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The purpose of the Psi Chi Journal of Psychological Research is to educate, support and promote professional development, and disseminate psychological science. Through the Psi Chi Journal, members can build research skills in the process of receiving thoughtful, detailed, and rigorous feedback on their work. A supportive review process leads to publication. Publications provide recognition and evidence of scholarly productivity of authors. Published manuscripts are original and empirical, making a contribution to psychological knowledge. Psi Chi journal authors are Psi Chi members at the undergraduate, graduate, and faculty levels. Work of undergraduate students may be less complex in design, scope, or sampling than that of graduate students or faculty authors. The peer review process takes into account developmental stage in the evaluation of each submitted manuscript. Three professionals review each submission. Each issue of the Psi Chi Journal is a compilation of scientifically rigorous reports across the professional developmental spectrum.

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Despite its apparent simplicity, visual perception is a complex process. What one sees is not solely due to the light that enters the eye and the subsequent two-dimensional image on the retina. Perception of the world can also be influenced by individual’s purposes, physiological state, and emotions (Proffitt, 2006). Evidence already exists for sadness (Riener et al., 2011) and fear (Stefanucci & Proffitt, 2009) can alter distance perception so that distances are perceived as farther away. The current study inquired whether anger and relaxation also alter distance perception. We hypothesized that angry participants would overestimate distances compared to relaxed participants because other negative emotions lead to similar relative overestimations. Forty-two students participated in the study. Anger was induced in half of the participants by asking them to solve impossible anagrams while listening to a high-pitched sound. The other half listened to relaxing music for 5 min. The manipulation was effective, as participants in the anger condition were angrier than those in the relaxed condition as assessed by the Anger Onset Scale (Mittleman et al., 1995). Following this mood manipulation, participants viewed three targets located at different distances and were asked to estimate the respective distance to each both verbally and by walking blindfolded. Participants in the anger condition judged the targets to be farther than those in the relaxed condition, but only when blind walking, $F(1, 40) = 6.58$, $p = .01$, $\eta_p^2 = .13$. Verbal estimations were not different between the two groups. A possible explanation for no difference between the two groups’ verbal estimations is that anger may have affected the participant’s walking response but not their perception of the targets. Additional research should investigate whether other negative emotions like sadness and fear also lead to relative blind walking overestimations.
Observers also systematically overestimate the slants of hills (Proffitt, 2006). Taking into account systematic underestimates of distances and overestimates of hill slants, previous research investigating the role of mood or physiological state has focused on relative over or underestimations and not the accuracy of estimations. For example, Rienar et al. (2011) found that sad participants reported greater hill slant estimations relative to happy participants. All of the participants still overestimated the slants of the hills, but the sad participants overestimated more than the happy participants.

Our visual system is influenced by the purpose of our actions (Proffitt, 2006). Visual perception takes into account the opportunities and costs associated with action. When we see a distant object for example, our visual system assesses the risks and rewards associated with the object, such as how much energy would be required to reach it. When the energy required to reach an object increases, the apparent distance to the object increases as well. This apparent increase in distance associated with an increase in energetic costs will cause people to walk further than they normally would when estimating a distance (Witt, Proffitt, & Epstein, 2005). Witt, Proffitt, and Epstein (2004) found that people judged targets as being farther away if they threw heavy balls as opposed to light balls. People wearing backpacks also overestimate distances relative to those who are unencumbered (Proffitt, Stefanucci, Banton, & Epstein, 2003).

In addition to being influenced by the purpose of our actions, visual perception can also be influenced by emotion (Proffitt, 2006). Stefanucci, Proffitt, Clore, and Parekh (2008) examined fear’s impact on visual perception. Participants in the study stood at the top of a hill and estimated its slope, while either standing on a skateboard or a stable box of equivalent dimensions. The group standing on the skateboard consistently judged the hill as being steeper relative to the group standing on the box. Given the otherwise equivalent viewing conditions, this overestimation is likely due to the fear associated with standing on a skateboard at the top of a steep hill. Similarly, Stefanucci and Proffitt (2009) examined the effect of fear on judging distance by having participants either look down from a balcony or look up at it from the ground. The group that judged the distance from the balcony consistently overestimated the distance compared to the group that judged from the ground, likely due to the fear associated with falling.

What aspect of fear changed perception in these cases? Fear is certainly an unpleasant emotion, but it is also associated with an increase in autonomic arousal (e.g., heart rate). According to an influential model of emotions proposed by Larsen, Diener, and Clark (1992), emotional states can vary by two dimensions. The first dimension is pleasantness or valence, which is whether emotional states are positive or negative. Pairs of emotions can be described using the valence spectrum. For example, happiness, a positive emotion, exists on one end of the valence spectrum and sadness, a negative emotion, exists on the other (Larsen et al., 1992). Recent studies have shown that differences in valence can correspond to different perceptions of spatial layout. For example, Rienar et al. (2011) examined whether happiness or sadness can affect people’s perception of the slopes of hills. Sad participants consistently overestimated the slopes of hills in comparison to happy participants.

