not supported; witness credibility appeared to have no effect on likelihood of participants being misled by misinformation.

For Hypothesis 2a, half of the participants watched the video first, then read the police report (misinformation), and half read the report first and then watched the video. The average scores for participants correctly remembering the video in spite of misinformation was 5.03 ( $SD = 1.65$ ) for the video first condition and 5.63 ( $SD = 1.68$ ) for the misinformation/witness first condition,  $F(1, 122) = 4.35,$

$p = .039$ . Thus, Hypothesis 2a was supported; memory for the video was worse when the misinformation was presented afterward rather than when misinformation was presented beforehand (i.e., a recency effect occurred).

Finally, for Hypothesis 2b, the ANOVA showed no significant interaction between the two independent variables,  $F(1, 122) = 2.01, p = .159$ .

### Hypothesis 3

The third hypothesis was that higher scores on conscientiousness would be correlated with better memory scores, both for general items and for items relating to misinformation to which participants were exposed. See Table 1 for a correlation matrix. The correlation between conscientiousness and memory for regular questions was  $r(125) = .12, p = .190$ , which was in the expected direction, but was not significant. The correlation between conscientiousness and correctly recalled items in spite of exposure to misinformation was also in the expected direction,  $r(125) = .16, p = .071$ , but was not statistically significant. Hypothesis 3 was thus not supported.

Table 1

*Correlation Coefficients for the Relationships between Conscientiousness and Memory (Hypothesis 3).*

Variable	Cons	Misinfo	Regular
1. Conscientiousness	--	$r = .16$	$r = .12$
2. Misinfo Correct		$p = .071$	$p = .190$ $r = .23$
3. Regular Correct			$p = .011$ --

*Note.* "Misinfo Correct" = correct answers for questions based on misinformation, and "Regular correct" = regular memory questions. Degrees of freedom ranged from 125 to 126.

## Discussion

Results for Hypothesis 1 showed that credibility of the witness had no effect on participants' susceptibility to misinformation. Misinformation from an off-duty police officer was no different than misinformation from a young adolescent, not supporting Hypothesis 1. This result goes against previous research (Hovland & Weiss, 1951; Kelman & Hovland, 1953; Lorge, 1936) that found higher-credibility sources to be more persuasive to an

audience; however, these studies did not examine the role of credibility within a misinformation effect context.

The lack of significant results for Hypothesis 1 may be attributed to three possibilities. First, perhaps credibility of the witness is not relevant to the misinformation effect. However, two alternative explanations seem more likely. In this study, it is possible that participants accepted the witness' credibility because it was presented in the form of a police report, which is a cue for authenticity. Perhaps participants only paid attention to the nature of the report and did not focus on who the witness actually was (the child or the off-duty officer). Thus, the experimental manipulation may have been weak. Finally, the lack of significance may be due to the small sample size. A power analysis indicates that a sample of at least 176 people would have been needed to detect small but significant differences between groups; this study originally recruited 164 participants, but several had to be excluded due to the possibility that they had seen the experimental video in a separate study.

Hypothesis 2a was about the order of the original event and the misinformation. Overall, memory was worse when participants read the police report (containing misinformation) after the event compared to before, supporting Hypothesis 2a. This finding replicates Eakin et al. (2003) by showing that there was higher recall accuracy for the actual event when misinformation was presented first, compared to presenting misinformation after the event. In other words, participants' memory seemed to focus on the information they had received most recently (a recency effect). As Lindsay and Johnson (1989) found, more recent information – even when it is wrong – is likely to infiltrate a memory test and lead to errors. Hypothesis 2b (the interaction) was not supported, likely because of the lack of significance for source credibility.

Hypothesis 3 involved memory and the personality trait conscientiousness. This correlation was not significant in terms of participants rejecting misinformation about the original event, meaning that conscientiousness was not associated with memory scores. Participants high in the trait conscientiousness were only very slightly more likely to have better memory scores. As mentioned above, very few studies have examined the role of conscientiousness on memory accuracy (see Liebman et al., 2002). In Liebman et al. (2002), the researchers found no significant correlation between memory accuracy and conscientiousness, so the lack of significance in the current study is also a replication of this result. It is also possible that the low power (due to small sample size) was not able to detect significant patterns even if they had been present. More

research on this specific trait—as well as additional personality factors in memory—would help to fill this gap in our current academic understanding of what does (or does not) influence memory ability.

### Strengths

This study had many strengths. The length of the video was approximately 45 seconds, a relatively short period of time. Crimes can happen subtly and quickly, and the use of a short video can relate to the actual amount of time that people witness crimes in the “real world.” Thus, this study had good ecological validity in terms of the pragmatic nature of the crime. In addition, witnesses are often asked about the events leading up to the crime and what happened afterward. Although a laboratory setting could never truly represent an actual crime scene, the experimental nature of the current study did allow researchers to focus on specific causal relationships (and not simply correlational associations). In addition, results found support for a recency effect in recognition memory, supporting past work on this phenomenon (e.g., Crowder, 1993; Schulster, 1989).

### Limitations and Future Research

There were a few limitations concerning the population of this study. The sample was not representative in age or race. Most of the participants were White and the average age was 20.57 years old. In order to increase the external validity of this study, there would need to be a diversified sample. It would also be interesting to expand the diversity of the sample in other ways, such as including police officers in the sample, asking people to complete the study without warning them in advance that they would be taking a memory test at the end, and so on.

Another important limitation of this study was within the PsychData software used for participants to interact with all materials. The video was posted on YouTube and embedded into the survey. Participants recruited from university psychology courses were closely monitored during their sessions. However, participants from Facebook solicitations theoretically had the ability to pause and/or re-watch the video, in spite of explicit instructions not to. Thus, although the study had the benefit of an experimental design, the typical controlled environment of an experiment suffered from some participants' ability to control how they observed the critical materials. While this potential issue affected a minority of participants, it may have influenced the results. In future replications of this study, it would be beneficial to ensure more control over the environment; specifically, participants should only be allowed to view the experimental materials for a single time and for a controlled amount of time.

As mentioned above, participants in this study were warned of the upcoming crime video and told they would be asked about details later. When real crimes occur, witnesses are not warned; some may not even realize they witnessed a crime. Also, witnesses are often not interviewed immediately following the event, and they may discuss it with others, distorting their original memories. Thus, the timeline of this study did not represent a realistic comparison to actual eyewitness experiences (see Mudd & Govern, 2004). One limitation of the current study was that all participants were asked about their memory within a few minutes of seeing the video. Future research could include conditions with various time delays to further investigate the question of whether memory and timing of events are connected.

For future research, it would also be interesting to change the source of the information. This study found no effect of witness credibility, but that may have been an artifact of the materials (or lack of statistical power). One limitation was the lack of a manipulation check that could have simply asked participants to identify the witness who was the source of the police report; this question might have made the witness's credibility more salient. In addition, instead of using a police report, the information might have been more influential if it had come directly from the source instead of through the context of a police report. Because the manipulation was a police report in both conditions, a police officer is the one creating the report, becoming the main source of information, not necessarily the witness. Thus, participants may have assumed either condition had relatively good credibility. Finally, an additional experimental condition could contain a distraction task after participants view the video, but not include any misinformation. This condition would allow for testing of whether any task after viewing the crime would affect memory accuracy, providing even greater detail regarding what might increase or decrease individuals' ability to recall crime scenes.

### Conclusion

Results indicated that neither credibility of a witness nor conscientiousness are significantly associated with memory accuracy in a misinformation effect context. However, it is unclear whether these findings are due to a relatively small sample size and/or a weak manipulation. Replication of the study with a more controlled environment for participants, stronger manipulations, a larger and diverse sample, and manipulation checks would provide more convincing evidence for whether these constructs really are linked.

This study did find a significant effect of when misinformation is presented on later memory accuracy. In "real life" situations, misinformation about a crime will

always occur after the crime is witnessed – and this order of events led to worse memory in the current study.

Eyewitness accuracy is extremely important because juries heavily rely on it and sometimes it is the only evidence for a case (Leippe, 1985; Loftus, 2011). From this study, it appears that the timing of information in relation to the event is an important factor in predicting memory accuracy. Future research could explore details of this effect, such as whether misinformation provided immediately after the event has more or less influence than misinformation provided hours, days, or even weeks later. This research adds to the fields of psychology and criminology by examining the traits of a witness and the circumstances which produce the most accurate memory.

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## Appendix A: Police Reports

*Low Credibility Condition*

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Case No: 6579821

Date: October 26, 2014

Reporting officer: Officer Wiley

Prepared by: Janis Olson

Incident: Young woman walking to class - approached by man trying to steal her purse

Witness: Timothy, age 10

Note: Timothy was at Captain Coffee [coffee shop] with his mother when he saw the incident. Timothy's mother went inside to pay for the drinks while he waited outside and witnessed the event. He dialed 911 on his cell phone; Officer Wiley arrived twelve minutes later.

## Details of Event:

Witness was sitting at nearby coffee shop when he heard shouting from a young woman. Witness reported, "the woman was trying to fight off a man who was trying to steal her purse." The witness described details of the victim: female, carrying a white purse, green cell phone, and four books, wearing a jacket, white shirt, and boots, with brown hair. Witness described the perpetrator: male, brown hair and a mustache, wearing a black t-shirt and khakis, with white shoes. Witness reported seeing the woman cross the street and watching the man approach her. Witness reported, "The man was riding a green and white moped as he approached the woman. The man got off his moped and grabbed hold of the woman's purse. She dropped the books in her hand as the man tried to take the purse."

Submitted to SDPD on 10/26/14 at 7:17 PM

*High Credibility Condition*

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Case No: 6579821

Date: October 26, 2014

Reporting officer: Officer Wiley

Prepared by: Janis Olson

Incident: Young woman walking to class - approached by man trying to steal her purse

Witness: Officer Timothy Granger, age 42

Note: Officer Granger was at Captain Coffee [coffee shop] with his family when he saw the incident. He was off duty that day and did not intervene for the safety of his family. He dialed 911 on his cell phone; Officer Wiley arrived twelve minutes later.

## Details of Event:

Witness was sitting at nearby coffee shop when he heard shouting from a young woman. Witness reported, "the woman was trying to fight off a man who was trying to steal her purse." The witness described details of the victim: female, carrying a white purse, green cell phone, and four books, wearing a jacket, white shirt, and boots, with brown hair. Witness described the perpetrator: male, brown hair and a mustache, wearing a black t-shirt and khakis, with white shoes. Witness reported seeing the woman cross the street and watching the man approach her. Witness reported, "The man was riding a green and white moped as he approached the woman. The man got off his moped and grabbed hold of the woman's purse. She dropped the books in her hand as the man tried to take the purse."

Submitted to SDPD on 10/26/14 at 7:17 PM

Appendix B: Link to Video

<https://www.youtube.com/watch?v=lzMSGMr6WEY>



Appendix C: Sample Questions from Memory Test

What was the name of the hospital?

- a. St. John's Hospital
- b. International Medical University
- c. Illinois Medical University
- d. Information Not in the Video

What was the gender of the perpetrator?

- a. Male
- b. Female
- c. Information Not in the Video

What was the color of the victim's cell phone?

- a. Black
- b. Green
- c. Yellow
- d. Information Not in the Video

What color was the victim's purse?

- a. Tan
- b. Black
- c. White
- d. Information Not in the Video

What was the color of the perpetrator's shirt?

