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motions have probably always played an influential role in the daily lives of people and the situations in which they engage. In recent years, much attention has been devoted to what specific roles procrastination and self-awareness have in emotional responses. Procrastination is commonly experienced in both personal and professional arenas and can lead to many negative emotions. For example, Pychyl, Lee, Thibodeau, and Blunt (2000) reported that significantly higher levels of guilt and lower levels of motivation were experienced by students when they reported that they were procrastinating. Further, Scheier and Carver (1977) found that self-focused attention, by use of a mirror, heightened a person’s awareness of and responsivity to both positive and negative affects, therefore possibly amplifying the positive or negative emotion experienced. A better understanding of how procrastination and self-awareness interact to influence the kind and intensity of emotions may help individuals better self-regulate and manage their daily lives.

Procrastination is a problem that is becoming more prevalent amongst college students. It is estimated that up to 70% of college students procrastinate on academic tasks (Schouwenburg, Lay, Pychyl, & Ferrari, 2004). Generally speaking, to procrastinate means to put off something that must be done. Solomon and Rothblum (1984) defined procrastination as “the act of needlessly delaying tasks to the point of experiencing subjective discomfort” (p. 503).

There are many possible reasons for the occurrence of procrastination in college students. Solomon and Rothblum (1984) concluded that there are two distinct reasons for procrastination by college students. First was fear of failure, which incorporates concerns about meeting other people’s expectations, about meeting perfectionist standards, and about lack of self-confidence. Szalavitz (2003) suggested that procrastinators would rather be seen as lacking in effort than as turning in a performance that is not good enough. People who have perfectionist tendencies routinely put things off, which is an activity that is a core-identifying element of procrastination in students, and it can be indicative of the self-handicapping strategy. Ferrari (1991) found that procrastinators had significantly higher levels of public self-consciousness, self-handicapping, and social anxiety, along with lower levels of self-esteem. If people view them-
selves in such negative ways, it likely will have a direct impact on their self-confidence, usually by decreasing it. In turn, this diminished self-confidence can fuel more fear of failure and procrastination. Beck, Koons, and Milgrim (2000) also found that procrastination was linked to self-handicapping, although some of their results show that individuals with high self-esteem might adopt the self-handicapping strategy of procrastination in order to preserve a fragile sense of esteem.

A second reason for college student procrastination is task-aversiveness, which asserts that people will procrastinate when presented with boring or overwhelming tasks (Ferrari, Johnson, & McCown, 1995). Many times, working on a project makes both chronic and less chronic procrastinating students feel anxious or distressed due to anticipated performance evaluation, depression from not meeting their ideals, or boredom by the task. Students may focus on getting rid of the negative emotions by avoiding the project altogether (Baumeister, Heatherton, & Tice, 1994). For example, Pychyl et al. (2000) found that college students who interpreted a task as aversive or overwhelming procrastinated by participating in a less aversive, more enjoyable task, but reported experiencing higher levels of guilt and significantly lower levels of motivation. In addition, Senecal, Köestner, and Vallierand (1995) showed that no matter the importance of a specific course, students were still likely to procrastinate if the course material was not genuinely interesting. Thus, if a task is interpreted as boring, which is generally considered to be an aversive stimulus, a student is likely to procrastinate.

The above summary of procrastination in college students highlights the possible negative consequences of procrastination in less chronic and chronic procrastinators. The categorization of “less chronic procrastinator” encompasses those individuals who procrastinate inconsistently to those who rarely procrastinate. In contrast, “chronic procrastinators” exhibit procrastinating behaviors in a more consistent manner and this categorization includes individuals whom will procrastinate given any opportunity. Procrastination is not limited to college students, so its negative effects can be felt by a variety of individuals. For example, a survey of individuals across North America found that approximately 50% of them reported Internet procrastination (Lavoie & Pychyl, 2001). This type of procrastination takes place when an individual justifies not yet committing to work on an intended task on a computer by participating in more enjoyable computer tasks such as checking email or surfing the web for shorter intervals of time (Silver & Sabini, 1981, as cited in Lavoie & Pychyl, 2001). Quick gratification and the ability to discontinue at will are two key elements found in Internet activities that drive an individual to engage in Internet procrastination.

However, some recent studies have started to acknowledge positive effects of procrastination, at least in individuals who can be classified as active rather than passive procrastinators (Chun Chu & Choi, 2005). Active procrastinators are more like non-procrastinators in that they are goal directed, but they prefer to work under pressure. Using a build-up of pressure fits with the concept of stress as an effective motivator because, at some point, the resultant negative emotions can drive a person to action in order to alleviate the negative feelings. Gmelch (1983) focuses on such an approach in his article, Stress for Success: How to Optimize Your Performance. But unfortunately, with procrastination, a move to action may happen so late there is not enough time to do a thorough job on the task, and the situation as a whole is negative and leads to future aversion. Self-awareness can play a vital role in controlling and manipulating an individual’s awareness of his or her emotions. If a procrastinating person was to become more self-aware, would that increase the emotional intensity, and perhaps motivate the individual to act sooner?

Self-awareness is defined as attention focused inward (Scheier & Carver, 1977). Muraven (2005) defined someone high in self-focused attention as having thoughts that are focused inward at the self, while people low in self-focus attention have thoughts that are directed outward at the environment or situation. One of the most common ways of manipulating self-awareness is through the use of a mirror. For example, Scheier and Carver had participants fill out a questionnaire that assessed the occurrence of either self-focus or world-focus responses while in the presence or absence of a mirror. Their results showed mirror participants made more self-focus responses and fewer world-focus responses than nonmirror participants. They concluded that by focusing attention on oneself, internal states are clarified and emotions should be more intense and obvious to the individual. Thus, it could be hypothesized that negative emotions related to procrastination would be felt more intensely by an individual when he/she is made self-aware. The subsequent impact of the experience of negative emotions then will depend on how a person responds to them, which in part will be influenced by a person’s ability to self-regulate.

Self-regulation is termed as the process by which people control or alter their thoughts, emotions, and behaviors (Oaten & Cheng, 2005). Difficulties with emotional self-regulation often start when a person is exposed to some type of stressor. Oaten and Cheng
proposed that there is a “psychic cost” of adapting to stress, such that the ability to regulate performance on a task decreased following an external stressor. When adapting to stress, they suggested that some self-regulatory resource was used in the process, leaving a person less of that self-regulatory resource to devote to other tasks. Oaten and Cheng further proposed that many forms of self-regulation break down when people are under any type of stress. In support of this proposed sequence of events, Oaten and Cheng found that people who were under academic stress due to approaching examinations reported breakdowns in regulatory behavior that were not seen in the control group, which consisted of people not subject to approaching examinations. Such breakdowns may not be present in all people, but instead, vary depending upon people’s coping abilities. Struthers, Perry, and Menec (2000) suggested that, while students may be upset by negative events such as academic pressure, those who believed they could cope successfully become motivated to action and, consequently, often succeeded at the task. Procrastination may be a moderating factor in the type of coping used with procrastinators being less task-oriented. In turn, they may be more susceptible to breakdowns of emotional self-regulation and thus report higher levels of negative emotions than less chronic procrastinators.

In the current experiment, we manipulated several factors in order to induce both procrastination and a moderate amount of stress due to frustration. Participants were asked to complete a set of anagrams, one of which was impossible. Procrastination was encouraged by making the first anagrams very easy and by including an interesting distraction during the time to complete the anagram task. The presence or absence of a mirror allowed us to manipulate self-awareness. We anticipated that chronic procrastinators, as opposed to less chronic procrastinators, would experience greater negative emotions and that this would especially be true when a mirror was present.

**Method**

**Participants**

The sample consisted of 60 college students (41 women, 19 men) who were recruited from the psychology department participant pool at a mid-sized state university in East Texas. In exchange for voluntarily participating in this experiment, participants were given experimental credit to be applied to their classes.

**Design**

The study was a 2 X 2 between-subjects experiment. The first independent variable was self-awareness (high or low), which was operationalized by the presence of a mirror or the presence of a nature poster, respectively. The second independent variable was procrastination (chronic procrastinator or less chronic procrastinator), which was a measured variable using the Aitken Academic Procrastination Inventory (API; Aitken, 1982, obtained from Ferrari et al., 1995). Gender was recorded and analyzed as a possible covariate. The dependent variable was emotional state as measured using the Composite Affect Scale (Diener & Emmons, 1985, as cited in Pychl et al., 2000).

**Materials**

This experiment used the two standardized scales, five anagrams, visual distractors (mirrors and posters), and a preplanned conversation distraction. Procrastination was operationalized via the API (Aitken, 1982, obtained from Ferrari et al., 1995) to assess whether each individual was a chronic procrastinator or a less chronic procrastinator. The API consists of 19 items rated on a 5-point scale (1 = Always false, 5 = Always true) and assesses an individual’s tendency to procrastinate in academic life. The 19 statements were interspersed throughout a larger body of 50 items. On the API, respondents were asked to rate statements such as: “I am often frantically rushing to meet deadlines”, or "I am careful to return library books on time.” Nine items on the API were reverse scored. In order to shorten testing time, a modified version of the API was used in the current experiment. The modified procrastination scale included 11 of the original 19 questions assessing procrastination (questions 1, 2, 4, 6, 9, 10, 12, 13, 14, 16, and 19). Using the subset of 11 procrastination questions, for our participants, the Cronbach’s alpha was satisfactory with \( \alpha = 0.78 \). This alpha compared relatively well to that obtained by Aitken (1982, as cited in Ferrari et al., 1995) using the full scale (using 120 freshman and sophomore college students, his \( \alpha = 0.82 \)). The current 11 questions were interspersed throughout a larger body of 30 other items. In our modified version of the API, 5 of the 11 items were reverse scored.

Emotional state was measured using Diener and Emmons’ Composite Affect Scale (1985, as cited in Pychl et al., 2000). This scale consists of nine adjectives which were rated using a 7-point Likert scale (1 = Not at all to 7 = Extremely much). Four adjectives (happy, joyful, pleased and enjoyment/fun) represented positive affect. The other five adjectives (depressed, unhappy, frustrated, angry/hostile and worried/anxious) represented negative affect. For each participant, a positive score was taken from the average of all the positive adjectives. The same was done for the negative adjectives. The two question-
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naires administered during the experiment were not
titled with the original names of the scales but were
given different titles that did not reveal information
about what the questionnaire was assessing.

The anagram task sheet consisted of five anagrams
and spaces at the top for the participants to write in
their initials and gender. The first two anagrams were
easy, the third was moderately harder, the fourth one
was impossible, and the fifth one was easy. The easy
anagrams were placed first in order to reinforce that
the task could be done quickly and possibly promote
procrastination.

The presence of a mirror represented the high
self-awareness condition. The mirror was 18 in by 18
in and was positioned on the desk at the participant’s
viewing level. A poster was displayed on the wall in
approximately the same location as the mirror for the
low self-awareness condition. The poster used for the
experiment was 18 in by 22 in and depicted a nature
scene.

Procedure

After the participants arrived, they were given the
informed consent to read and sign if they agreed. The
participants then completed the API (Aitken, 1982,
obtained from Ferrari et al., 1995). When participants
finished the API, the researcher explained that they
were going to receive an anagram task that they had
8 min to complete and that for this particular set of an-
agrams, it usually took people 3 to 4 minutes to finish.
The participants were also told that if they finished
all of the anagrams in the given time period, they
would be entered into a drawing to win a $50 gas gift
card from Texaco. Due to the economic situation
of college students and in order to strengthen motiva-
tion to complete the anagram task, a $50 gas card to
Texaco was offered initially instead of the Domino’s
Pizza and Blockbuster Video gift cards.

After group instructions (four people maximum),
each person was randomly assigned to one of the two
self-awareness conditions, and then the individual par-
ticipants were ushered into individual testing rooms.
Two testing rooms contained a mirror placed at eye
level to increase the participant’s self-awareness. In
the other two testing rooms there was a poster at eye
level on the wall so that all four testing rooms gave
the participant an item of visual interest. The doors
of the testing rooms remained open throughout
the experiment so that the participants could hear a pre-
planned conversation that occurred between the
researcher and a friend who stopped by. This planned
conversation lasted 1 min and was intended to dis-
tract the participants during their task and promote
procrastination. The conversation highlighted a spe-
cific event that took place at a bachelorette party the
previous weekend, and then mentioned also that the
groom had gambled away the honeymoon money.
The conversation ended with a prediction that the
couple was going to have a big fight.

When 8 min were over, the anagram task was col-
lected by the researcher. As the researcher collected
the anagram task from each participant, an apology was
given by the researcher for the conversation inter-
ruption during the experiment. After the collection of
anagrams, the researcher distributed Diener and
Emmons’ Composite Affect Scale (1985, as cited in
Pychyl et al., 2000). At the top of the questionnaire
was a place to put the participant’s initials and gen-
der. The researcher also announced that this portion
of the experiment was not timed and that when par-
ticipants were finished, they should come out and give
the questionnaire to the researcher.

After turning in the second questionnaire, the participants were given a debriefing form and thanked
for their participation. The debriefing form stated
that the drawing would be for gift certificates to
Domino’s Pizza and Blockbuster Video, rather than
for a $50 gas card. The debriefing form also made
clear that different elements in the experiment were
created to build anxiety and that the conversation the
participants overheard was fictitious. The debriefing
form also stated the true nature of what the surveys
used in the experiment were measuring. Also at this
time, participants were told that if they were inter-
ested in entering the real drawing, they needed to
write their e-mail address on a paper, which served as
the means of contact for the winner.

Results

Prior to analysis, each of the two questionnaires
administered in the experiment was scored. The score
of the API (Aitken, 1982, obtained from Ferrari et al.,
1995), which measured the participant’s level of pro-
crastination, was the sum of the ratings for the 11 pro-
crastination questions. Scores that fell in the range
of 11 to 32 were considered to be an indication of less
chronic procrastination while scores falling in the
range from 33 to 55 categorized an individual as a
chronic procrastinator. The scoring ranges were
achieved by a median split between the lowest and
highest scores on the questionnaire.

Diener and Emmons’ Composite Affect Scale
(1985, as cited in Pychyl et al., 2000) measured the
emotional state of the participant and was used to
indicate emotional self-regulation. The nine adjectives
in the questionnaire were categorized as represent-
ing either a positive emotion or a negative emotion.
For each participant, a positive score was calculated

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as the average of all the positive adjectives. The same was done for the negative adjectives.

In order to investigate gender as a possible covariate, it was correlated with the average positive and negative emotional state scores, but neither correlated significantly, \( r = .02 \) and \( r = .01 \), respectively. Thus, gender was not used as a covariate.

A 2 (Procrastination) X 2 (Self-Awareness) between-subjects ANOVA was performed for both positive and negative emotion scores. There were no significant effects for the positive emotion scores. For the negative emotion scores, there was no significant main effect for self-awareness; however, a trend was found for procrastination \( F(1,56) = 3.45, p = .07 \). Chronic procrastinators reported higher negative emotions than less chronic procrastinators \( (M = 2.8, SD = 1.1, M = 2.4, SD = 0.8, \text{respectively}) \). Procrastination and self-awareness significantly interacted, \( F(1,56) = 4.53, p = .04 \). Figure 1 shows the means for all conditions. Participants in the high self-aware (mirror) condition showed less negative emotion if they were less chronic procrastinators, but more negative emotion if they were chronic procrastinators. Procrastination type did not influence emotion in the low self-awareness condition, and overall, individuals without a mirror showed levels of negative emotion in between, and not different from, the two groups in the mirror condition.

### Discussion

As predicted, chronic procrastinators in the high self-awareness condition with a mirror present had the highest negative emotion scores. This result lends support to Scheier and Carver’s (1977) study which asserted that self-focused attention heightens a person’s awareness of and responsivity to both positive and negative affects. Because the experiment created stress due to frustration and thus should have induced negative rather than positive emotions, it is not surprising that there were no significant effects on the positive emotion scores.

With respect to Oaten and Cheng’s (2005) theory of self-regulation, our data trend can be interpreted as follows. The chronic procrastinators in the high-self awareness condition were put in a situation of increasing frustration due to task incompletion, and the presence of the mirror constantly promoted self-awareness of their lack of progress. The resultant negative emotions depleted their regulatory strength more quickly, leading to a breakdown in emotional regulatory behavior and an enhanced experience of negative emotions. When the mirror was not present, the chronic procrastinators were less self-aware, and thus, experienced more moderate negative emotions. Their regulatory resources were not depleted, which left more resources to help regulate and control cognitive and emotional states. In contrast, the less chronic procrastinators should have stayed on task, but because it was impossible to finish all the anagrams, they experienced moderate negative emotions. However, the presence of the mirror promoted self-awareness of their efforts and led to an increased reduction in negative emotions. Future research could explore whether there are ways to slow the depletion of regulatory resources/strength in highly stressful situations, allowing for an increased ability to cope and a less negative emotional state. Relaxation techniques and intermittent breaks are two ways that could possibly aid in slowing the depletion of regulatory strength in a stressful situation. There may also be differences in whether individuals experience consistently high levels of self-awareness (consistent with a trait), or fluctuations of self-awareness more dependent upon the situation (consistent with a state). Those with low trait self-awareness might experience more benefit from external manipulations of self-awareness such as the use of a mirror or relaxation techniques.

The current finding of increased negative emotions by chronic procrastinators supports Pychyl et al. (2000), who found that trait procrastination was positively correlated with negative affect. Additionally, research done by Ferrari (2001) stated that chronic procrastinators compared to less chronic procrastinators held low expectations for success of their per-
formance and were more likely to generalize poor performance expectations to future, similar tasks. However, the current significant interaction between procrastination type and self-awareness suggests that the effects of procrastination type are complex. Chronic procrastinators in the high self-awareness condition were different only from less chronic procrastinators in the high self-awareness condition, with no differences between chronic or less chronic procrastinators in the low self-awareness conditions. Thus, procrastination does not always lead to more negative emotions than nonprocrastination. The existence of two types of procrastinators, active and passive (Chun Chu & Choi, 2005), further supports the complexity of procrastination types. Because we did not classify our participants as active or passive procrastinators, we cannot make conclusions about how these two subtypes of procrastinators might differently respond to our task. However, given the relatively short duration of the experimental procedure, the two types of procrastinators may not have been able to develop meaningfully different responses.

Moving to implications of procrastination for college students, there seem to be two alternate possibilities. First, if procrastinators do not experience increased negative emotions, they may continue to procrastinate on a task. Thus, it might benefit procrastinators to increase self-awareness. This increase could be accomplished through the use of mirrors or through a discussion of their situation with friends. However, the benefit of such a strategy might only be obtained by a subset of procrastinators. A second possibility is that by increasing procrastinators’ self-awareness, the resultant increase in negative emotions would lead them to more strongly avoid the task. Again, this might especially be true for certain types of individuals. Future research should investigate the relationships between different sources/types of self-awareness, different types of procrastinators, and their effects on positive or negative emotional salience. Both of the above possibilities discuss resultant effects of procrastination on behavior as well as emotion. The current study investigated the first component, the effect on emotions. Future research should measure effort on the task as well as the emotions produced by the situation. Additionally, because the current study used a median split to categorize chronic and less chronic procrastinators, the groups may not have been as different as the labels imply. As more normative data becomes available, it might be possible to more accurately categorize individuals as chronic, less chronic, or nonprocrastinators.

Several aspects of the current experiment possibly impacted external validity. First, the participants were young adults in college. Distractions such as Internet activities, texting with friends on cell phones, music, television, and social engagements within the college community are more common to this age group, and may not generalize to common distractions for other age groups. Thus, the current results might not accurately reflect the effects for middle-aged or older adults due to different life pressures. Additionally, this study does not account for life experience. Life experience found in middle-aged and older adults might increase their ability to cope with stressful or frustrating circumstances. Bjorck and Klewicki (1997) found that as participants’ ratings of experiential similarity increased, their ratings of imaginability, coping efficacy, and optimistic flexibility also increased. As a person ages, he/she naturally has more experience in different situations, therefore possibly leading to more positive and confident emotions when dealing with stressful or frustrating situations. The inclusion of a broader age range in future studies would allow an exploration of the possible moderating effects of age on the negative emotions experienced in response to stressful situations.

A second possible threat to internal validity was a loud and intrusive sound coming from the room next to the lab, although it was clearly audible in all testing rooms. The sound was the loudest in the two testing rooms for the high self-awareness condition. It is possible that some of the frustration that participants experienced could have been due to feelings of being annoyed that developed from hearing the obtrusive sound during the experiment. This additional distraction does not negate our findings of the difference between chronic and less chronic procrastinators because both experienced the noise. However, it might have enhanced the difference in the patterns of response between the high and low self awareness conditions. Further research is needed to explore different kinds of distractions in the environment and to see how certain types of distraction influence a procrastinator’s productivy or emotional state.

The current research supports previous findings of the negative impact of chronic procrastination but additionally suggests that self-awareness can moderate the intensity of the negative emotions experienced. Future research should investigate how other characteristics of the individual interact with the effects of procrastination and self-awareness. In some cases, different relaxation techniques could be developed and taught to students to counteract any negative emotional or psychological effects that result from procrastination. For others, the increase in emotions might more effectively prompt task-oriented coping behavior. By expanding knowledge in these areas,
intervention and counseling techniques can be improved in order to help individuals live healthier and more productive lives.

References


One of the most basic aspects of survival for both animals and humans involves the consumption of food. From an evolutionary perspective, it is puzzling to consider how eating disorders have managed to persist in the face of this very basic human survival need. One possible suggestion for the evolutionary persistence of eating disorders is that anorexia nervosa evolved as a woman’s attempt to suppress her reproductive capabilities when conditions in her community were adverse. One example of a major adverse condition for ancestral women was the occurrence of food shortages (Wasser & Barash, 1983). Evolution helped ensure the survival of a potential mother and her child by preventing her body from being able to conceive if her body weight was too low (Epling & Pierce, 1992). Although this suggestion has biological significance, it does not account for the causation of other eating disorders in our current environment. This introduction attempts to examine the development and aspects of eating disorders in direct connection with female competition for mates and status.

Darwin’s theory of sexual selection is a fundamental theory in evolutionary psychology. This theory focuses on the reproductive advantages and adaptations of members of the same gender and species that were consequences of successful mating (Paul, 2002). Darwin suggested that adaptations and advantages of sexual selection came about through two primary processes: intersexual selection and intrasexual competition (ISC). Intersexual selection, which Darwin also referred to as female choice, is the selection of mates of the opposite sex who possess preferred characteristics (Buss, 2004). Women are typically more likely to engage in intersexual selection when choosing a mate because of their increased parental investment in offspring and the need for a reliable supply of resources that are essential to their survival. Conversely, ISC is the competition between same-gender members for access to a member of the opposite sex. ISC typically occurs in the gender with less investment in potential offspring because the goal of such competition is sexual access to a desired mate rather than long-term commitment or resources. Based on this Darwinian theory of sexual selection and on the research findings on mate preferences, the sexual competition hypothesis (SCH) posits that female ISC

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The present study examined female intrasexual competition (ISC) in relation to perceptions of bulimia nervosa and anorexia nervosa in women. It was hypothesized that ISC for mates would be more prevalent in women displaying greater bulimic thoughts and behaviors, and that ISC for status would be more prevalent in women displaying greater anorexic thoughts and behaviors. Participants included 90 women between the ages of 18–22. The results indicated that ISC for mates was a main motivating factor in bulimic thoughts; however, ISC for status was not found to be a main motivating factor in anorexic thoughts. Self-esteem was also found to be a major contributing factor in the perception of eating disorders.
is at the root of anorexia nervosa and bulimia nervosa (Faer, Hendriks, Abed, & Figueredo, 2005).

Some of the most basic support for the SCH is found in the clinical definitions of the two major eating disorders. Anorexia nervosa and bulimia nervosa are both eating disorders which mainly affect women and are typified by a fear of gaining weight (Mitchell & Peterson, 2005). It is this fear of gaining weight, otherwise referred to as the pursuit of thinness (Faer et al., 2005), that researchers are beginning to associate with competition for mates and status. More specifically, bulimia nervosa is characterized by episodes of binge eating, shortly followed by purging behavior such as vomiting, laxative use, or excessive exercising (Schlundt & Johnson, 1990). Women with bulimia nervosa typically maintain an average to above average body weight (Mitchell & Peterson). These women appear fairly healthy and are thus able to participate in ISC for mates. In contrast, anorexia nervosa is defined by self-starvation and perceptual distortions about one’s body (Schlundt & Johnson, 1990). Women with anorexia nervosa typically have emaciated bodies, poor health, and decreased sex drives (Mitchell & Peterson). In addition, women with anorexia tend to score higher on scales measuring characteristics such as perfectionism and the need for control (Mitchell & Peterson). For these women, achieving a slender figure is not as much about the attraction of a potential mate, but is more likely about the satisfaction that comes from self-control and food control. Once women with anorexia begin losing weight successfully, diet, exercise, and self-control are quickly realized as areas where they can compete with other women and win (Crowther, Tennenbaum, Hobfoll, & Stephens, 1992). It is unlikely that these women are able to, or even want to, participate in ISC for mates. Rather, it is suggested that these women are indirectly competing for status among themselves (Faer et al., 2005).