The second dimension used to categorize emotions is level of arousal (high arousal or low arousal). Fear is an example of a high arousal emotion. It is possible for two emotions to have the same degree of valence but differ in regards to their arousal (Larsen et al., 1992). For example, relaxation and excitement are both ‘positive’ emotions but relaxation is low in arousal and excitement is high (Ader, 2007). Anger, which was one of the emotions of interest in the current study, lies on opposite ends of the valence and arousal emotional dimensions, because it is a negative emotion that is high in arousal (Lewis, Jalivand-Jones, & Barret, 2008). Fear lies on the same ends of the respective emotional dimensions as anger, and fear has proven to affect the perception of spatial layout (Stefanucci et al., 2008; Stefanucci & Proffitt, 2009). The fact that anger and fear lie on the same ends of the valence and arousal spectrums suggests that anger may affect perception in a similar fashion to fear.

Relaxation, which was the second emotion of interest in the current study, is a positive emotion that is low in arousal (Lewis et al., 2008). Relaxation often decreases one’s heart rate, blood pressure, and anxiety (Kaushik, Kaushik, Mahajan, & Rajesh, 2006). Anger in contrast to relaxation, is an emotion that can lead to poorer conflict resolution and collaborative problem solving, poorer performance on cognitive tasks, and lower self-efficacy on various tasks (Baron, 1988). These negative effects are likely the result of both the negative valence and high arousal of the emotion.
Anger's Effect on Distance Perception

After considering previous research, valence appears to be a better predictor of biases in spatial layout due to the fact that fear and sadness, both of which are ‘negative’ emotions, result in similar relative overestimations, despite falling on opposite ends of the arousal spectrum (Riener et al., 2011; Stefanucci et al., 2008; Stefanucci & Proffitt, 2009). It is therefore reasonable to speculate that, if anger alters distance perception, the effect may be due more to its negative valence than its high arousal.

Previous research regarding mood’s effect on distance perception has only used verbal estimations (Stefanucci & Proffitt, 2009). However, several studies have demonstrated that manipulations that affect verbal distance estimations can also influence blind walking estimations, which is why the current study implemented both. Witt et al. (2005), told participants prior to walking on a treadmill that they would either throw a ball at a target or blind walk to the target. Participants who anticipated walking to the target tended to overestimate the distance when blind walking relative to those who anticipated throwing a ball at the target when blind walking. Although the blind walking judgments were relatively different between the groups, they were generally near the actual distance. Therefore, blind walking is generally a more accurate way to estimate distance than verbal reports, even though manipulations, such as the aforementioned one, can result in relative blind walking differences between conditions (Proffitt, 2006). The results from Witt et al. (2005) suggest that blind walking is influenced by the energetic costs related to walking. In other words, walking on the treadmill increased the anticipated effort of walking to the target but not throwing something to it.

We hypothesized that angry participants would overestimate the distances to the targets used in the experiment relative to relaxed participants. Participants gave two types of distance judgments, verbal estimations and blind walking. We hypothesized both types of judgments would result in relative overestimations for the anger group. We believed the anger group’s judgments would be greater relative to the relaxed group’s judgments as a result of anger being lower in valence, and not as a result of anger being higher in arousal. We also expected the participants to systematically underestimate the distances verbally in each condition, due to previous research suggesting distances further than three meters will be systematically underestimated (Philbeck & Loomis, 1997). Differences in perception as a result of differing emotional states are important because being in a sad mood, for example, can lead to an increased risk of automobile accidents.

Method

Participants

Forty-two students, 25 women and 17 men, ages 19–22 (M = 21; SD = 1.10) participated in the study for four dollars. We did not collect information on participants’ ethnicity. Previous research (i.e., Riener et al., 2011; Stefanucci et al., 2008) also used approximately 40 to 50 participants. The participants were randomly assigned to either the anger or relaxed condition prior to their arrival and each group had 21 participants. The anger condition consisted of 12 men and nine women and the relaxed condition included five men and 16 women. They were recruited from college summer classes at Randolph-Macon College, a small liberal arts college on the east coast, and the procedures were approved by the Institutional Research Board (IRB) of the college. Approximately 100 students enrolled in summer classes were approached by the experimenters to participate.