- a. Black
- b. White
- c. Brown
- d. Information Not in the Video

ROLE OF FACEBOOK CONTENT AND POST FREQUENCY ON PERCEPTIONS OF  
FACEBOOK USER'S SELF-ESTEEM, COMPETENCE, AND EMPLOYABILITY

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**Abstract** - Social media outlets, like Facebook, are now a ubiquitous part of popular culture allowing individuals to share any detail of their lives with others. For this reason, Facebook has become a resource for employers to acquire information about and, subsequently, evaluate prospective employees. Because Facebook content has been shown to reflect the true personality traits of Facebook users (Back et al., 2010; Goodman et al., 2014), the content posted on Facebook may limit the real-world opportunities (i.e., jobs) available to some Facebook users. However, it is unclear if university students recognize the implications of the content they post on Facebook, and how the content may be perceived by potential employers. The current study experimentally examined how content posted on Facebook (i.e., professional versus unprofessional), as well as the frequency of the posted content, affects university-aged students' perceptions of the personality characteristics and future opportunities (i.e., employment) of Facebook users. A total of 151 undergraduate students viewed one of six hypothetical Facebook profiles where the content reflected professional (e.g., studying) or unprofessional (e.g., drinking) "college student behavior" posted at a low, moderate, or high frequency. Participants then rated their perceptions of the Facebook user's self-esteem, competence, and employability. Facebook users who posted unprofessional, compared to professional, content were consistently perceived to possess lower levels of self-esteem and competence, and be less employable. Although perceptions of Facebook user's competence was unaffected when (professional or unprofessional) content was posted at a low frequency, Facebook users were perceived as less competent when posting unprofessional content at a high or moderate frequency. Undergraduate students appear to recognize that unprofessional content on Facebook, that is posted relatively frequently, may negatively impact how they are perceived.

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In today's society, online social networks (OSNs), have become so popular that they are the primary medium for communicating and networking via the Internet (Back et al., 2010; Boyd & Ellison, 2008). OSNs are web-based sites that allow individuals to create a self-representative profile, viewed in whole or part by the public (Boyd & Ellison, 2008). As a means to express one's daily thoughts, OSNs enable people to voluntarily share personal information at the click of a mouse, or tap of a screen. Consequently, OSNs, such as Facebook, are becoming a treasure trove of information for employers to view when considering prospective employees (Clark, 2006). Because recent research has demonstrated that OSN profiles communicate information about individuals' real personalities (i.e., extended real-life hypothesis) and not idealized versions of individuals' personalities (i.e., idealized virtual-identity hypothesis; Back et al., 2010), OSN site users, especially the relatively young users, should conscientiously consider how the

content they post online may influence their real-world opportunities (e.g., employment). Although OSN profiles appear to communicate information about individuals' true personalities, it is unclear if university-aged students recognize the implications of the content they post on OSNs, like Facebook, and the ways the content may influence how they are perceived by future employers. Given this gap in the literature, the current study examines if university students recognize the impact of posting content reflecting either professional or unprofessional "college student behavior" on Facebook, and how such content influences the perceived self-esteem, competence, and employability of the user. The current study also examines if the frequency of posts reflecting the aforementioned types of college student behavior influences how OSN users are perceived.

University students may perceive posts on OSNs, like Facebook, as harmless opportunities for self-expression or exercises in free speech (Olson, Clough, &

Penning, 2009), but such opportunities or exercises can have real and serious consequences. For example, in spring 2007, a preservice teacher in an undergraduate elementary education program was denied a (bachelor's) degree because of a picture posted on an OSN. The student, who was intoxicated and depicting a drunk pirate in a photo captioned "Drunken Pirate" (Carvin, 2007) was viewed as violating the professional standards of expectant teaching employees. In a separate and widely publicized incident, undergraduate students from Purdue University were expelled when their Facebook posts implied that they were distributing a controlled substance (i.e., cocaine) on campus. Consequently, not all posts on OSNs are harmless opportunities for self-expression, and students' judgments about what to make public on OSNs are clearly subject to real and serious consequences.

One consequence associated with posting "personal" information on OSNs is the growing concern that OSNs are being used as an evaluation tool to glean information about individuals' personalities (Shea & Wesley, 2006). Because OSNs are an extended social context in which users freely share information about themselves (Back et al., 2010), research linking posts on OSNs to a user's personality has recently emerged. To establish that OSNs, like Facebook, do in fact reflect a medium in which users express their true personality, Winter et al. (2014) examined if the quantity and style (e.g., self-promotional) of content posted on Facebook is associated with users' personality traits (e.g., narcissism and extraversion). Facebook users who posted content at high quantities were expected to be relatively extroverted and narcissistic, and post statuses reflecting greater self-promotional content were expected to be revealing of individuals' narcissistic tendencies. Using an online questionnaire, participants completed measures assessing their level of extroversion and narcissism, and then provided the researchers with their last three Facebook posts (i.e., status updates). Results revealed that the frequency of content posted on Facebook was positively associated with users' extroversion and narcissism; self-promotional content was associated with greater narcissistic, but not extroverted, tendencies. Winter et al.'s study demonstrates that Facebook users' personality tendencies are manifested in the frequency and style of their status updates. Given that OSN posts appear to reflect the personality of the users, it is possible that the public can surmise the personality of users by reading their posts.

OSN users may or may not recognize that the content they post on mediums like Facebook tend to reflect who they are (and the choices they make) as

individuals, and previous research has demonstrated that even a small amount of "negative content" posted on OSNs influences how users are perceived (Goodmon, Smith, Ivancevich, & Lundberg, 2014). This is concerning because alcohol-related content is commonly presented on adolescents' and young adults' OSN profiles. Recent research revealed that 85% of U.S. college students posted an average of 8.5 alcohol-related messages on their Facebook profiles within a six-month period (Egan & Moreno, 2011). Additionally, when analyzing the content of MySpace, a popular OSNs, more than half of underage students, aged 17 to 20, posted alcohol-related text or images (Moreno, Briner, Williams, Brockman, Walker, & Christakis, 2010), and the alcohol-related posts on OSNs appear to be directly associated with real life alcohol use. For example, one study by Fournier and Clarke (2011) demonstrated that 76% of college students' Facebook profiles contained alcohol-related content, and there was a positive correlation between perceived alcohol use by friends on Facebook and self-reported alcohol use. In a follow-up study, Fournier, Hall, Ricke, and Storey (2013) further demonstrated that college students' perceptions of the drinking norms on college campuses via the OSNs like Facebook influence their own alcohol consumption. College students in Fournier et al.'s (2013) study were exposed to Facebook pages with or without drinking content and then reported their perceptions of the drinking norm among college students on their campus. Students who viewed the Facebook profile containing alcohol-related content estimated higher drinking norms than students who viewed the Facebook profile without alcohol-related content. Interestingly, this effect was moderated by the student's own drinking behavior; students who reported drinking themselves estimated the drinking norm to be especially high when viewing a Facebook profile containing alcohol-related content. Because the majority of students (68.4%) in Fournier et al.'s study reported that they and their friends drink or post alcohol-related content on Facebook (70.9%), these data suggest that a drinking culture is common, perhaps even normalized, on college campuses. In fact, the social psychological literature commonly reports findings demonstrating that college students overestimate the amount of alcohol consumed by their peers, and these overestimates contribute to increased rates of drinking among the students themselves (Borsari & Carey, 2001). Consequently, college students may be misperceiving the value or popularity of drinking among their peers, and consequently, they may believe such behavior is viewed favorably in the "real world".

Although drinking on college campuses, and posting such behavior on Facebook, may be common,

only recently has research examined if this kind of content influences how users are perceived. For example, Goodmon et al. (2014) examined if the professional or unprofessional (e.g., drinking, partying, smoking, profanity, sexual references) nature of content posted on Facebook influences the perceived personality traits of the user. Seventy-six undergraduate psychology students viewed 3 paper versions of Facebook profiles, adapted from real Facebook users, varying only in the degree of professionalism (low, moderate, high). Participants then completed the brief version of the Big Five Inventory (i.e., openness to experience, conscientiousness, extraversion, agreeableness, neuroticism) as if they were the Facebook user for each of the three profiles. Results revealed that participants perceived the user with professional content more positively – with more openness to experience, conscientiousness, agreeableness, and emotional stability (i.e., low neuroticism) – compared to the users with moderately professional and unprofessional content. Users posting unprofessional content were perceived as more extraverted (i.e., without a cautionary mental filter) compared to the other two more professionally inclined users. Goodman et al.'s study demonstrates that college students may recognize that unprofessional (and not professional content) posted on Facebook reflects rather negatively on their personality.

Although the presence of alcohol-related content on OSNs may reflect negatively on college student users, so too may their inattention to the “intellectual rigor” of their posts, both of which reflect poor “college student behavior”. Scott, Sinclair, Short, and Bruce (2014) examined if proper language used to convey information on Facebook influences impressions of a Facebook user. One hundred twelve participants first took an academic test to confirm they could in fact, clearly identify proper language (i.e., spelling and grammar) in sentences. The participants were then shown six manipulated Facebook pages that contained three status updates, either spelled correctly, spelled incorrectly, or in text speak. Text speak includes phonetic spellings (e.g., “u”), acronyms (e.g., “lol”), and “emotigrams” [e.g., “:-)"]; Scott et al. (p. 562)]. Participants were then asked to respond to single-item measures of intelligence, competence, and employability for each of the six Facebook pages. Results revealed that Facebook users who used proper spelling and grammar were perceived as more intelligent, competent, and employable than those who used incorrect spelling and grammar. Facebook users using text speak were perceived as significantly less intelligent and employable than those using correct language. Scott et al.'s research demonstrates that proper (and professional) “academic-related behavior” is positively evaluated and influences

how intelligent, competent, and employable Facebook users are perceived.

Previous research has revealed that professional and unprofessional content reflecting “college student behavior” posted on OSNs can potentially communicate a lot of information about a user. Adolescents’ and young adults’ use of OSNs, with their unprofessional (i.e., alcohol-related) posts in particular, suggest they may not recognize (or consider) the negative implications of such content on their real-world opportunities (e.g., employment). Given employers utilize OSNs for information about prospective employees (Carvin, 2006; Clark, 2006), the current study examines if university students recognize the impact of posting content reflecting two types of “college student behavior” (i.e., drinking behavior with improper spelling/grammar vs. studious behavior with proper spelling/grammar) on Facebook influences the perceived self-esteem, competence, and employability of the user. Given that college life is associated with a “drinking culture” (Goodmon et al., 2014), the frequency of the unprofessional posts was also expected to influence college students’ perceptions of a Facebook user’s self-esteem, competence, and employability. Specifically, it was predicted that college students would report no perceived differences in the self-esteem, competence, or employability of Facebook users who post professional or unprofessional content at a *low* frequency. In contrast, it was predicted that those who post unprofessional content on Facebook at a *moderate* or *high* frequency would be perceived to possess lower levels of self-esteem and competency and, consequently, be less employable than users who post professional content at a moderate or high frequency.

## Method

### Participants

During the fall 2015, 151 undergraduate students (104 female, 47 male) ages 18-23 ( $M_{age} = 19.91$ ,  $SD = 1.12$ ) enrolled in Psychology courses at a mid-sized private university in the Midwest voluntarily participated in this study. For their participation, students received fifteen-minutes of “participant pool credit” toward their psychology class requirement. The study was conducted in small groups of less than 20 students, in classrooms on campus. The university permits the consumption of alcohol on campus by individuals who are of legal drinking age.

### Design

The study was conducted as a 2 (Facebook Content: Professional, Unprofessional) x 3 (Post Frequency: Low, Moderate, High) between-subjects

experimental design. The independent variables were Facebook Content and Post Frequency, and the dependent variables were the perceived Self-Esteem, Competence, and Employability of the Facebook user.