Although the characterizations of anorexia nervosa and bulimia nervosa provide biological support to the SCH, there is also a large cultural and environmental component to the development of eating disorders in relation to ISC. Problematic eating patterns and body dissatisfaction appear to become increasingly prevalent as girls advance through their adolescent years (Brooks-Gunn, Rock, & Warren, 1989). The changes that occur in a young girl’s body during puberty, combined with the increased importance of relationships with the opposite sex and the media’s use of thin ideals, all contribute to the body dissatisfaction and possible development of eating disorders in teenage girls. This increase in interest and interaction with the opposite sex includes initial interest in boys, the emergence of dating in high school, and the beginning of sexual relationships (Crowther et al., 1992). Girls are able to perceive the societal connection between physical attractiveness and success in opposite sex relationships very early in adolescence (Crowther et al.). As young girls mature into their late teens, this observed connection tends to form into the firm belief that all men desire women who are thin. This shift in the dynamics of relationships with the opposite sex at the time of puberty heightens young girls’ awareness and obsession with the pursuit of thinness. All of these factors lead to an increase in body dissatisfaction and potential development of eating disorders among girls.

The body dissatisfaction that has been identified in adolescent girls progressed into more severe cases for many young women on the brink of adulthood. It has been suggested that this increase in severity was due to an increased need to attract a mate (Crowther et al., 1992). It is on this basis that the SCH finds support in the vast amount of research about the evolutionary significance of mate preferences. Throughout evolutionary history, men and women have made various choices regarding their potential mates and reproductive partners. The majority of research in this area suggests that successful mate choices are based on the reproductive potential and reproductive investment of members of the opposite sex (Geary, Vigil, & Byrd-Craven, 2004). Ancestral men and women who chose mates that were able and willing to invest in offspring were more likely to survive and pass on their genes. Over time, successful mate choices have evolved into a more specific set of mate preferences that share the common goal of reproductive success.

In Western societies, an important aspect of successful mate selection includes ISC. Because the gender ratio of men to women who are sexually active in our society deviates from 1:1, not all men and women will be successful in finding compatible mates (Buss & Barnes, 1986). In this type of mating system, ISC becomes increasingly significant and affects all aspects of life. For men, ISC takes place for women who display certain physical characteristics such as beauty, youth, and health. Because of the vast cultural and ethnic variability in attempts to define female physical attractiveness, research has focused on those female qualities that signal good reproductive value and fertility (Singh). Buss and Barnes suggested that these two qualities were interchangeable with cues of a woman’s age and health, such as good muscle tone, clear skin, youthfulness, and physical fitness. In a particular study on the adaptive significance of waist-to-hip ratio (WHR), Singh found that men related a lower WHR with increased reproductive potential in women. Although WHR is an important indicator of...
a woman’s health and reproductive fitness, Singh also suggested that the best predictors of reproductive potential were features which indicate youthfulness. In Singh’s study men tended to associate this important characteristic of youthfulness with the drawing of the thinnest female model. This connection between thinness, youthfulness, and reproductive value in our society could possibly be at the core of the eating disorder problem among young women.

Although women are not often considered as participants in ISC because they are the choosier of the two sexes, they must still compete for the two most important characteristics in prospective male partners: access to resources and long-term commitment (Faer et al., 2005). This competition between women is based on the characteristics that men find desirable in prospective partners, as listed above. In Western societies, these desirable characteristics are exploited and presented in the mass media in alarming numbers. It is also apparent that the average standards of beauty for women that are conveyed in Western societies correspond with the typical age at which there are high fertility levels and the best chance of successful reproduction (Buss & Barnes, 1986). For women, especially in Western societies, constant exposure to the thin ideal causes decreased levels of body satisfaction and self-esteem (Irving, 1990). This difficult requirement of thinness, coupled with the desire for a mate who will commit, may be contributing to the formation of maladaptive and unhealthy eating behaviors among women.

Although there is biological, cultural, and evolutionary support for the SCH, very little research has been done on this topic in relation to the development of eating disorders. The purpose of the present study was to examine the sexual competition hypothesis (SCH) in terms of the origins and factors related to bulimia nervosa and anorexia nervosa in women. When considering the large number of eating disorder cases among young women today, it is obvious that research into the possible causes of eating disorders is important. The information that is yielded from this and other similar studies can be used to aid in the formation of future treatment and assessment programs for women with eating disorders, as well as for educational purposes. The present study is similar to a study conducted by Faer et al. (2005) in which various factors associated with female competition for mates and status were surveyed to determine their effect on the degree to which participants rated themselves as demonstrating behaviors and thoughts associated with either anorexia nervosa or bulimia nervosa. In order to test the SCH, female participants in a nonclinical population were surveyed. It is understood that the thought patterns and behaviors associated with eating disorders existed on a continuum ranging from positive body image, a dieting mentality, all the way to severe clinical cases. Based on this information, it is possible to successfully test the hypotheses with a general population of women (Faer et al., 2005).

The current study used four subscales from the Eating Disorders Inventory (Garner, Olmstead, & Polivy, 1983), including bulimia, perfection, body dissatisfaction, and drive for thinness, as well as an additional scale evaluating anorexia (Faer et al., 2005). To measure ISC, the Female Competition for Mates Scale and the Female Competition for Status Scale (Faer et al.) were used. As an additional part of this study, other variables that may help draw the connection between ISC and anorexia and bulimia were also examined. These other variables include: personal mate value, ideal partner mate value, body dissatisfaction, general competitiveness, and self-esteem (Rosenberg, 1965).

Based on information from the study conducted by Faer et al. (2005), it was hypothesized that the direct process of ISC for mates would be more prevalent in women showing greater tendencies toward bulimic thought patterns and behaviors; whereas the indirect process of ISC, manifesting itself in a competition among women for status, would be more prevalent in women showing greater tendencies toward anorexic thought patterns and behaviors. It was also hypothesized that these findings would be mitigated by the participants’ level of self-esteem.

**Method**

**Participants**

Data were collected from 90 female undergraduate students attending Creighton University. The participants ranged in ages from 18 to 22 (M = 19.05, SD = 1.04). The participants’ ethnicities included 82.2% White, 1.1% African-American, 8.9% Asian, 4.4% Hispanic, 2.2% Native American, and 1.1% Filipino. The majority of the participants received credit for an introductory psychology class for participating in this study.

**Materials**

All participants were given identical packets of various questionnaires. The packet of questionnaires was similar to the surveys that were employed in the study conducted by Faer et al. (2005). The questionnaires consisted of the following measures: the Female Competition for Mates Scale (Faer et al., 2005), the Female Competition for Status Scale (Faer et al.), the General Competitiveness Scale (Faer et al.), three forms of the Mate Value Inventory (MVI; Kirsner, 1983), and various questionnaires. The packet of questionnaires was similar to the surveys that were employed in the study conducted by Faer et al. (2005). The questionnaires consisted of the following measures: the Female Competition for Mates Scale (Faer et al., 2005), the Female Competition for Status Scale (Faer et al.), the General Competitiveness Scale (Faer et al.), three forms of the Mate Value Inventory (MVI; Kirsner, 1983), and various questionnaires.
Figueroedo, & Jacobs, 2003), and four of the subscales from the Eating Disorder Inventory (EDI; Garner et al., 1983), including an additional subscale that was created to evaluate anorexia (Garner & Garfinkel, 1979). The present study also included the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965).

The General Competitiveness Scale (Faer et al., 2005) was utilized to measure participants’ levels of competitiveness. This measure included statements such as, “I love to play competitive sports” (Faer et al.) and asked participants to rank their degree of agreement for each statement on a Likert scale. The Likert scale for this measure was a 6-point scale, ranging from strongly disagree to strongly agree. The Female Competition for Mates Scale and the Female Competition for Status Scale (Faer et al.) were similar to the General Competitiveness Scale; however, both of the former scales included an additional section of vignettes. The vignettes included scenarios for which the participant was asked to rate the given character’s behavior in terms of how appropriate she believed it was. The Likert scale was a 6-point scale ranging from completely inappropriate to completely appropriate. The packet of surveys also included three forms of the Mate Value Inventory (MVI; Kirsner et al., 2003). The three forms used were Ideal Friend mate value, Self-Mate value, and Ideal Long-Term Partner mate value. With the MVI, participants were asked to rate the importance of a variety of characteristics in terms of their importance for each of the three forms. Ratings for this measure were based on a Likert scale, ranging from -3 (extremely low on this characteristic) to +3 (extremely high on this characteristic).

In order to measure participants’ degrees of eating-disordered behaviors and maladaptive ideologies about their bodies, four subscales from the Eating Disorder Inventory (EDI; Garner et al., 1983) were utilized. The four subscales that were used include the Body Dissatisfaction, Perfectionism, Drive for Thinness, and Bulimia scale. These scales included phrases such as “I think my thighs are too large” and “I have the thought of trying to vomit in order to lose weight” (Garner et al., 1983) and asked participants to rate their degree of agreement with each statement. The ratings for these subscales ranged from always to never and are based on a 5-point Likert scale. A fifth subscale was added to this part of the questionnaire which measures anorexia and abnormal eating behaviors. This subscale was taken from the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979) and was similar to the other subscales in terms of format and rating scale. Lastly, the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), which was the most widely used measure of self-esteem, was included. With this scale, participants are asked to rate the degree to which they agree or disagree with statements such as “At times, I think I am no good at all” and “I am able to do things as well as most other people” (Rosenberg, 1965). Specific questions from the various scales were reversed scored when appropriate.

All of the scales were tested for internal validity using Cronbach’s alpha. They were all found to have acceptable internal reliability. The alphas for the scales were as follows: (a) Female ISC for Mates, .89; (b) Female ISC for Status, .80; (c) General Competition, .82; (d) Perfectionism, .77; (e) Body Dissatisfaction, .87; (f) Bulimia, .65; (g) Anorexia, .62; (h) Drive for Thinness, .84; (i) Self-Mate Value Inventory, .93; (j) Ideal Partner Mate Value Inventory, .98.

Procedure

Approximately 34 participants were surveyed at a time in a typical classroom setting, taking roughly 30 minutes to complete the packet of surveys. Due to the personal and confidential nature of the questionnaires, participants sat at tables which provided them with enough space to create a sense of privacy. All participants were given identical paper-and-pencil packets of the various questionnaires, and they were asked to complete them as honestly and completely as possible.

Results

The present study examined the hypothesis that the direct process of female ISC for mates would be more prevalent in women showing greater tendencies toward bulimic thought patterns and behaviors, whereas the indirect process of ISC, manifesting itself in a competition among women for status, would be more prevalent in women showing greater tendencies toward anorexic thought patterns and behaviors. After correlating the participants’ scores for the various factors, there was some support for this hypothesis, although not all of the hypothesized relationships were found to be significant.

The 5-point Likert scale used for the five subscales of the EDI (Garner et al., 1983) was reversed in order, with a score of 5 indicating never and a score of 1 indicating always. Based on this rating scale, higher scores on the scales of Body Dissatisfaction, Drive for Thinness, Bulimia, Anorexia, and Perfection actually indicated a lower tendency toward those given characteristics. Therefore, a negative correlation involving any of these five scales could actually be interpreted as a positive correlation.

ISC for mates was negatively correlated with Body Dissatisfaction, \( r(90) = -.22, p = .05 \), and Drive for Thinness, \( r(90) = -.49, p < .01 \). In this study, higher
degrees of ISC for mates indicate greater body dissatisfaction and a higher drive for thinness. There was also a significant positive correlation between ISC for mates and ISC for status, \( r(90) = .57, p < .01 \). There was not, however, a significant correlation between ISC for mates and scores for General Competitiveness, \( r(90) = .04, ns \), or between ISC for mates and scores for Perfectionism, \( r(90) = -.11, ns \). ISC for Status was also not found to be significantly correlated with scores for either General Competitiveness, \( r(90) = .01, ns \) or Perfectionism, \( r(90) = -.01, ns \). Perfectionism was not significantly correlated with scores on the Anorexia scale, \( r(90) = .01, ns \).

Drive for Thinness was positively correlated with scores on the Bulimia scale, \( r(90) = .55, p < .01 \), but was not significantly correlated with scores on the scale for Anorexia, \( r(90) = .07, ns \). A higher drive for thinness may have indicated higher levels of bulimic thoughts and behaviors, but is not necessarily an indicator for anorexic thoughts and behaviors. Scores for Body Dissatisfaction were positively correlated with scores for Drive for Thinness, \( r(90) = .57, p < .01 \), indicating that the more dissatisfied a person is with her body, the higher her drive for thinness.

The connections between ISC for Mates and scores on the Bulimia scale, and ISC for Status and scores on the Anorexia scale were not supported as directly as was hypothesized. Scores on the scale for Bulimia were significantly correlated with scores for both ISC for Mates, \( r(90) = -.44, p = .01 \), and ISC for Status, \( r(90) = -.30, p = .01 \), indicating that higher levels of ISC for both mates and status correlated with levels of bulimia. However, scores on the Anorexia scale were not significantly correlated with either ISC for Mates, \( r(90) = -.16, ns \), or with ISC for Status, \( r(90) = -.14, ns \). Although the causal relationships did not directly follow our hypothesis, the results provided some support in terms of the overall hypothesized relationships.

The present study also examined the relationships between self-esteem and the various factors associated with ISC and eating disorders. Self-esteem scores were significantly correlated with scores on the scales for Bulimia, \( r(90) = .41, p < .01 \), Body Dissatisfaction, \( r(90) = .44, p < .01 \), Drive for Thinness, \( r(90) = .53, p < .01 \), ISC for Mates, \( r(90) = -.49, p < .01 \), and ISC for Status, \( r(90) = -.26, p = .01 \). These results indicate that higher levels of self-esteem are associated with lower levels of bulimia, body dissatisfaction, drive for thinness, ISC for mates, and ISC for status. Self-esteem was not, however, significantly correlated with scores on the Anorexia scale, \( r(90) = .06, ns \).

Table 1 is a table of the descriptive data for the dependent variables. Table 2 is a correlation table that depicts the correlations between all of the variables.

Figure 1 maps out the correlational relationships between the variables listed above. This path diagram was derived from the structural equations model used in the original study by Faer et al. (2005). All of the depicted relationships in the path diagram were statistically significant on a .05 or .01 level.

**Discussion**

The present study examined the sexual competition hypothesis (SCH) in relation to the origins and motivations for bulimia nervosa and anorexia nervosa in women. Various factors associated with female competition for mates and status were surveyed to determine their effect on the degree to which participants rated themselves as demonstrating behaviors and thoughts associated with either anorexia or bulimia. It was hypothesized that ISC for mates would be more prevalent in women displaying higher bulimic thought patterns and behaviors, and that ISC for status, as manifested in various factors associated with competition for status, would be more prevalent in women displaying greater anorexic thought patterns and behaviors. It was also hypothesized that participants’ levels of self-esteem would have an effect on the results. Consistent with this hypothesis, it was suggested that women are motivated by one of two paths: (a) ISC for status, which caused women to engage in competitive behaviors and seek perfection (Faer et al., 2005) and manifested in behaviors and thoughts associated with anorexia; or (b) ISC for mates, which caused women to become concerned with their appearance which lead to body dissatisfaction and a drive for thinness in an attempt to attract a desired mate. This dissatisfaction and drive for thinness was manifested in thoughts and behaviors associated with bulimia (Faer et al., 2005). As the results indicate, these two paths were not as clear-cut as was hypothesized.

The sexual competition hypothesis (SCH) proposed that eating disorders were the result of women’s concern with their physical appearance for the purpose of attracting a mate. The results seemingly lend support to this hypothesis, finding ISC for mates as a main motivating factor in bulimic thoughts. ISC for mates was found to be directly correlated with both body dissatisfaction and drive for thinness, indicating that as a woman’s level of competition for a mate increases, so does her body dissatisfaction and drive for thinness. Body dissatisfaction, drive for thinness, and ISC for mates were all directly correlated with bulimia, which further supported the hypothesis that female ISC for mates was a strong motivating factor in bulimia nervosa cases among women. The results suggest that a woman’s desire to attract and keep a mate may be at the root of her body dissatisfaction, drive for thin-
ness, and ultimately, bulimia. These results were consistent with the results found by Wiederman, Pryor, and Morgan (1996), which suggested that women with bulimia tend to report their initial motivations for dieting as attempts to attract men and be physically desirable.

Results concerning the factors associated with female ISC for status and anorexia were more difficult to establish in the current study. As the results indicated, ISC for status was directly correlated with ISC for mates, drive for thinness and bulimia. It did not, however, have any direct correlation to anorexia. The only connection between ISC for status and anorexia existed between the correlations of drive for thinness and body dissatisfaction. This indirect relationship suggested that as a woman’s level of competition for status increased, so did her drive for thinness. Drive for thinness was then correlated with body dissatisfaction, which was then correlated with anorexic thought patterns. This weak relationship between ISC for status and anorexia was not enough to provide support for the hypothesis in this area.

As was stated above, ISC for status and ISC for mates were also directly correlated. This correlation, paired with the lack of support for the relationship between ISC for status and anorexia, suggested that

### TABLE 1

**Descriptive Data for the Dependent Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem</td>
<td>90</td>
<td>20.09</td>
<td>4.30</td>
</tr>
<tr>
<td>Competition for mates</td>
<td>90</td>
<td>18.72</td>
<td>6.32</td>
</tr>
<tr>
<td>Vignettes for mate comp</td>
<td>90</td>
<td>8.37</td>
<td>5.12</td>
</tr>
<tr>
<td>Competition for status</td>
<td>90</td>
<td>10.21</td>
<td>3.00</td>
</tr>
<tr>
<td>Vignettes for status comp</td>
<td>90</td>
<td>7.98</td>
<td>4.57</td>
</tr>
<tr>
<td>General competitiveness measure</td>
<td>90</td>
<td>13.27</td>
<td>4.65</td>
</tr>
<tr>
<td>Bulimia</td>
<td>90</td>
<td>25.63</td>
<td>5.84</td>
</tr>
<tr>
<td>Perfection</td>
<td>90</td>
<td>12.78</td>
<td>18.88</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>90</td>
<td>19.22</td>
<td>6.47</td>
</tr>
<tr>
<td>Thinness</td>
<td>90</td>
<td>17.20</td>
<td>8.72</td>
</tr>
<tr>
<td>Anorexia</td>
<td>90</td>
<td>25.31</td>
<td>4.35</td>
</tr>
<tr>
<td>MVI – Self</td>
<td>90</td>
<td>33.89</td>
<td>10.24</td>
</tr>
<tr>
<td>MVI – Friend</td>
<td>90</td>
<td>30.50</td>
<td>8.61</td>
</tr>
<tr>
<td>MVI – Long-term partner</td>
<td>90</td>
<td>40.61</td>
<td>6.79</td>
</tr>
</tbody>
</table>

### TABLE 2

**Correlation Table Depicting the Correlations Between the Variables**

<table>
<thead>
<tr>
<th></th>
<th>ISC Mates</th>
<th>ISC Status</th>
<th>Body Dissat</th>
<th>Thinness</th>
<th>Bulimia</th>
<th>Anorexia</th>
<th>Gen Comp</th>
<th>Perfection</th>
<th>Self-Esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISC Mates</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISC Status</td>
<td>.57**</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Dissat</td>
<td>-.23*</td>
<td>-.13</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thinness</td>
<td>-.49**</td>
<td>-.33**</td>
<td>.58**</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulimia</td>
<td>-.44**</td>
<td>-.30**</td>
<td>.37**</td>
<td>.55**</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anorexia</td>
<td>-.16</td>
<td>-.14</td>
<td>-.26*</td>
<td>.07</td>
<td>-.02</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gen Comp</td>
<td>.05</td>
<td>.01</td>
<td>-.17</td>
<td>-.12</td>
<td>-.01</td>
<td>-.04</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perfection</td>
<td>-.11</td>
<td>-.01</td>
<td>-.03</td>
<td>.12</td>
<td>.09</td>
<td>.01</td>
<td>-.11</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>-.49**</td>
<td>-.26*</td>
<td>.44**</td>
<td>.55**</td>
<td>.41**</td>
<td>.06</td>
<td>-.14</td>
<td>.10</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Note:* $p < .05$, **$p < .01$
ISC for status was merely another way that women competed for mates. Based on this information and the previous results, the SCH was seemingly supported by the results of this study. The part of the hypothesis that suggested that ISC for status was directly related to anorexia, however, was not supported.

The lack of significant results related to anorexic thoughts may be, in part, due to the limited population of participants that was utilized. However, it may also be an indication that commonly held theories about the causes and motivations behind anorexia may not be as accurate as is currently believed. This possibility opens the door to further research about other causes specific to anorexia nervosa. This study also did not produce any informative results about the effects of perfection or general competition in relation to bulimia or anorexia. In other similar studies (Franco-Paredes, Mancilla-Díaz, Vázquez-Arévalo, López-Aguilar, & Álvarez-Rayón, 2005; Pieters, Hulstijn, Vanderreycken, Maas, Probst, Peuskens, & Sabbe, 2004), perfection has often been cited as a causal factor for eating disorders, specifically anorexia. The lack of correlational relationships with these two factors may also be due, in part, to the population of participants that was utilized. Further research is necessary to find the true magnitude of their effects.

The present study also examined the effect of self-esteem on the various factors associated with female ISC and eating disorders. In a related area of research, Corning, Krumm, and Smitham (2006) compiled the results of multiple studies about the effects of self-esteem and eating disorders in women and found widespread support for the suggestion that low levels of self-esteem are clearly related to the presence of eating disorders. The present study found similar results, which indicated that as levels of self-esteem increased, body dissatisfaction, drive for thinness, ISC for mates, ISC for status, and levels of bulimic thoughts decreased. These results signify a powerful connection between a woman’s self-esteem and the likelihood of her developing an eating disorder. This information offers support to programs that are being developed to help women prevent, treat, and overcome eating disorders by focusing on raising their levels of self-esteem.

The results of this study are fairly consistent with the results found in the study by Faer et al. (2005). The information from both studies provides support for the SCH and helps make some headway in the debate about the possible origins of eating disorders. It is important to note that ISC is extremely pervasive in young girls. This competition increases as young girls age into early adulthood because of the increased pressure to find a mate (Crowther et al., 1992). This knowledge about the relationship between the effects of ISC for mates and body dissatisfaction, drive for thinness, and eating disorders may help clinicians, patients, and loved ones of women with eating disorders approach the issue in new, innovative ways.

In order to effectively combat the rising numbers of eating disorder cases among women, the information garnered from this study must be used in conjunction with information gathered from studies about the effects of other cultural and environmental components that are related to ISC. These components include things such as the strong societal connection that is made between physical attractiveness and success in relationships with the opposite sex (Crowther et al., 1992), as well as the media’s tremendous emphasis on unrealistic beauty ideals. The study by Corning et al. (2006) suggests that the low levels of self-esteem typically associated with the presence of eating disorders are often the result of social comparisons to things or people who are considered better, such as comparisons to the thin-ideal images used in magazines (Hawkins, Richards, Granley, & Stein, 2004). As Sypeck, Gray, and Ahrens (2004) have found, internalization of the thin-ideal that penetrates through popular culture produces higher levels of body dissatisfaction and is linked to an increase in eating disorder cases. All of these factors must be considered when developing new approaches to combat and treat eating disorder cases.

The present study contained a few possible limitations that may have had an impact on the results. The most important limitation of this study arises from the nonclinical population of participants that was
used. Although it is generally understood that the thought patterns and behaviors associated with eating disorders exist on a continuum for all women (Faer et al., 2005), the results of this study would likely be more telling if it was conducted with populations of women who have been clinically diagnosed with anorexia nervosa and bulimia nervosa. Future replications of this study may want to explore these populations of women. A second limitation of this study includes the homogenous nature of the population of participants. In the present study, all of the participants were between the ages of 18 and 22, attended the same Midwestern university, and were mostly White. Although the age range and race of the participants in this study is fairly consistent with the population of people who develop eating disorders, a more diverse sample of participants may produce more extensive results. Other similar studies may attempt to utilize women with a broader range of ages, ethnicities, socioeconomic statuses, and geographic locations. The third limitation of this study is the small number of overall participants. A larger population of women may make it easier to see more defined patterns among the results.

Future research in the area of eating disorders is extremely important due to the rising numbers of cases in women today. Very little research in this area has been done from the standpoint of evolutionary psychology. From this perspective, it would be helpful to have more solid support for the SCH and female ISC as it relates to eating disorders. Replications of this study, as well as innovative studies about other causal factors, will help provide clinicians and patients with a better understanding of the questions that surround eating disorders.

Although the results of this study do not follow the clearly defined pathways that were originally hypothesized, they do lend support to the SCH and to the overall notion that female ISC for mates is directly related to thoughts and behaviors associated with eating disorders in young women. This information is extremely useful in the development of interventions and programs designed to prevent and treat eating disorders. Future studies in this area only prove to increase the amount of knowledge and help better the programs that are currently being used for women with eating disorders.

References


Comparing Academic Motivation and Accomplishments Among Traditional, Nontraditional, and Distance Education College Students

Relationships among self-concept, stress, goal orientation (learning or performance), and grade point average (GPA) among traditional, nontraditional, and distance education students were examined. Seventy-two traditional, 40 nontraditional, and 19 distance education students completed a demographic questionnaire, the Goals Inventory (Roedel, Schraw, & Plake, 1994), the Student Life Stress Inventory (Gadzella, 1991), and the Index of Adjustment and Values (Bills, Vance, & McLean, 1951). Results showed that distance education and nontraditional students were more learning-goal oriented and less performance-goal oriented than traditional students. Learning-goal oriented students had higher GPA’s than performance-goal oriented students and distance education students had higher GPA’s than nontraditional and traditional students. Significant relationships were found with other variables including stress, self-concept, sex, number of credits, hours employed, and hours spent studying.