Materials/Stimuli

Anger elicitation. It was important to choose suitable methods for inducing emotional states so that we could attempt to disentangle the relative impact of anger and relaxation. Anger has been elicited temporarily in people in a variety of ways in an experimental setting. Berkowitz and Harmon-Jones (2004) described several useful techniques, one of which involves placing an aggressive cue near the subject, such as a gun or a person linked to a previous frustrating incident. Berkowitz and LePage (1967) shocked participants and told them the shock came from another person in the adjacent room. The participants were given the option to return the shock, and they chose to do so more often if there was a gun next to the shock button. Another common technique is the use of auditory stimuli to evoke anger. High-pitched sounds have proven to be effective in eliciting anger (Stevenson & James, 2008). Attempting to solve impossible anagrams is yet another way to induce temporarily anger (Matthews et al., 2006). We chose impossible anagrams paired with high-pitched sounds as a simple, safe, and convenient way to induce low levels of anger.

Participants listened to a high-pitched pure tone for 5 min through headphones at an intensity of 5000 Hz from Bould (2007). In addition to
listening to the high pitched sound, participants in the anger condition attempted to solve a series of unsolvable anagrams. There were 13 anagrams total, varying from 6 to 12 letters and only the first and last were solvable.

**Relaxation elicitation.** Relaxation, specifically induced via pleasant music, has been linked to the lowering of blood pressure and decreased heart rate (Bernardi, Porta, & Sleight, 2006). The sound of raindrops falling on a roof was selected in the current study to induce relaxation. The use of repetitive rhythmic sounds of nature is a common tool used in relaxation training and stress management (Fried, 1990). Walker (1972) suggested that listening to a repetitive stimulus, such as raindrops falling on a roof, is an effective relaxation tool because it provides the brain with a minimal amount of stimulation. To induce relaxation, participants listened to relaxing music through headphones for 5 min from Okano (2012), which was the sound of raindrops falling on a roof.

**State and trait anger.** The participants’ level of state anger was measured using the Anger Onset Scale with Likert-type anchors ranging from 1 (completely calm) to 7 (enraged) (Mittleman et al., 1995). The alpha level in both the Mittleman et al. study and the current study was set at .05. Trait hostility was assessed using the MMPI Anger Scale, which consists of 16 true or false questions (Butcher & Spielberger, 1983). The questions in the MMPI Anger Scale are concerned with self-control, temper, and propensity for violence. For questions 1–15, each *true* response gives the participant 1 point and for the final question a *false* response gives the participant a point. The higher the point total, the higher the participant’s trait hostility.

**Distance perception.** We chose the distances used in our study based upon the results of previous research utilizing distances within the same range (i.e. Stefanucci et al., 2008; Witt et al., 2004; Witt et al., 2005). The actual distances of the targets from the starting point of the observers were 5.79, 6.71, and 9.14 meters.

**Procedure**

Participants entered the laboratory, signed the informed consent agreement and were given full instructions. The experiment consisted of three phases. First, the mood manipulation was achieved in the experimental room, then the participants were taken outside for the distance judgment task, and finally they were taken back inside for the mood assessment.

**Phase 1:** Those in the anger condition were told that the experiment concerned problem solving under distracting conditions. They were given the anagrams and were told previous participants solved at least six or seven. They listened to a high-pitched sound and attempted to solve the anagrams for 5 min. In the relaxed condition, the participants listened to relaxing music for 5 min prior to being taken outside for phase two.

**Phase 2:** All participants were taken outside of the laboratory at Randolph-Macon to a flat area of land approximately 50 feet from the experimental room and instructed to judge the distances of three targets using the blind walking method. Participants in the anger condition were told they would later attempt another series of anagrams to keep them in an angry state. The participants were first taken to a starting point, with one target to their left, one in front of them, and one to their right. All participants gave blind walking judgments for the left, nearest target first, the middle, most distant target second, and the right, middle distant target third. This order was chosen because we felt that judging the targets in relative distance order would be too easy for the participants. After looking at a target, the participants would put on a blindfold and walk whatever distance they believed the target to be. The targets were removed by the experimenters as they were walking to avoid participants inadvertently hitting the targets. The participants were escorted back to the starting point where they would repeat the same procedure with the next target in the sequence. After completing the three blind walking estimations, the participants were taken back to the starting point and instructed to remove the blindfold. They were then asked to give a verbal estimation for each distance in feet. The participants gave their verbal estimations for the three targets in the same sequence they gave their blind walking estimations. Each participant gave six distance estimations in total: three blind walking and three verbal estimations.

**Phase 3:** Following the distance estimation phase, the participants were escorted back inside where their mood and trait hostility were assessed using the Anger Onset Scale and the MMPI Anger Scale. They were then debriefed, and the purpose of the experiment was revealed to them.

**Results**

An independent samples *t* test was performed to determine if the manipulation was successful, as
assessed by the Anger Onset Scale. Participants in the anger group became angrier than those in the relaxed group, \( t(40) = 2.08, p = .044; d = .455 \). The average temporary level of anger, as assessed by the Anger Onset Scale, for the anger group was 2.29 (\( SD = 1.67 \)), and the average for the relaxed condition was 1.48 (\( SD = 0.60 \)). Trait hostility, as assessed by the Minnesota Multiphasic Personality Inventory Anger Scale did not differ between the two groups. Interestingly there was no correlation between trait hostility and temporary anger (\( r = .12 \)).