## Materials

**Frequency of professional and unprofessional posts on Facebook.** Facebook profiles, created for this study, depicted users (whose name was gender-neutral) who posted professional or unprofessional content about their attitude toward and commitment to academics (see Appendix A). The professional content depicted a student who expressed positive attitudes (e.g., “So excited for my classes this semester. Hoping for a 4.0”) toward and a strong commitment (e.g., picture of studying behavior on a Friday night) to academic success. The unprofessional content depicted a student who expressed negative attitudes (e.g., “classes this semester suck. just trying to pass. #dsgetdegrees”) toward and a weak commitment (i.e., picture of alcohol-related party on a Friday night) to academic success.<sup>1</sup> A description of the Facebook user’s frequency of posting the professional or unprofessional content was presented, in text, at the top of the Facebook profiles (see Appendix B).

**Perceived self-esteem.** The perceived self-esteem of the Facebook user was measured using an adapted version of Rosenberg’s (1965) Self-Esteem Scale. Statements on the 10-item scale ( $\alpha = .95$ ) were revised to reflect participants’ perceptions of the Facebook user’s self-esteem instead of participants’ evaluations of their own self-worth (sample item: On the whole, the Facebook user is satisfied with himself/herself). All items were answered using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). After reverse scoring the five negatively keyed items, ratings were averaged, with higher scores reflecting more positive perceptions of the Facebook user’s self-esteem.

**Perceived competence.** The perceived competence of the Facebook user was assessed using an adapted version of Fiske, Cuddy, Glick, and Xu’s (2002) measure of Competence. Language on the six item ( $\alpha = .95$ ) scale was revised to assess participants’ evaluations of the Facebook user’s level of competence or intelligence (sample item: “As viewed by society, how intelligent is the Facebook user?”). Participants responded to each item

using a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). The responses to the statements were averaged, with higher scores reflecting greater perceived competence.

**Perceived employability.** Perceived employability was measured using a 4-item scale ( $\alpha = .95$ ) created for this study. The items assessed participants’ respect for and trust in the Facebook user within a work setting. The items were: (1) “Would you be willing to work with the Facebook user?” (2) “Would you trust the Facebook user in a job setting?” (3) “If the Facebook user were your coworker, would you respect them?” (4) “If you were a hiring manager of a company, would you hire the Facebook user?”. Participants responded to each item using a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Definitely*). The responses to the items were averaged, with higher scores reflecting greater perceived employability.

## Procedure

The study was conducted as a 2 x 3 between-subjects experimental design. Participants were randomly assigned to one of six conditions where they viewed a Facebook profile with either professional or unprofessional content, posted at a low, moderate, or high frequency. Prior to their participation, participants were read an informed consent document, and completed a demographic form assessing their gender, age, and year in college. Participants were then asked to view one of the hypothetical Facebook profiles depicting the professional or unprofessional content posted at a low, moderate, or high frequency. After viewing a Facebook profile, participants were asked to complete the perceived Self-Esteem, Competence, and Employability measures assessing their perceptions of the Facebook user. Upon completion of these tasks, the participants responded to manipulation check items assessing their recollection of the Facebook profile content (i.e., professional or unprofessional) and the frequency of the Facebook user’s posts (i.e., low, moderate, high). Participants were then thanked and debriefed.

## Results

A series of 2 (Facebook Content) x 3 (Post Frequency) between-subjects ANOVAs tested participants’ perceptions of the Facebook user’s Self-

<sup>1</sup> In a small pilot study ( $n = 87$ ), students viewed the unprofessional and professional Facebook profiles created for this study and reported if “[they] have ever posted a photo of themselves on social media engaged in the behavior displayed.” These same students also rated, using a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Always*), how often the activity portrayed in the unprofessional and professional Facebook profiles is posted on social media. The results revealed that just over half of the students (44 of 87; 50.6%) reported posting a picture of themselves engaging in the professional behavior (i.e., studying), and even more students (68 of 87; 78.2) reported posting a picture of themselves engaging in the unprofessional behavior (i.e., drinking). Furthermore, 45 students reported that studying is “Often” or “Always” portrayed on social media, and 50 students reported that drinking is “Often” or “Always” portrayed on social media. These data suggest that social media posts by college students of studying or drinking behavior are relatively common and realistic.

Table 1

Means (and Standard Deviations) Associated with the Interaction Between Facebook Content and Post Frequency on Perceptions of Self-Esteem, Competence, and Employability

	Professional			Unprofessional	
	Low Moderate	Moderate High	High	Low	
Self-Esteem (.98)	5.15 (.71) 3.56 (1.06)	5.97 (.58)	5.77 (.56)	3.39 (.77)	3.72
Competence (.70)	5.28 (.66) 2.54 (.90)	6.14 (.56)	5.90 (.68)	2.86 (.77)	2.73
Employability (.62)	3.92 (.64) 1.45 (.46)	4.45 (.42)	4.20 (.66)	1.61 (.56)	1.68

Esteem, Competence, and Employability (see Table 1). The main effect of Facebook Content was significant across all three dependent measures. Facebook users posting professional content were perceived to possess higher self-esteem, greater competence, and be more employable than Facebook users posting unprofessional content,  $F_s(1, 145) > 222.56, p_s < .001, \eta_p^2 > .61$ . The main effect of Post Frequency was significant for perceptions of a Facebook user’s self-esteem and employability,  $F_s(2, 145) > 3.87, p_s < .023, \eta_p^2 > .05$ , but not significant for perceptions of a Facebook user’s competence,  $F(2, 145) = 3.02, p = .052, \eta_p^2 = .04$ . Specifically, when Facebook Content was posted at a moderate or high frequency, the Facebook user was perceived to possess a higher self-esteem and greater competence than when Facebook Content was posted at a low frequency. A significant interaction between Facebook Content and Post Frequency emerged for perceptions of a Facebook user’s competence,  $F(2, 145) = 6.39, p = .002, \eta_p^2 = .08$  (see Figure 1). Simple effects tests revealed that for Facebook posts of moderate or high frequency, perceptions of the Facebook user’s competence was lower with unprofessional content than professional content; there was no significant difference in perceptions of the Facebook user’s competence with professional or unprofessional content posted at a low frequency.

**Discussion**

The purpose of the current study was to examine university students’ perceptions of OSN posts reflecting two types of college student behavior, as well as the impact of frequency of the posted content, on the perceived self-esteem, competence, and employability of the user. Results revealed that the content has a clear, and important, impact on the students’ perceptions of the Facebook users’ self-esteem, competence, and employability. Unprofessional, content, compared to professional content, was consistently perceived to reflect lower levels of self-esteem, and competence, and employability of the Facebook user. Content posted at moderate or high frequencies, compared to low frequencies, were consistently perceived to reflect

higher levels of self-esteem and employability of the Facebook user. When Facebook users posted unprofessional or professional content at low frequencies, perceptions of the Facebook user’s competence was unaffected. However, when Facebook users posted unprofessional content at a moderate or high frequencies, they were perceived as less competent.

The current findings suggest that university students may have some awareness that content posted on OSNs, like Facebook, impact the personality characteristics and future opportunities (i.e.,

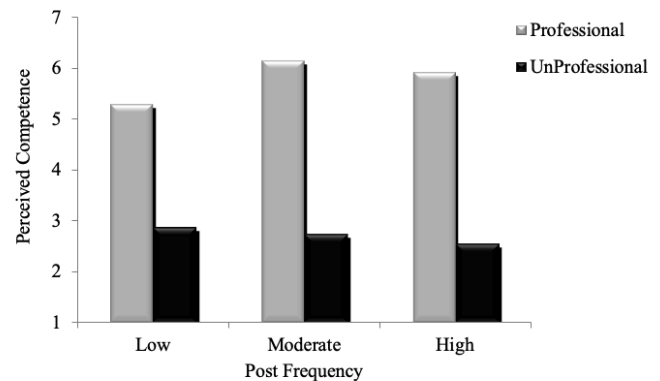


Figure 1. Simple effects of the significant interaction between Post Content and Post Frequency on Perceptions of Competence.

employment) of Facebook users. Given that university-aged students reported anticipating more negative impacts for unprofessional behavior (posted at relatively high frequencies) posted on OSNs, it is alarming that students, themselves, are still posting unprofessional content at high rates (Fournier & Clarke, 2011). This finding raises questions about students' motivation for posting such content online. OSNs are an extended social context where individuals build and maintain social relationships and social capital (Ellison, Steinfield, & Lampe, 2007), and some university-aged students may perceive that alcohol-related activities are valued by their peers (despite recognizing the activities are not well-received by future employers). Consequently, future research might examine if students' "orientation toward college life" (i.e., those who are socially versus academically oriented) influences how they perceive certain college student behavior (i.e., alcohol or study related posts on OSNs).

The frequency of posts on Facebook was an important factor contributing to college students' perceptions of a Facebook user's levels of self-esteem and employability. Facebook users who posted content at a moderate or high frequency were perceived to possess a higher self-esteem and to be more employable than Facebook users who posted at a low frequency. Individuals who post relatively frequently on OSNs, like Facebook, may possess more social self-efficacy and, therefore, tend to be more outgoing and sociable. These types of social skills may lead to positive impressions about their personality characteristics and future opportunities. Ainin, Naqshbandi, Moghavyemi, and Jaafar (2015) revealed that social self-efficacy was associated with Facebook users' confidence in posting freely (i.e., frequently) online, so future research should consider the role of post frequency, not just post content, in examining questions about individuals' perceptions of, and experiences with, various OSNs. Finally, it should be noted that although the current study found support for the role of post frequency on the perceived level of a Facebook user's self-esteem and employability, the manipulation of post frequency may have lacked mundane realism. Future research, conducted with actual Facebook profiles, may demonstrate that unprofessional content posted at a high frequency yields especially negative perceptions of a Facebook user.

Interestingly, college students perceived Facebook users who posted unprofessional content at moderate and high frequencies as being less competent than Facebook users who posted unprofessional content at low frequencies. Begg, Anas, and Farinacci (1992) demonstrated that repetition is positively related to the

belief in something, whether it's true or not. It is possible that Facebook users who repetitiously/consistently post unprofessional content on Facebook help viewers to conclude that the users are truly unprofessional. This finding is particularly noteworthy because it encourages college students to conscientiously consider the image they portray online, and how that portrayed image may be perceived by others.

As research on perceptions of OSNs continues to grow, future research will help to explain the relationship between college students' use of OSNs and their perceptions of various behaviors on OSNs. For example, extensions of the current study might examine how students' year in college (and therefore, closeness to being on the job market) influences how they perceive their own and others' professional and unprofessional posts online. Students who are near graduation may have especially negative perceptions of the personality characteristics and job opportunities for peers who post unprofessional content. Such research would reveal whether factors associated with the Facebook user (i.e., closeness to graduation) or the content posted on Facebook, drive evaluations of OSNs activity.

### Conclusion

Although there is much research yet to be conducted on OSNs, the present data provide a compelling warning to some university-aged Facebook users, in that they should give carefully consideration to what they post on OSNs. Posts of moderate or high frequencies, especially with content reflecting unprofessional college student behaviors, promotes perceptions that they lack self-esteem, possess low competence, and may struggle finding employment. Facebook users should be cautious when posting unprofessional content online.

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Appendix A  
Facebook Profiles Presented to Participants

The image shows a screenshot of a Facebook profile for Casey Smith. The profile header includes the name 'Casey Smith' and navigation options like 'Update Info' and 'View Activity Log'. The cover photo depicts a desk with a laptop, a coffee cup, and several books, including one titled 'Oxford Living Terms'. The profile information section lists 'Studied at Xavier University' and 'Lives in Cincinnati, Ohio'. The timeline shows three posts: a cover photo update, a post about going to class 10 minutes early with the hashtag #earlybirdgetsthe worm, and a post expressing excitement for classes and a goal of a 4.0 GPA. The right sidebar features a 'Recent' year filter from 2010 to 2015 and a small advertisement for PayPal.