The traditional college student is becoming less the norm as an increasing number of nontraditional and distance education students attend colleges and universities. Consequently, interest in studying the college experience of nontraditional and distance education students is on the rise. In order for universities and colleges to provide a college atmosphere supportive of all students, it is important to understand what factors relate to the college experience for nontraditional and distance education students and what motivates them to learn. Previous research has shown that differences exist between traditional and nontraditional college students in their goal orientation, academic performance, level of self-concept, and stress. However, this research has not included distance education students.

Goal orientation has two categories, performance and learning. Performance-goal orientation referred to a focus on proving competence and avoiding negative evaluations. Performance-goal oriented individuals have a preference for easier tasks to ensure success, have unstable confidence in challenging situations, and feel more anxiety about evaluations. Learning-goal orientation referred to a focus on increasing knowledge and skills, actively seeking challenging tasks, and persistently and effectively problem solving when facing failure or an obstacle (Eppler & Harju, 1997).

In their study comparing goal orientation, study habits, work commitments, academic performance, and irrational beliefs among traditional and nontraditional college students, Eppler and Harju (1997) found that nontraditional students were more learning-goal oriented and were less performance-goal oriented than traditional college students. They also found that learning-goal oriented students spent more time studying than performance-goal oriented students and that nontraditional students spent more hours in paid employment per week than traditional college students. Studies comparing the academic performance and level of self-concept of traditional and nontraditional college students found that nontraditional students were more satisfied with their academic performance. Academic performance was also shown to correlate positively with level of self-concept (Anolik, 1980). Eppler, Carsen-Plentl, and Harju (2000) compared traditional and nontraditional college students on goal orientation, grade point averages, failure attributions, and general optimism. They found that non-
traditional students had higher learning-goal orientation, lower performance-goal orientation, and higher grade point averages (GPAs) than traditional college students.

Perceptions of stress varied among traditional and nontraditional college students in a study conducted by Dill and Henley (1998). They found that, although nontraditional and traditional college students had some similar stressors, there were also stressors unique to each group. Traditional students reported more stress with regard to peer-related events and social involvement, whereas nontraditional students dealt with more stressors related to responsibilities outside of school.

The work of Eppler and Harju (1997), Eppler et al. (2000), and Dill and Henley (1998) shows that the college experience is different for traditional and nontraditional college students and that differences in goal orientation, stress, academic performance, and self-concept exist between traditional and nontraditional college students. The previous research neglected to include distance education students. As the number of distance education students expands, it is becoming more important to understand the factors related to the college experience of these individuals. Research comparing traditional, nontraditional, and distance education students would present a variation on the previous research because distance education students do not share the same on-campus experience as traditional and nontraditional students.

The purpose of the present study was to identify the relationships among self-concept, stress, goal orientations (learning or performance), and academic performance for traditional students, nontraditional on-campus students, and distance education college students, and to determine whether those relationships differed for the three groups. We predicted that learning-goal orientation would be more positively correlated with academic performance than performance-goal orientation. We also predicted a negative correlation between level of self-concept and stress, and a positive correlation between academic performance and level of self-concept. Finally, we predicted that we would replicate the previously identified differences in goal orientation between traditional and nontraditional students. We also anticipated that the distance education students would differ more from the traditional than the nontraditional students.

**Method**

**Participants**

A total of 131 students participated. These included 72 traditional on-campus students (38 men and 34 women), 40 nontraditional on-campus students (16 men and 24 women), and 19 distance education students (6 men, 12 women, and 1 unknown) enrolled at the University of Wisconsin–Platteville. Traditional students were defined as students who attended college immediately following high school graduation. Nontraditional students were 25-years-old or older who did not immediately pursue college following high school graduation. Distance education students were students who were not on campus. These students included national and international students who were taking online classes to obtain their degrees.

Due to incomplete responses, 10 questionnaires (4 nontraditional students and 6 traditional students) were excluded from our data set. Traditional students ranged in age from 19–25 with a mean age of 21. Nontraditional students ranged in age from 25–50 with a mean age of 30. Distance education students ranged in age from 23–56 with a mean age of 40. Out of the total 131 participants, 126 were White, 3 were Asian, 1 was Hispanic, and 1 was Biracial. Traditional on-campus students were recruited from upper level courses. Nontraditional on-campus students were recruited through an e-mail request sent to 548 nontraditional students, as well as through the Nontraditional Student Club. Distance education students were also recruited through an e-mail request sent to 294 distance education students. Response rates were 7.3% for nontraditional students and 6.4% for distance education students. All students were enrolled for the fall 2005 semester and had completed at least one prior semester at the University of Wisconsin–Platteville. Participation was voluntary.

**Materials**

Participants completed four questionnaires:

**Demographic Inventory.** A demographic inventory, constructed by the principal investigators, was used to determine the age, sex, ethnicity, year in school, overall level of stress, number of credits taken for the semester, hours spent studying, hours employed, and current grade point average (GPA) of the students. Categorical response categories were used to measure number of hours spent studying (0–4, 5–8, 9–12, and 12+) and number of hours employed (0–5, 5–10, 10–15, and 15+)

**Goals Inventory.** The Goals Inventory (Roedel, Schraw, & Plake, 1994) measures goal orientation (performance or learning). The Goals Inventory consists of 25 statements that assess attitudes and behaviors that reflect either a learning or performance orientation. Twelve of the 25 statements are learning factors and 5 are performance factors. Remaining statements are fillers. Students rate on a 5-point Likert scale whether the item is true of them or not. The 12
learning factors are averaged to produce a learning orientation score. The possible range of scores for the averaged learning orientation score is 1–5. The five performance factors are averaged to produce a performance orientation score and the range of scores is 1–5. In both cases, higher scores indicate a stronger goal orientation. The remaining statements are not scored. Test-retest reliability, according to Roedel, Schraw, and Plake, (1994) is .73 for the learning subscale and .76 for the performance subscale.

**Student Life Stress Inventory.** The Student Life Stress Inventory (Gadzella, 1991) measures stress and reactions to stressors on nine subscales, including five stress categories and four reaction categories. The stress categories are Frustration, Conflicts, Pressures, Changes, and Self-Imposed. The four reaction categories are Physiological, Emotional, Behavioral, and Cognitive Appraisal. Students respond to the 51 items using a 5-point Likert scale. Scores are obtained by summing the responses to each subscale. The range of possible scores varies depending on the subscale as the number of items for each subscale is different. The range of scores for the nine subscales are as follows: Frustration: 7–35, Conflicts: 3–15, Pressures: 4–20, Changes: 3–15, Self-Imposed: 6–30, Physiological: 14–70, Emotional: 4–20, Behavioral: 8–40, and Cognitive Appraisal: 2–10. High scores for a category indicate high stress in that category. Estimates of reliability and validity were computed for the nine stress categories but not for the individual items. Gadzella (1994) reported Cronbach alpha values that ranged from .52 (Frustrations) to .85 (Changes).

**Index of Adjustment and Values.** The Index of Adjustment and Values (IAV) was used to measure self-concept and was reconstructed by the principal investigators from instructions given in Bills, Vance, and McLean (1951). The IAV consists of a list of 42 traits that are rated using a 5-point Likert scale. The traits were rated on three different factors, including how often the trait is a characteristic of the participant, how they feel about each trait being a characteristic of them, and how much they wish that trait were a characteristic of them. Self-concept is assessed by first creating two scores, a self-acceptance score (SAC) and a self-ideal discrepancy score (SID). To obtain the SAC, the second rating for each trait (how they feel about each trait being a characteristic of them) is summed. The SID scores are obtained from the sum of the differences of the first and third ratings for each trait (sum of the differences between how often the trait is a characteristic of them and how much they wish that trait was a characteristic of them). The self-ideal discrepancy score is then subtracted from the self-acceptance score to obtain a total self-concept. Higher self-acceptance scores and lower self-ideal scores indicated a higher self-concept.

**Procedure**

Questionnaires were administered to traditional on-campus students in upper-level classes with the consent of the instructor during their designated class time. These students read an informed consent form that explained the purpose of the study. They were then given the four questionnaires to complete in the following order: Demographic Inventory, Goals Inventory, Student-Life Stress Inventory, and Index of Adjustment and Values. At the end of each session, participants were debriefed and invited to attend a research symposium at which the results of the study would be shared.

Nontraditional on-campus and distance education students who volunteered to participate in response to an email request received a packet in the mail that included an instructional letter (informing

### TABLE 1

Means and Standard Deviations for Classification Groups on Goal Orientation and GPA

<table>
<thead>
<tr>
<th>Classification</th>
<th>Learning-goal orientation</th>
<th>Performance-goal orientation</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Traditional</td>
<td>3.42&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>.50</td>
<td>2.60&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Nontraditional</td>
<td>3.66</td>
<td>.37</td>
<td>2.51</td>
</tr>
<tr>
<td>Distance Education</td>
<td>3.69</td>
<td>.33</td>
<td>2.14</td>
</tr>
</tbody>
</table>

<sup>a</sup> Traditional differs significantly from distance education, <i>p</i> < .05; <sup>b</sup> Traditional differs significantly from nontraditional, <i>p</i> < .05.
participants of the purpose of the study and how to complete the questionnaires), a participant consent form, four questionnaires, a debriefing statement, and a return envelope. The nontraditional on-campus students were also given the option of taking the questionnaires at a Nontraditional Student Club meeting following the same procedure used with the traditional on-campus students.

Results

A multivariate analysis of variance (MANOVA) was used to analyze the differences in goal orientation (performance or learning) of traditional, nontraditional, and distance education students. The main effect for classification was significant, $F(4, 256) = 5.52, p < .01, \eta^2 = .08$. Univariately, significance was found for learning-goal orientation, $F(2, 128) = 5.43, p = .01, \eta^2 = .08$, with distance education and nontraditional students being more learning-goal oriented than traditional students (see Table 1). Post hoc Scheffe tests indicated that distance education and nontraditional students did not differ significantly, but traditional students differed significantly from distance education and nontraditional students. Significance was also found for performance-goal orientation, $F(2, 128) = 4.03, p = .02, \eta^2 = .06$, with distance education students being less performance-goal oriented than nontraditional students and traditional students (see Table 1). Scheffe tests indicated that distance education students and traditional students differed significantly on performance-goal orientation though distance education and nontraditional students did not. Overall, all three groups of students were more learning-goal oriented ($M = 3.53, SD = .45$) than performance-goal oriented ($M = 2.50, SD = .67$).

A second MANOVA was used to analyze differences of traditional, nontraditional, and distance education students in GPA, overall stress, the nine subscales of stress, and self-concept. This MANOVA also analyzed the differences of men and women on these same variables plus goal orientation. Multivariately, the interaction of sex of participant and classification was not significant, $F(28, 208) = 1.03, p = .22, \eta^2 = .12$. Also, no differences were found for the classification groups or sex of participant related to self-concept.

Multivariately, a significant main effect was found for classification, $F(28, 208) = 1.69, p = .02, \eta^2 = .19$. Univariately, significance was found for GPA, $F(2, 116) = 9.21, p < .01, \eta^2 = .14$, with distance education students having higher GPA’s than nontraditional and traditional students (see Table 1). Post hoc Scheffe tests found that distance education students did not differ significantly from nontraditional students, but did differ significantly from traditional students on GPA.

Further, nontraditional students were found to differ significantly from traditional students on GPA. Significance was also found for two of the stress subscales, Changes, $F(2, 116) = 3.07, p = .05, \eta^2 = .05$, and Cognitive Appraisal, $F(2, 116) = 4.41, p = .01, \eta^2 = .07$. Stress related to Changes referred to any kind of change or adjustment in one’s life that was unpleasant or disrupted the individual’s life or life goals. It also referred to experiencing multiple changes at one time. Stress related to Cognitive Appraisal referred to evaluating the intensity of a stressful situation and how effectively it was handled. It appears that distance education students felt more stress from Changes than nontraditional and traditional students (see Table 2); however, post hoc Scheffe tests did not find any significant differences among the three classification groups. Nontraditional students and distance education students reported more stress related to Cognitive Appraisal than traditional college students (see Table 2), and post hoc Scheffe comparisons indicated that nontraditional and traditional students significantly differ from one another. However, post hoc comparisons did not find the difference between distance education students and traditional students to be significant. The classification groups did not significantly differ on their overall level of stress.

A significant multivariate main effect was also found for sex of participant, $F(14, 103) = 1.86, p = .04, \eta^2 = .20$. The means and standard deviations are displayed in Table 3. Significant gender differences were found for performance-goal orientation, $F(1, 116) = 4.57, p = .04, \eta^2 = .04$, with women being more performance-goal oriented than men. Significance was found for GPA, $F(1, 116) = 7.90, p = .01, \eta^2 = .06$, with women having higher GPA’s than men. Men and

### Table 2

<table>
<thead>
<tr>
<th>Classification</th>
<th>Changes $M$</th>
<th>Changes $SD$</th>
<th>Cognitive appraisal $M$</th>
<th>Cognitive appraisal $SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>7.38</td>
<td>2.27</td>
<td>5.53*</td>
<td>1.98</td>
</tr>
<tr>
<td>Nontraditional</td>
<td>8.09</td>
<td>2.47</td>
<td>6.65</td>
<td>2.10</td>
</tr>
<tr>
<td>Distance Education</td>
<td>8.88</td>
<td>2.25</td>
<td>6.63</td>
<td>1.54</td>
</tr>
</tbody>
</table>

*Traditional differs significantly from nontraditional, $p < .05$. 
women also significantly differed on Physiological Stress, $F(1, 116) = 6.36, p = .01, \eta^2 = .05$, with women reporting higher levels of Physiological Stress than men. Physiological Stress referred to physical reactions to stress such as headaches, fatigue, sweating, hives, and weight gain/loss.

To better analyze the variables that significantly related to GPA, a stepwise regression was computed with goal orientation, overall stress, the nine stress subscales, self-concept, and sex of participant as predictors and GPA as the dependent variable. Learning-goal orientation entered in the first step of the regression, $R^2 = .05, F(1, 120) = 6.75$, $p = .01$. Therefore, learning-goal orientation explained the greatest amount of variance in GPA, $\beta = .23, t(120) = 2.60, p = .01$, with students who were more learning-goal oriented reporting higher GPA’s. The fourth and final step of the regression showed that sex of participant as well as two stress subscales, Conflicts and Self-imposed, were also significant predictors of GPA, $R^2 = .18, F(4, 117) = 6.44, p < .01$. The stress subscale of Conflicts referred to experiencing stress that is the result of choosing among two or more alternatives that were either both desirable, both undesirable, or a combination of desirable and undesirable. Self-imposed stress referred to experiencing stress as a result of being competitive, procrastinating, or worrying. Performance-goal orientation was left out of the equation and did not significantly relate to GPA. A summary of the stepwise regression is presented in Table 4.

Bivariate correlations of academic performance (GPA), goal orientation, overall stress, nine subscales of stress, self-concept, and sex were conducted. The correlation between total self-concept and GPA was not found to be significant, $r(121) = .13, p = .14$. Also, the correlation between overall stress and level of self-concept was not found to be significant, $r(128) = -.14, p = .12$. However, one of the nine subscales of stress, Emotional Stress, was found to correlate significantly with level of self-concept, $r(128) = -.24, p = .01$. Students with lower self-concepts reported higher Emotional Stress. Self-concept and learning-goal orientation were found to correlate significantly, $r(128) = .48, p < .01$, with students who have higher self-concepts focusing more on increasing their knowledge and skills.

Finally, the number of credits for the current semester, hours spent studying, and hours employed were collected categorically, $\chi^2$ tests were calculated. The $\chi^2$ test for hours spent studying was not significant, $p = .11$. However, a pattern seemed to exist in that over half of the traditional students reported studying less than 8 hours a week, whereas over half of the nontraditional students reported studying 9 hours or more a week. The distance education students were equally distributed with some studying under 4 hours, others between 4 and 12, and the rest 12 or more. The $\chi^2$ test for hours employed revealed significant differences among the three classification groups, $\chi^2 (6, N = 131) = 25.68, p < .01$. All of the distance education students were employed over 15 hours a week, whereas the nontraditional and traditional students were split with half employed less than 5 hours and the other half employed over 15 hours a week.

**Discussion**

The present data support the hypothesis that differences would be found between traditional, nontraditional, and distance education students in goal orientation (performance or learning) and academic performance. Consistent with previous findings by

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**TABLE 3**

Means and Standard Deviations for Men and Women on Performance-Goal Orientation, GPA, and Physiological Stress

<table>
<thead>
<tr>
<th>Sex</th>
<th>Performance-goal orientation M</th>
<th>Performance-goal orientation SD</th>
<th>GPA M</th>
<th>GPA SD</th>
<th>Physiological stress M</th>
<th>Physiological stress SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>2.41</td>
<td>.70</td>
<td>3.12</td>
<td>.50</td>
<td>26.20</td>
<td>7.71</td>
</tr>
<tr>
<td>Women</td>
<td>2.66</td>
<td>.62</td>
<td>3.35</td>
<td>.52</td>
<td>30.51</td>
<td>6.99</td>
</tr>
</tbody>
</table>
Eppler and Harju (1997), nontraditional students were more learning-goal oriented than traditional college students; the same was true for distance education students. Traditional students were found to be somewhat more performance-goal oriented than the nontraditional students, consistent with the findings of Eppler and Harju (1997), and significantly more performance-goal oriented than the distance education students. Together these findings suggest that distance education and nontraditional students focus more on increasing their knowledge and skills, seeking out challenging tasks, and persistently and effectively problem solving to overcome obstacles and avoid failure. All three classification groups identified more with learning-goal orientation than performance-goal orientation; however, traditional students scored the highest of the three groups on performance-goal orientation. This suggests that traditional students focus more on avoiding negative evaluations and proving their competence by selecting easier tasks rather than challenging tasks to enhance the likelihood of success.

Consistent with the research by Eppler et al. (2000) the current study found that traditional, nontraditional, and distance education students differ on academic performance in that distance education and nontraditional students have higher GPA’s than traditional students. Distance education students also have higher GPA’s than on-campus nontraditional students. Also, nontraditional students spent the most time studying, followed closely by traditional students, which supports the finding by Eppler and Harju (1997) that learning-goal oriented students spend the most time studying. The results of our study continue to be consistent with the research by Eppler and Harju (1997) as it was found that learning-goal oriented students had higher GPA’s than performance-goal oriented students. This finding also supports the hypothesis that learning-goal orientation would be more positively correlated with academic performance than performance-goal orientation.

When comparing these groups on academic performance, it is important to note the differences that were found among traditional, nontraditional, and distance education students in the average number of credits that the three groups carried as well as the average number of hours spent employed. Both of these factors could influence the differences found on academic performance. Distance education students took an average of 6 credits, whereas nontraditional students took 12 and traditional students took 15. However, all of the distance education students were employed over 15 hours a week, whereas only half of the nontraditional and traditional students reported working over 15 hours a week. Similar patterns in hours employed for nontraditional and traditional students are shown with half of each group employed less than 5 hours and the other half employed over 15 hours a week. These results differ from those found by Eppler and Harju (1997). Eppler and Harju (1997) found that nontraditional students spent more hours employed than traditional students. However, our results suggest that distance education students worked more hours than nontraditional and traditional students.

Another interesting finding is the lack of relationship between academic performance and performance-goal orientation. Academic performance and performance-goal orientation are not found to correlate significantly, which is surprising as performance-goal oriented students are more concerned with being successful and performing competently (Eppler & Harju, 1997). A higher GPA would seem to symbolize success and adequate understanding of materials and would therefore be something for which performance-goal oriented students would strive. However, it is known from previous research that learning-goal oriented students have the most concern for acquiring knowledge and skills, which results in better grades (Eppler & Harju, 1997).

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Learning-Goal-Orientation</td>
<td>.02</td>
<td>.01</td>
<td>.23</td>
</tr>
<tr>
<td>Step 2 Learning-Goal-Orientation</td>
<td>.02</td>
<td>.01</td>
<td>.22</td>
</tr>
<tr>
<td>Sex</td>
<td>.23</td>
<td>.09</td>
<td>.22</td>
</tr>
<tr>
<td>Step 3 Learning-Goal-Orientation</td>
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<td>.01</td>
<td>.16</td>
</tr>
<tr>
<td>Sex</td>
<td>.25</td>
<td>.09</td>
<td>.24</td>
</tr>
<tr>
<td>Conflicts</td>
<td>.06</td>
<td>.03</td>
<td>.20</td>
</tr>
<tr>
<td>Step 4 Learning-Goal-Orientation</td>
<td>.02</td>
<td>.01</td>
<td>.17</td>
</tr>
<tr>
<td>Sex</td>
<td>.26</td>
<td>.09</td>
<td>.25</td>
</tr>
<tr>
<td>Conflicts</td>
<td>.08</td>
<td>.03</td>
<td>.23</td>
</tr>
<tr>
<td>Self-Imposed</td>
<td>-.03</td>
<td>.01</td>
<td>-.22</td>
</tr>
</tbody>
</table>
Although we did find significant differences in stress for the three groups, they are inconsistent with the stressors noted in previous research by Dill and Henley (1998). Dill and Henley (1998) found that nontraditional students experienced more stress from events outside of school, and traditional students felt more stress from social and peer involvements. We found that nontraditional and distance education students felt more stress related to Cognitive Appraisal than traditional students. Cognitive Appraisal involves evaluating one’s perceptions and responses to stressful situations. This suggests that the more learning-goal oriented students experience more stress related to Cognitive Appraisal. This may be a result of learning-goal oriented students being more concerned with how effective their problem solving abilities are as well as their level of skill in handling challenging tasks. Distance education students experienced more stress from Changes than nontraditional and traditional students. No other stress differences were found to be significant among the three groups.

The differences in stressors found in this study may be a result of using the Student Life Stress Inventory rather than the Adolescent Perceived Events Scale, which Dill and Henley (1998) used. The Adolescent Perceived Events Scale is meant to be used with traditional college students and therefore was believed to be an inadequate instrument in measuring stress for nontraditional and distance education students. Therefore, the Student Life Stress Inventory was used as it has been used with college undergraduate students ranging in age from 17–54 (Gadzella, 1994). The findings of our study support the hypothesis that traditional, nontraditional, and distance education students differ in stress; however, it is minimally supported considering that there were 10 different stress factors (overall stress and 9 stress subscales) on which the students were compared and the three groups only differed significantly on 2 stress factors.

The hypothesis that traditional, nontraditional, and distance education students will differ on level of self-concept is not supported. Further, the finding by Anolik (1980) that academic performance highly correlated with level of self-concept is not replicated; therefore, our hypothesis that academic performance and level of self-concept will be positively correlated is not supported. However, there is minimal support for the hypothesis that level of self-concept correlates negatively with stress, because self-concept did correlate with the Emotional subscale of stress. These results indicate that students who have lower self-concepts experience more emotion when they are in stressful situations.

In addition to the differences found among traditional, nontraditional and distance education students, sex differences are found as well. Women are found to be more performance-goal oriented than men and to have higher GPA’s than men. It is interesting to note that this relationship is contrary to the relationship of academic performance and goal orientation found with the classification groups. Future researchers may want to explore this relationship further, because this finding may suggest that a differential relationship exists between academic performance and performance-goal orientation for men and women. A final difference found between men and women is on the stress subscale of Physiological Stress. Women are found to experience higher levels of Physiological Stress than men. This suggests that women and men respond to stress differently.

A few limitations of this study should be considered. There is a low response rate from the nontraditional and distance education students, which could potentially limit the generalizability of our findings as a result of sampling bias. The nontraditional and distance education students who are willing to take the time to respond to our survey may represent a more serious and dedicated group of students than those who did not respond. However, the results of our study are consistent with previous findings on traditional and nontraditional students; this suggests that the nontraditional sample, though small, is fairly representative of nontraditional students in general. Methodologically, our contact with the nontraditional and distance education students are restricted to one e-mail contact. This limited communication may have lowered our response rate. A final limitation of this study may be that both part-time and full-time nontraditional and distance education students are included in this study. The results of this study might differ if part-time students are excluded. It is possible that these students experience less stress as a result of taking fewer classes and not carrying a full credit load. This can also have alter the results on GPA. It may be easier to obtain a high GPA with fewer credits. However, it may be difficult to obtain a sample of distance education students that includes only full-time students. Future research should also attempt to include a more diverse participant pool because this sample consisted primarily of Caucasians.

Our results suggest that distance education and nontraditional students are very similar and would benefit from a different learning environment than traditional students. Distance education and nontraditional students seem to embrace challenges more than traditional students and are less anxious about failure. Because nontraditional students and traditional
students are typically interspersed in classrooms, the challenge of providing a supportive environment for all students is even greater. An educational environment conducive to a learning-goal orientation may be stressful to traditional students, but it might also be beneficial. We found traditional students to be stronger on learning-goal orientation than performance-goal orientation and our results indicate that learning-goal orientation is more strongly related to academic accomplishments. Thus, the benefits of educational techniques designed to enhance learning goals may outweigh any experienced discomforts. Given the rate of increase in the representation of distance education and nontraditional students at universities, such changes may be inevitable.