Two 2 (mood) x 3 (distances) repeated measures ANOVAs, one for the verbal and one for the blind walking judgments, were performed. For the verbal judgments, there was no significant main effect for mood \( F(1, 40) = .005, p = .94, \eta^2_p < .001 \), nor was there a significant interaction between mood and distance \( F(2, 40) = .33, p = .71, \eta^2_p = .01 \). There was a significant main effect for distance \( F(2, 40) = 95.89, p < .001, \eta^2_p = .71 \). A Bonferroni post-hoc test revealed significant differences between the shortest and middle distance estimations (\( p = .003 \)), the middle and furthest distance estimations (\( p < .001 \)), and the shortest and furthest distance estimations (\( p < .001 \)) which indicates that both groups’ estimations increased with each distance regardless of the emotional state they were experiencing. Both groups severely underestimated all three distances verbally (Figure 1).

For the blind walking judgments, there was also no significant interaction between mood and distance \( F(2, 40) = .35, p = .71, \eta^2_p = .01 \). However, there were significant main effects for both distance \( F(2, 40) = 117.5, p < .001, \eta^2_p = .75 \) and mood \( F(1, 40) = 6.58, p = .01, \eta^2_p = .13 \). Post-hoc analysis for distance revealed significant differences between the shortest and furthest distance estimations (\( p < .001 \)) and between the middle and furthest distance estimations (\( p < .001 \)), but not between the shortest and middle distance estimations (\( p = .08 \)). The main effect for mood indicates that the anger group’s estimations were collectively greater than the relaxed group’s estimations (\( p = .05 \)), but the lack of interaction between the two variables indicates that the two groups’ estimations were not significantly different for any particular distance. Figure 2 shows that the angry participants’ three blind walking estimates were greater compared to the relaxed group.

We also calculated the accuracy of both group’s respective judgments by calculating each participants percentage error score. The percentage error scores were calculated by dividing the participant’s error (deviation from the actual distance) by the actual distance. For example, the average percentage error for the relaxed group’s shortest verbal estimation was -.34 meaning on average the relaxed group’s verbal estimations were 34 percent under the actual short distance (Figure 3). Figures 3 and 4 reveal the average percentage of error for both groups: three verbal (which were drastically underestimated) and three blind walking judgments (which were far more accurate).

**Discussion**

The purpose of this study was to examine the effects of anger and relaxation on relative distance perception. To our knowledge, this is the first study to document anger’s impact on distance perception. The results partially supported our hypothesis that anger would lead to relative overestimations of distance judgments when compared to relaxation. Participants in the anger condition collectively judged the three distances as being farther than those in the relaxed condition but only when blind walking, and not verbally as we also hypothesized. Because there was no interaction between mood and distance, there were no differences between the
groups’ blind walking estimations for any particular distance.

These results support findings from previous research that has shown that other negative emotions, specifically sadness and fear, lead to relative overestimations in distance and hill slant judgments (Riener et al., 2011; Stefanucci et al., 2008). The fact that sadness and fear lie on opposite ends of the arousal spectrum and both lead to relative overestimations suggests the valence of the emotion, and not the level of arousal, is the reason for biases in estimations. However, our findings that suggest anger may lead to overestimations relative to relaxation only offer a tentative step in this direction, given that we did not manipulate valence and arousal separately, and given that the verbal estimates did not differ between the groups.

The present study supported previous research in several other ways. In both conditions, participants underestimated the distances verbally which is consistent with previous research which has shown that people often underestimate distances when giving a verbal estimate or when performing a visual matching task regardless of their physiological or emotional state (Amorim et al., 1998; Profitt, 2006). The present study also demonstrated that blind walking is generally a more accurate measure than verbal estimates (Figures 3 & 4) which is consistent with previous research (Witt et al., 2005). The relative difference in blind walking estimates between the two groups also supports research suggesting blind walking estimates can be relatively different between conditions following a manipulation just as verbal estimates can be (Proffitt, 2006).

Why did anger appear to affect blind walking, but not verbal judgments? If anger affects the perception of spatial layout in the same way as other negative emotions, then the anger group’s verbal judgments would have been greater relative to the relaxed group’s which was not the case. It is possible that anger affected the participants’ walking response, and not necessarily their perception of the targets. Being in an angry or negative valence state, likely increases the energetic costs related to walking. Conversely, a relaxed positive valence state characterized by a decrease in blood pressure and heart rate likely decreases the energetic costs related to walking. This increase in energetic costs associated with walking could cause one to believe more energy is required to reach an object when in an angry state relative to being in a relaxed state.