Facebook profile for Casey Smith. The profile header includes the name "Casey Smith", a search bar, and navigation links for "Casey", "Home", and "Find Friends". The cover photo shows a bar counter with various drinks and bottles. The profile picture is a silhouette of a person's head. The bio indicates that Casey Smith studied at Xavier University and lives in Cincinnati, Ohio.

The timeline shows the following posts:

- A status update: "What's on your mind?" with options for Status, Photo / Video, and Life Event.
- A cover photo update: "Casey Smith updated their cover photo. 18 mins · Edited · [privacy icon]". The caption reads: "What my Friday night looks like...". The image shows a bar counter with drinks and bottles.
- A text post: "20 minutes late for class. might as well just skip lol". It has options for Like, Comment, and Share.
- A text post: "classes this semester suck. just trying to pass #dsgeldegrees". It has options for Like, Comment, and Share.

On the right side of the profile, there is a "Recent" section with a list of years: 2015, 2014, 2013, 2012, 2011, and 2010. There is also an advertisement for PayPal with the text: "Quicker pay, more play. www.paypal.com. Score games and downloadable content with just a username & password when you use PayPal."

Appendix B

Language Used to Manipulate the Facebook User's  
Frequency of Posting Professional or Unprofessional Content

High Frequency Posting

The Facebook user posts very often. The posts below are highly representative of usual content authored by the Facebook user.

Moderate Frequency Posting

The Facebook user posts at a moderate frequency. The posts below are moderately representative of usual content authored by the Facebook user.

Low Frequency Posting

The Facebook user posts very seldom. The posts below are a low representation of usual content authored by the Facebook user.

MEASURED AND MANIPULATED CONTROL:  
PREDICTING EMPATHY AND EATING DISORDERS

MARIA TRUJILLO AND WIND GOODFRIEND

BUENA VISTA UNIVERSITY

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**Abstract** - The desire for control affects everyone's life to different extents; thus, it is important to understand both internal and external control factors in order to better predict individuals' actions (Kay, Sullivan, & Landau, 2015). The current study investigated control from both an internal (personality) and external (experimental manipulation) context. Outcome variables were eating disorder symptomology and empathy toward victims of bullying in college students. Results showed, surprisingly, that while some aspects of controlling personality (social dominance orientation) were positively correlated with general acceptance of bullying, other aspects (conscientiousness) were negatively correlated. In addition, Type A personality was positively correlated with the desire to be thin and with eating disorder symptomology in general, while conscientiousness was negatively correlated with bulimia disorder symptomology. Also surprisingly, experimental manipulations of control had no significant effect on either dependent variable. Implications and additional results are discussed, along with future research possibilities.

*Keywords:* Control, Social Dominance Orientation, Type A, Conscientiousness, Bullying, Eating Disorders

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Control plays a significant role in our daily lives; lack of control might lead to negative behaviors such as drug and alcohol abuse, sexual assault, and lack of safe sexual practices. Beyond individual behaviors that may result from low control, control is important to most people's feelings of comfort in navigating the world. People want to feel in control of their actions and the environment (Kay, Sullivan, & Landau, 2015). Control stresses personal responsibility for our actions, whether it is to increase (e.g., making sacrifices) or decrease (e.g., consuming drugs or alcohol) self-control, because we have a choice. Long-term self-control can be due to a specific drive, habit, or incentive (Logan, 1973). The purpose of this research was to further understand control from a wide lens. To that end, the current study examined control from both an internal context (as a personality trait) and from an external context in the form of an experimental manipulation. In addition, this study explored links between control and two outcomes: eating disorder symptomology and empathy toward victims of bullying.

**External Control**

Previous studies on control have frequently focused on "locus of control," or one's perception of

whether control is internal (caused by one's own actions and plans) versus external (due to outside variables such as fate, luck, or the intentions of a divine being; Stebbins & Stone, 1977). Although locus of control may be a relatively stable framework for how one interacts with the world, some studies have attempted to make perceptions of control salient under different conditions. For example, Gilbert (1976) asked college students to think about ten different situations in which control might be a factor. First, all participants were asked to think about the situations in terms of recent events or "how they had been feeling or thinking lately" (p. 304). Next, the same participants were asked to consider the same events but in a long-term context or "what they considered typical of themselves" (p. 304).

These participants (Gilbert, 1976) were more likely to exhibit an external locus of control in the recent condition, but an internal locus of control in the long-term condition. The results were in spite of all participants self-reporting a general internal locus overall. The study thus implies that short-term perceptions of control may depend, at least in part, to one's current situation or mental framework. However, this study asked the same participants to think about each situation (a within-subjects design); few studies

have attempted to experimentally manipulate perceptions of control in a between-subjects design. This was one purpose of the current study.

### **Internal Control: Personality**

While perceptions of control may vary depending on the situation, personalities amongst individuals also vary. It is possible that need for control in one's personality has an influence on how one's life is lived, including the likelihood of one taking on social roles such as a bully or a victim. At the very least, it might be reasonably expected that controlling personalities might be associated with lower empathy toward victims. This study measured three personality traits associated with desire for control: social dominance orientation, Type A personality, and conscientiousness. While many personality traits exist that have at least some overlap with concepts of control, these particular constructs seemed the most directly relevant to issues of control in how one approaches everyday situations. While past research has investigated each trait individually, little research seems to exist that includes multiple traits in a single study to allow for comparison.

**Social Dominance Orientation.** It seems inevitable that two or more groups will eventually experience conflict between or among them. Typically, one group will dominate the other in some way, establishing a social hierarchy. Social dominance theory promotes superiority of one social group over the other (Pratto, Sidanius, Stallworth, & Malle, 1994). It is *social dominance orientation* (SDO) that determines the extent to which one desires one's in-group to be superior to others as a basic part of one's personality. Individuals high in SDO are influenced by their acceptance of inequality, and they tend to favor hierarchy-enhancing ideologies. In contrast, individuals with low SDO will favor hierarchy-attenuating ideologies (Pratto et al., 1994), meaning they believe society should not include structures allowing for some groups to have more power over others. Therefore, people low in SDO may be less prejudiced and discriminatory against out-groups and may have more empathy toward them or toward people who are in "lower" social groups or social situations. In essence, people low in SDO may not need as much social structure and may allow for less control over social hierarchies, while people high in SDO prefer power and control in a social context.

**Type A.** Individuals with a Type A personality desire more control in regards to their academic and occupational performances (Spence, Pred, & Helmreich, 1989). They are described as hard-driving, competitive, time-urgent, and hostile-irritable (Heilbrun & Friedberg, 1988). Not only are Type A individuals identified as

controlling when it comes to the workforce and academic excellence, but Furnham (1983) also concluded that Type A individuals are less conscious of health threats than Type Bs (who are more relaxed and less controlling). This may be because Type As simply ignore health concerns because they do not wish to admit lack of control over their own health outcomes. Unfortunately this lack of acknowledgment has been linked to cardiovascular problems due to vulnerability to stress (Heilbrun & Friedberg, 1988). Typical Type A behavior could be described as a classic self-control problem, because a common outcome of being high in Type A traits is that lack of control results in anger, hostility, rudeness, and aggression (in other words, behaviors associated with bullying others; Smith, 2006; Smith, Glazer, Ruiz, & Gallo, 2004).

**Conscientiousness.** The term conscientiousness is included in the Big Five taxonomy of personality traits (Goldberg, 1993). Conscientiousness describes individual differences in people's general self-control, which results in specific behaviors such as following rules, working hard, and following a strict code of morality (Roberts, Lejuez, Krueger, Richards, & Hill, 2014). Individuals high in conscientiousness have high control of their lives such as their health, job, or school performance (Barrick, Mount, & Judge, 2001). There are two domains of conscientiousness: orderliness and industriousness. Orderliness refers to the ability to be prepared, while industriousness refers to the ability to work hard (De Raad & Peabody, 2005; MacCann, Duckworth, & Roberts, 2009). Both of these domains tie back to self-control and the ability to delay gratification to achieve long-term goals. Self-control and living responsibly were of particular interest in the current study.

### **Outcomes of Control**

Certainly, there are many outcomes of control (or lack thereof) in daily life. For example, one might think of addictive tendencies as lack of control in regards to gambling, drug or alcohol use, or even excessive time spent playing video games. While it is not feasible to study all of these constructs in a single study, the current research chose two outcomes of empirical interest. The first is perceptions of bullying, which directly ties to control as most bullying situations involve one person attempting to control another through physical or psychological intimidation. The second is eating disorders, in which an individual attempts to control their own eating and physical body. In a way, eating disordered behavior might be considered a form of self-bullying, control, and judgment.

**Control, bullying, and empathy.** *The Bully Project*, a national campaign, defines bullying as “an individual or a group repeatedly harming another person—physically (e.g. punching or pushing), verbally (e.g. teasing or name-calling), or socially (e.g. ostracizing or spreading hurtful rumors)” (The Bully Project, n.d.). Bullying is not only a face-to-face situational event, but with increased technology that is available to almost anyone, “cyber bullying” is also a phenomenon of concern (Steffgen, König, Pfetsch, & Mezler, 2011). Research shows that bullying is motivated by control: Bullies target victims with less power than themselves in order to feel a greater sense of control over the victim, the situation, or their own lives (Sansone & Sansone, 2008).

Hunter and Boyle (2002) concluded that after giving children a checklist on perceptions of bullying, those who were bullied had less control than the perpetrator. In this study 348 children, age nine to eleven, were given a self-report questionnaire that was designed to assess information regarding bullying prevalence, location, frequency, and duration. This research was also designed to collect information regarding the perception of control and coping responses. The data revealed that girls felt less in control of frequent bullying when it occurred daily or weekly, than when it occurred infrequently by chance. Female victims and victims of short-term bullying also felt less in control than male or long-term victims did, respectively.

When individuals witness bullying, varying amounts of empathy toward the victim may occur. Empathy is the ability to share and understand others’ emotional states (Happ, Mezler, & Steffgen, 2015). It is our emotional response to a context. Empathy toward bully victims might be predicted as a result of how the witness feels about his or her own control and power. Participants who have been in situations in which they felt a lack of control may feel more empathy toward victims and, in parallel fashion, feel more negativity toward the bully. In addition to previous situational influences on power and control, participants with highly controlling personalities may be more accepting of bullying due to the inherent power dynamics involved. This study examined the role of control and attitudes toward bullying in both contexts (internal and external predictors of control).

**Control and eating disorders.** Eating disorders are, unfortunately, relative common in young people, affecting 13% of women (Allen, Byrne, Oddy, & Crosby, 2013). Individuals with high controlling personalities are more prone to eating disorders due to the excessive control needed by this particular disorder. Eating disorders such as bulimia nervosa, binge eating,

and anorexia nervosa require individuals to be in charge of their behaviors and follow strict behavioral protocols. Indeed, having a controlling personality may be a risk factor in eating disorders or predisposing individuals to later developing an eating disorder (Leon, Fulkerson, Perry, & Cudeck, 1993).

Obsessive characteristics of personality have been identified as a risk factor for eating disorders in other studies as well. For example, personality characteristics such as feelings of personal ineffectiveness and low self-esteem have been linked to greater likelihood of eating disorders (Wagner, Halmi, & Maguire, 1987); these individuals may be motivated to increase control in their lives to feel an improved sense of self-worth. Individuals with particular personalities that require control who live in a world of constant demand for perfectionism can feel extreme pressure; if this is combined with other personality traits such as impulsiveness, it could result in disorders such as bulimia (Pearson, Zapolski, & Smith, 2015). Control is key to these eating disorders as discipline plays a major role in their “success.” While other studies have examined the link between eating disorders and personality disorders, the current study focused on controlling personalities at the non-clinical level.