**References**


Nicotine is one of few addictive (Stolerman & Jarvis, 1995; US Department of Health and Human Services [USDHHS], 1998) psychoactive agents legally and readily available for human consumption in a variety of relatively inexpensive tobacco and tobacco replacement products. The widespread availability of nicotine-containing products, together with the appetitive (Russell, 1980) and addictive properties of nicotine, create a rich environment for repeated exposure, dependence, and the unfortunate health consequences that have been associated with chronic tobacco use (Heinrich, 2003). It is generally agreed that a better understanding of the factors that contribute to nicotine use is an important scientific and societal goal.

Experiments investigating the impact of nicotine on the behavior and physiology of nonhumans provide an important contribution to the goal of establishing a direct functional relationships between nicotine exposure and the behavior and physiology of a living organism. Although intravenous injection is the most common experimental paradigm for investigating nonhuman nicotine self-administration (Corrigal, Coen, & Adamson, 1989; Valentine, Hokanson, Matta, & Sharp, 1997), there is renewed interest in rodent self-administration procedures (Adriani, Marci, Pacifici, & Laviola, 2002; Biondolillo & Pearce, 2007; Dadmarz & Vogel, 2003; Klein, Stine, Vandenberg, Whetzel, & Kamens, 2004; Maehler, Dadmarz, & Vogel, 2000) which were popular prior to the development of intravenous models (Flynn, Webster, & Ksir, 1989; Lehouezec, Martin, Cohen, & Molimart, 1989). Advantages of oral self-administration procedures include a relatively unlimited duration of experimental investigation, complete freedom of movement by an intact subject, measurement of consummatory responses, and the increased likelihood that individual patterns of nicotine self-administration will present themselves (Abreu-Villaca, Queiroz-Gomes Fdo, Dal Monte, Filgueiras & Manhaes, 2006; Flynn, et al., 1989; Perkins, 1995). All of these features are relevant to a model attempting to mimic voluntary nicotine exposure as seen in the human tobacco user.

**Individual Differences in Voluntary Self-Administration of Oral Nicotine in Female Rats**

Eight adult female Sprague Dawley rats had free access to both a nicotine solution and distilled water. At no time were rats deprived of food, water, or forcefully exposed to nicotine. Individual consumption patterns emerged with some animals drinking little nicotine solution and others preferring it over water. Results suggest that providing a nicotine solution of 1µg/ml nicotine hydrogen tartrate salt (SigmaAldrich) continuously in the home cage is sufficient to establish voluntary self-administration of nicotine in some rats. Further, this method of nicotine self-administration is promising and yields the kind of individual nicotine intake patterns seen in human tobacco users.

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Although a voluntary self-administration approach offers many advantages, it does come with methodological challenges. The most critical challenge stems from the very nature of the approach, which allows subjects to voluntarily drink (or not) a solution containing nicotine. Failure to demonstrate preference for the nicotine solution or even substantial levels of consumption of nicotine in rats using the most common oral self-administration situation, the two bottle choice paradigm (Flynn et al., 1989; LeHouzec et al., 1989; Smith & Roberts, 1995) has resulted in researchers resorting to methods of forced exposure (LeHouzec et al.) or sweetening the solution containing nicotine (Meliska, Bartke, McGlacken, & Jensen, 1995; Smith & Roberts). Although these procedures increase the consumption of nicotine, they do little to support the position that nicotine possesses reinforcing qualities for rats. In the absence of substantial evidence that rats will voluntarily consume a nicotine solution, one must question the assumption that nicotine possesses reinforcing properties for rats when administered orally (see Frenk & Dar, 2000, for a review questioning the assumption that the reinforcing properties of nicotine have been established using any method in nonhumans).

Studies using oral nicotine self-administration by rats must address some basic issues of the approach before it can be used to ask more important questions about nicotine use and addiction. For example, if the goal of the research is to determine the effects of nicotine using a voluntarily self-administered model, research subjects must first drink the solution containing nicotine, and they must drink it in sufficient quantities to experience a pharmacological effect. This approach, as attractive as it is in terms of potential applicability, clearly depends on rats’ initial reactions to the olfactory and gustatory cues of the nicotine solution itself as well as any post oral impact associated with consumption of the nicotine solution. The problem may be further complicated by the possibility that different rats may respond differently to the gustatory cues associated with a given concentration of nicotine solution as well as the post-oral pharmacological effects of nicotine.

The conclusion that rats will develop a preference for a nicotine solution over water lacks adequate support. Much of the data reported from oral nicotine self-administration studies were generated with group designs (Flynn et al., 1989; Smith & Roberts, 1995) and interpreted through the analyses of group data with no consideration of the intake patterns of individual rats. However, Maehler et al. (2000) reported data indicating that rats develop idiosyncratic patterns of consumption with some preferring and others avoiding the nicotine solution; thus supporting our concern that individual rats may in fact respond quite differently to the taste of a nicotine solution and/or the pharmacological effects of nicotine contained in the solution. More recently, Dadmarz and Vogel (2003) noted that group means may mislead in their conclusions and individual animals responses to nicotine are the determining forces in nicotine self-administration.

The first aim of the this study was to demonstrate voluntary intake of nicotine via an oral solution without depriving rats of water, forcing exposure to nicotine, or relying on a sweetened solution to encourage consumption. The second aim was to describe any idiosyncratic patterns of nicotine self-administration in individual subjects. The general assumption by those who use or critique the oral self-administration model seems to be that all rats exposed to a nicotine solution must respond in the same way to it, showing a clear preference for the nicotine solution over water in order to conclude the model is valid. We disagree with this and assume that individual rats, like humans, may react very differently to nicotine. In fact, we anticipated that some rats would drink little or none of the nicotine solution but that other rats might establish a pattern of consumption with continued and constant exposure to nicotine in the home cage. Our oral self-administration model provides an ideal way to both demonstrate and take advantage of idiosyncratic nicotine self-administration patterns as rats are free to consume nicotine in varying amounts from one day to the next. Demonstrating individual differences in nonhumans would be directly in line with the observation that humans differ greatly in their frequency of tobacco use and propensities to become “dependent” on tobacco products (Shiffman, 1989). Such findings would suggest that under conditions of voluntary access, nicotine availability is sufficient to establish chronic exposure in some rats but not in other rats; findings which would converge with those reported by Maehler, et al. (2000) and would support the position that models of nicotine use and dependence should be equipped to explain variations in individual use and development of dependence (Shiffman, 1991).

**Method**

**Animals and Maintenance**

Eight female Sprague Dawley rats, approximately 64 days old at the beginning of the study were housed individually in 46 (d) x 30 (h) x 28 (w) cm wire mesh cages equipped with a 28 x 16.5 cm loft accessed by a 28 x 9 cm ramp. Animals were housed in a temperature and humidity controlled colony room under a reverse 12:12 light/dark cycle. Rats were treated in accordance with the ethical standards of the APA;
approval for procedures used was granted by the
Institutional Animal Care and Use Committee at
Arkansas State University, and all rats remained healthy
for the duration of the experiments. Two water bot-
tles (BioServ #9010 100 ml) were mounted on the out-
side of the cage 23 cm apart. The drinking reservoirs
extended into the home cage approximately 4 cm and
rested approximately 2 cm from the floor of the loft.
Rats accessed liquid from a 2.5 cm diameter opening
in the bottle reservoir. Lab Diet 5012 Food pellets
were piled in a corner of the cage as needed. Food
pellets were discarded and replaced with every cage
cleaning. Visual access to adjacent animals was reduced
with opaque dividers between cages. Rats had free
access to Cell Sorb Plus bedding, food, and water at all
times in the home cage. Cages were cleaned and rats
were inspected and weighed every 3 days.

Phase 1

During Phase 1, both cage bottles were filled with
100 ml of distilled water (DW). The amount consumed
from each bottle, rounded to the nearest ml, was
recorded at the same time daily (8:00 am, 2 hours into
rats’ light cycle) prior to rinsing and filling bottles
with fresh DW. Phase 1 served to allow rats to accli-
mate to conditions of the lab and to establish indi-
vidual baseline drinking patterns across bottles, as
well as total volume intake prior to nicotine availability.
Further, baseline choice consumption was used to
determine the presence of a preferred bottle or bot-
tle position. Phase 1 continued for 30 days. By this
time it was clear that rats were consuming consistently
from both bottles and did not vary more than 10 ml in
total volume consumed each day across 10 con-
secutive days.

Phase 2

Conditions and procedures of Phase 2 were iden-
tical to those of Phase 1 with the exception that one
of the bottles was filled with a nicotine solution
(1µg/ml; Sigma Aldrich nicotine hydrogen tartrate
salt dissolved in distilled water). This concentration
of nicotine was selected based on evidence that con-
centrations exceeding 5 µg/ml are avoided, possibly
due to bitter taste cues (Flynn et al., 1989).

The position of the bottle containing the nicot-
ine solution (NS) was counterbalanced randomly
across rats but bottle positions were always the same

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**FIGURE 1**

Two-bottle choice consumption during the final 15 days of Phase 1 and Phase 2 averaged over
eight subjects. A. During Phase 1 both bottles contained distilled water (DW); B.
During Phase 2 one bottle contained a nicotine solution (NS) and the other contained DW.
Data points reflect mean scores and error bars reflect standard deviations.
FIGURE 2

Raw two-bottle choice consumption values of individual rats that consumed little NS (R1, R8) or demonstrated no preference for either the NS or DW (R6, R7) during the final 15 days of Phase 2. The right panel presents consumption during a final post test following nicotine deprivation.
FIGURE 3

Raw two-bottle choice consumption values of individual rats that consumed more NS than DW during the final 15 days of Phase 2. Note the axis change for R4 which consumed considerably more liquid than the other animals. The right panel presents consumption during a final post test following nicotine.
within subjects. Volume intake from each bottle continued to be recorded at the same time each morning prior to filling tubes with fresh DW or NS. Phase 2 was used to compare intake patterns across days when rats could freely choose between DW and NS to drinking patterns when both bottles contained DW. Together, Phase 1 and 2 allowed us to determine if the NS possessed aversive gustatory features that were avoided immediately and to determine if rats might develop an increased appetite for nicotine with prolonged availability of nicotine in the home cage.

Rats were never deprived of water or food nor were they forced to consume the NS. In fact, NS and DW bottles were consistently placed on the left or right side of the home cage for a given subject to provide a clear location cue. The decision to hold bottle position constant was based on pilot data collected in our lab which suggested that during initial exposure rats did not appear to discriminate between the NS and DW. Specifically, reversing bottle positions daily resulted in all rats’ failure to develop consistent patterns. By holding the position of the nicotine bottle constant, position served as a relevant stimulus to be associated with any post-oral effects of nicotine. Given the weak concentration of nicotine in our NS, it is possible that taste cues were minimal or were not aversive and therefore the NS is not avoided based on taste cues alone.

Following Phase 2, rats were prepared for a pilot study to examine the influences of nicotine pre-exposure on conditioned taste aversion, the results of which were not reported here. During this pilot, study rats did not have access to the oral nicotine solution for 12 days. Rats were not water deprived and conditions were identical to that of Phase 1. On day 13 of nicotine deprivation, rats were introduced to a post-test. Subjects were presented with two bottles: one containing DW and one containing NS. Subjects were allowed to sample from either bottle for 24 hours. Bottles were placed in the same positions as in Phase 2.

Results

Figure 1 illustrates two-bottle choice consumption during the final 15 days of Phases 1 and 2, left and right panels respectively. Data in Figure 1 represent mean volume consumed (N = 8) each day, from each bottle. Error bars denote empirical standard deviations. By the end of Phase 1, group means revealed rats were consuming consistently from both bottles (left panel Figure 1) and total consumption was stable with less than 10 ml difference in total volume consumed across the final 15 days of the Phase. By the end of Phase 1, total volume intake was, on average, 32 ml (means calculated on all 8 rats’ final 7 sessions of Phase 1 with left bottle volume consumed M = 15.56 ml vs. right bottle volume consumed M = 16.57 ml).

We used an alpha level of .05 for all statistical tests. A repeated measures ANOVA across days confirmed no statistically significant difference in volume consumed from the left versus right bottle, \( F(1, 7) = 1.28, p > .05 \).

The right panel in Figure 1 illustrates two-bottle choice consumption during Phase 2 when rats had access to both NS and DW. By the end of Phase 2, all rats were drinking from both tubes. However, a notable feature of the data from Phase 2 was an increase in error variance as different rats exhibited individual patterns of consumption of DW and NS. The error variance was especially noteworthy when you compare it to the error associated with Phase 1 behavior (left panel). The second notable feature of these data was the increase in total fluid intake when compared to that of Phase 1. By the end of Phase 2, total volume intake was, on average, 53 ml of liquid (mean calculated on all 8 rats, final 7 sessions). A repeated measures ANOVA applied to total volume consumed in the final sessions of Phase 1 versus Phase 2 revealed a statistically significant main effect of phase, \( F(1, 7) = 7.86, p < .05 \). Further, a breakdown of total volume consumed from bottles containing nicotine versus DW revealed that consumption increased from Phase 2 comparably for both bottles (NS, M = 18.32 vs. M = 27.34; DW, M = 19.00 vs. M = 26.14 for initial and final sessions of Phase 2 respectively) although the differences between initial and final ingestion for each solution were not statistically significant, \( F(1, 7) = 1.35, p > .05 \).

Figures 2 and 3 allow examination of intake data for individual rats during the final 15 days of Phase 2 (left panels). These data revealed clear differences in consumption patterns across individuals. Two rats (R1 and R8) consumed little or no NS (Figure 2). Four rats (R4, R5, R6, R7) consumed relatively equal amounts of either solution (Figures 2, 3); and two rats (R3 and R2) typically consumed more NS than DW. Note the change in Y axis scale for subject R4. Although this animal did not show a clear preference for NS over DW, she was drinking considerably more NS than the other rats. Individual consumption trends emerged during the final 15 day of Phase 2 such that 3 rats—R6, R2 and R5—began and ended the phase with relatively equal sampling of NS and DW. Three rats—R1, R8, and R—began and ended the phase with large sampling differences between the two bottles. Two rats, R4 and R7, exhibited erratic sampling patterns of both NS and DW.

The single data points presented in the right panel of Figures 2 and 3 represent consumption of NS and
DW on a single post test day at the end of Phase 2. It is relevant to note that regardless of voluntary consumption levels during Phase 2, following 12 days of nicotine deprivation, 6 of 8 rats consumed more NS than they had during Phase 2. Only two animals, R6 and R7, did not show an increase, nor decrease, in NS consumption during the post-test. Rather, their intake levels of NS were comparable to those observed during the final days of Phase 2.

Discussion

The two-bottle free-choice method is widely accepted as a valid experimental method in nonhuman studies investigating voluntary intake of, and preference for, oral solutions (Bachmanov, Tordoff, & Beauchamp, 1996; Meliska, et al., 1995). The present study supports evidence reported by Maehler et al. (2000) that female Sprague Dawley rats will voluntarily self-administer nicotine in an oral solution, and that individual differences are clearly evident in consumption patterns (see Dadmarz & Vogel, 2003) with some subjects consuming little nicotine and others consuming more nicotine solution than water during the final days of choice Phase 2. Although discussion of individual differences in vulnerability to nicotine addiction or dependence is premature, these data indicate individual differences in voluntary self-administration. We suggest variability in subjects’ reaction to nicotine which makes further investigation with this approach to self-administration even more attractive as a means of answering questions about factors that contribute to the behavior of individuals voluntarily approaching or avoiding nicotine.

Individual tendencies to consume the nicotine solution are clear, though an explanation for them is not readily evident. To interpret our consumption data, one must consider the potential influence of two factors associated with a nicotine solution. The first factor, the stimulus features of the solution (i.e., odor and taste cues) would be present upon a subject’s initial exposure to the solution. If these stimulus features were aversive, one would expect rats under conditions of no deprivation to simply avoid the solution. In Phase 2, although Subject R8 drank little of the NS, she didn’t avoid it altogether—sometimes drinking as much as 10 ml of the solution in a 24-hour period. Further, all of the other rats reliably consumed some of the NS. Together these data indicate that our NS did not present odor and taste characteristics that some of the NS. Together these data indicate that our NS did not present odor and taste characteristics that might contribute to the behavior of individuals voluntarily approaching or avoiding nicotine.

On the other hand, if the stimulus features of the solution are attractive to rats, one will expect rats to readily consume the solution upon habituating to its novelty. Although this will provide the simplest explanation for our rats that consumed the NS, it also suggests that we are dealing with different populations of rats—those who like the taste of the nicotine solution, those who do not, and those who show no clear preference.

However, several additional points make the appetitive features an unlikely solitary explanation. First, rats did not gradually increase consumption of the NS across days as one might expect if they were in part controlled by mere exposure as in habituation to novelty or experience-induced palatability (Flynn et al., 1989). Rather, they tended to either consume a stable amount (R1, R8, R3, R5) of NS from day-to-day or to behave unpredictably (see R7, R4) from day-to-day. Second, evidence from earlier work in our lab indicated that if the bottle positions were rotated from day-to-day, rats’ consumption behavior was even more erratic with rats neither consistently approaching or avoiding the NS (e.g., all rats tended to behave like R6 and R7). Taken together, our data suggest that taste cues alone cannot account for the observed behaviors. Furthermore, previous studies revealed the taste of nicotine alone does not contribute heavily to its voluntary consumption (Glick, Visker, & Maisonneuve, 1996). Evidence from Maehler et al. (2000) showed both male and female rats titrate their nicotine intake despite varying concentrations of the drug in solution; suggesting it was not the taste of the solution, but the amount of nicotine in the solution that determined intake.

It is possible that rats either are unable to discriminate between the NS and DW from taste cues or that they can discriminate between the two but find the solutions to be of equal taste valance/value. If a subject’s initial experience with the nicotine solution is one of indifference or inability to discriminate between the nicotine solution and control vehicle, then one will expect, putting bottle and location preferences aside, relatively equal sampling from the bottles containing the nicotine solution and control vehicle. Rats R6, R7, and R5 fit this pattern. Based on these 3 rats’ data alone, one can conclude that either the nicotine solution produces little discernable postoral effects (i.e., pharmacological) or it produces delayed post-oral effects that the subjects are unable to associate with the location cue. Though there is systemic absorption of pharmacologically significant amounts of nicotine when delivered orally, this route relies on the relatively slow process of gastric absorption and first-pass metabolism before becoming avail-
able in the bloodstream. Questions arise concerning both the speed with which nicotine becomes available and the amount of nicotine ultimately available to the central nervous system—important issues for the development of bottle preference learning and dependence (for review see Warnakulasuriya, Sutherland, & Scully, 2005).

We deliberately placed the bottle containing NS in the same location from day-to-day (Lee, Chen, Shih, & Hiroi, 2004) to facilitate any discrimination between the taste and/or post-oral effects of nicotine, and our data suggested that some of our subjects (R1, R8, R3, R5) could discriminate between the two bottles. Posttest data provide indirect evidence that the NS was, at some level, reinforcing to subjects as deprivation from NS resulted in markedly increased consumption for some rats (R1, R8, R3, R5) and levels of consumption for the remaining rats were comparable to that of Phase 2.

In conclusion, our results demonstrate that chronically exposing female Sprague Dawley rats to a weak concentration of oral nicotine results in reliable, voluntary self-administration in some rats. These data add strength to the case that reporting only group means may be insufficient for our understanding of nicotine consumption in a voluntary model. We generalize these data only to female Sprague Dawleys but plan a formal test of males in a future study. It will be interesting to see if environmental availability will exert the same influence on older rats, or if this effect is somehow linked to age of exposure as rats, like humans, have been shown to be more vulnerable to nicotine during adolescence. Although the study is limited in that it did not address sex, strain, development, or differences brought on by duration or concentration of oral nicotine, the strength of this study lies in the method employed which clearly reveals individual differences in nicotine self-administration. Individual differences are also observed in human tobacco users (Benowitz & Jacob, 1997; Shiffman, 1989, 1991) making this method a viable comparative tool to analyze factors contributing to voluntary nicotine self-administration.

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Over the last two decades, there have been numerous studies investigating accuracy in the detection of lies in verbal statements (See Vrij, 2000). This research has implications for individuals involved in law enforcement and the justice system, but also has implications for ordinary people who are likely to be on the receiving end of deception everyday (See Feldman, Forrest, & Happ, 2002; DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Interpersonal deception may lead to financial losses as well as emotional distress. The majority of scientific studies investigating the accuracy of college students or other laypersons have shown that performance above chance is rare (See Vrij, 2000). The purpose of the present research was to investigate the hypothesis that people are better detecting lies in verbal statements told by people they know well versus strangers.

Our research was initiated in response to media coverage in high-profile criminal investigations. Journalists appear to seek out family and friends of suspects or defendants in order to ascertain the extent to which the family and friends believe statements made by the accused. For example in 2001, when Gary Condit was suspected of knowing something about the disappearance of the intern Chandra Levy, journalists doggedly pursued Condit’s wife for comment. Relatively late in the investigation, she made the statement that she was “behind Gary 100 %” (Associated Press, 2001). The statement had no impact on the concrete details of the investigation; however, it may have influenced the public perceptions as well as perception of those involved in the investigation. In 2003, there was a similar interest in the beliefs of Lacy Peterson’s family about Scott Peterson’s possible involvement into Lacy’s disappearance. Soon after the disappearance, members of Lacy’s family made public statements that they believe Scott Peterson’s accounts (Associated Press, 2003a). A month later, upon discovering that he had been involved in an extra-marital affair, Peterson’s family released a statement that they believed Scott Peterson’s accounts (Associated Press, 2003b). Our research was conducted in partial completion of a senior honor’s thesis in the Department of Psychology at Oklahoma State University. The research was supported by the grant from National Science Foundation (BCS 0488968) award to Dr. Shelia M. Kennison.

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Detecting Lies Told by Friends and Strangers

The research investigated the hypothesis that having a personal relationship with someone improves one’s ability to detect lies in verbal statements. In Study 1, we found that people reported higher levels of confidence in their ability to detect lies told by someone close to them versus a stranger. In Study 2, we conducted a lie detection experiment with additional participants. The results indicated that having a personal relationship with the storyteller did not lead to significantly higher accuracy. However, additional analyses showed that accuracy was significantly predicted by how often the storyteller reported lying in everyday life and the amount of time the storyteller and story judge spent together each week. The results are consistent with the view that behavioral cues are produced during lying, and success in lie detection can occur when one becomes skilled at perceiving those cues; however, individuals can vary in their skill level.
tal affair during the weeks leading up to his wife’s disappearance, the family retracted their support of Scott’s statements (Associated Press, 2003b). The family’s initial belief in Scott’s statements and then subsequent disbelief greatly influenced public opinion. These cases and others suggested to us that there appears to be an implicit assumption in our culture that those closest to an individual know the person best and would be able to determine when/if the person was lying.

Although journalists and the general public may tend to believe that family members and friends are better judges of a person’s honesty than are others, the empirical literature on lie detection has yielded no evidence for this view thus far. In fact, the literature on lie detection has shown that most people are generally poor lie detectors. In most studies with individuals who are not directly involved in law enforcement, performance on lie detections tasks is rarely above chance (See Vrij, 2000). Studies with individuals who work in law enforcement have yielded similar results; Vrij (1993) tested a group of detectives in a lie detection task and observed an accuracy rate was at chance level (i.e., only 49%), and Elaad (2003) tested a group of police officers and found their performance was below chance. Elaad also found that participants generally believed that they were good lie detectors and were confident in their lie-detecting judgments. The author pointed out that inaccuracy coupled with overconfidence is a dangerous combination as it can turn “suspicion into certainty” and increase the possibility of obtaining false confessions.

The low accuracy rates in lie-detection studies may be evidence that when evaluating statements of others, listeners believe statements of true more often than they believe they are lies. Stiff, Kim, & Ramesh (1992) argued that most lies are not detected because people are seen as typically honest and lying is viewed as not prevalent. He referred to this tendency as truth bias. A truth bias is consistent with the views of Grice (1989) who proposed that there are conversational norms which guide the delivery of information from speaker to listener. One of the four norms is the Maxim of Quality, which states that speakers avoid making statements that are known to be false. Because as speakers we follow the norm to be truthful (as much as it is relevant), we may also implicitly assume others follow the same conversational norm when they are speaking to us. The intriguing implication is that those speakers who routinely violate the norm may demonstrate the truth bias less often. Those who frequently lie might perceive lying as more prevalent than those who lie less often. We will address this issue further in the Discussion.

We reasoned that more familiarity with a person would lead to more opportunity to observe and to learn the person-specific behavioral cues that produced during lying. In the increasingly familiar world of poker-playing, such behavioral cues would be called tells. When bluffing, a person might adjust his or her stack of chips or twist a ring or some other innocuous behavior. Learning what behaviors are commonly produced when one lies requires ample experience with the person, both when they have produced truthful and deceptive verbal statement. In the lie detection literature, there is ample evidence that individuals may produce different verbal and nonverbal behaviors during lying versus truth-telling. Ekman, O’Sullivan, Friesen, and Scherer (1991) analyzed verbal and nonverbal cues for those providing truthful and dishonest verbal statements. Analyses of smiling behaviors and pitch of the voice could distinguish lies from truths in 86% of the cases. Frank and Ekman (1997) found that the analysis of very small (micro) facial expressions could distinguish 80% of lies from truths.