Several factors limited this study. First, given that the study was conducted at a small liberal arts college, many participants knew the experimenter. This familiarity may have diminished the effect of the anger manipulation, unintentionally relaxing participants who knew the experimenter. This complication may have led participants to experience the high arousal aspect of anger, but not the negative valence. It is possible that the participants in the anger group might have reported higher levels of anger if they also experienced the negative valence of anger. In a similar vein, knowing the experimenters could have also deterred participants from reporting high levels of trait hostility.

Though there were shortcomings to the current study, our results suggest possible directions for future research. Previous research regarding mood’s effect on perception has relied on verbal reports only (Stefanucci et al., 2008; Stefanucci & Proffitt, 2009). We implemented blind walking estimations in the present study because previous research has shown manipulations other than mood can similarly affect verbal and blind walking reports (Philbeck & Loomis, 1997; Witt et al., 2005). The present study suggests that anger can result in further blind walking estimations relative to relaxation, so it is possible that other negative emotions like sadness and fear may lead to similar relative blind walking overestimations.
The current study partially supported previous research regarding negative emotions leading to relative overestimations in the perception of spatial layout. Future research should examine whether other negative emotions, such as boredom and anxiety, alter distance perception. In addition, future research should implement a third baseline condition between anger and relaxation. A third condition in which no mood manipulation is performed could help determine which emotion has the greater effect on perception. Furthermore, future research should implement a measure to determine the participants’ arousal level specifically in addition to a measure to report anger. We were unable to determine if arousal or valence played a more important role in the participants’ estimates, because we only used a scale to measure anger.

References

Stefanucci, J. K., Proffitt, D. R., Clore, G., & Parekh, N. (2008). Skating down...
a steeper slope: Fear influences the perception of geographical slant. Perception, 37, 321–323. doi: 10.1068/p5796


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Although most of the historical research of psychology and color has evaluated the influence of color on psychology, more recent research has assessed the impact of psychology on color, particularly the psychological context in which the color is perceived (Meier, D’Agostino, Elliot, Maier, & Wilkowski, 2012). Because the meaning of the color red depends on its context, red’s use in human communication is extensive and varied. It is associated with sexual signaling (Guéguen, 2012), nonsexual rewards (e.g., certain ripe fruits; Maier, Barchfeld, Elliot, & Pekrum, 2009), and aversive circumstances (e.g., blood from a wound or failure in achievement contexts; Elliot, Maier, Binser, Friedman, Pekrum & Pekrum 2007; Elliot, Maier, Moller, Friedman, & Meinhardt., 2007). Red has also been shown to enhance intersexual attractiveness in humans (Elliot et al., 2010; Elliot & Niesta, 2008; Guéguen, 2012), regardless of their acknowledgement to the effect (Kayser, Elliot, & Feltman, 2010). Elliot and colleagues have labeled this phenomenon the red effect on sexual attraction.

Emotion is part of human’s general psychological context. It influences perceptions, judgments, and actions. Therefore, it is very likely that emotional primes could operate as moderators of the red effect, although the relationships between certain emotions and the red effect have not yet been explored. In contrast, the red effect’s biological roots—particularly its role in sexual fitness—may make this phenomenon resistant to manipulation. This study seeks to explore the role of emotional manipulation as a moderator of the red effect on self-reported sexual attraction.

The Potential for an Inherent Phenomenon

The color red carries many different social, emotional, and sexual connotations across cultures. In primarily English-speaking nations, for example, red is frequently associated with love, lust, anger, and fear (Aslam, 2006). Although female fertility is most directly displayed through the blood of menarche and menses, there are both ancient and modern representations (e.g., The Scarlet Letter) of this red-sexuality connection (Hupka, Zaleski, Otto, Reidl, & Tarabrina, 1997; Jobes, 1962; Knight, Powers, & Watts, 1995). The pairing is not
exclusively a social or even human construct. In closely related primates such as chimpanzees and mandrills, displays of red on the female’s body (e.g., chest, genitalia) indicate ovulation and possible sexual receptiveness to mates (Gerald, 2003; Setchell & Wickings, 2004). These displays also increase male chacma baboons’ sexual response to female conspecifics, as demonstrated by an increase in masturbation and mounting attempts (Bielert, Girolami, & Jowell, 1989; Waitt, Gerald, Little, & Krasielburd, 2006). It is possible that the red effect may be an innate, diluted form of this sexual signaling, and that it has been passed down to humans from recent genetic ancestors. Alternatively, human biology may have developed its own color-cued sexual signaling, as increases in sexual arousal sometimes lead to flushed faces and chests and extra blood flow to the genitals.