Different eating disorders may have different links to control. For example, anorexia (characterized by severe eating restriction) requires a very high level of self-control. A psychological sense of control has been tied to both the development of anorexia symptoms and to successful treatment of anorexia (Nipomnick, 2011). Beyond this internal sense of control, external variables have also been linked to eating disorders including both anorexia and bulimia. Salgado (2007), for instance, showed that when participants felt especially out of control, attempts at controlling weight went up in young adults both in terms of restricting eating and in increased purging behaviors. Further investigation of the link between control and eating disorder symptomology is warranted in order to better understand these connections.

### Hypotheses

Based on the reviewed literature, the current study proposed the following hypotheses:

**H1.** Individuals experimentally primed to think about a situation in which they have no control will be more empathetic toward victims of bullying, compared to participants primed to think about situations of high control.



**H2.** Individuals primed to think about situations in which they have no control will report higher eating disorder symptomology, compared to high-control individuals.

**H3.** Individuals measuring high in controlling personality will be less empathetic towards victims of bullying.

**H4.** Individuals measuring high controlling personality have higher eating disorder symptomology.

## Method

### Participants

This study included 99 participants (30 males, 69 females) who were recruited from psychology courses at a small Midwestern university and from social media sources such as Facebook. Ethnicity was 45% White, 22% Hispanic/Latino, 15% Black, 14% Asian, 3% Other, and 1% Mixed. The age ranged from 18 to 41 years ( $M = 20.65$ ,  $SD = 2.71$ ).

### Predictor Variables

**Social dominance orientation.** To measure SDO, participants completed the scale created by Pratto et al. (1994). Participants responded to 16 items on a 7-point Likert scale (1 = *Very negative*, 7 = *Very positive*). Items included, "It's OK if some groups have more of a chance in life than others," and, "If certain groups stayed in their place, we would have fewer problems." Items 9-16 were reverse-scored before being included in the composite, which was a sum of all items. Scores could thus range from 16 to 112, with higher numbers indicating higher belief in social dominance. The mean of this sample was 36.94 ( $SD = 15.53$ ). Internal consistency for this scale was  $\alpha = .92$ .

**Conscientiousness.** To measure conscientiousness, participants completed the scale created by Goldberg (1992). Participants responded to 20 items on a 9-point Likert scale (1 = *Extremely inaccurate*, 9 = *Extremely accurate*). Items on the scale included, "Careless" (reverse-scored) and, "Organized." Items were summed; composite scores could thus range from 20 to 180, with higher numbers indicating more conscientiousness. The mean of this sample was 130.97 ( $SD = 21.77$ ). Internal consistency for this scale was  $\alpha = .91$ .

**Type A.** To measure Type A personality, participants completed the scale created by Spence, Helmreich, & Pred (1987). Participants responded to a total of 12 items on a 7-point Likert scale (anchors changed with each item). Items on the scale included, "How often do you set deadlines or quotas for yourself in courses or other activities?" and, "How seriously do you take your work?" Scores were summed composites that

could range from 7 to 84, with higher numbers indicating more Type A personality. The mean of this sample was 35.54 ( $SD = 5.33$ ). Internal consistency for this scale was  $\alpha = .55$ .

### Independent Variable: Essay Manipulating Control

Participants were, by random assignment, given one of the two possible essays. One essay primed the individual to a situation of high control and the other to a situation of low control (see Appendix). In the high control condition, participants were asked to write about a situation in their past in which they were in control and had a good outcome. In the low control condition, participants wrote about a past situation in which they had no control and it led to a bad outcome.

### Dependent Variable 1: General Perceptions of Bullying

To assess the participants' general perceptions of bullying, they completed a modified version of the Personal Experiences Checklist (PECK) scale (Hunt, Peters, & Rapee, 2012). The scale asked participants to rate 11 specific items on a 7-point Likert scale (1 = *Never acceptable* and 7 = *Always acceptable*). Items on the scale included, "Kids threaten another kid over the phone" and, "Kids kick another kid." Items are averaged to create a composite score; possible scores ranged from 1 to 7, with higher numbers indicating more acceptance of bullying. The overall mean of this sample was 1.51 ( $SD = .66$ ). Internal consistency for this overall scale was  $\alpha = .97$ .

### Dependent Variable 2: Perceptions of Bullying Scenarios

To assess perceptions of fictional bullying scenarios, participants responded to several items regarding their reactions to fictional vignettes (Walton & Goodfriend, 2015). Participants read a short paragraph detailing one student bullying another in various ways (physical bullying, verbal bullying). After reading the paragraph, participants responded to several questions regarding their feelings about the situation and the impact it would have on both students involved. Three specific reactions were assessed, as follows.

**Perceptions of the bully.** The first sub-scale contained three questions that addressed how acceptable the fictional bully's behaviors were. Items included, "How acceptable is the bully's behavior?" "Should the bully be punished?" and, "If the bully is punished, how severe should that punishment be?" Participants were asked to circle a number on a 7-point Likert scale, with different anchors for each item. The responses to each of the three items were averaged to determine the mean composite

score. Thus, the possible range was 1-7, with higher numbers indicating a more negative view of the fictional bully. The mean of this sample was 6.11 ( $SD = .80$ ). Internal consistency of this scale was  $\alpha = .54$ .

**Perceived effects on the victim.** The second sub-scale contained seven questions which addressed the perceived effect of the bully's actions on the victim. Items included, "How severely will the victim be physically harmed?", "How severely will the victim be emotionally harmed?", and, "How severely will the victim be depressed?" Participants were asked to circle a number on a 7-point Likert scale, and responses were averaged to determine a mean composite score. Thus, the possible range of scores was 1-7, with higher numbers indicating greater perceived negative effects on the victim. The mean of the sample was 5.12 ( $SD = 1.17$ ). Internal consistency for the scale was  $\alpha = .89$ .

**Emotional reactions.** Finally, participants completed five items assessing their emotional reactions to bullying. The items listed emotions (angry, amused, frustrated, sad, and sympathetic) and participants indicated how they felt about the fictional scenario on a 7-point Likert scale (1 = *extremely accurate*, 7 = *extremely inaccurate*). Items were scored such that higher numbers indicated more positive emotional reactions (in other words, less of a negative reaction, or more acceptance). The composite score was an average of the items; thus, the possible range of scores was 1 to 7. The mean of this sample was 3.58 ( $SD = 1.95$ ), with internal consistency as  $\alpha = .89$ .

### Dependent Variable 3: Symptomology of Eating Disorders

To measure the participants' symptomology of eating disorders, they completed the Eating Disorder Inventory (EDI) scale (Garner, Olmstead, & Polivy, 1983). The scale asked participants to rate 23 specific items on a 6-point Likert scale (1 = *Never* and 6 = *Always*). Items on the scale included, "I eat when I am upset" and, "I feel satisfied with the shape of my body" (reverse scored). For overall scores, all responses are averaged, so possible scores ranged from 1 to 6, with higher numbers indicating more eating disorder symptoms. The overall mean of this sample was 2.97 ( $SD = .82$ ), with internal consistency  $\alpha = .90$ .

In addition, the measure included three subscales, which were also analyzed for hypothesis testing. Each subscale included 7 items and were averaged. Subscale one was for drive for thinness ( $M = 3.14$ ,  $SD = 1.20$ ,  $\alpha = .88$ ). Subscale two was for bulimia ( $M = 2.17$ ,  $SD = .98$ ,  $\alpha = .86$ ). Finally, subscale three was for body dissatisfaction ( $M = 3.45$ ,  $SD = 1.02$ ,  $\alpha = .87$ ).

### Procedure

Participants were recruited in two major ways: (1) through announcements in general psychology classes and (2) via public social media, such as Facebook. Participants who were recruited from classes received extra credit (as chosen by the professor); two sessions were held in which participants completed the survey in a single room at a given time. Participants signed their names on a separate piece of paper indicating their participation (so they could receive extra credit), but their computer responses remained completely anonymous. Publicly recruited participants did not receive any compensation except the thanks of the researchers.

During the sessions all participants were asked to go to a URL for the survey provided by the software company PsychData, which provides all survey materials online. Participants were asked to read a basic consent form and click "yes" in order to continue on past the initial screen. The order of materials in the survey was as follows: demographics, SDO scale, conscientiousness scale, Type A scale, essay manipulating control, fictional vignette and survey regarding perceptions of the bully and victim, PECK checklist, and finally a symptomology checklist for eating disorders. Participants were able to complete all measures at their own pace. After participants were done, they saw a screen at the end of the survey stating that the survey was completed, and they were thanked for their participation. The hosting university's Institutional Review Board for ethics approved the study.

### Results

#### Hypothesis 1

The first hypothesis stated individuals experimentally primed to think about a situation in which they have no control ( $n = 49$ ) would be more empathetic toward victims of bullying, compared to the participants primed to think about high control ( $n = 34$ ). T-tests analyzed the mean differences for all four bullying outcome variables (overall perceptions via the PECK scale, plus perceptions of the fictional bullying scenario including perceptions of the bully, perceptions of the victim, and emotional reactions). All four tests were non-significant (all  $ps > .126$ ). Thus, Hypothesis 1 was not supported.

#### Hypothesis 2

The second hypothesis stated that individuals primed to think about situations in which they have no control would report higher eating disorder symptomology. Again, four t-tests assessed mean differences between groups for the eating disorder outcome variables (overall symptomology, desire for

thinness, bulimia, and body dissatisfaction). Again, none of these tests were significant; all  $ps > .316$ . Therefore, Hypothesis 2 was not supported.

**Hypothesis 3**

The third hypothesis stated individuals measuring high in controlling personalities (SDO, Type A, and conscientiousness) would be less empathetic towards victims of bullying. To test this, correlations were conducted between all three personality traits and with all four variables regarding perceptions of bullying (i.e., general acceptance and the three measures of reactions to the fictional scenarios). Three of these correlations were statistically significant and nine were not (see Table 1). Type A was not significantly correlated with any of the outcomes. Social dominance scores were positively correlated with general acceptance of bullying,  $r(83) = 0.25, p = .024$ . Conscientiousness scores were negatively correlated with general acceptance of bullying,  $r(83) = -0.36, p < .001$ . Finally, conscientiousness was also positively correlated with having negative views of the fictional bully,  $r(84) = 0.32, p = .003$ . Therefore, Hypothesis 3 was partially supported.

Table 1: Correlations Between Personality and Perceptions of Bullying

	Perceived Effects on Victim	Emotional Reaction	Perceived Effects on Bully	PECK
SDO	-.138	.045	-.010	.248*
Type A	.107	-.151	.097	-.154
Conscientiousness	.052	-.065	.317**	-.359**

Note. SDO = Social Dominance Orientation. PECK = Personal Experiences Checklist. \* Indicates  $p < .05$ ; \*\* indicates  $p < .01$ .

**Hypothesis 4**

The fourth hypothesis stated individuals measuring high in controlling personalities would self-report higher eating disorder symptomology. Again, correlations were run between all three personality traits and the four eating disorder variables (desire for thinness, body dissatisfaction, bulimia, and overall scores). Of these twelve correlations, three were statistically significant and two of those were in the hypothesized direction (see Table 2). SDO was not significantly correlated with any of the outcomes. Type A personality showed a positive correlation with the desire to be thin,  $r(81) = 0.38, p < .001$ , and was positively correlated with all eating disorder symptomology,  $r(81) = 0.28, p < .001$ . Conscientiousness, surprisingly, showed a negative correlation with bulimia disorder

symptomology,  $r(80) = -0.23, p = .043$ . Therefore, Hypothesis 4 was generally not supported.