A small, but growing area of research suggested that some individuals may be able to learn to spot specific behavioral cues associated with lying (Ekman & O’Sullivan, 1991; Ekman, O’Sullivan, Friesen, & Scherer, 1991; Ekman, O’Sullivan, & Frank, 1999). In the most recent demonstration, Ekman et al. (1999) investigated whether three professional groups (i.e., two law enforcement groups and a group of psychologists) with special interest or skill in deception had high accuracy at detecting lies based on demeanor. Participants viewed brief video segments in which a person described a personal opinion. The highest accuracy rates (i.e., 77%) were observed for federal agents working with the Central Intelligence Agency. Other groups’ accuracy rates were between 50 and 67%. Ekman et al. (1999) showed that all groups were significantly more accurate judging lies than judging truths, a pattern that the authors stated had not been observed in prior research involving less accurate groups.

We also reasoned that the content of an individuals’ verbal statements may vary when the statement is true versus contains false facts. Familiarity with an individual may provide one with experience detecting cues of deception in the content. Recent research has shown that the verbal content of true and false statements may differ systematically. Newman, Pennebaker, Berry, and Richards (2003) collected true and false verbal statements from college students. Statements either did or did not reflect the students’ true opinion on a controversial topic, such as abortion. They found that false statements generally contained fewer first-person singular pronouns, more...
words that reflect negative emotion, more motion verbs and fewer exclusive words (e.g., but and except). False statements were also found to be less cognitively complex, in that they contained more concrete verbs and shorter sentences. Using a computerized text-based analysis program, they were able to classify false and true statements 67% of the time when the topic was invariant. Overall, the computer program was accurate on 61% of statements.

In the present research, we set out to determine whether there is a general tendency for people to believe that they are better at detecting lies in the verbal statements of those they know well versus those that they do not know well and whether having a personal relationship with a person resulted in a general higher accuracy in detecting lies as compared to detecting lies told by a stranger. We recognized that several outcomes were possible. People may be better at detecting lies told by friends than lies told by strangers and because of life experience with actual lying friends, they have developed a belief their ability to detect lies told by friends. Second, people may believe they are better at detecting lies told by friends, but perform no differently in lie detection tasks involving friends and strangers. As Elaad (2003) showed with law enforcement individuals, confidence does not ensure accuracy. Third, people may be worse at detecting lies told by friends than lies told by strangers, because there may be a psychological need to believe the statements of friends. There may be anxiety related to being involved in close friendships in which lies could occur without detection. People can generally convince themselves that they would be able to spot a lie if told to them by a close friend, because not believing this might lead to psychological distress.

In the present paper, we reported the results of two studies. In Study 1, we surveyed college students about their lying behaviors, beliefs about lying, and their ability to tell lies and to detect lies told by people they know well versus people they do not know well. The results of this study confirmed our observation that there is a general bias to believe that it is easier to detect lies told by someone you know well than to detect lies told by a stranger. In Study 2, we conducted a lie detection experiment in which we compared accuracy in detecting lies told by a friend and lies told by a stranger. The results of this experiment demonstrated that for most people, knowing a person well did not lead to better overall performance. However, there were significant correlations observed between accuracy and (a) how often the storyteller tells lies in everyday life, (b) the closeness of the relationship between the storyteller and story judge, and (c) the amount of time the storyteller and story judge spent together each week. Implications for real world lie detection are discussed.

**Study 1**

The purpose of Study 1 was to determine whether there is a general belief or bias that one is better able to detect lies in the verbal statements of someone they know well versus the statements of a stranger. Each participant completed a short questionnaire.

**Method**

**Participants.** Sixty undergraduates enrolled in psychology courses at Oklahoma State University participated in exchange for course credit. The average age for participants was 22 years (SD = 3.08).

**Materials and Procedure.** Participants completed a one-page questionnaire on which they indicated their ability to tell lies, their ability to detect lies, how often they lie, their opinion of lying, and if they thought they were better at lying and detecting lies from a friend or a stranger. Two versions of the questionnaire were used. Half of the participants received the questionnaire with the statement, “I am good at knowing when people I know well are lying (1 = disagree, 7 = agree)” appearing before the statement, “I am good at knowing when people I don’t know well are lying (1 = disagree, 7 = agree)”; half of the participants received the questionnaire with the opposite order. A copy of these questions has been provided in Appendix A.

**Results**

Mean responses were calculated for each question on the questionnaire. The results indicated that participants report greater confidence in detecting lies told by someone close to them than lies told by a stranger (5.17 vs. 3.48, respectively), t(59) = 6.83, p < .01. In contrast, participants judged their ability to lie to someone close to them as comparable to their ability to lie to a stranger (3.40 vs. 3.48, respectively), t(59) = .32, p > .05. Table 1 displays these results.

We also found evidence that there were relationships among attitudes about deception. Table 2 summarizes the results from correlational analyses. The most noteworthy results are those involving participants’ self-reported lying ability and how often they lied. Participants’ self-reported lying ability was positively correlated with how often they lied, r = .51, p < .01. Lying frequency and lying ability were positively correlated with responses to the statements, “People lie all the time,” r = .34, p < .01 and r = .30, p < .01, respectively; and “Lying is okay as long as if you don’t get caught,” r = .41, p < .01, and r = .32, p < .01, respectively. These results were consistent with two interpretations: (a) individuals who viewed themselves as...
skilled liars were likely to engage in lying more often, or (b) the more a person lied, the more confident he or she becomes about their lying ability. Individuals who lied frequently may have (a) viewed others were similar to themselves and lied frequently or (b) viewed others as lying frequently and decided to lie frequently themselves. We were particularly intrigued by the fact that there was no significant relationship between individuals’ view that lying was wrong and how often they lied, \( r = -.10, \ p > .05 \). One might have expected a stronger negative correlation indicating that stronger beliefs that lying was wrong was associated with less lying.

**Discussion**

The results provided support for the hypothesis that individuals believed themselves to be better able to detect lies told by someone close to them than lies told by someone that they do not know well. The purpose of Study 2 was to determine whether having a personal relationship with someone results in better accuracy in judging the truthfulness of one’s verbal statements versus judging the truthfulness of a stranger’s verbal statements.

**Study 2**

The purpose of Study 2 was to determine whether one’s ability to detect lies in verbal statement is influenced by having a personal relationship with the person making the statement. Additional participants were recruited to participate in a lie detection task in which verbal statements were judged as true or false. Pairs of same-gender friends were recruited for the experiment. One member of each pair was assigned

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Summary of Ratings About Ability to Detect Lies and to Tell Lies From Study 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
</tr>
<tr>
<td>I am good at knowing when people I know well are lying.</td>
<td>5.17</td>
</tr>
<tr>
<td>I am good at knowing when people I don’t know well are lying.</td>
<td>3.80</td>
</tr>
<tr>
<td>I am good at lying to people I know well.</td>
<td>3.40</td>
</tr>
<tr>
<td>I am good at lying to people I don’t know well.</td>
<td>3.48</td>
</tr>
</tbody>
</table>

*Note: Participants ratings involved a scale from 1 to 7 (1 = disagree, 7 = agree).*

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Summary of Results of Correlational Analyses From Study 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q6</td>
</tr>
<tr>
<td>1. I am a good liar.</td>
<td>.51</td>
</tr>
<tr>
<td>6. How often do you lie?</td>
<td>-.10</td>
</tr>
<tr>
<td>7. Lying is wrong and should never happen.</td>
<td>-.37</td>
</tr>
<tr>
<td>8. Lying is okay if it doesn’t hurt anyone.</td>
<td>.53</td>
</tr>
<tr>
<td>9. Lying is okay as long as if you don’t get caught.</td>
<td>.57</td>
</tr>
<tr>
<td>10. I don’t have any problem with lying.</td>
<td>-.12</td>
</tr>
<tr>
<td>11. I believe people lie only in special circumstances.</td>
<td>.46</td>
</tr>
<tr>
<td>12. I believe people lie on rare occasions.</td>
<td>-.44</td>
</tr>
<tr>
<td>13. I believe people lie somewhat frequently.</td>
<td>.56</td>
</tr>
<tr>
<td>14. I believe people lie all the time.</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Boldface font indicates significant results, \( p < .05 \).*
to be the storyteller. The other was assigned to be the story judge. Storytellers participated first. They provided eight verbal statements, each describing a life event that either did or did not happen to the speaker. In order to ensure facilitating to a storytelling phase, we provided participants with a list of 50 life events from which they could choose events that they had experienced and events that they had not experienced. The number of true stories among the eight was randomly determined as was the order of stories on the videotape. Each story was to last 2 or 3 min. In a separate session, the videotape was shown to 2 participants: 1 being a friend of the storyteller and 1 being a stranger to the storyteller. Judges viewed each story and indicated whether they believed if each story was true or a lie.

Method

Participants. The participants were 44 (16 male, 28 female) additional undergraduates at Oklahoma State University. Participants were enrolled in the study as friends (same-gender, nonromantic friends). One participant in each pair was enrolled in a psychology course and received credit for their participation. All participants were native speakers of American English. The average age of the participants was 19 years (SD = 1.32).

Materials and Procedure. All participants signed up for the study with a friend of the same gender. One was randomly assigned to be the storyteller, and the other to be the story judge. Storytellers and story judges were tested at different sessions.

Storytellers were informed that they would tell eight stories about previous personal experiences. They were given a list of 50 life events from which they selected 8 events that had happened to them and 8 events that had not happened to them. This list has been provided in Appendix B. The interviewer then randomly determined for that participant the number of stories out of eight that would be true for that participant’s storytelling session. The numbers one through eight were written on slips of paper and placed in a bowl. The interviewer picked a number out for each participant. For example; if the interviewer drew out the number five, then the storyteller would describe five events that had happened to them and three events that had not happened to them. The storyteller would then go back to the list of life events and make final selections of the events that would be described. At this stage, storytellers were told to choose events for the true statements that their friend was unlikely to have heard about before. Before videotaping began, the interviewer created a random ordering of the stories that would be told. Each story topic labeled as either true or false was put in a bowl. The interviewer drew out the topics one at a time. This ordering of topics was used for the sequence captured on videotape. The interviewer instructed storytellers to take two to three minutes to describe each event and to try to be as convincing as possible.

Following the videotaping, the storytellers completed questionnaires in which they rated their opinion of their own ability to tell lies, their ability to detect lies, how often they lie, their opinion of lying, and if they thought they were better at lying and detecting lies from a friend or a stranger. A copy of these questions has been provided in Appendix B. Participants also answered a demographics questionnaire, including questions about the closeness of their relationship to the friend. Participants rated the nature of their relationship on a scale from 1 to 7 (1 = strangers, 7 = best friends). Participants rated the closeness of their relationship (1 = not close, 7 = very close). Participants indicated how much time they spend with their friend outside of class each week. Participants indicated how long they had known their friend. Before storytellers left the session, the interviewer reminded them that it was important not to discuss the stories that they told with their friend. Participants typically seemed eager to comply with this instruction. Participants appeared to enjoy the possibility of making it as difficult as possible for their friend to judge the truthfulness of their stories.

For each story judge, the interviewer began the session by telling the judge that two sets of eight stories would be viewed. One set of stories would be told by a friend, and one set of stories would be told by a stranger. Half of the story judges judged stories told by a friend first and half judged stories told by a stranger first. Story judges were always the same gender as the storytellers. Each story judge was given a response sheet with 16 lines for responses. For each line, there was a space to write in a sentence describing the story topic. To the right, there were the words TRUTH and LIE. They were told to circle the appropriate word for each story. Story judges were also told that for each storyteller, the number of true stories was randomly determined. A storyteller could tell eight stories that were all true or eight stories that were all lies. They were instructed to judge each story without considering the stories that had come before. Following the judging, each judge completed the same questionnaires that storytellers had completed.

Results and Discussion

Responses of story judges were scored for accuracy, and mean accuracy was computed for the friend and stranger conditions. Appendix C displays sam-
amples of stories from the experiment. Table 3 displays mean accuracy by condition. Our results indicated that friends were numerically slightly more accurate than strangers (61% vs. 55%, respectively); however, the difference in mean accuracy for the two conditions was not significant, \( t(21) = 1.29, p > .05 \).

The only support for the view that knowing a person well influenced accuracy in lie detection was obtained in correlational analyses. Accuracy in the friend condition was found to be significantly correlated with how often the storyteller reported lying in everyday life, \( r = .54, p < .01, r^2 = .29 \) and also with how much time the friends spent together each week, \( r = .57, p < .01, r^2 = .32 \). These correlations suggest that friends may become more skilled at detecting deception through time spent together if deception is occurring. It is interesting to note that storytellers’ view of their lying ability was not significantly related to the accuracy rates of judges, \( r = .15, p > .05, r^2 = .02 \). The data was analyzed by multiple regression in which accuracy in the friend condition was predicted from how often the storyteller reported lying in everyday life and how much time the friends spent together each week. The regression produced indicated that 43 % of the variance in accuracy in the friend condition could be explained, \( R^2_{adj} = 43\% \); the overall relationship was significant, \( F(2,19) = 8.81, p < .01 \).

We also analyzed participants responses to the questionnaire used in Study 1. On average, all participants reported believing that they were better at detecting lies told by friends than lies told by strangers (5.25 and 3.70, respectively), \( t(86) = 5.26, p < .01 \). Participants who had been storytellers were more confident in their lie-detecting abilities than participants who had been story judges (5.09 and 3.86, respectively), \( t(42) = 4.31, p < .01 \). The size of the mean difference in the rated confidence judging lies told by friends and strangers did not differ significantly for participants who had been storytellers and story judges (1.82 and 1.27, respectively), \( t(42) = 1.13, p > .05 \). We observed that participants’ role in the study (i.e., storyteller vs. story judge) significantly influenced the extent to which they reported “not having any problem with lying”; storytellers agreed more than story judges (3.41 vs. 2.18, respectively), \( t(42) = 2.44, p < .01 \). This result suggested that the act of telling lies may lead to developing less negative attitudes toward lying, even when the telling of lies was part of a controlled experiment (see Table 4).

Efforts were made to analyze the content of the stories produced in the study following the coding used by Newman et al. (2003). In our analyses, we found no significant differences in measures of content from true and false stories. There were no significant differences in the mean number of words in true and false statements. There were no significant differences in the number of times the speaker said “uhm” or paused during speaking. There were no significant differences in the number of first person personal pronouns used in true and false statements. There were no significant differences in the number of negative words (e.g., no, not, never, among others) used in true and false statements. Prior research had observed differences in word usage in true and false

### TABLE 3

**Summary of Performance in Lie Detection Task From Lie Detection Study.**

<table>
<thead>
<tr>
<th></th>
<th>Storyteller was a Friend</th>
<th>Storyteller was a Stranger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Accuracy</td>
<td>61%</td>
<td>55%</td>
</tr>
<tr>
<td>SD</td>
<td>.17%</td>
<td>.17%</td>
</tr>
<tr>
<td>Minimum</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>Maximum</td>
<td>100%</td>
<td>88%</td>
</tr>
</tbody>
</table>

### TABLE 4

**Summary of Ratings About Ability to Detect Lies Told by Friends and by Strangers for Storytellers and Story Judges From Study 2.**

<table>
<thead>
<tr>
<th>Participant’s Role</th>
<th>Ability to Detect Lies Told by Friend</th>
<th>Ability to Detect Lies Told by Strangers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storyteller</td>
<td>5.73 (1.16)</td>
<td>4.45 (1.26)</td>
</tr>
<tr>
<td>Story judge</td>
<td>4.77 (1.02)</td>
<td>2.95 (1.46)</td>
</tr>
<tr>
<td>Mean</td>
<td>5.25 (1.18)</td>
<td>3.70 (1.54)</td>
</tr>
</tbody>
</table>

*Note: Participants ratings involved a scale from 1 to 7 (1 = disagree, 7 = agree). Standard deviation in parenthesis.*
opinion statements. It is possible we did not observe these differences because our participants described everyday life events.

**Discussion**

The present research demonstrated that people generally believe they are better at detecting lies in statements told by friends than strangers; however, in an experiment, we found that when participants attempted to judge verbal statements as truth or as lies, participants’ accuracy was not significantly different when verbal statements were made by a friend or by a stranger. Nevertheless, we found some evidence that aspects of the personal relationship between the storyteller and the story judge was significantly related to accuracy. The strongest predictor of accuracy in the friend condition was the combination of how often the storyteller lied in everyday life and how much time per week the storyteller and story judge spent together. We viewed this relationship to be similar to a practice effect. For those judges who had the most opportunity to observe their friend lying and possibly being caught telling lies, they were the more accurate. In our study, we did not ask participants how often they had caught their friends in a lie. Had we obtained this information, it may have been possible to account for additional variance in accuracy rates. We would expect that judges with direct experience discovering a friend’s lying would be better at lie detection than judges without direct experience discovering a friend’s lying.

We acknowledge that the content of the verbal statements collected in the lie detection study can be viewed as neutral when compared to the types of verbal statements under scrutiny in criminal investigations. The neutrality of the stories was unlikely to evoke in story judges the type of psychological stress associated with considering the possibility that a friend may be lying. Outside of the laboratory, when we consider the possibility that a friend might be lying, we may be psychologically resistant to concluding that a lie has been told. One may view this as a form of truth bias arising from close relations. We may readily believe a lie, if the truth would be inconsistent with our view of the person close to us or require us to accept an unpleasant reality. In this way, the failure to detect the lie may be not only related to poor lie-detecting ability, but also be a form of ego-protection. Certainly, more research on the psychological processes involved in lie detection and lie-detecting ability is warranted. Because law enforcement personnel rely on information obtained from family and friends of criminal suspects, understanding how personal relationships affect lie detection could ultimately lead to improvements in criminal investigations.

In sum, the present research clearly demonstrated that there is a general belief that one can detect lies told by someone close to them better than they can detect lies told by a stranger. We found some support for this view in correlational analyses involving accuracy, how often the storyteller lied in everyday life, and how much time the storyteller and story judge spent together each week; however, on average, story judges were not significantly more accurate judging stories told by friends than stories told by strangers. Future research investigating the extent to which personal relationships influence lie detection and perceptions of the veracity of verbal statements is warranted. In situations in which verbal statements contain content that the storyteller views as inconsistent with their perception of the storyteller’s character, having a personal relationship with the storyteller may impede rather than facilitate lie detection.

**References**


APPENDIX A

The following questions were used in Study 1 and the lie detection experiment. All questions were answered using a 7-point scale, with two anchor labels. The anchor labels are provided for each question.

1. I am a good liar. (1 = disagree, 7 = agree)
2. I am good at knowing when people I know well are lying. (1 = disagree, 7 = agree)
3. I am good at lying to people I know well. (1 = disagree, 7 = agree)
4. I am good at knowing when people I don’t know well are lying. (1 = disagree, 7 = agree)
5. I am good at lying to people I don’t know well. (1 = disagree, 7 = agree)
6. How often do you lie? (1 = very rarely, 7 = all the time)
7. Lying is wrong and should never happen. (1 = disagree, 7 = agree)
8. Lying is okay if it doesn’t hurt anyone. (1 = disagree, 7 = agree)
9. Lying is okay as long as you don’t get caught. (1 = disagree, 7 = agree)
10. I don’t have any problem with lying (1 = disagree, 7 = agree)
11. I believe people lie only in special circumstances. (1 = disagree, 7 = agree)
12. I believe people lie on rare occasions. (1 = disagree, 7 = agree)
13. I believe people lie somewhat frequently. (1 = disagree, 7 = agree)
14. I believe people lie all the time. (1 = disagree, 7 = agree)
## APPENDIX B

The following list of topics were used in the lie detection experiment. Participants were instructed to choose eight events that they had experienced and eight events that they had not experienced.

<table>
<thead>
<tr>
<th>Experienced</th>
<th>Not Experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Got in trouble for calling 911</td>
<td>Performed in a play</td>
</tr>
<tr>
<td>Ate an exotic food (snails, caviar)</td>
<td>Rode in a hot air balloon</td>
</tr>
<tr>
<td>Babysat kids</td>
<td>Rode in an airplane/helicopter</td>
</tr>
<tr>
<td>Baked a cake/pie</td>
<td>Rode in/drove a boat/jet ski</td>
</tr>
<tr>
<td>Bought something off an infomercial</td>
<td>Stole a candy bar/shoplifted</td>
</tr>
<tr>
<td>Broke a bone</td>
<td>Swallowed a goldfish</td>
</tr>
<tr>
<td>Cheated on a test</td>
<td>Visited the Grand Canyon/Eiffel Tower</td>
</tr>
<tr>
<td>Flew a kite</td>
<td>Was a camp counselor</td>
</tr>
<tr>
<td>Found money</td>
<td>Was a substitute teacher</td>
</tr>
<tr>
<td>Gave someone a haircut</td>
<td>Was stood up by a date</td>
</tr>
<tr>
<td>Got a massage</td>
<td>Went deep sea fishing</td>
</tr>
<tr>
<td>Got pulled from the water by a lifeguard</td>
<td>Went on a blind date</td>
</tr>
<tr>
<td>Got stuck at the top of a Ferris wheel</td>
<td>Went on a road trip</td>
</tr>
<tr>
<td>Had a stalker</td>
<td>Went to a black tie formal</td>
</tr>
<tr>
<td>Had acupuncture</td>
<td>Went to a Garth Brooks concert</td>
</tr>
<tr>
<td>Had an exotic or unusual pet (Lion, ferret, etc)</td>
<td>Went to a Halloween party dressed as a clown</td>
</tr>
<tr>
<td>Had to get braces</td>
<td>Went to a professional sports game</td>
</tr>
<tr>
<td>Had your palm read</td>
<td>Went to a rodeo</td>
</tr>
<tr>
<td>Had your wisdom teeth removed</td>
<td>Went to an oral surgeon</td>
</tr>
<tr>
<td>Jumped out of an airplane/gone bungee jumping</td>
<td>Went to Disney World/Land</td>
</tr>
<tr>
<td>Learned to play a new instrument</td>
<td>Were bitten by a snake</td>
</tr>
<tr>
<td>Lied on a resume</td>
<td>Were in a car accident caused by you</td>
</tr>
<tr>
<td>Lost a large sum of money</td>
<td>Won a stuffed animal at a carnival game</td>
</tr>
<tr>
<td>Participated in a parade</td>
<td>Worked as a janitor</td>
</tr>
<tr>
<td>Participated in a wedding</td>
<td>Worked as a lifeguard</td>
</tr>
</tbody>
</table>
APPENDIX C

Sample stories from lie detection study.

“I was given a pet this year from my brother for Christmas. He gave me a pink toed tarantula. It was the cutest thing I ever had, and I named it Bubblegum. Well, the problem with that is that Bubblegum, when it molted, died. So, my dad decides he’s going to put it in a casing so that I can have it as a paperweight on my desk. Well, the whole time we’re trying to put it in this paperweight, it keeps floating back up to the surface, and it’s feet keep poking out of the top. So, we decided we’re going to make a stronger mixture of this stuff, so that he can stay inside of the casing. Well, when we do that, we also had some left over so we had to make some other paperweights. The problem with that was that the paperweight, it got ... uhh ... it got attached to the inside of the plastic molding, and it was the only one that got attached, and it got cracked so the spider is like half hanging out of the paperweight and half in it. But that was the most unusual pet I had, but then my brother bought me another one because he felt bad cause it died, so I have another pink toed tarantula now.”

“Well, before I lived in Oklahoma, I lived in California, and on our way out here, we decided we were going to make it into like a little family vacation type thing. So when we were driving to move out here we stopped at the Grand Canyon to go visit it. It was one of the most beautiful places I’ve ever been to. It was huge, but I really wanted to ride a donkey down to the bottom of it, so I could go on the white water rapid thing. You have to like ride the donkey down to the bottom, because if you don’t you have no way of getting down there. So, we rode it all the way down to the bottom and when we got to the bottom, my brother fell off the donkey. So we get into the white water raft, and they’re trying to teach us how to ride in the white water raft down this river. Well, my dad decides that it would be a good idea for him to paddle the boat, which was a really bad idea. so needless to say, he flipped it, and we ended up soaked.

Note: The first column story is true. The second column story is a lie.
Sharing is often thought of as the act of giving an object to someone else either permanently or for a finite amount of time (Eisenberg, 1992). Few investigations have examined children’s perceptions of sharing directly. However, children’s self-reports may facilitate investigation of their reasoning for why they or others share. Children may share because perspective-taking fosters empathic concern about others’ feelings or desires. Alternatively, children may be motivated to share because of an expectation of receiving something in return. At some ages, children may share because an authority figure urged them to share. Children may also share simply because someone previously shared with them. The present study investigated the motivations school-age children provided for sharing.