**Neurological Structures and Emotions**

Although the neurological source of the red effect remains an unanswered question, it may be possible to suggest with what emotional structures the red effect interacts. This study did not evaluate brain activity in conjunction with the red effect, so neurological models are only briefly and tentatively proposed here. Previous neuroimaging studies have suggested that emotionally arousing, positive pictures elicit activity from structures in the brain that coordinate reward and desire, such as the nucleus accumbens (NAcc) and lateral prefrontal cortex (Gerdes et al., 2010; Irwin et al., 1996; Meseguer et al., 2007; Northoff et al., 2000). Presenting positive images may therefore activate the appetitive system of the brain and cause a subsequent increase in men’s feelings of attraction for a woman’s photograph. In contrast, negative images have previously been shown to activate neural structures of the avoidance emotional system, such as the amygdala and medial orbitofrontal cortex (Hariri, Mattay, Tessitore, Fera, & Weinberger, 2003; Northoff et al., 2000). The pictures’ negative valence could inspire feelings of fear or avoidance, particularly when they are followed by a presentation of the color red (Elliot et al., 2007, 2009), moderating the red effect and lowering overall attractiveness ratings.

**Psychological Context and the Red Effect**

Red’s influence over sexual interest may be innate, but it may also be susceptible to emotional manipulation. Self-reported sexual attraction has been shown to increase following increases in physiological arousal (Allen, Kenrick, Linder, & McCall, 1989; Dutton & Aron, 1974). Although this phenomenon has not been documented in conjunction with the red effect, it is likely that positively arousing images will enhance the red effect through this same mechanism. Some dangerous and fearful contexts seem to enhance sexual attraction, too, due to increases in physiological arousal. However, red has been shown to prime avoidance behavior in some threatening contexts (Elliot et al., 2009), so exposure to negatively arousing images could either enhance or suppress the red effect. Therefore, the effects of a strong emotional state on the red effect are worth further exploration.

To simulate highly pleasant and highly aversive emotional contexts, this study utilizes positive-, negative-, and neutral-valence pictures from the International Affective Pictures System (Lang, 1995; Lang, Bradley, & Cuthbert, 1997). We predict that a woman’s photo bordered in red will be perceived as more attractive than a woman’s photo bordered in blue following the presentation of emotionally neutral pictures. This condition should most closely replicate the setting of the original red effect experiment, and hence we predict a similar baseline red effect as reported by Elliot and Niesta (2008). Positively arousing pictures should stimulate the appetitive system and increase general physiological arousal (Bradley, Codispoti, Cuthbert, & Lang, 2001), producing higher attractiveness ratings overall. It is also possible that negative pictures will enhance attractiveness over neutral pictures due to a physiological misattribution of increased sexual desire (Allen et al., 1989; Dutton & Aron, 1974). However, negative pictures may lower attractiveness ratings by adversely affecting the context of the target woman’s border color, particularly in the red condition (Bradley et al., 2001; Elliot et al., 2007, 2009). The red effect may be selectively enhanced in either or both high-valence picture conditions due to red’s susceptibility to context and attractiveness’s susceptibility to an increase in physiological arousal. The results of this study may be used by perception psychologists, neuropsychologists, and marketing psychologists investigating the environmental factors that influence attraction.

**General Method**

**Overview**

Following university Institutional Review Board approval, participants were recruited through classroom announcements that described a study investigating how men form first impressions of women. All participants signed a general consent
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form prior to participation in the study. In the experiments reported herein, participants first viewed a series of 10 images, after which they viewed and ranked the attractiveness of a photograph of a woman surrounded by a colored background. The images were selected to assess the influence of generally positive stimuli, generally negative stimuli, and neutrally-valenced and nonarousing stimuli on the red effect.

Stimuli

The red color used to frame the target female photo was determined by using a color calculator (Lindbloom, 2012) to translate the values reported in the original red effect experiment (Elliot & Niesta, 2008) from the Commission Internationale de l’Eclairage Lightness*Color*Hue (CIELCh) color model to a red-green-blue (RGB) color model. The translated red (blue) RGB framing colors used were 183 (76), 70 (105), 60 (200).