**Discussion**

Results for Hypothesis 1 revealed experimentally priming individuals to think about a situation in which they have no control had no effect on how empathetic they would be toward victims of bullying. Individuals in both the low and high control groups appeared to feel the same towards the both the victim and perpetrator of bullying. Other research (e.g. Pennebaker, 1997) has supported the idea that reminding people of past traumas by asking them to write essays about the events can increase one’s affiliation with others. Perhaps if the essay prompts had been more relevant to either of the outcome variables (bullying or eating disorders), the writing prompts would have had a significant effect. Another possibility to why there was no significance in the current study could be because the sample size was not big enough for significance to be present or because the materials used in the manipulation were not powerful enough. Future research should explore this question by varying the questions asked of participants, how many times they write, how long they write, etc. in order to make the manipulation more powerful.

For Hypothesis 2, results revealed that individuals primed to think about situations in which they have no control did not report higher eating disorder symptomology, compared to high-control individuals (this was true for thinness, body dissatisfaction, and bulimia). It was thought that individuals who were primed to think about no control would show higher eating disorder symptomology versus individuals in the high control condition, because the eating disorders provide a way to regain control over one’s environment (Kay et al., 2015). Again, it is possible that the lack of significance in the current study was due to a weak experimental manipulation. Perhaps there was not enough time between the priming manipulation and the measurement

Table 2: Correlations Between Personality and Eating Disorder Symptoms

	Drive for Thinness	Bulimia	Body Dissatisfaction	All Eating Disorders
SDO	-.070	.028	-.176	-.112
Type A	.382**	.163	.107	.277*
Conscientiousness	.119	-.226*	.010	-.024

Note. \* indicates  $p < .05$ ; \*\* indicates  $p < .01$ .

to have a very strong influence or effect. In addition, more nuanced measures of eating disorders might have provided additional insight. For example, future research could utilize scales more focused on anorexia versus bulimia, as anorexia behaviors certainly require higher levels of control and discipline.

Hypothesis 3 expected to find that participants with controlling personalities would be less empathetic towards victims of bullying. The results revealed that, as expected, high social dominance orientation was significantly associated with more acceptance of bullying, while conscientiousness was significantly associated with less acceptance of bullying (and more negative views of a fictional bully). SDO promotes superiority of one social group over others, while conscientiousness promotes self-control and the ability to respond depending on values, morals, and social expectations (Baumeister, Vohs, & Tice, 2007). It makes sense for individuals who want superiority of one social group over the other to accept the presence of bullying and even potentially be able to relate to the bully. How else can one group overpower the other if methods such as bullying are not used? It also makes sense that a person high in conscientiousness (using their values and morals) will be aware that this type of behavior is wrong. The results revealed that personality does in fact influence whether or not one will be accepting of bullying and of behaviors that are socially wrong. If we apply this information to schools, it would be a useful tool to have when developing ways to help students or in designing training programs to help curb aggressive behaviors. Even more specifically, understanding how personality influences views of bullying can be useful in predicting bystander intervention behaviors. For example, bystander training might emphasize the controlling dynamics involved in bullying behavior to potentially make students low in SDO or high in conscientiousness particularly attuned to why bullying is not acceptable.

Finally, Hypothesis 4 revealed some, but little, evidence that individuals high in controlling personality have higher eating disorder symptomology. Out of the three personality traits measured, only Type A had a significant correlation with the desire to be thin and with eating disorder symptomology overall. Individuals with a Type A personality are described as hard-driving and competitive (Heilbrun & Friedberg, 1988). Past research showed that individuals with high controlling personalities are more prone to eating disorders due to the excessive control needed by these particular disorders. High controlling personalities may be a risk factor in eating disorders or in predisposing individuals to later developing an eating disorder (Leon et al., 1993),

a trend that was partially supported in the present study. This research could help build different tactics on how to teach and help those with eating disorders; therapy could focus on helping clients understand that at least in part, their symptoms may come from a desire to gain control. However, the general lack of support for this hypothesis also implies that there are more important variables that might predict eating disorders, and future research should attempt to identify these predictors.

### **Limitations and Future Research**

There were several limitations to this study. Having a larger sample size might have helped some of the trends gain statistical significance. Additionally, the present survey was accessed online. This caused a serious problem of participant incompleteness; many individuals began the survey but dropped out before taking all of the scales. This further limited the sample size and degrees of freedom for any given hypothesis. Also, two of the scales (Type A personality and perceptions of the bully) had low internal consistency (.55 and .54 respectively) and thus participants may have interpreted individual items in different ways.

The situational control manipulation could also have important limitations. The essay prompts were very broad and might have been interpreted differently by different participants. Actual responses were not coded to see if participants in each condition had similar content in their essays. In addition, there was not a manipulation check. Finally, future research could tighten the experimental manipulation by crossing conditions of high or low control with good or bad outcomes. The current study only included (1) low control and bad outcome and (2) high control and good outcome. Adding conditions with low control/good outcome and high control/bad outcome could test for whether any effects are specifically due to control or whether they are based on positive or negative consequences.

When measuring eating disorder symptomology, bulimia was the only specific eating disorder that was measured. As mentioned above, it would be interesting in the future to also measure anorexia and compare the difference in results. Anorexia requires more of a controlling personality in order to discipline one's self to eat less and convince yourself that you are overweight, so it is certainly more aligned with the goals of this study than bulimia or a simple desire for thinness. Thus, future research should use scales that specifically measure different kinds of eating disorders, including separate scales for anorexia versus bulimia symptoms. It would also be interesting to expand the traits measured for controlling personality beyond Type A, SDO, and conscientiousness to see if other predictors of either

eating disorders or reactions to bullying can be identified as related to the desire for control. Finally, assessing previous pathology or measuring eating disorder symptoms in a longitudinal design could reveal interesting patterns regarding changes in eating as a result of changing environmental stressors or feelings of control.

### Conclusions

By understanding control and what it can do to one's life, individuals may gain insight into their behavioral choices and worldviews. While some control can be good, such as providing for discipline and restraint, excessive desires for control may lead to negative outcomes. This study found evidence that belief in social hierarchies is tied to acceptance of bullying and that Type A personality is associated with eating disorder symptomology. A greater understanding of how personality and environmental influences on one's feelings of control may lead to a more positive and healthy future by understanding how control ties to both perceptions of bullying and to eating disorder experiences.

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## Appendix

**Experimental Manipulation (Essay)***Low control condition*

Describe a time in which you had no control and it led to a bad outcome. For example, someone stole something from you, you were blamed for something that wasn't your fault, you lost a job when it wasn't your fault, someone scammed you out of money, etc. First, describe the situation, then describe how that made you feel.

*High control condition*

Describe a time in which you had complete control over a situation and it led to a good outcome. For example, you were able to choose a reward that you had earned, you got a job or a good grade due to working hard, you won an award because of excellent work, etc. First, describe the situation, then describe how that made you feel.

*Special Features*

*Psychologically speaking*

TRANSCENDING THE SUM OF HIS PARTS:  
AN INTERVIEW WITH MICHAEL WERTHEIMER

KINSEY BOLINDER<sup>1</sup>, AMY VIEJO<sup>2</sup>, SOFIA SOFTAS-NALL<sup>3</sup>, AND RICHARD L. MILLER<sup>2\*</sup>

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Michael Wertheimer received his BA from Swarthmore College, his MA from The Johns Hopkins University, and his PhD in experimental psychology, from Harvard University. He taught three years at Wesleyan University before moving to the University of Colorado at Boulder in 1955 where he is now Professor Emeritus in the Department of Psychology and Neuroscience. Professor Wertheimer has published hundreds of peer-reviewed articles and many books, including *A Brief History of Psychology* (currently in its 5<sup>th</sup> edition), *Max Wertheimer & Gestalt Theory* (with D. Brett King), the enlarged edition of *Productive Thinking* (co-authored with Max Wertheimer), and many others. He also coedited all six volumes of the series *Portraits of Pioneers in Psychology*, and in 2000 he was one of the first recipients of the Lifetime Career Achievement Award from the Society for the History of Psychology “for sustained, outstanding, and unusual contributions to the history of psychology.” Alongside his stellar successes as a scholar, Professor Wertheimer remains a living legend in the teaching of psychology, with two national awards for the teaching of psychology as well as numerous university and other teaching recognitions. He ran the departmental honors program at the University of Colorado for more than four decades while he also directed doctoral research in experimental and sociocultural psychology. Professor Wertheimer has been as president of four APA divisions (general psychology, teaching of psychology, theoretical and philosophical psychology, and history of psychology), the Rocky Mountain Psychological Association, and Psi Chi, he has served as a member or chair of many APA boards and committees, and he has served numerous terms on the APA Council of Representatives. Professor Wertheimer continues to publish, present, and contribute to the teaching of psychology when he is not hiking, skiing, and climbing in the mountains of Colorado.

William Douglas Woody  
University of Northern Colorado



**Miller:** The Journal of Psychological Inquiry is primarily a journal of undergraduate research papers. We have three interviewers from three different schools to conduct this interview. They will take turns asking questions that they have prepared. If there are any follow up questions that people in the audience want to ask, please give your name and your school so we can appropriately note it in the transcript. Once we finish with this interview, Dr. Wertheimer will have a chance to review it. Let's get started by introducing the interviewers. Kinsey Bolinder is a senior at Boise State University. After graduation, she plans to take a year or two away from school, and then start applying for Ph.D. programs. She is still deciding which programs she would like to apply to, but some areas of interest are cognitive and experimental psychology. Amy Viejo is a student at Texas A&M University-Kingsville. She is a junior, and plans to apply for masters and doctorate programs in psychology, but still has a very open mind. Sofia Softas-Nall is enrolled at the University of Northern Colorado. She is a junior who is interested in applying for positive psychology [programs]. She is also a philosophy student, and so is exploring some philosophy options as well.

**Wertheimer:** Good! I think philosophy and psychology have been segregated much too much in the last decades. There is a division of philosophical psychology in APA. Become a member, if you aren't already.

**Miller:** At this point, I will leave you in the capable hands of these students, who have prepared a series of questions. The audience is also invited to participate in asking questions of Dr. Wertheimer

**Bolinder:** What was it like to grow up as the son of the famous Max Wertheimer? How did your early childhood home influence your thinking?

**Wertheimer:** What was it like? Wonderful. How much did it influence me? Tremendously. In fact, I'm sure that my career was also greatly influenced by my being Max Wertheimer's son. I'm almost certain it got me into Swarthmore College, which is a very exclusive school. My father died while I was a senior in high school, and his colleague, Wolfgang Köhler, essentially decided to take me under his wing at Swarthmore. He got me in there, and I'm sure that my job offers once I got my Ph. D. were influenced in part by my last name.

And just as a bit of psychoanalytic stuff, I remember my naïve pleasure when I ended up having a larger number of publications than my father had. But it

was also very clear to me that any one of his very few publications was far more influential than any or any combination of the stuff that I had published.

It's been a major part of my life, inevitably. Gestalt psychology was, in a way, part of my home life when I was growing up through the whole way of thinking in his book, *Productive Thinking*, that I hope some of you have read, since it's still in print. It was first published in 1945. He used productive thinking and got everyone around him to engage in productive thinking. Whether you are a two, three, or four year old child, or an adult who is there for dinner. Productive thinking encourages you to try to understand what is really the root of any given problem and try to come up with a solution. Somehow being intellectually curious, critical thinking or getting to what he called the "radix," or core of an issue, was something that was there since my childhood. And the Gestalt notion that the whole is different from the sum of its parts and that what something is, is very much affected by its context, all that kind of thing has become a part of my everyday life and thinking since childhood. For that matter, he also used to try some of the puzzles, the examples that he would use in lectures on his kids. That was a lot of fun.

I remember one. For example, there used to be some wise people in the deserts of Southeastern Europe and North Africa. One such wise man was walking along near a tent city. In the tents was a single pole in the middle. He heard a not very desperate call for help in one of the tents. He opened the flap and looked in, and there was a lady making bread. She had a small table in front of the tent pole, which had a wad of dough right on it. She had reached around the pole to the other side, to a bag of flour. She had gotten just the right amount of flour she needed and wanted to get it on top of the dough, but the pole was in the way. So, this lady called for help. The wise man went in and asked her what was wrong. She told him she had exactly the right amount of flour in her hands, "but I can't get the flour onto my dough." The wise man's hands, unfortunately, were not very clean, so he couldn't offer to take the flour. How did he suggest she solve this problem?