Observational approaches are a common strategy for studying children’s sharing behaviors (e.g., Eisenberg-Berg & Neal, 1979). However, researchers who employ this approach usually fail to use self-report in addition to their observational methods (e.g., Hay, Caplan, Castle, & Stimson, 1991; Ioannidou-Dumont, 1986). Contrastingly, some have used self-report as the only means to get a closer look at children’s sharing behaviors (e.g., Batson, Fultz, Schoenrade, & Paduano, 1987; Eisenberg, Miller, Shell, McNalley, & Shea, 1991; Kim, 1998). An example is Kim (1998) who studied Korean first-, third- and fifth-graders’ concepts of authority and moral reasoning. Children were given stories about potential moral events that occurred at school (e.g., sharing candy). In interviews, children were presented with pairs of different authority figures, each of whom gave a hypothetical directive for what they should do in a situation. Children selected the authority figure whose instruction they would follow and provided justifications for their answer. Overall, children provided three types of justifications: authority-based, act orientations (i.e., the child shared the candy because it was a good thing to do), and authority combined with act orientations. Results showed some age differences, but no gender differences. Notably, fifth graders used authority justifications.

**The Effects of Grade and Sharing Cost on Children’s Perceptions of Sharing**

This study examined first (n = 30) and fourth graders’ (n = 30) perceptions about sharing. All children heard a vignette in which their friends shared. Half of the children heard a vignette in which sharing posed a high cost (HC), and the remainder heard one in which their friend had a low cost (LC). Afterward, children answered questions regarding sharing motives and their feelings. Children then heard a vignette in which they shared and answered similar questions. Lastly, they made a moral judgment about a nonsharing friend. Results showed that fourth graders perceived sharing as harder for their friends than did first graders. Additionally, children who heard the HC vignette reported it was less okay for their friends not to share than children who heard the LC vignette.

**Author Note.** The authors would like to thank Accalia Kusto for her data analysis advice, and the principals, teachers, and students who participated in this study.

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*Faculty supervisor
motives combined with act orientations more than did first or third graders.

Studies also examine sharing by children with their friends. Their motivations for sharing with their friends may be different than motivations for sharing with others (e.g., siblings or strangers). Berndt (1981), for example, interviewed first and fourth graders about their willingness to share with and/or help a friend with four different scenarios. After each story, the children were asked if they would share, for how long, and what they would do if their friends asked them to share. Consistent with previous research, more fourth graders than first graders reported that they would share with their friends and also refused less often to share than did first graders. Berndt’s study further underscores age differences in children’s explanations regarding sharing. However, Berndt failed to consider how much the children shared and its role on how participants would perceive sharers’ motivations and feelings. Therefore, the researchers in the present study manipulated the amount that the children had shared with them. The children were put into one of two groups (a) high cost and (c) low cost. High cost means children who shared with participants suffered a high cost because they shared the majority of their candy. Conversely, low cost means that children who shared with the participants suffered a low cost because they shared a small amount of their candy.

**Statement of the Problem**

The current study extended previous studies by examining first- and fourth-graders’ perceptions of their own as well as their friends’ motivations and feelings for sharing. One aim was to describe any overarching themes in children’s motivations for sharing. Two sets of hypotheses examined children’s perceptions: (a) when the children’s friends were sharers and (b) when the children were sharers. A final hypothesis addressed children’s judgments about not sharing. The researcher did not take gender into consideration because previous research about sharing failed to find any gender differences (e.g., Eisenberg-Berg & Neal, 1979; Kim, 1998).

**Friend as Sharer**

(1) There would be no significant age or cost differences in the feelings or motives children attributed to themselves or to sharers when they were recipients of their friend’s sharing.

(2) First graders overall would perceive sharing as easier for their friends than would fourth graders. Furthermore, fourth graders in the high-cost group (HCG) would perceive sharing as less easy for their friends than would the fourth graders in the low-cost group (LCG).

**Child as Sharer**

(1) When the roles were reversed, and participants became sharers, children in the HCGs were expected to report sharing more than would children in the LCGs.

(2) It is anticipated that in the high-cost condition, older children would attribute more positive feelings to themselves and to their friends than would younger children. This was thought because in the HCG where children are sharing a larger amount of candy, older children are perceived by the present researchers to focus on the intrinsic reward; therefore, would be proud for doing something that was difficult, but nice, for their friends. However, the younger children would focus more on the extrinsic factors of giving away something that they really wanted instead of looking at the gesture that was made to their friends. This claim, for example, is supported by Piaget (1932/1965) who focused on moral development. He said that younger children, who have not yet developed autonomous morality do not understand fairness, equality, or the perspectives of others. Therefore younger children may focus more on the idea of giving away something that they are fond of rather than on how their friends might feel. The children may, therefore, think that their friends’ thoughts do not differ from their own.

3) Overall, sharing would be perceived as easier by children in the LCG than in the HCG. Moreover, fourth grade children in the HCG would report sharing as less hard to do than would younger children in the same group.

**Not Sharing**

First graders, overall, and fourth graders in the low-cost condition were predicted to judge not sharing to be less acceptable than would fourth graders in the high-cost condition.

**Method**

**Participants**

The participants for this study were children attending one of two parochial schools located in a midsize suburban Midwestern city. The sample included 60 children: 83.3% White, 8.33% Hispanic, 6.71% African American, and 1.66% Native American. The children were solicited through the schools and were in the first (age \( M = 7.05, SD = .58 \)) and fourth grades (age \( M = 9.96, SD = .61 \)). Parents were asked to complete a permission form and a short demographic questionnaire ahead of time.
Interview

The purpose of the interview was used to establish the child’s view about how right it is to share. Therefore, one of the questions that the interviewer asked the child was if there were no rule about sharing and the child did not want to share, how it would be okay for the child not to share (moral question). Additionally, three vignettes were designed specifically for this study: high cost, low cost, and reciprocity. High cost meant that there was a high cost to the friend who shared. The high-cost vignette told the story of a friend who had four tootsie rolls and the child shared three tootsie rolls. Low cost meant that there was a low cost to the friend who shared. The low-cost vignette told the story of a friend who had four tootsie rolls and who shared one tootsie roll. Half of the children in each age group received the low-cost vignette. Finally all children heard a reciprocity vignette. The final vignette was a reciprocity vignette. It told the story of a child (the participant) given three cookies for dessert at lunch. At lunch, the child’s friend does not have any cookies. This was a reciprocity vignette because after hearing the vignettes in which the child shared with him/her, now the participant was given the chance to decide how much (if any) to share back. (See Appendix A for sample vignettes).

Procedure

Before data collection began, the first author briefly visited the classrooms to get acquainted. The experimenter returned to the schools 2 weeks later to conduct data collection for those children whose parents returned a signed consent form. Children were tested individually in a classroom away from other students. Before starting the formal interview, each child was asked to think of the first name of a close friend in the class and to think about this friend when answering the questions. The researchers thought that this would make the child more able to answer the questions if he/she were thinking of a real person rather than someone fictitious.

The formal interview consisted of three parts. First, the researcher read a short vignette to the children. All children heard a vignette in which their friends shared with them. Half of the children in each age group heard the vignette in which sharing posed a high cost to their friend. The remaining children heard a vignette in which there was a low cost for sharing with their friend. The child first answered the question, “why their friend should share”. Children’s verbal responses were recorded by the experimenter and were later coded into three categories by two independent coders (percent agreement was .88). The final categories were: friendship, being nice, or miscellaneous (i.e., don’t know, authority, reciprocity). Then children answered three more questions: (a) their feelings about their friend sharing (b) how their friends would feel about sharing, and (c) how easy or hard it would be for their friend to share. The children answered questions using a child-friendly 4-point Likert scale, designed by the first author, using cartoon faces ranging from really happy to really sad. Another scale was used for the easy or hard question that was also another child-friendly 4-point Likert scale, designed by the first author, using thumbs ranging from really hard (two thumbs down) to really easy (two thumbs up; see Appendix B). After each answer, children provided reasons for the answers that they chose.

In the second part of the interview, children heard a different vignette in which they become potential sharers and were asked if they would share or not, and if so, how much. Children then were asked four similar questions about their motives and feelings about sharing. Third, children described rules for sharing at their school, and then made a moral judgment about their friends not sharing.

Results

First, a chi-square test for independence was performed to compare grade by type of motive (what reason the children attributed to their friends for sharing). The results indicated that there were no significant grade or motive differences. Another chi-square test for independence was used to assess cost (high or low) by type of motive. The results also indicated there were no significant differences. Despite the fact that the results revealed no significant differences, it was interesting to note that more friendship answers were attributed by children in the low-cost group than in the high-cost group. Furthermore, more being nice answers were attributed by children in the high-cost group than children in the low-cost group (See Table 1).

| TABLE 1 |
|---|---|---|
| **Frequencies for Motives by Cost** | Cost |
| | Low | High | Total |
| Motives | | | |
| Being nice | 10 | 19 | 29 |
| Friendship | 12 | 8 | 20 |
| Other | 8 | 3 | 11 |
| Total | 30 | 30 | 60 |
Friend/Child as Sharer

For the set of questions in which the friend was the sharer, separate 2 (grade) X (cost) Analysis of Variance (ANOVA) assessed the effects of grade (first or fourth) and type of cost (high or low) on the responses to each question that was asked. For the question about the feelings of the children in relation to the friends sharing, the results indicated there was a significant main effect for age, $F(1, 56) = 4.35$, $p = .04$, such that the fourth graders in the high-cost group reported sharing would be more difficult for friends than the first graders. There were no interactions. The results revealed no significant grade or cost differences or interactions for the remainder of the questions in which the friends were sharers (see Table 2). For the set of questions in which the children were sharers, a 2 (grade) X 2 (cost) ANOVA revealed no significant main effects or interactions for any of the four questions (see Table 2).

Moral Question

For the moral question asking how ok (or not ok) would it be for the friends to keep all of the tootsie rolls, the results from another 2 (grade) X 2 (cost) ANOVA revealed a significant main effect for cost, $F(1,56) = 7.29$, $p = .01$, such that the children in the high-cost group reported that it would be less okay for their friends to keep all of the candy ($M = 2.90$, $SD = .68$) than the children in the low-cost group reported ($M = 3.00$, $SD = .73$; see Table 2).

Discussion

The results suggested a trend such that, overall, the low-cost group responded with more “friendship” answers and the high cost responded with more “being nice” answers. Therefore, the participants could have looked at the amount of candy being shared as a method of perceiving their friends’ motive for sharing. The researchers were surprised by this finding. Although this finding was not statistically significant, if one was to increase the sample size, it is anticipated that this finding would be significant.

It was expected that there would be no significant age or cost differences in the feelings children attributed to themselves as the recipient of their friends’ sharing. For the question “if your friend shared this way how would you feel”, the data revealed that the first grade children answered differently than the fourth graders. Specifically, the researchers explain these findings as at different ages children could perceive the motives of people differently. Though when it came to them sharing with other friends, and how their friends would feel about being shared with, there were no differences in response. This finding can be interpreted that children at all ages can give reasons for why they share and have the ability to take the per-

**TABLE 2**

<table>
<thead>
<tr>
<th></th>
<th>1st Grade</th>
<th>4th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low cost</td>
<td>High cost</td>
</tr>
<tr>
<td></td>
<td>$M$ ($SD$)</td>
<td>$M$ ($SD$)</td>
</tr>
<tr>
<td>Friend as sharer*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s feelings</td>
<td>3.07 (.70)</td>
<td>3.00 (.93)</td>
</tr>
<tr>
<td>Friend’s feelings</td>
<td>3.00 (1.00)</td>
<td>2.93 (1.03)</td>
</tr>
<tr>
<td>Friend’s ease</td>
<td>2.73 (1.10)</td>
<td>2.60 (1.18)</td>
</tr>
<tr>
<td>Child as sharer*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharing cookies</td>
<td>2.93 (.80)</td>
<td>3.00 (.66)</td>
</tr>
<tr>
<td>Child’s feelings</td>
<td>3.67 (.82)</td>
<td>3.53 (.64)</td>
</tr>
<tr>
<td>Friend’s feelings</td>
<td>3.00 (1.10)</td>
<td>3.20 (.86)</td>
</tr>
<tr>
<td>Child’s ease</td>
<td>3.87 (.35)</td>
<td>3.80 (.41)</td>
</tr>
<tr>
<td>Moral question**</td>
<td>3.60 (.51)</td>
<td>3.20 (.78)</td>
</tr>
</tbody>
</table>

* Children responded using 4-point Likert scales with 1 being the lowest answer and 4 being the highest.

** Children responded using a 4-point Likert scale with 1 being the highest and 4 being the lowest.
spective of others. But when it comes to situations that involve themselves in relation to others, younger children may still have difficulty taking the perspectives of others.

Also, there were no differences found in the feelings that the children attributed to themselves if they were the person sharing, or how easy or hard it would be for them to share. This can be interpreted that children at these ages think that in order for them to share that it must be easy for them and they must have positive emotions about themselves.

It was predicted that first graders, overall, and fourth graders in the low-cost condition, would judge not sharing to be less acceptable than would fourth graders in the high-cost condition. There was a significant main effect for cost with the moral question. Overall the children in the low-cost group attributed not sharing as less okay than the high-cost. However, the data conveys that first graders, overall, and fourth graders in the high-cost condition judged sharing to be more unacceptable than the fourth graders in the low-cost condition. By looking at the reasons the first-grade and fourth-grade children in the high-cost group provided for why they chose their particular answer, we found that they thought that not receiving any candy was unfair. More specifically, if their friends gave them more candy in the previous story, and then decided not to share it with them, the children decided that it was less okay for their friends to keep the candy than the children that did not get that much candy to begin with. This was an interesting finding to note.

**Limitations of the Present Study and Implications for Future Research**

One limitation of the present study is that children may have given answers that they thought were socially desirable rather than their true answer. This possibility could be tested simply by after interviewing the children, observing them at lunch or during playtime to see if what they said in the interview was consistent with what they really do. Furthermore during assent, the children were told that they were going to talk about sharing; perhaps this primed them to respond in certain ways. This could be controlled for by telling the children that they were going to talk about classmates instead of sharing or friendship. Another possible limitation is that some children may not find the items shared in the vignettes as desirable.

Future researchers could ask each child what their favorite candy is and use that in the vignette. Like all studies using Likert-type scales, it was found that sometimes the children wanted to pick another answer that was not available (i.e., a little happy and a little sad). Future researchers could add another cartoon face option to the Likert-types scales to help alleviate this problem.

Future research could look at other age groups and compare their answers to the answers given by the first and fourth graders in this study. The children sometimes expressed that the situations in the vignettes were not fair; however, the researcher did not follow-up with an additional question assessing their reasoning. Therefore, it would be interesting to ask a question about the fairness of sharing and to compare different ages and cost groups. Being that this interview was written for the purpose of this study, future researchers could help to validate and edit this measure and over time it could be used for future studies on perceptions of children in regards to sharing.

In conclusion, this study assessed how perspective taking abilities of children in regards to sharing. This study is important because if teachers and parents know how their children think (in regards to focusing on intrinsic or extrinsic factors), parents and teachers could be better able to teach children about sharing.

**References**


CHILDREN ON SHARING □  Lickenbrock and Kuebli

APPENDIX A

Sample Vignettes

High-Cost Vignette:
Imagine one day your friend comes to school with four tootsie rolls. And you really like tootsie rolls. Your friend gives you three tootsie rolls. So she/he had one left for him/herself.

Low-Cost Vignette:
Imagine one day your friend comes to school with four tootsie rolls. And you really like tootsie rolls. Your friend gives you one tootsie roll. So she had three for herself.

Reciprocity Vignette:
Now imagine one more thing. The next day your mom gave you 3 cookies for dessert with your lunch. That day your same friend doesn’t have any dessert with her/ his lunch.

Moral Vignette:
Imagine for a minute that there was no rule for sharing at your school. And your friend didn’t want to share with you. How ok (or not ok) would it be for your friend to keep all of the tootsie rolls for his/herself?

APPENDIX B

Samples of Likert Scales used in interview

Really Sad     A Little Sad    A Little Happy          Really Happy

Really Hard      A Little Hard       A Little Easy                    Really Easy

Really Okay         Okay        Not Okay   Really Not Okay
The tendency to behave in ways that comply with social norms that are contrary to one’s private beliefs is known as conformity. The most widely known studies of conformity are Asch’s (1951, 1957) experiments involving line judgment tasks. Asch’s research involved a naïve participant choosing one of three lines to which the stimulus line was closest in length. In the classic condition, three confederates answered uniformly and incorrectly. Asch found that 76% of the participants conformed at least once to the situation and indicated later that they had actually believed the line to be a different length than the expressed answer. Asch’s findings highlighted the extent to which the desire to be liked by strangers overpowered the need to right. Since that time, social psychologists have been trying empirically to understand the conditions that promote conformity and the reasons behind conforming behaviors.

Whether it is the role of citizens in promoting genocide or a college student succumbing to the peer pressure to drink too much at a party, the issue of conformity is important in understanding why people act as they do. Conformity has traditionally been studied in relationship to situational variables; however, personality or dispositional factors also play a role. Situational factors, such as the presence of an authority figure, are those that can be predicted from characteristics of a given situation; whereas dispositional attributes are internal states which produce consistency across situations (Moos, 1969). Situational factors associated with higher conformity include reduced accountability for actions (Quinn & Schlenker, 2002), group size (Asch, 1955), and difficulty of task (Baron, Vandello & Brunsman, 1996). A variety of dispositional attributes have also been shown to be associated with high conformity including low self-esteem (Berkowitz & Lundy, 1957), high authoritarianism (Altemeyer, 1988; Feldman, 2003), low social class (Fontaine, 1991), and being a woman (Rudman & Fairchild, 2004).

A dispositional factor of interest to the study of conformity is self-monitoring. Self-monitoring is an internal state combining self-observation and self-con...
trol. By processing certain self-related information, people try to control the attributions and impressions others form of them; therefore, self-monitoring is related to self-presentation (Renner, Laux, Schütz, & Tedeschi, 2004). Individuals use their perceptions of how others view them as guidelines for their behavior in certain situations. Snyder (1974) contended that self-monitoring is influenced by one’s external cues as to what is socially appropriate. The level of self-monitoring a person displays has to do with how aware of a situation they are, and the extent to which they change their behavior in accordance to their awareness of certain situations. Traditionally, self-monitoring has been assessed by the use of self-report Likert-type scales that allow researchers to differentiate between high and low self-monitors.

Low self-monitors tend to guide their behavioral choices on the basis of relevant internal states such as values, feelings, and dispositions. They are concerned that their behaviors accurately reflect their internal states (DeBono, 1987). The self-presentation and expressive behavior of low self-monitors seems to be controlled from within, rather than monitored and altered to fit a given situation (Snyder, 1974). Low self-monitors react positively to situations in which they have the opportunity to express their underlying beliefs and values (Snyder & DeBono, 1985). The demands of social situations generally do not motivate them to change their behavior (Brown, White & Gerstein, 1989).

High self-monitors are more likely to control their self-presentation and expressive behavior (Snyder, 1974). Individuals who are considered to be high self-monitors may be more skillful at using the expression and self-presentation of others in social situations as guidelines for their own behavior. Snyder and Swann (1976) and Snyder and Tanke (1976) found data suggesting that people who are considered to be high self-monitors can tolerate greater inconsistency between their behaviors and their attitudes than people who are considered to be low self-monitors. Correspondingly, individuals with high concern for appropriateness would modify their behaviors to be in accordance with what they think are the social norms. High self-monitors are more likely to vary their behavior in response to situational changes than are low self-monitors (Ickes & Barnes, 1977). High self-monitors should be more likely to display a higher level of conformity than individuals who are considered to be low self-monitors. Although the relationship between self-monitoring and conformity behavior is plausible, very little empirical research on the topic exists. In the literature review for this study, the closest empirical examination of self-monitoring and “conformity” measured attitude change rather than conformity but did focus on the underlying motivation of impression management. Chen, Schechter, and Chaiken (1996) found that high self-monitors showed more attitude change motivated by impression management than did low self-monitors. The current study applies self-monitoring theory more directly to a behavioral conformity situation.

Measuring Conformity

There are two common ways conformity is measured: self-report and behavioral observations. Observational research involves the creation of a conformity situation where participants’ actual behavior in the situation is observed and measured. The Asch studies (1951, 1957) are classic examples of laboratory based conformity situations. Measuring actual conformity is time consuming for researchers and involves the use of confederates. In more recent years, researchers have utilized computers to simulate conformity situations (Lee, 2006; Lee & Nass, 2002; Sassenberg & Boos, 2003). In Lee and Nass’s study, participants were led to believe that they would be interacting with other participants via a computer. After reading hypothetical situations on a computer screen, they were asked to make a decision after they saw that the other “participants” all chose the same answer.

Given the demands of measuring conformity in the laboratory, researchers have also attempted to measure conformity via more traditional attitudinal or personality-type scales comprised of items to which participants indicate how much the item captures their beliefs or propensities (Goldsmith, et al., 2005; Levine, 2004; Rudman & Fairchild, 2004). Goldsmith, et al. used a 7-point semantic differential format to present bipolar adjectives such as compliant-defiant, inflexible-adapting, and differing-concurring to measure one’s tendency to conform. Finally, another form of self-reported conformity prompts participants to reveal how they might react to the conformity situations as indicated in written scenario (e.g., Berndt, 1979). The predictive validity of these measures (scales or self-report) to behavioral conformity has not been determined.

Actual levels of conformity tend to be much higher in behavioral measures than in self-reports. Given the high premium placed on independence as a desired trait in the United States (Hsu, 1985), participants wishing to present themselves in a positive manner would be less likely to report that they would conform. In addition, both experts and laypeople underestimate the power of situational variables. One of the best known examples of how self-reports may be inac-
acurately was noticed in Milgram’s (1963) study of obedience. Participants were told to administer electrical shocks to confederates disguised as fellow participants. Despite demands from the confederates to stop the shocks, the participants were encouraged by the researcher to continue with the experiment. Milgram asked psychiatrists, college students, and middle class adults how they would behave in the situation and how they thought other people would behave in the same situation. Psychiatrists predicted that only 1 out of a 1,000 people would go all the way to 450 volts, which was past the “Danger: Severe” level. However, in Milgram’s study, 65% of the participants actually went all the way (Milgram). The degree of conformity was greatly underestimated by those asked to predict the behavior of others because they relied on dispositional explanations rather than situational variables.

The current study explored the relationship between self-monitoring, self-reported conformity, and a behavioral measure of conformity. We expected to find a positive correlation between self-monitoring and self-reported conformity. We also expected to find only a moderate relationship between self-reported conformity and behavioral conformity. Finally, we expected to find that high self-monitors were more likely to conform than were low self-monitors in a behavioral conformity situation.

**Method**

**Participants**

Thirty-one female, White undergraduate students (age 18–22, \( M = 19, SD = 1.04 \)) enrolled in an introductory psychology course at a mid-sized public Midwestern university received extra-credit for their participation in this study. Given prior research indicating gender differences in conformity, we solicited only female participants. It would have been difficult to secure a sample large enough to have sufficient power to detect gender differences. Participants were selected on the basis of their scores on the Lennox and Wolfe (1984) Revised Self-Monitoring Scale (RSMS) administered in an initial testing of 93 female participants. We performed a tertiary split on the RSMS scores to yield groups of high and low self-monitors resulting in 37 participants, 31 of whom were able to complete the study. The 6 participants who did not complete the behavioral component of the study declined due to time pressures and did not differ in the basic demographic information from the 31 who did complete the study. Eighteen participants were classified as low self-monitors (\( M = 35.83, SD = 3.00, \) range 28–39); whereas 13 participants were classified as high self-monitors (\( M = 50.00, SD = 2.45, \) range 47–55).

**Materials**

At the initial testing, all participants completed a questionnaire that included several measures including the RSMS and two measures designed by the authors: a self-report measure of conformity and six behavioral vignettes. Several other measures were included to mask the purpose of the study. The RSMS consists of 13 items measured on a 6-point Likert-type scale. Seven of these items represent Ability to Modify Self-Presentation, which includes statements such as “I have the ability to control the way I come across to people, depending on the impression I wish to give them.” The other six items represent Sensitivity to the Expressive Behaviors of Others. These items include statements such as “I can usually tell when I’ve said something inappropriate by reading it in the listener’s eyes.” In past research, the RSMS has been found to be reliable and valid (Bearden, 1999; Shuptrine, Bearden, & Teel, 1990). For the final sample of 31 participants in this study, alpha = .87.

The self-report measure of conformity was a nine-item scale designed by the study’s authors with the intent of measuring how likely the participants would be to conform in hypothetical situations. The nine scenarios included an even distribution of prosocial, neutral, and antisocial conformity situations (range 14–55; \( M = 25; SD = 7.00 \)). Scores for each participant were added up to calculate a total self-report conformity score. Participants were asked to indicate what they would do in a given situation and how certain they were of their decision based on a 6-point Likert-type scale. The following are two examples from the self-report conformity scale.

You are with a group of your friends, and you are all trying to decide what to do this weekend. All of your friends really want to go and see the new horror movie that just came out. You do not like horror movies and would prefer to see something else. You tell your friends you want to see something else, but they tell you they really want to go see the horror movie. What do you do? Response choice was 1 (Definitely go to the movie) to 6 (Definitely not go to the movie.)

You are sitting in class on the first day with three other friends when a person in your cube of your dorm comes and sits next to you. Your friends do not like this person and start teasing this person right away. You kind of like this...
Participants were then asked if they would choose to "Study for the exam." or "Take the Minneapolis job." and all of the participants selected "Take the Minneapolis job."