Positively-arousing and low-arousing (neutral) images were selected from the IAPS (Lang, Bradley, & Cuthbert, 2008). We attempted to maximize participant arousal without using overly erotic images or direct images of faces, which might prime sexual ideation and possibly influence attractiveness judgments independent of emotional activation. Examples of highly arousing, positive images include pictures of white-water rafting, money, and cliff jumping (IAPS numbers: 8080, 8170, 8180, 8501, 1710, 5700, 5833, 8190, 8370, and 8420). On a scale of 1 to 9 (1 = not at all, 9 = extremely), the average valence rating was 7.83, and the average arousal rating was 6.35. The 10 neutral images all had low arousal ratings and had neither a distinctly attractive nor aversive association. Examples of low arousing, neutral images include pictures of filing cabinets, baskets, and ironing boards (IAPS numbers: 5740, 7004, 7006, 7010, 7040, 7080, 7090, 7217, 7705, and 7950). On a scale of 1 to 9, mean valence was 4.86, and mean arousal was 2.18. Negative images were selected so that the average arousal rating was roughly the same as that of the positive images, but valence values were roughly opposite (Lang et al., 2008). Examples of images presented included pictures of spiders, suicidal behaviors, and war (IAPS numbers: 6350, 9810, 9940, 6230, 6231, 8485, 9163, 6570.1, 1022, and 1202). The mean valence of the negative pictures was 2.55, and the mean arousal was 6.63 on the scale of 1 to 9. Although full depictions of faces were avoided, one image depicted a half-masked individual. Despite their negative valence, primarily disgusting pictures were not used. The pictures were initially randomly ordered, then presented in the same order to each participant through Microsoft Office PowerPoint 2007 for 4 s each.

The last image presented in each condition was the same photograph of a young woman. It was a digitized 2.5” x 3.5” photograph of a moderately attractive woman’s face and torso, and it was surrounded by either a red or blue background color filling the remaining monitor area. The picture of the woman had previously been used and rated for attractiveness by Elliot and Niesta (2008), who reported an average rating from 15 respondents of 6.73 on a 9-point attractiveness scale.

Participants

One hundred and eleven undergraduate men were recruited as volunteers for this research project. Ethnicity was not self-reported, although researchers noted that participants were primarily Caucasian. Average age of participants in Experiment 1 (N = 31) was 22.5 (SD = 3.95), whereas the average age of participants in Experiment 2 (N = 80) was 21.5 (SD = 3.43), with ages varying from 18 to 38. Participants were told that the experiment was a psychological research project exploring how men form first impressions of women, and all provided signed consent to participate. The men were also informed that they could potentially be compensated via extra credit or class credit, as well as earn an entry into a drawing for either a $25 or a $15 iTunes gift card. The drawings were held at the experiments’ conclusion. One individual received the $25 gift card, and another individual received the $15 gift card.

Procedure

All participants were exposed to the same slide-show of 10, randomly ordered IAPS images. The images were presented for 4 s each, after which participants viewed the photograph of the target woman for 5 s. The students were then given a questionnaire consisting of the following items: several decoy questions (e.g., participant demographics); two perceived attractiveness measures using the words “how pretty do you think the person is” and “how attractive...” on a 1 to 9 Likert-type scale (1 = not at all, 9 = extremely); and a question testing their awareness of the effect of color (i.e., a question asking them to guess the purpose of the experiment). The perceived attractiveness measures and awareness question replicated those used by Elliot and Niesta (2008), whereas...
the decoy questions were included to distract the participants from detecting the actual purpose of the experiment. Once the participants completed their questionnaire, they were debriefed about the nature of the research in which they were involved. Approximate total duration of the experiment was 5 min.

Data Analysis
The dependent variable consisted of participants’ responses to two key questions: “How pretty do you think this person is?” and “How attractive do you think this person is?” Scores on each question were averaged to create a composite attraction variable, which was then compared across conditions.

Experiment 1
In this experiment, participants were assigned to either a positive valence or a neutral valence picture condition. Experiment 1 was designed to assess for a general effect of emotional arousal on attractiveness.

Method
All images in this experiment were presented over computer monitors (17” Dell Ultrasharp 1907FPv LCD) in a quiet but open campus computer lab. Built-in brightness and saturation settings on individual monitors were not controlled for. A postexperimental sample of the computer monitors revealed a modal brightness of 100%, and its RGB settings were 100%, 96%, and 100% respectively.

Each participant was randomly assigned to one of four conditions in a between-subjects design: highly positively arousing pictures/red background (labeled AR), highly positively arousing pictures/blue background (AB), low arousing/red background (LR), and low arousing/blue background (LB). Thirty-one respondents participated in this study; all groups had eight participants except group AB, in which one participant’s data was misplaced during postprocedural analysis. The experiment began with the presentation of 10 IAPS images in a pseudorandom order for 4 s each. Following exposure to the 10 emotion-priming images, the young woman’s black-and-white photograph was presented on screen surrounded by either a red or blue background color, depending on experimental condition. Participants then completed the response questionnaire consisting of questions relevant to the attraction variable and distractor questions.