**Audience member:** Walk around the pole until her hands are on the same side as her dough.

**Wertheimer:** You got it! All you have to do is go around to the other side of the pole and drop the flour. It was that kind of very simple-minded problem that he would use to demonstrate insight - things like that in his lectures, but he would try them out on his kids when we were little at the dining table.

**Miller:** How old were you when the family came to the United States?

**Wertheimer:** I was six. [with a strong artificial German accent]: That's why I still have such a strong accent, you know.

**Miller:** Any early memories of what it was like in that move?

**Wertheimer:** Yes and no, in the sense that there was kind of solidity and a feeling of safety in the family with my mother and father and older brother, my younger sister. We were a very close-knit family. It was always warm and comfortable. Yes, it was a totally new experience being over here. None of the family knew any English worth talking about. German was the secret language at home when we were in this country in New Rochelle. For that matter, I remember being shocked when some outsider dared to speak the secret family language also. It was our language! No, it was a very warm, appreciated childhood and very supportive on the part of both my mother and father, not to mention my older brother and younger sister. It was a very positive experience. It was a challenge, but not at all traumatic coming to this country.

**Viejo:** Did you always know that you wanted to be a psychologist, and if so, when? Were there significant teachers who played a role in your decision?

**Wertheimer:** Both, in the sense that Gestalt theory and thinking about things and being interested in the world and how things work, was always a part of my cognitive experience from a very young childhood. I started out at Swarthmore as an undergraduate in French Literature. I had French and Spanish in high school, as well as Latin/Greek. They did that for only one year. Monday was Latin, Tuesday was Greek, Wednesday was Latin, Thursday was Greek, and so on. It was wonderful for learning all kinds of roots, and I have been an amateur etymologist ever since. But there was enough interference between the two that they discontinued that after one year. So French Literature was my first major at Swarthmore. Then it became Linguistics, partly because of an inspiring teacher by the name of Carl Reuning, who wrote a wonderful book called *Joy and Freude*, in which he compared the way in which the two languages, English and German, map the world of positive experiences. It's very different in the two languages.

I'm a fascinated psycholinguist, convinced of the old Sapir-Whorf notion that language inevitably structures experience. I think it's unfortunate that the foreign language requirement is no longer as strong as it used to be because if you really learn to speak another language, you learn a completely different way of seeing the world! Even something as simple as the Spanish usage of the reflexive and passive illustrates this. If I drop a cup and break it, the agency idea is totally different in Spanish. It's not me, it's not my fault that I dropped it and broke it. *Se cayó*, it fell; *Se rompió*, it broke itself, I had nothing to do with it. I went from French Literature to Linguistics, from that to Philosophy, and finally psychology as a major.

Köhler sent me to Johns Hopkins University for the masters because he thought I hadn't gotten enough physical science. I had been too much spoiled with the humanities and social sciences.

I guess I'm not sure when I decided to become a psychologist, but academia really didn't attract me much until my last two years at Swarthmore College. At the time, if you did reasonably well your first two years, you could "read for honors" the last two years. You had no more classes the last four semesters. You took two seminars each semester, one in your major, one in one of two minors. So you had four total seminars in psychology, in the major, and two each in two minors. Your professors never graded you. Typically the seminars met once a week in the professor's home, often in the evening. Typically you had to prepare a paper for each of the seminars. Somebody took notes during the seminar session and would read them at the beginning of the next session. It was just a heady, lovely, wonderful experience. No apple-polishing; you squeeze your professors dry for whatever they could help you do and find out and learn. It was wonderful.

Except for the last month, when you had eight outside examiners who gave you a three hour written and a one hour oral on each of the eight seminars you had taken. Those eight examiners at the end would decide whether you had to take some more courses before you can graduate, whether you graduate at all, whether you graduate cum laude, magna cum laude, or with highest honors, summa cum laude.

It was a wonderful, wonderful experience, and helped me decide that I wanted to have an academic career. And I've loved it.

I think the highest point was directing an undergraduate honors program at the University of Colorado-Boulder for close to forty years. The best students didn't bother. It was the second tier who weren't all that sure about their own capacity, who really profited

from that program. It was a wonderful program that required taking a couple of seminars, doing a thesis, and taking several exams: a written exam, both an essay exam and a multiple guess one, and an oral on the thesis. There was a whole bunch of those kids who after they had done their original study, written it up, defended it; thought, “Oh, by golly, I can do it!” What an experience! I loved it.

**Softas-Nall:** Do you think there could be a unified psychology, and do you think there should be a unified psychology?

**Wertheimer:** This has been a movement within APA and elsewhere for decades. It’s the primary issue with which Division I, general psychology of APA, concerns itself. There are many people, especially those who still like the old-fashioned idea of good liberal education and critical thinking, who think a unified discipline has major advantages. Even if someone specializes, and at least in the 20<sup>th</sup> century you had to specialize in some sub-part of psychology to develop a career as a researcher and a good published scholar, I think even that part is greatly enhanced by the perspective of how this little piece of psychology, whether it’s behavioral genetics, or social psychology, or personality, or whatever, how that fits into the whole effort to understand how individual beings, whether they’re humans or otherwise, function. The basic question of what is psychology about? The study of the psyche. What is the psyche? Well, we’ve had many issues about that. But keeping that broader perspective is useful in virtually every human endeavor. It’s certainly true in psychology. In fact, I think Division I still has an annual lecture that’s the unification lecture for that year. So there are a lot of people who are intrigued with the idea of keeping psychology unified.

At the same time, there has been tremendous fractionation. Especially at the end of the 20<sup>th</sup> century and now, there are a lot of people who don’t want to be called psychologists who used to be called psychologists. “No, I’m a neuroscientist.” “No, I’m a behavioral geneticist.” “No, I’m a decision expert,” etc. I think these two opposing orientations are going to continue to be there. I think they both have something to say, but as you can tell from what I’ve been saying, obviously I’m on the side of yes, let’s try to see what there is that is common to all of these different efforts.

**Bolinder:** What motivated you to get involved in scholarship and research?

**Wertheimer:** It’s fun. It was my two last years at Swathmore College that just totally sold me on the intellectual life and what wonderful excitement and challenge it can provide. Then the first few years after my Ph.D. I did “publish or perish” stuff and found it really very nice that one could be paid to study almost any question that intrigues you in almost any way that seems to you to make sense. I don’t know if that’s still true of today’s academia, but it was in the middle of the 20<sup>th</sup> century when I finished my Ph.D. in 1952. Back then, I published in a tremendously wide range of areas, mostly experiments, and found it tremendously rewarding. It also related to the honors experience that I had and the honors program that I directed at CU Boulder, encouraging people to puzzle about things that puzzled them. How can you phrase this in a form in which some empirical data might be relevant in deciding whether this is so or not? In fact, in junior seminar, which was part of the required part of the honors program at CU Boulder for many years, the students got started on a research project that could become their thesis during their senior year. Just that process itself, coming up with a question that interests you and deciding how you can do something with it that might provide some interesting information is fun.

**Viejo:** What were your early research interests?

**Wertheimer:** As I indicated, I jumped all over the map. My very first publication was based on my master’s thesis, which had to do with binaural hearing and auditory localization. The second one was totally different. One of the dollar-a-year professors at Harvard, J.G. Beebe-Center, had read a book by D. O. Hebb on the Organization of Behavior in which he claimed that a German monograph by one Von Senden summarized all of the known results of visual experiences of people born blind who then got their sight afterwards. He thought that the Von Senden data, case histories, didn’t match what Hebb said about the need for learning in visual perception, and knowing that my native language was German he asked me to read Hebb’s work and come up with a little paper about Von Senden and Hebb. I drafted it, and showed it to Beebe-Center and he went through the first paragraph with me, sentence by sentence, “now this implies such and so, did you mean that? Is this part here really relevant?” I think we went through 7 or 8 drafts before he got me to the point where I thought that “yes, this was saying what I thought it should.” (A wonderful teacher, whom I should have mentioned earlier.) That was another publication then, on the role of

learning and perception in the American Journal of Psychology 1950 or 1952.

My Ph. D. research, I chose very poorly. My director was Smitty S.S. Stevens, the psychophysicist, and he had a theory about the random variation of thresholds over time, quantum theory. And so I proposed to test his theory, just to prove it wrong. I measured absolute thresholds in vision, in hearing, in pain using radiation on a black spot, measured these over time on a number of different people. Back then there weren't any computers and I remember my calculator took an hour and a half for every 10 minutes of data that I gathered. I managed to prove that in a number of different ways of defining randomness, threshold variation over time was not random; wrote this in my dissertation, went off to go skiing for a week and thought the dissertation would be read and I'd be ready for the oral. I came back and was told there won't be an oral because, according to Stevens, "the problem was pretty awful, but your procedures are pretty good". Verplanck was on the committee, and he said, "Your problem is terrific but your methods weren't very good, you know?" Then E.G. Boring, the historian, was the third member of the committee. He said he agreed with the other two committee members didn't think it was ready for an oral. So I ran a few more variations, resubmitted it and passed my Ph. D. with flying colors. I also spent a year as a clinical intern at Worcester State Hospital and there was a fellow there whose name I will not mention, who was convinced that the Rorschach was a very good test. It could easily tell whether someone was paranoid or not by the appearance of eyes on the Rorschach, especially if the response was a pathognomonic one, like "those eyes are staring out at me from the gloom." So I went through the records, of the verbal records of the Rorschach test that had been taken on intake cases and their diagnoses and found there was no relationship between the number of eye contact responses and whether somebody had called suspicions in the case histories or was diagnosed as paranoid. I published that too, so I did a wide range of stuff, whatever happened to interest me.

There was another one that fell completely flat at the time. This was '51 to '52. I was working at the Worcester State Hospital and they kept records of the weights of all of the patients. Lobotomies were still popular back then, and somebody had published an article showing that frontal lobotomy in primates tended to produce a weight increase. So, I thought heck, I can just look at the records here and see whether the same holds true of humans. So I got the records of people that received lobotomy and their monthly weight, and it went up nicely after lobotomy. But my wife pointed out "are

you sure lobotomy had anything to do with it? How about the year before the lobotomy? How about those people for whom lobotomy had been proposed but permission had not been received from the relatives?" Controls! And it turned out that that nice trend upwards after lobotomy had already been there the year before, and for those that didn't receive lobotomy, the two lines coincided perfectly. It wasn't lobotomy after all, patients in the hospital just all were gaining weight, so I didn't publish that one.

I'm a general psychologist but also a fellow of the division of experimental psychology, too. I enjoy experiments because they can help sort things out.

**Softas-Nall:** How, if at all, have you involved your undergraduate students in your research?

**Wertheimer:** Tremendously; usually I followed their lead in their thesis and dissertations—graduate students' dissertations. And an awful lot of the honors thesis that were produced by these wonderful students ended up with me as a co-author. I think, legitimately; I helped them think it through, but they did the main work. An awful lot of my publications are with undergraduates and with graduate students.

In fact, I think one regret, if it is a regret, of my career is that so much of it was externally motivated. It was the interests of the students, it was a request from a publisher, it was something else like that that got me to engage in the projects I was engaged in; very little of it came from inside me. In a way, that feels like a failure.

**Audience Member:** Early on you started doing projects, out of whim, out of curiosity, and that went away?

**Wertheimer:** No that continued, because almost any project that a student would suggest, I would get interested in, too.