Dan’s birthday is next week. His friends and he have a tradition where they all go out to eat for each other’s birthdays, and whoever has the birthday gets to pick the restaurant. Dan hasn’t been to his favorite restaurant in a long time, and he has really been looking forward to it. However, it is not the cheapest place he could pick. One of his friends has been having a rough time this year financially, and he knows it would be a struggle for that friend to be able to come and pay for his meal. Dan would have no problem paying for his friend’s meal, but he is afraid of embarrassing him by offering. Should Dan pick the more expensive restaurant and offer to pay for his friend’s meal, but risk embarrassing him, or should he pick a different restaurant that he doesn’t like as much?

Participants were then asked if they would "Pick the expensive restaurant" or "Pick a less expensive restaurant" and all of the participants selected "Pick a less expensive restaurant."

Procedure

At the end of this semester, Ashley will be graduating with a degree in business administration. She has spent the past 8 weeks searching and applying for jobs. After several interviews, she finally got a job offer in Minneapolis. The company is prepared to offer her a competitive salary with excellent benefits and a month’s worth of paid vacation. However, since Ashley is from the Milwaukee area, if she took the job it would mean moving away from family and friends. Her grandma is 91 years old, and has recently suffered a massive stroke. Her mom tells Ashley that her grandma might not be around for much longer. Although this news is upsetting, Ashley was never very close with her grandma. Ashley’s mother can get her a job at her firm, but it is 60% of the pay of the other job with little chance of advancement. Should Ashley take the job offer in Minneapolis, or should she move back home to Milwaukee in order to spend more time with her grandmother before she dies?

Participants were then asked if they would "See Jordan" or "Study for the exam" and all of the participants selected "Study for the exam."

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Thank you for coming back to complete the second part of this study, which measures decision-making processes in group situations. We will have you read a series of vignettes. After each vignette, we would like to hear your decision about what you would do in the given situation. When stating your decision, please choose from one of the two options instead of giving your own alternative. At the end, we will ask you to rate this experience.

The vignettes were then handed out individually on notecards. After everyone finished reading the vignette, the researcher pointed to the first confederate and said “How about you start. Please tell us what you chose and we can just continue in a circle.” The researchers always made sure that the participant would be the last to answer. The first vignette was new (the participant had not seen it in the previous questionnaire), and the three confederates split their responses such that two of them answered one way and one gave the opposite answer. The next three vignettes were those from the initial questionnaire that had yielded uniform responses and, for which, participant responses were known. On each of these three vignettes, the confederates all answered the opposite of what the participant had indicated in their questionnaire packet. To help disguise the purpose of the study, the last two vignettes were also new, and, once again, the confederates split their answers. At the end of the experiment, the researcher said “Thank you very much for your cooperation. The results and a debriefing statement will be emailed to you once all of our data has been collected. Thanks and have a good night!”

The researchers led each group out a back door so as not to meet any future participants who might be waiting.

Results

The level of conformity was computed in two ways. Any participant who conformed at least once in the three trials where the confederates answered uniformly in the direction opposite the participant’s original answer was considered to have conformed. Secondly, the number of times a participant conformed was computed. Overall, 61% of participants conformed at least once, whereas 39% never conformed. Of those who conformed, 53% conformed once, 37% conformed twice, and 10% conformed three times.

Our hypothesis that self-monitoring would be positively related to self-reported conformity was also not supported. For the initial larger sample $r(93) = .01$, ns, and for the final sample of high and low self-monitoring $r(31) = .03$, ns. Our hypothesis that there would be a moderate positive relationship between actual conformity and self-reported conformity was also not supported $r(31) = .09$, ns. Finally, our hypothesis that self-monitoring would be related to behavioral conformity was supported. Self-monitoring was positively related to behavior conformity $r(31) = .45$, $p < .01$. Low self-monitors ($n = 18$) conformed an average of .61 times, $SD = .85$; whereas high self-monitors ($n = 13$) conformed an average of 1.46, $SD = .88$, $F(30, 1) = 7.36$, $p < .01$. In a related finding, a higher percentage of high self-monitors conformed than did low self-monitors (see Table 1), $X^2 = 5.13; p < .05$. Figure 1 displays the correlations among the three major variables.

Discussion

Our hypothesis that a positive relationship between self-monitoring and behavioral conformity exists was supported. High self-monitors were more likely to conform than were low self-monitors. This finding provides support for the theory that dispositional traits such as self-monitoring can affect conformity in actual situations. We presume that the behavior of the high self-monitors in our behavioral conformity was affected by a higher concern with what others would think of them than was the behavior of the low self-monitors. One aspect of self-monitoring relates to individuals using their perceptions of what others think of them as guidelines for their own behavior in certain situations (Snyder, 1974). Therefore, high self-monitors should be more likely to change their expressed beliefs in direct relation to the behavior of others. Because low self-monitors are not as willing to change their behavior in accordance with how others view them, they should not be as likely to go against their original views in order to agree with the group.

Our results did not support the hypothesis that there would be a positive correlation between self-monitoring and self-reported conformity. Perhaps the trait of self-monitoring is more evident in situations with an external cue, such as the physical presence of others, than in written scenarios where the presence of others is merely hypothetical. Another possible

<table>
<thead>
<tr>
<th>Percentages of Self-Monitors Who Conformed at Least Once</th>
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<tbody>
<tr>
<td>Conformity</td>
</tr>
<tr>
<td>High Self-Monitors ($n = 13$)</td>
</tr>
<tr>
<td>Low Self-Monitors ($n = 18$)</td>
</tr>
</tbody>
</table>
Correlations among self-monitoring, self-reported conformity, and behavioral conformity.

\[ r = 0.03, \text{ns} \]

\[ r = 0.45, p < 0.01 \]

\[ r = 0.09, \text{ns} \]

Explanation for the non-significant finding is that individuals may not be as aware of their self-monitoring behavior until they are in a situation involving others. If high self-monitors are not aware of their tendencies to monitor their own behavior, they would be unlikely to correctly determine their actions in a given situation. However, the authors have significant concerns regarding our scale’s ability to reliably measure self-reported conformity. The reliability coefficient was very low (.14) and the correlation between self-reported and actual conformity was non-significant. Given the power of situational variables associated with conformity, it is possible that there is a very low probability of developing a valid and reliable self-report measure of conformity. Another factor that may play a role in the inaccurate self-report of conformity behavior is that independent behaviors are more desirable in an individualistic culture like the United States (Gardiner & Kosmitzki, 2005). Therefore, when self-reporting behaviors, high self-monitors may have opted for the more “socially desirable” choices of acting independent in the behavioral situation where the socially desirable outcome was to agree with the others. Overall, if it is possible, a reliable and valid measure of self-reported conformity would need to be developed in order to conduct further research on this topic.

This study includes some limitations that may have influenced the results. The major limitation is that our self-reported conformity scale was not proven to be reliable, with a Cronbach’s alpha of .14. The relationships between self-monitoring and self-reported conformity, and behavioral conformity and self-reported conformity, might have been significant given a reliable self-report measure. Because a period of 6 weeks lapsed between the initial questionnaire and the behavioral measure, it is possible that outside influences in the participants’ lives caused them to actually change their decisions in the behavioral vignettes. In this case, agreeing with the confederates would not be considered as conformity. However, these chance events should have been evenly distributed between high and low self-monitors. Finally, in order to more accurately generalize the findings of this study, additional studies should be conducted using larger, gender balanced, and more ethnically diverse samples.

This study utilized a traditional behavioral situation in order to measure the relationship of self-monitoring and conformity. The extent to which situational circumstances influence levels of conformity have been well established (Quinn & Schlenker, 2002; Asch, 1955; Baron, et al., 1996). Dispositional factors influence conformity to a lesser extent than situational factors; but also play a role. Our study provides strong behavioral evidence for a relationship between self-monitoring and conformity for women. Additional research on this topic with larger more diverse samples in terms of race, ethnicity, gender, and age across a wider variety of conformity situations should provide additional evidence that individuals who utilize perceptions of what others think of them as guidelines for their own behavior will be more likely to conform in many circumstances.

References


The amount of research on aggression in interpersonal relationships has significantly increased over the years. According to Dr. Stephen Franzoi, aggression is defined as, “any form of behavior that is intended to harm or injure some person, oneself or an object” (Franzoi, 2005, p.488). In terms of this definition, aggression can be both physical and verbal. Physical aggression, therefore, may include pushing, hitting, slapping, or any other methods used to physically harm another individual. Verbal aggression, in contrast, may include name-calling, threats, or verbal gestures that cause emotional or psychological harm to another. The use of both physical and verbal aggression in intimate or romantic relationships has become a problem in modern society. Current studies have investigated the growing epidemic of aggression, specifically aggression targeted against women. For example, research has found that between 7 and 20% of women in primary health care settings are receiving treatment for violence and aggression from intimate partners (Coker, Smith, McKeown, & King, 2000).

Of course, not all interpersonal conflict leads to aggression. However, once aggression enters a relationship, aggressive behaviors tend to remain stable over time. Studies have found that acts of psychological harm, often accomplished through verbal aggression, are predictors of future physical aggression (Murphy & O’Leary, 1989). If severe physical aggression is established between partners, evidence indicates that this aggressive cycle will continue with a greater chance that sexual coercion may occur (Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000). With such striking evidence at hand, it is imperative that these aggressive behaviors and tendencies are studied and identified in individuals. Such research is necessary to establish programs that can be developed to combat these behaviors and stabilize healthy relationships between romantic partners.

Society often assumes that aggression is more common among men in interpersonal relationships. In a

**Aggressive Behavior in Conflict Tactics and Sexual Experiences in Relationships**

Aggressive behavior within relationships has been a topic of much discussion and research in past decades. Research has found that a rise of conflict within relationships mirrors an increase of physically and verbally aggressive methods of conflict resolution. Also, once aggression enters a relationship, it is likely to escalate as the couple becomes more serious and committed. In studying college-aged heterosexual relationships at a variety of commitment levels, we hypothesized that men, typically stereotyped as more dominant and aggressive, engage in more physical aggression. In contrast, women were hypothesized to engage in more verbal aggression. However, results found the contrary. In this study, women were found to use more physical aggression than men. Also, it was found that couples involved in more committed relationships are more likely to use both physical and verbal aggression.

**Author Note.** Kirstin Noe and Cal Stoffel contributed equally to this paper. Dr. Debra Oswald was the faculty sponsor. This project was completed as part of an independent study at Marquette University under the supervision of Dr. Debra Oswald.

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*Faculty supervisor*
recent meta-analysis of gender differences in aggression, Archer (2000) explains that society has created two dominant viewpoints that researchers use when studying aggression in romantic relationships. On one hand, some believe that aggression is equally inflicted by both partners, which is contrasted by those who believe that women are more often the victim (Archer, 2000). Those who believe that aggression is more often inflicted by men may believe in the common societal generalization that men are more dominant and violent whereas women, on the other hand, are more passive and unthreatening. Although various studies have supported each viewpoint, Archer explains that it is important to keep in mind the theoretical basis of each study. For example, studies from researchers such as Claes and Rosenthal (1990), who studied the aggressive behaviors of male perpetrators, may approach the issue from the “female victim” standpoint. In this sense, research analyzing female victims will tend to lead to the conclusion that men are in fact more aggressive than women (Archer, 2000). In contrast, studies that investigate conflict models and aggression on behalf of both men and women may not conclude that men are significantly more aggressive than women. Archer’s (2000) meta-analysis studied many models of aggression and found, in fact, that men are not always more aggressive than women, which is contrary to popular assumption.

In fact, several studies have indicated that women engage in physical aggression in romantic relationships (Katz, Kuffel, & Coblentz, 2002). There are disagreements as to whether both male-initiated violence and female-initiated violence are equally prevalent or equally harmful in a relationship. Katz et al. (2002) found that men in relationships experience more moderate violence than do women. An example of moderate violence would be throwing something at a partner, rather than physically slapping or hitting him/her. This study, along with others, also found evidence that aggression between partners may be reciprocal (Archer, 2000). In other words, if one partner acts in an aggressive nature, both partners may be more likely to use aggression in conflict resolution. One previous study found that the longer a man is in a committed relationship, the more likely he is to use violence. Consequently, women may be likely to engage in violence in terms of self-defense (Stets & Pirog-Good, 1987). Similarly, a recent study by Schumacher and Leonard (2005) found that the presence of both verbal and physical aggression in committed relationships and marriages is a predictor of future aggression on the part of the aggressor, as well as retaliatory aggression on the part of the victim (Schumacher & Leonard, 2005). More specifically, physical aggression by the husband was a predictor of future aggression by the wife, but not vice-versa. This again suggests that a great deal of female aggression may be self-defensive in nature. However, the use of verbal aggression by both husband and wife predicted future use of verbal aggression in both partners.

Previous studies have analyzed the differences in satisfaction levels between men and women in romantic relationships. Katz et al. (2002) found that when aggression was present, women were more dissatisfied in relationships than are men. However, there were no significant differences in dissatisfaction levels when status and length of the relationships were analyzed. That is, when aggression existed in a relationship, women in committed relationships were just as dissatisfied as women in casual dating relationships (Katz et al.). Men, however, tend to be more satisfied than women in committed relationships (Katz et al.). This increased relationship satisfaction among men may be related to gender socialization. Studies have found empirical evidence that link patriarchal gender socialization and aggressive behaviors in relationships. For example, men who are socialized to believe that men are the dominant gender are more likely to use aggression and sexual coercion in relationships (Hill & Fischer, 2001). As a study by Gelles (1983) supports, men tend to use coercive sexual aggression in terms of maintaining control of a relationship. Typically, men feel they are socially powerful and may therefore use aggression as a method of demonstrating power in interpersonal relationships. Consistent with evidence that aggression is repetitive once it enters a relationship, a study by Ryan (1995) found that men who use verbal aggression tend to eventually engage in sexual aggression as well.

Although men engage in more sexually coercive aggression, women were more likely to engage in aggressive behaviors when solving everyday conflict with a partner (Hogben & Waterman, 2000). Yet, there is a notable difference between the coercion styles of men and women. Men, while being more sexually coercive, are more likely to use drugs or alcohol, thus making their partner unable to respond to coercive methods in trying to resist sexual activity. Women, on the other hand, rely on methods that are significantly less physically coercive while trying to reach conflict resolution (O’Sullivan, Byers & Finkelman, 1998). Such methods may include verbal threats, manipulation by sulking, and persistent arguing.

In a meta-analysis of aggression between partners, Archer (2000) found that when measures of aggression were based on specific acts, women were more likely to use physical aggression towards their partners than men. For example, the Conflict Tactics Scale asks
respondents to indicate the frequency of specific acts, such as: swearing, stomping out of a room, kicking, pushing or choking a partner, etc. However, when aggression was defined in terms of the visible consequences, such as bruises, men were more likely than women to use physical aggression (Archer, 2000). The results of Archer’s study may be due to the fact that men are usually bigger than women and therefore more likely to create visible images of this aggression in terms of marks, bruises, or cuts. It is important to note, however, that the effect sizes were small for each of the results found in Archer’s study, which illustrates the need for further investigation in this area.

It is evident that any type of aggression is dangerous in a relationship. Aggression creates a harmful cycle—once aggression has entered a relationship, it is likely to return in different forms, such as sexual coercion. This study will aim to review the conflict tactics used by individuals in a relationship in terms of verbal and physical aggression. Furthermore, verbal and physical aggression will be analyzed in terms of how they are both used in methods of sexual coercion. Based on evidence from past studies, we hypothesize that men, compared to women, will engage in more physical aggression in both conflict tactics and sexual coercion. Secondly, we hypothesize that women, in comparison to men, will engage in more verbal aggression in both conflict tactics and sexual coercion. Also, with respect to relationship status, we hypothesize that those couples involved in committed relationships or marriage will illustrate a higher level of aggressive conflict tactics and sexual coercion than couples of lower commitment.

Method

Participants

There were 423 participants in this study: 276 (65.2%) were women and 147 (34.8%) were men ranging from the ages of 17 to 43 (M = 19.63). Of the participants, 363 (85%) were White, 14 (3.3%) Hispanic, 13 (3.1%) Asian American, and 12 (2%) African-American. In terms of relationship status, 24 (5.6%) were married, 168 (39.4%) dating exclusively, 87 (20.4%) dating casually, and 140 (32.9%) single.

Measures

Conflict Tactics Scale (CTS). Straus (1979) developed this scale in order to measure different conflict tactics used by couples. In his studies, Straus reported a reliability of .79–.80 for verbal aggression and .82–.83 for physical (violent) aggression. The scale was divided into four subsets—reason in conflict resolution, hostile refusal to communicate, verbal abuse, and violence. However, given the goal of our study to examine verbal and physical aggression, the scale was divided into verbal (e.g., did or said something to spite my partner) and physical (e.g., threw something at my partner) aggression tactics. The answer scale distinguished responses by the number of times a participant had engaged in those acts in the past twelve months (0 = Never to 6 = More than 20 times). Means were computed for each of the subscales.

Sexual Experiences Survey (SES). Experience using both verbal and physical sexual coercion in a relationship was measured with the SES (Koss & Oros, 1982). The authors of this study suggested that acts of sexual aggression fell on a continuum ranging from verbal threats (e.g., obtained sexual intercourse with a person who didn’t want to, by saying things you didn’t really mean) to physical assault (e.g., used physical force to engage someone in kissing). Items on the survey ranged from asking whether a partner misinterpreted the degree of wanted sexual intimacy to asking whether or not one had been held down by an individual when refusing to consent to sex. Subscales for verbal and physical aggression were computed with sums of the endorsed items.

Demographics. The demographic survey included items on gender, age, relationship status (single, dating casually, dating exclusively, or married) and ethnicity.

Procedure

The data obtained for this study were previously collected as part of a larger study on relationships (Oswald & Russell, 2006). Participants were recruited from university introductory psychology subject pools at a private Midwestern university and a small Eastern college. Participants completed the conflict tactics scale, sexual experience survey, and demographics as part of a larger study on relationships (see Oswald and Russell). All surveys were presented in random order. Surveys were kept anonymous as identifying participant information was never collected. Participants received extra credit for their participation in the study. Following completion of the surveys, participants were debriefed about the study goals and were provided with contact numbers for resources if they wanted to talk to a professional about their own relationship experiences.

Results

Using SPSS, independent t tests and analyses of variance were computed to test the hypotheses. The results of these tests are presented in Tables 1 and 2. For the hypothesis regarding gender effects and sexual aggression (that men score higher on the physical portion of the SES aggressor version while women
score higher on the verbal portion), an independent t-test was performed. There was in fact a significant difference between men and women in terms of verbal aggression t(396) = 2.14, p < .05. Men were found to score higher on the verbal portion (M = .80, SD = .92) than women (M = .62, SD = .74). However, there was not a significant gender difference on the physical aggression portion of the SES.

Independent t-tests were performed to test the hypothesis that women would score higher on the use of verbal conflict tactics, while men would score higher on the use of physical conflict tactics. A marginally significant difference did exist between men and women t(389) = -1.54, p = .13), such that women scored higher on the use of verbal conflict tactics (M = 1.48, SD = 1.05) than men (M = 1.31, SD = 1.04). Consistent with our hypothesis, a significant gender difference was found in terms of physical conflict tactics, t(387) = -3.27, p < .05. However, contrary to our own hypothesis, women scored higher on the use of physical conflict tactics (M = .14, SD = .38) than men (M = .03, SD = .11).

Analyses of variance were performed to examine physical and verbal conflict tactics in the context of relationship status. An ANOVA for the verbal scores met significant difference, F(3, 383) = 4.99, p < .05. A post hoc test (Tukey HSD) revealed a difference between those who were married and those who were dating exclusively and between those who were married and those who were single. Married individuals scored highest (M = 1.26, SD = 1.63), followed by those dating exclusively (M = .65, SD = .70) and single individuals (M = .56, SD = .69). An ANOVA for physical scores did not meet significance, F(3, 390) = 1.05, p > .05).

**TABLE 1**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Men n = 147</th>
<th>Women n = 276</th>
<th>t</th>
<th>p</th>
<th>95% Confidence Interval of the Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES Verbal</td>
<td>.80 (.92)</td>
<td>.62 (.74)</td>
<td>2.14</td>
<td>.03</td>
<td>.01 to .35</td>
</tr>
<tr>
<td>SES Phys.</td>
<td>.01 (.19)</td>
<td>.01 (.09)</td>
<td>1.02</td>
<td>.31</td>
<td></td>
</tr>
<tr>
<td>CT Verbal</td>
<td>1.31 (1.04)</td>
<td>1.48 (1.05)</td>
<td>-1.54</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>CT Phys.</td>
<td>.03 (.11)</td>
<td>.14 (.38)</td>
<td>-3.27</td>
<td>.01</td>
<td>.04 to .18</td>
</tr>
</tbody>
</table>

Note. Standard Deviations are in parentheses. Sample sizes of men and women vary slightly for each analysis due to missing data.

Discussion

Results of this study indicate that stereotypical views of relationships may in fact be a myth. That is, contrary to our hypothesis, this study indicates that women may be more physically aggressive than men in terms of resolving conflicts. However, both men and women are equally likely to be verbally aggressive toward one another. Of course, there are a variety of factors that may explain why we found such interesting results. After comparing our data with past research, it is evident that further study and investigation is needed on this topic in order to make any conclusions. For example, the surveys used, especially the Conflict Tactics Scale, should be investigated in terms of how...
valid it is in analyzing the conflict tactics of women. In his recent meta-analysis, Archer (2000) mentions that the Conflict Tactics Scale has yielded higher levels of physical aggression in women because women may be responding in self-defense. Therefore, if women are claiming to be physically aggressive, but in a form of self-defense, it cannot accurately be concluded that women are more physically aggressive than men. Similarly, evidence from Stets and Pirog-Good (1987) suggests that when a woman receives threats from her partner, she may engage in physical aggression in order to protect herself from perceived oncoming threats. It is also important to keep the “social desirability” factor in mind. It is possible that men did not respond accurately on the Conflict Tactics Scale because they did not want to be seen as abusers. That is, they did not want to admit to being physically aggressive with their partners because it is perceived as socially unacceptable. Therefore, it is important to analyze responses in terms of both social desirability and the use of physical aggression used as self-defense.

Although women illustrated higher levels of physical aggression as a conflict tactic in this study, men illustrated higher levels of physical aggression than did women during sexual experiences. As several past research studies have illustrated, men are more likely to use physical behaviors in sexual coercion than are women. Historically, the United States has been a patriarchal society. However, in recent decades, women have made incredible strides in terms of status on a variety of levels. Therefore, it is possible that men feel they must live up to history’s societal standards of dominance and honor by engaging in aggression to maintain the standard of the “ideal” man (Ryan, 1995).

Similar to our results regarding conflict tactics, this study found that both men and women are equally likely to use verbal aggression in sexually coercive situations. Such results may be due to the fact that once aggression enters a relationship, it is more likely to be reciprocated from both individuals (Archer, 2000). It is also important to note that while there is evidence of physical aggression in this study, the means for verbal aggression are higher than those of physical aggression. For example, the mean for men using verbal aggression on the Conflict Tactics Scale was 1.31, and their mean for using physical aggression was only .03. Therefore, this study suggests that college students may be more verbally aggressive, rather than physically aggressive, in terms of conflict tactics and sexual coercion. While it may be the fortunate case that our sample is not engaging in a high frequency of aggressive or sexually coercive acts, these low numbers suggest that our sample may have underreported. Future research involving the number of times an individual is a victim rather than the aggressor may lead to more accurate results of both physical and verbal aggression in relationships.

This study hypothesized that couples involved in committed relationships or marriage will display a higher level of aggressive conflict tactics and sexual coercion. In fact, there was a significant difference in verbal aggression on the Sexual Experiences Survey between married individuals and individuals dating exclusively. There was also a difference between married individuals and single individuals. Married individuals engaged in the highest level of verbal sexual aggression, followed by individuals dating exclusively, and single individuals. There was also a significant difference on the Conflict Tactics Scale between individuals dating exclusively and single individuals. Those dating exclusively used more verbal conflict tactics than those who were single. These results suggest that as the commitment levels of a relationship increase, so too does the use of verbal aggression. However, it is
important to keep in mind that the relatively low number of married participants was a limitation in terms of equal distribution of responses. Different results may have been gathered if the groups were more equally distributed as far as relationship status.

This study finds no significant differences in the use of physical sexual aggression based on relationship status. However, there is a significant difference between individuals dating exclusively and single individuals on the use of physical conflict tactics. Those who are dating exclusively were more likely to use physical conflict tactics than single individuals. Such results are similar to those found by Katz et al. (2002) and illustrate that the more committed a person is in a relationship, the more likely he/she is to use or be victim to aggression. Overall, research suggests that individuals in exclusive relationships engage in more verbal and physical conflict tactics. There is also a higher level of sexual aggression in these committed individuals than in single individuals, which is again consistent with research from Katz et al.

A possible explanation for these higher levels of aggression in more committed relationships may be the level of comfort individuals have established with one another. Individuals who are involved in serious relationships are not as worried about how they come across to the other person and may therefore be more likely to engage in aggression. Furthermore, those who are in more committed relationships see each other more often and there exists, therefore, more opportunity for conflict situations to arise. Individuals who are single may only occasionally date casually and will not always be able to establish a comfort level that may lead to physical and verbal aggression, which research from Katz et al. suggests.

There are several limitations to this research. Our sample included college students in heterosexual relationships. Future studies should use a more representative sample consisting of a variety of ages and relationship statuses, including more married couples. Future studies should also aim to have ethnically diverse samples. Also, due to this study’s goal, we focused on verbal and physical aggression in relationships. Thus, only verbal and physical subscales were identified on each of the surveys used. As research from Russell and Oswald (2001, 2002) has found, the use of only certain portions of this scale did not affect its reliability or validity. However, different results may be obtained by using entire scales, or different scales that have more than one category in defining conflict and sexual experiences between individuals. For example, the first statement on the Sexual Experiences Survey reads, “Misinterpreted the level of sexual inti-

macy a date desired.” In terms of our study, this was identified as a verbally aggressive act. However, it is possible to categorize this as “miscommunication” between partners. While breaking this scale down into subsets may be seen as a limitation to our study, it is important to realize that there are a variety of types of aggression. For example, aggression may be considered verbal, but also emotional or psychological in the same instance. Further studies should investigate breaking aggression down into further categories that can help to clearly define aggression from a variety of angles.

Future research should also focus on gender differences in the use of conflict tactics in terms of the relationship status. For example, our study illustrates that individuals in committed relationships are more likely to use verbal aggression. However, there is no difference in terms of gender differences. Understanding these possible gender differences can lead professionals to the creation of different strategies, or the improvement of existing strategies, which may help couples achieve conflict resolution. Past research has also indicated that both physical and verbal aggression in a committed relationship can be predictors of future aggression and retaliatory aggression on part of the victim (Schumacher & Leonard, 2005). Therefore, further research on gender differences can lead to the creation of programs that can help couples eliminate current aggression problems and reduce the likelihood that aggression will arise in the future.

Although future research is imperative in gaining a better understanding of social interactions, results from this study indicate that typical stereotypes in society are not always true. For example, women may be as likely, or in some cases more likely, to use physical aggression. Such results illustrate the importance of avoiding assumptions and addressing relationship conflict as a mutual problem. Breaking down gender stereotypes in relationships can lead to a more focused analysis of conflict and the creation of successful resolution strategies.

References


Visual dominance has been a popular research topic in perceptual psychology because of Rock and Victor’s (1964) landmark study demonstrating vision’s dominance over touch. The results of many more studies over the years have supported the hypothesis that vision is dominant over touch in conflict situations (Colavita, 1974; Kinney & Luria, 1970; Miller, 1972; Pavani, Spence, & Driver, 2000). However, no study thus far has examined the possibility that visual dominance over touch may be moderated by the amount of cortical representation a body part occupies on the somatosensory cortex. For example, would a body part with relatively high cortical representation be less prone to visual dominance than a body part with relatively low cortical representation?

Pavani et al. (2000) examined participants’ ability to determine the location of a vibrotactile stimulus with both congruent visual information (when the visual stimulus indicated the same location as the vibrotactile stimulus) and incongruent visual information (when the visual stimulus indicated a different location than the vibrotactile stimulus). Participants received the vibrotactile stimulus through either the thumb or the forefinger, between which there was no significant difference in cortical representation (Sutherling, Levesque, & Baumgartner, 1992). The experimenters’ choice to have participants use the thumb and forefinger was a good one, as the study was not intended to examine the moderation of cortical representation. Otherwise, the results may have been confounded. If the thumb and middle finger had been used instead (between which there is a significant difference in cortical representation, according to Sutherling et al.), the thumb may have responded significantly faster and with greater accuracy.

In a study examining the cortical space devoted to the human hand, Sutherling et al. (1992) found that the index finger (hereafter, digit 2) had significantly...
greater cortical representation than the little finger (hereafter, digit 5).

Based on the findings of Sutherling et al. (1992), the present study sought to examine any difference in visual dominance that may exist between digit 2 and digit 5. Six hypotheses were tested:

Hypothesis 1: With congruent visual and tactile stimuli, response time will be shorter for digit 2 than for digit 5.

Hypothesis 2: With congruent visual and tactile stimuli, there will be no significant difference in accuracy between digit 2 and digit 5.

Hypothesis 3: Responses will be more accurate for congruent stimuli than for incongruent stimuli.

Hypothesis 4: Responses will be faster for congruent stimuli than for incongruent stimuli.

Hypothesis 5: With incongruent stimuli, response time will be shorter for digit 2 than for digit 5.

Hypothesis 6: With incongruent stimuli, digit 2 will be more accurate than digit 5.

The first hypothesis was based on the idea that digit 2’s greater cortical space would lend itself to faster response time. The second hypothesis assumed that congruent stimuli should present no difficulty to the participant in terms of accuracy. Hypotheses 3 and 4 (that responses would be faster and more accurate for congruent stimuli) are consistent with the results of Pavani et al.’s (2000) study. Hypotheses 5 and 6 propose that a larger amount of cortical space reduces visual dominance of touch.

**Method**

**Participants**

A sample of 45 students from California State University, Stanislaus (Turlock, CA), was recruited (43 women and 2 men). Some students received extra credit for their participation. All students were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 1992). Two participants’ scores were excluded from the data analysis. One of these participants was left-handed; the other achieved such low accuracy on the incongruent trials (25%) so as to be an extreme outlier from the rest of the group.

**Materials**

The Briggs and Nebes Handedness Inventory (1975) was used to determine handedness in the participants. This inventory included 12 items describing various tasks (e.g., throwing a ball to hit a target, writing a letter legibly, etc.). The participant responded on a 5-point Likert scale as to which hand she/he used for each task (always left, usually left, no preference, usually right, always right). Possible scores ranged from -24 (strong left-handedness) to +24 (strong right-handedness). The authors of the scale classified scores from +9 to +24 as indicating right-handedness. Participants in the present study had scores ranging from +10 to +24 (M = 20.79, SD = 3.78).

The Arachnimech SR-1 prototype (see Figures 1) was the apparatus used to deliver the visual and tactile stimuli to the participant and for the participant to respond to the stimuli. Two 5 cm × 10 cm × 15 cm experimenter’s boxes were mounted together in an “L” shape. Two red LEDs (the visual stimuli) were mounted on top of the posterior box 7.5 cm apart. Two rotating servos (the tactile stimuli) were mounted 7.5 cm apart and 2.5 cm back from the front end of the anterior box. Two response buttons were mounted 2.5 cm behind the servos on the anterior box.

**Procedure**

Students signed up to participate on the university’s online subject pool. Each participant came to the assigned room for the study at a designated time. When the participant arrived, she/he was presented with an informed consent form. The researcher reviewed this sheet orally and answered any questions that arose. The participant signed one copy of the informed consent form and returned it to the researcher. The participant was also given a blank, unsigned copy of the consent form for her/his records.

The participant completed the Briggs and Nebes Handedness Inventory (1975). The participant was
then instructed to place her/his right hand on the anterior portion of the SR-1 apparatus with the digit 2 resting on the left servo and digit 5 resting on the right servo. There was sufficient room on the SR-1 to rest the thumb, middle, and ring fingers naturally. The participant was instructed to stare at a focal point (a white, .5 cm square) during the two sets of trials, which was located halfway between the two LEDs.

The familiarization set consisted of four trials: one with congruent servo and LED activation for digit 5, one with congruent servo and LED activation for digit 2, one with servo activation for digit 5 and LED activation for digit 2, and one with servo activation for digit 2 and LED activation for digit 5. Preceding each trial, the participant was told which stimuli would be present and which button to press in response. This set of trials ensured that each participant understood the experimental instructions and was familiar with how to respond.

The experimental set consisted of the same types of trials presented in the familiarization set. Before the set began, the participant was told to respond according to the servo rotation, regardless of whether the LED stimulus was congruent or incongruent. The participant was asked to respond as quickly and accurately as possible by reaching slightly forward with the finger indicated by the servo and depressing the corresponding key, subsequently returning the indicated finger to the original servo position. There were 40 trials in this set: 20 congruent (10 indicating one finger, 10 indicating the other) and 20 incongruent (10 indicating digit 2 with the LED and digit 5 with the servo, and 10 indicating digit 5 with the LED and digit 2 with the servo) in a predetermined random order that was identical for all participants. There was a 5s pause between trials.

After the experimental set, the participant was orally debriefed and given a debriefing form that summarized the goals of the study, provided references for further reading, and indicated how she/he could learn about the results of the study.

**Results**

Table 1 shows the mean response times and accuracy scores for each condition of the experiment. To test the hypotheses, the data were analyzed using paired-samples t tests.

Regarding Hypothesis 1, with congruent visual and tactile stimuli, response time was significantly shorter for digit 2 than for digit 5, \( t(42) = 4.86, p < .01 \). There was no difference in accuracy between digit 2 and digit 5 (Hypothesis 2), as none of the participants made any errors in accuracy with congruent stimuli.

Regarding Hypothesis 3, responses were significantly more accurate overall for congruent stimuli than for incongruent stimuli, \( t(42) = 3.18, p = .01 \). Responses were also significantly faster for congruent stimuli than for incongruent stimuli (Hypothesis 4), \( t(42) = 6.99, p < .01 \).

Regarding Hypothesis 5, with incongruent stimuli, response times were significantly shorter for digit 2 than for digit 5, \( t(42) = 5.40, p < .01 \). With incongruent stimuli, there was no significant difference in accuracy between digit 2 and digit 5 (Hypothesis 6), \( t(42) = 1.06, p = .29 \).

**Discussion**

Five of the six initial hypotheses are supported by the results of the current study. Specifically, digit 2 was faster than digit 5 under congruent and incongruent conditions, and accuracy was not significantly different between the two conditions.

Hypothesis 6 is not supported by the results as there is no significant difference in accuracy between digit 2 and digit 5 (although accuracy is slightly higher

**TABLE 1**

<table>
<thead>
<tr>
<th>Digit</th>
<th>Response time (in milliseconds)</th>
<th>Accuracy*</th>
<th>Overall response time (in milliseconds)</th>
<th>Overall accuracy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congruent stimuli</td>
<td>2</td>
<td>923.81</td>
<td>10.00</td>
<td>957.21</td>
</tr>
<tr>
<td>Congruent stimuli</td>
<td>5</td>
<td>990.62</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Incongruent stimuli</td>
<td>2</td>
<td>1062.11</td>
<td>9.72</td>
<td>1101.25</td>
</tr>
<tr>
<td>Incongruent stimuli</td>
<td>5</td>
<td>1140.40</td>
<td>9.58</td>
<td></td>
</tr>
</tbody>
</table>

*Maximum score = 10.00
for digit 2). This result is not unexpected in light of the evidence in support of Hypothesis 5; one cannot expect both to be supported simultaneously. Participants invariably will choose between sacrificing speed for accuracy or accuracy for speed. Most choose accuracy above speed when they are told that both are important. If the researcher had instead emphasized that speed was more important than accuracy, we would expect Hypothesis 6 would be supported. This may also have been the result if the participant’s hand had been hidden from view. As it was, the participant may have been made aware of imminent mistakes (by the ability to see her/his finger reaching for the incorrect button) and been able to correct them before actually depressing the incorrect button. This would logically result in higher accuracy and slower responses, as the data show.

The results of the present study in support of Hypotheses 3 and 4 are consistent with previous research in terms of vision’s apparent dominance over the sense of touch (Colavita, 1974; Kinney & Luria, 1970; Miller, 1972; Pavani et al., 2000). However, the performance comparison of digit 2 and digit 5 is novel in this field of research. It would appear from the results that visual dominance may indeed be moderated by varying amounts of cortical representation.

However, the present study does have certain limitations that should be considered. First, the response keys on the SR-1 were a bit stiff, and thus required a certain amount of strength to depress. This may have been slightly more difficult for the weaker digit 5 than for the stronger digit 2, which may in turn have adversely affected the response times for digit 5. The use of more flexible response keys would make the present results more reliable.

Second, the support of both Hypothesis 1 and Hypothesis 5 is a possible confound. If it is a fact that digit 2 responds faster to a stimulus than digit 5, perhaps that may be the only reason Hypothesis 5 is supported. The fact that digit 2 responds faster did not necessarily mean it is more independent of visual dominance.

Third, there was no way for the experimenter to know for sure if the participants were keeping their eyes on the focal point as opposed to looking away or defocusing to circumvent distraction. It is reasonable to assume that, at least subconsciously, the desire to perform well at the task may outweigh verbal instructions, even with participants who understand the instructions and genuinely intend to follow them. If this is the case, the results may show only that digit 2 is capable of responding faster than digit 5, and that Hypothesis 5 really measures the same variable as Hypothesis 1. This can be remedied by making the visual stimulus more salient so that the visual distraction can not be easily averted.

Fourth, 95% of the participants were women. Therefore, it is not certain whether or not the results are generalizable to men, whose brain structure may be slightly different with regards to the somatosensory cortex.

Future research may compare the performance of several different age groups to determine any interaction effect between cortical representation and age in terms of visual dominance. It may also be worthwhile to explore any differences that may exist between typists and nontypists with regards to cortical representation of the fingers. Perhaps cortical representation is more equalized in typists (as typing requires more extensive use of digit 5 than other activities), and thus we may notice more pronounced results in a nontypist population. Future research can also investigate the role of the regional proportions of the motor homunculus as it relates to visual dominance. If cortical representation on the somatosensory cortex moderates visual dominance, one will expect the same of cortical representation on the motor cortex.

A follow-up study can investigate whether or not allowing the participant to see her/his hand would affect speed or accuracy. If a significant difference in accuracy truly does exist between digit 2 and digit 5, hiding the participant’s hand from view might accentuate this difference by preventing participant self-correction based on visual cues.

References


The U.S. Department of Health and Human Services (1997) conducted multiple surveys between 1967 and 1994 that revealed a drop in the income to poverty ratio scale from .74 to .66, suggesting that families are getting poorer and are in need of more help if children are planning to attend college in the future. Understanding the adversity that low-income families face, it is relatively easy to see the difficulties that students from these families endure when considering post-secondary education. The financial portion of school is only part of the equation. Because of the growing number of families classified as low-income, programs helping low-income youth overcome adversity are becoming increasingly important.

TriO offers an educational opportunity for low-income and disabled Americans and is present at more than 1,000 colleges, universities, community colleges, and agencies in America. Their commitment is to provide educational opportunities for all Americans regardless of race, ethnic background, or economic circumstance. Along with this commitment, Congress established a series of programs to help low-income Americans enter college, graduate, and move on to participate more fully in American society. Although student financial aid programs help students overcome financial barriers to higher education, TriO programs (U.S. Dept of Health & Human Services 1997) help students overcome class, social, and cultural barriers to higher education (http://www.coenet.us).

As mandated by Congress, two-thirds of the students served by TriO must come from families with incomes under $28,000 where neither parent graduated from college. More than 2,700 TriO programs currently serve approximately 866,000 low-income American students in sixth through twelfth grade. According to TriO, 37% of the students are White, 35% are African-American, 19% are Hispanic, 4% are Native American, 4% are Asian-American, and 1% are listed as “Other,” including multiracial students. TriO programs serve 22,000 students with disabilities and more than 5,000 U.S. veterans (http://www.coenet.us).

Students in TRiO’s Upward Bound program are said to be four times more likely to earn an undergraduate degree than students from similar backgrounds who did not participate in TRiO. Nearly 20% of all Black and Hispanic freshmen entering college in 1981 received assistance through the TRiO Talent Search or Educational Opportunity Center programs, and students in TRiO’s Student Support Services program are more than twice as likely to remain in college than are those students from similar backgrounds.

Faculty supervisor: Mary E. Pritchard, Boise State University

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**Relationships Between Self-Esteem and Factors Known to Affect College Attendance**

There are many factors impacting student’s decisions to attend college. Researchers investigated self-esteem, perceived academic abilities, and intended college attendance in a group of high school seniors involved in a program aimed at assisting them to get into college. Participants were 83 senior high school students (men = 28, women = 55) from various high schools in Idaho. Many students come from low socioeconomic backgrounds and were White (White = 40, Latino = 28, Asian = 6, African American = 2, and other = 6). Participants were asked 39 questions concerning intended college attendance, self-esteem, perceived academic abilities, and other factors that influenced their decision to attend college. Significant correlations were found between self-esteem and perceived academic abilities.
not enrolled in the program (http://www.coenet.us). Considering students in TRiO programs come from underrepresented groups, either in ethnicity or socioeconomic status, and the low percentage of these groups in higher education (Salle Mae Foundation, 2006), the effect of TRiO in diversifying higher education has been immense. Yet, there are still students who choose not to pursue post-secondary education despite having resources provided by TRiO; which poses the question of what additional factors impact student’s intention of attending college.

There are many factors that influence student’s decisions to attend college, such as finances, peer influence, and self-esteem (Coleman, 1965; Garfinkel, Huang, & Han, 2003). Due to the similarities between students that constitute TRiO programs (e.g., low-income status) it is important to examine some of these factors, such as neighborhood quality, which was related to self-perceived academic abilities, and in turn, related to school effort (Ceballo, McLoyd, & Toyokawa, 2004). In addition to the previous study, Gerardi (2005) found academic self-concept (perceived academic abilities) to significantly predict academic performance in low-incomes students. Furthermore, academic self-concept was shown to better predict learning persistence by other studies (House, 1992; Li-Fang, 2006).

Furthermore, Rosenberg (1989) has shown there to be a relationship between socioeconomic status and self-esteem. Contrary to these findings, some studies have found no relationship between socioeconomic status and scholastic self-perception (Schmitz, 2006) or socioeconomic status and self-esteem (Lever, Pinol, & Uralde, 2005). In addition to socioeconomic status influencing student’s self-esteem and perceived academic abilities, a relationship between self-esteem and academic success has been developed in the literature. Some studies have found self-esteem to be positively correlated with academic achievement and negatively correlated with counterproductive behavior, like aggression and delinquency (Alves-Martins, Peixoto, Gouveia-Pereira, Amaral, & Pedro, 2002; Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005). In addition, another study found a positive relationship between academic achievement and self-esteem (El-Anzi, 2005) and also, self-control was found to lead to higher self-esteem and higher grades (Tangney, 2004). Yet contrary to the previous studies, Sirin (2004) found self-esteem to have no relationship to academic performance. Because self-esteem has been found to play a role in academic performance, we found it necessary to incorporate a shortened version of the Rosenberg Self-Esteem Scale (Rosenberg, 1989) in our study.

It is our goal to understand how self-esteem affects adolescents in their pre-college schooling to better help them adjust and become better prepared for higher education. Addressing the problem earlier or during a time when children are seeking the help of others, and doing what we can to encourage and increase their self-esteem would be beneficial to them in many ways. Thus, our study examines how self-esteem relates to intended college attendance. More specifically, we hypothesized that intended college attendance will decrease when self-esteem is low and conversely, intended college attendance will increase as self-esteem increases. In addition to questions about self-esteem, we also asked about the student’s perception of their math skills, writing skills, grades, family support or pressure, helpfulness of career information and college visits, and level of involvement in TRiO-related activities. Researchers felt it is necessary to ask exploratory questions due to the relationship between self-esteem and academic achievement. It is well-established that variables, such as perception of math skills, relate to intended college attendance, but we wanted to examine how other variables known to relate to college attendance relate to self-esteem. Also, these questions have more practical implications for TRiO and are a way to understand student’s perception of common activities and other pressures surrounding college. Researchers hypothesized a positive correlation between self-esteem, greater perceived academic abilities, family support, and helpfulness of current information and college visits.

Method

Participants

Participants were 83 senior high school students (men = 28, women = 55) from various urban high schools in Idaho. The majority of the students were White (White = 40, Latino = 28, Asian = 6, African American = 2, and other = 6). All students were involved in a college preparation program designed for low-income, underrepresented college students in TRiO. The vast majority of students reported that they planned on attending college. In fact, only 7 of the 83 students reported not planning on attending college.

Materials

Students were asked whether they planned on attending college. In addition, self-esteem was measured by an abridged 5-item version of the Rosenberg Self-Esteem Scale (1989; alpha = .87). Although an abridged version is not ideal, it was used due to time constraints during data collection. In addition to self-esteem, researchers asked questions concerning stu-
dent’s perception of their math and writing skills, grades, family support or pressure, helpfulness of career information and college visits, and level of involvement in TriO-related activities. A 4-point Likert scale was used, ranging from 0 (strongly agree) to 3 (strongly agree). In addition to the above items, we collected demographic data.

TriO staff members were responsible for survey administration. TriO staff members pulled student out of their classes at different times of the day and interacted with them on a one-on-one basis. Staff members read to all students, prior to the survey, a disclaimer stating that if any questions made them feel uncomfortable, they did not have to answer it, and they had the option to quit the survey. The survey took 10 to 15 min to complete. Students completed the survey on scantron sheet.

Results

To examine the relationship between intention to attend college directly after high school and self-esteem, we ran an independent samples t test. Given a small number of students that reported that they did not plan on attending college, it is not surprising that we did not find a significant difference in self-esteem between individuals that planned to attend college (M = 11.65, SD = 3.28) and those who did not plan to attend college (M = 10.17, SD = 2.36), t(81) = 1.08. To further examine the influence of self-esteem on variables related to college attendance, we ran correlations between self-esteem and survey items. As displayed in Table 1, any of the factors known to influence college attendance related to self-esteem, including receptiveness to career information, college visits, perceived writing skills, perceived math skills, PGA, family support, family pressure, and participation in TriO activities.

Discussion

The goal of this study was to examine associations between those who planned to attend college and those who did not. Some of our hypotheses were confirmed, whereas others were not. Our first hypothesis was that high self-esteem would predict planned college attendance. Previous research has suggested that high self-esteem is related to academic achievement (Alves-Martins et al., 2002; Donnellan et al., 2005). However, it was not found to be significant in the present study, which was likely due to the low number of student who reported they were not planning on attending college after high school. It also may be that we used the wrong five questions from the Rosenberg Self-Esteem scale, instead of the full scale due to the time constraints placed on the survey. This possibility should be investigated further because of the strong relationship between academic achievement and self-esteem in the literature.

There were some interesting correlations between self-esteem and other variables known to relate to college attendance. First, there was a negative correlation between student’s perception of how helpful the career information was and self-esteem. It could be that students are discouraged about their future because they do not have a specific interest or know what they would like to do. Also, there was a negative correlation between self-esteem and how students perceived the college visits. That is, those students who have a low self-esteem were likely to have realized that college was not a possibility through college visits. In this case again, they may be discouraged about attending college. It could be that leaving their social support network makes it difficult for them to go to college. Probably the most interesting findings was that those who had lower self-esteem also reported that their

```
<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The career information did not help me in any way</td>
<td>-0.26*</td>
</tr>
<tr>
<td>The college visits made me realize that college was not a possibility for me</td>
<td>-0.41**</td>
</tr>
<tr>
<td>My writing skills are holding me back from going to college</td>
<td>-0.37**</td>
</tr>
<tr>
<td>My math skills are holding me back from attending college</td>
<td>-0.49**</td>
</tr>
<tr>
<td>My grades are adequate for college.</td>
<td>0.40**</td>
</tr>
<tr>
<td>My family is supportive of me going to college</td>
<td>0.38**</td>
</tr>
<tr>
<td>My family is pressuring me not to attend college</td>
<td>-0.34**</td>
</tr>
<tr>
<td>How many hours per month do you participate in TriO activities?</td>
<td>-0.24*</td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < .01
```
math and writing skills were holding them back from attending college. Perhaps these students have anxiety over their abilities in these areas, which could contribute to lower self-esteem. Also, there was a positive correlation between self-esteem and student perception of adequacy of their grades for college; that is, those who had higher self-esteem also perceived their grades as adequate for college. Perhaps math and writing skills provide a greater source of self-esteem measure than do grades and therefore, a reference point as to whether they ought to attend college.

Limitations
As with any study, there is room for improvement. First, we were not able to survey the entire population of TriO students, nor were researchers able to ensure the survey was taken in the same setting for each student. Secondly, we did not have an adequate sample size. A third limitation was that we were surveying high school students that consisted primarily of White females. Fourth, survey length was an issue in the present study. If it were possible to create a longer survey with multiple questions for each variable of interest, the end results may be different. Finally, our sample was composed of high school seniors who are waiting graduation and basing their perceptions on what they foresee in the future. The fact that we did not have access to students who graduate and either advanced to college or not, contributed to a major loss of valuable information that might have influenced our results. Although only 7 of the 85 students surveyed reported not planning to attend college after high school, the number could be more than 1 that actually do not attend college when it comes time to enroll. Thus, attending college was measured by expressed intentions which may or may not reflect actual college attendance. In addition, the result in this study are a survey of potential reasons for these students not to attend college, whereas if we had access to graduates, they could inform us better about which variables actually contributed to their not advancing to college in retrospect.

Conclusion
Our study examined the influence of self-esteem on intended college attendance, as well as the relation between self-esteem and several variables known to predict college attendance. Future research should examine why self-esteem is negatively correlated with college visits and career information. This could help guidance counselors and staff involved in planning college visits change aspect of college visits and career information in order to make them more appealing to students with lower self-esteem or help students not to be discouraged if they do not have a specific academic plan. Another interesting correlation found in our survey was that lower self-esteem individuals were more likely to report that their math and writing skills were holding them back from attending college. Research should be done to discover if students are dealing with anxiety or are actually lacking in their math and writing skills and how each affects self-esteem by utilizing standardized test scores and comparing them to their perceived abilities. Regardless, to enhance college enrollment, guidance counselors and staff involved in college recruiting programs need to address issues such as anxiety over math and/or writing skills and self-esteem.

References
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