**Audience Member:** But you didn't initiate it.

**Wertheimer:** I very rarely initiated any projects that I have been involved with. In fact, one that I haven't finished yet: a couple of grandkids and a couple of colleagues have suggested that I should write an autobiography. I wouldn't have done it on my own. I have a draft now, some 400 pages. I have no idea what to do with it yet; I have to edit it a lot. But, again, that came from outside suggestions. Almost all of the stuff that I put my energies into and a lot of it from APA, I've been on boards and committees of APA and RMPA and the board of directors of APA; a lot of stuff that I paid attention to

has been because other people wanted me to. I hope many of you have some internal drive, like positive psychology, that gets you excited and that you can pursue. I didn't have that from inside.

**Audience member:** So to me, what that says, is that you were a true teacher because you help your students have a voice in what they were inspired by. I understand to you that may feel like a failure, but as an outsider, the fact that you helped your students give voice to their inspirations, to me that is a true teacher.

**Wertheimer:** Thank you. That has really been my motivation: to help, especially for people who weren't all that sure about themselves. I want to help them become a little more self-reliant and realize they got it, even though they don't really get it yet.

Teaching is a weird profession. A huge part of it is not providing information or teaching subject matter, it's helping people become what they can become. Positive psychology, I feel like, the Maslowian motion, too.

**Softas-Nall:** That sounded like Rollo May to me.

**Wertheimer:** There's been a lot of inspiring folks who made that kind of assertion.

**Miller:** You said earlier in your talk that what we need is evidence-based teaching techniques but don't you really think that what makes a difference is the passion of the teacher? Some teachers can do one thing and be really good and inspire students and some other teachers can do something completely different and also inspire. It's not really about the technique, it's about the intersection between the technique and the individual teacher.

**Wertheimer:** I suspect that once the empirical work is done, that that hypothesis is likely to be corroborated.

**Audience Member:** Can I take you back on that a little bit? So you indicated in your speech that there might be this shift to online learning or at least the lecture part of it. How do you think that's going to affect stirring up intellectual curiosity in freshmen and people that have no experience with experimental research? Do you think it'll help or hurt or...

**Wertheimer:** I think it's already helping that so many of these courses are available free online. You've got an enormous number of people who never even thought of college listening to these things. It's enriching the lives of an awful lot of people already. I don't think you need to have the exams and tests to get credit for it. If somehow your mind is expanded by listening to some of these things, it's only to the good. I'm not sure that really answers your question.

**Audience Member:** It did. Absolutely. Thank you.

**Bolinder:** In an earlier interview, you told your interviewer that you would advise students pursuing graduate studies in psychology to avoid a counseling and clinical specialization or a scientific academic career. Can you please expand more on why you thought that?

**Wertheimer:** It wasn't until 1925 that people were better off going to a physician if they had something wrong with them than staying away. Even with broken bones and all kinds of other things like that. That time is possibly arriving. I'm not sure it has arrived, yet for clinical and counseling psychology. There was back in the 50's, an interesting little study, I think there were three groups, one was receiving psychoanalytic psychotherapy, another group was receiving non psychoanalytic psychotherapy, and the third was getting compensation for their neurological psychoneurotic problems but weren't receiving any treatment. Among the ones who were not receiving any form of psychotherapy, the improvement rate two years later was something like 80 percent. This was based on a whole slew of different studies being summarized. Among those receiving non psychoanalytic psychotherapy, the improvement rate was something like 70 percent improvement two years later. Among those receiving psychoanalytic psychotherapy the improvement rate was around 60 percent after two years. As you can imagine, this produced a real furor and there has been a discussion ever since whether psychotherapy is effective or not. There have been quite a few claims by avid people who say they know it works and that's it. That's been true of an awful lot of the people in those fields. It's been true of their clients as well as of themselves. But if you look at this past data, at least when I was receiving them at that time, the data were not at all clear that psychotherapy or counseling were doing any good. My empirical criterion again.

**Audience Member:** Can I ask one follow up on that?

Wertheimer: Sure.

**Audience Member:** Have you read any data regarding long-term efficacy of treatment versus non-treatment groups?

**Wertheimer:** There is an enormous literature on that kind of subject and it is conflicting. There are some very short term ones like Bernie Bloom's and well, long term ones. The data are not consistent. While there is an awful lot of faith in the psychotherapy community that they're doing well, one problem is you get fads. People get convinced that this approach is really going to work. Then you get a dispatch, an evaluation of it, empirically from outside, and well maybe it does about as well as a control group with another well-established method.

Or it may be doing no better than the control group or as untreated. The data, once you look at truly empirically objective evaluations of psychotherapy and counseling, are not clear that these procedures really are doing any good. Of course, people won't engage in some kind of therapy or treatment if they don't think it'll work. There's a huge placebo effect of that kind on both the practitioner and on the part of the client and one can argue that the placebo effect is useful. If it works, do it. If you think it's going to work and it does help, whether it's acupuncture or....

**Miller:** Exorcism?

**Wertheimer:** The data are not yet really clear when you look at them carefully; the psychotherapist is not yet quite at the stage that the medical physician was in 1925 when it was finally demonstrable that consulting a physician for some kind of physical problem was more likely to get you better than if you didn't. And there still are many areas: dermatology, psychiatry, where the art of treatment is at best an art and there is not yet a good established empirical base for many of the things that doctors do that they hope will improve the patient's condition. If the patient and the physician and the family are convinced that it'll help, it often does, but if you look at the placebo controls, it's usually no better than a placebo, even in many areas of medical practice.

**Viejo:** How did your early undergraduate experiences shape how you have taught undergraduates?

**Wertheimer:** My early undergraduate experience was regular lecture courses and I hardly even

remember any of those though. I do remember the seminars I had my last two years. I had one teacher for a course that fulfilled a requirement for European history. The first semester, I just didn't understand anything and I got a C. The second semester, I thought I was finally understanding something and then that semester I got a D in history. I made much of my career the last few decades in history of psychology, which seems weird.

I had a wonderful teacher of Shakespeare. In fact study of Shakespeare has gone on for a few more generations. I had a daughter who got her Ph.D. at Yale in English with a dissertation on a Shakespeare topic. Our granddaughter, her daughter, is now also a Shakespeare fiend. I had a wonderful teacher in French literature; that's why I majored in French, I guess. One ideal class was one where two of us, my college roommate, who was born in Vienna, and I had a seminar on Goethe, the German poet, at the professor's house. Mrs. Sills would always have some wonderful German baked goods for the breaks during the seminar. However, my early undergraduate years didn't really influence me all that much, except that they got me interested in various topics such as French literature and linguistics and philosophy that I hadn't known much about before.

**Softas-Nall:** What does Gestalt psychology have to offer psychology of the twenty-first century? How can it inform current existential and positive psychology?

**Wertheimer:** There has been a rebirth of Gestalt thought. In fact, one of my most recent books, published by MIT press, was the English translation of my father's two papers that founded the Gestalt school. There has been so much interest in Gestalt thought, how it is relevant to personality, to visual neuroscience, to a whole slew of other areas including aesthetics. Gestalt, without there being any reference to it by name, has become a major current trend in an awful lot of relevant areas including positive psychology. I don't think that Martin Seligman was much of a Gestaltist himself, but certainly one could combine positive and Gestalt psychology in productive ways. Another nice project for you.

**Softas-Nall:** How would Gestalt Psychology view the human being in terms of its parts, would Gestalt Psychology see the human being as other than the sum of its parts? I'm trying to get at what you were saying earlier about how Gestalt psychology is relevant to personality and I'm wondering about personal identity.

**Wertheimer:** Personal identity is part of personality, it's not the full personality. There was a student of my father's who wrote a book on the Christian personality as a Gestalt. This was one of the first uses of the word Gestalt, in fact the footnote of the use of the term Gestalt in her dissertation was about three pages long and referred to my father's Gestalt theory. That was the first printed version of Gestalt theory.

A personality is a Gestalt. The human being is a Gestalt, the parts of which are important in terms of their role within that whole that is the personality. One's identity is one part of that, but it too is determined by the interaction with the other parts of it. One's own identity, different people one interacts with have different emphases of different parts of that Gestalt for them. If I didn't have as much of a paunch, if I was still stronger than I am now, my physical part of me would be a more central part of my self-image than it has become. I used to be a mountaineer, member of the Rocky Mountain Rescue Group, a skier and all that kind of stuff. I still do some cross country skiing, but that kind of thing is no longer as central a part of my Gestalt as it once was. People's Gestalten change over time too. Again, it's a definitional issue, just as we were mentioning earlier, it's almost impossible to define psychology in a way that will satisfy everyone. In the same way, personality is such a term. Everyone has an idea of what that is and there may be some kind of commonality, but it's hard to find what it is. I don't know if that really speaks to your question sufficiently.

**Softas-Nall:** I'm glad that you answered that. I was actually wondering that for a very long time and I asked that question in my history of psychology class, and Dr. William D. Woody didn't exactly have an answer for me, so I got what I was looking for, thank you.

**Miller:** This is a long question and I'm going to ask it. In your Gestalt psychology seminar at CU Boulder in 1995, you discussed your experiences in Skinner's advanced behavior analysis seminar at Harvard in the 1950s. You noted that he started each class session with an invitation to propose something that his behaviorism could not explain. You said that he answered all questions strongly. In particular, you noted that after a few weeks of class, other seminar participants answered for Skinner and then he did not have to talk. When you were asked by Brett King whether you were satisfied with Skinner's explanations you said that you were. Brett was surprised by that. You said, "They were very complete explanations in that language." Can you elaborate about what you

meant by 'complete explanations in that language'? I've been wanting to ask this question for years.

**Wertheimer:** Skinnerian approach... R.I.P. I think it's disappeared. It was a very productive approach towards psychology. It's completely different from so many other languages for describing behavior. At first I thought it would be easy to come up with examples that couldn't be dealt with in the Skinnerian framework or Skinnerian language, such as productive thinking. But once I had learned Skinner's lingo it became easy to describe behavior in the Skinnerian behavioristics. It obviously was a very productive perspective and there are many other perspectives whether it's Martin Seligman's or Rollo May's or Abraham Maslow's or Doug Woody's. Everyone has his own way to try somehow to make sense of reality whether that reality is human behavior, whether its understanding or trying to empathize or understand somebody that's different from you. These are all tasks that almost all human beings have and there is a huge variety of potential ways to think about such things, many of which can be very productive, including the Skinnerian. I'm not a Skinnerian, I never was. Although I did help Skinner teach pigeons to play ping pong, which I found interesting.

Basilias Softas: That's fun.

**Wertheimer:** He had a ping pong table slightly raised in the middle and the ball would either roll down one side or another. A pigeon was at each end and their task was to hit the ball so it fell down the other side. When it fell down the other side then this pigeon got fed. You could teach pigeons to play ping pong, to be competitive, but the pigeons outwitted Skinner. They soon realized that if neither of them pecked at it they would both get fed more often.

**Audience member:** We use that as an example whenever we're teaching about behaviorism in my intro to psychology course so I'm going to start citing you now, as well as Skinner.

**Miller:** Kinsey, we have time for one last question.

**Bolinder:** What are some of the things you value most in life?

**Wertheimer:** My family. My mind. At my age I've seen an awful lot of my friends and colleagues, even younger ones, begin to have challenges that way. I'm

scared silly about no longer being able to think properly. Family, people, friends, intellectual activities are things I value. I still do crossword puzzles almost every night. I play bridge; engage in things like writing; this talk that I gave today. Stuff like that I just find very, very rewarding. Also, interactions with people I've known of which there are many, not just my kids and grandkids and great grandkids and friends, but I hear from students

sometimes from surprisingly far away and long ago. When my wife and I were in Kathmandu, Nepal some years ago somebody shouted across a rice field "Hello Dr. Wertheimer". It was a former student who recognized me.

So, people, thank you all.