Results
Following Elliot and Niesta’s (2008) procedure, the questions “How pretty...” and “How attractive...” were averaged together to produce one mean attraction variable for each survey; these were then averaged together again to produce average attractiveness ratings for each condition (Figure 1). A 2 (picture) x 2 (color) analysis of variance (ANOVA) did not show a significant effect of picture type \( F(1, 27) = 0.24, p = 0.63, \eta^2_p = 0.01 \) or color, \( F(1, 27) = 2.65, p = 0.12, \eta^2_p = 0.09 \) on attractiveness. Nonetheless, a planned comparison \( t \) test was then performed on the data from the positive and neutral picture conditions, as the positive pictures were expected to influence the effect of red on attractiveness, and the neutral condition was predicted to replicate the findings of Elliot and Niesta (2008). The decision to directly proceed to planned comparison analysis, generated a priori from study hypotheses and regardless of the outcome of the omnibus ANOVA, has been previously justified by methodological researchers (e.g., Keppel, 1991). The first \( t \) test revealed a significant effect of red on attractiveness following positive pictures: \( t(13) = 3.01, p = 0.01, d = 1.67; M_{\text{red}} = 7.19 (SD = 0.70) \) versus \( M_{\text{blue}} = 5.96 (SD = 0.87) \). A subsequent \( t \) test on neutral picture data showed no significant effect: \( t(14) = 0.18, p = 0.86, d = 0.10; M_{\text{red}} = 6.44 (SD = 1.27) \) versus \( M_{\text{blue}} = 6.31 (SD = 1.53) \). Nonetheless, the average attractiveness rating in the LR condition was very similar to “red” ratings.
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reported in Experiment 4 of Elliot and Niesta (2008), and effect sizes were comparable \( (d = 1.11, 1.55, 0.73) \).

Discussion

Experiment 1 failed to report significant omnibus results, most likely because it was underpowered relative to the experiments in Elliot and Niesta (2008; i.e., their studies ranged from 11.50 to 31.50 respondents per condition, whereas the present experiment had 7.75 respondents per condition). However, our effect size was similar to that reported by Elliot and Niesta (2008) in their red versus blue, green, and white conditions (approximately one “point” on the 1 to 9 scale). Planned comparison \( t \) tests did reveal a significant red effect in the positive picture condition, but there was no effect of red on attractiveness in the neutral picture condition. The documentation of the red effect despite the high experimental noise (e.g., different monitors, any variance from the exact hue and lighting in the original red effect study) suggests that the red effect can be quite robust across experimental settings and hues.

Experiment 2

Experiment 2 was designed to include more participants, limit experimental noise by tightening the control over the study’s setting, and investigate the influence of both positively arousing and negatively arousing images on the red effect. The results of Experiment 1 seemed to suggest that positive pictures not only increase attractiveness ratings overall, they may have selectively enhanced the red effect. Negatively arousing pictures were hypothesized to increase physiological arousal and thus reported sexual attraction generally (i.e., via the misattribution theory of attraction). However, given that the interpretation of red relies on context (Elliot et al., 2009; Gerend & Sias, 2009; Guéguen, 2012), the influence of negative pictures on the red effect was less certain.

Method

Participants were randomly assigned to one of six possible experimental conditions: three between-subjects picture conditions followed by either a red or blue background (positive [labeled PR and PB], negative [NR, NB], and neutral [LR, LB]). Picture conditions were distinguished by three different sets of 10 images selected from the IAPS. The positive and neutral sets were the same as used in Experiment 1; negative images were selected based on ratings of arousal and valence so that average positive and negative arousal ratings were roughly the same but valence values were roughly opposite (Lang et al., 2008). Examples of images presented included pictures of spiders, suicidal behaviors, and war (IAPS numbers in NR and NB conditions: 6350, 9810, 9940, 6230, 6231, 8485, 9163, 6570, 1022, and 1202). The mean valence of the negative pictures was 2.55 and the mean arousal was 6.63 on a scale of 1 to 9 \( (1 = \text{not at all}, 9 = \text{extremely}) \). As in Experiment 1, nudity and full depictions of faces were avoided, although one image depicted a half-masked individual. Despite their negative valence, primarily disgusting pictures were not used.

The same red and blue background colors used in Experiment 1 were used in Experiment 2. Unlike the first experiment, all stimuli were presented on two 17" Dell Ultrasharp 1907FPVt LCD monitors, the brightness of which was set to 100%, and its RGB settings were 96%, 100%, and 100%, respectively. Furthermore, rather than a campus computer lab, all respondents completed the experiment alone in a small windowless lab with a single computer.

Results

Attractiveness questions were averaged as in Experiment 1. A 2 (color) x 3 (picture) ANOVA resulted in no significant main effects of color, \( F(1, 72) = 2.39, p = 0.13, \eta_p^2 = .03 \), picture condition, \( F(2, 72) = 0.10, p = 0.90, \eta_p^2 = .00 \), nor interaction, \( F(2, 65) = 1.32, p = 0.27, \eta_p^2 = .04 \); Figure 2. Although the omnibus ANOVA was not significant, our initial hypothesis of the overall red effect and heightened red effect in neutral and positive pictures, respectively, motivated our use of planned \( t \) tests for these two conditions (Keppel, 1991). However, unlike Experiment 1, a significant red effect was not found in either the positive or neutral picture condition.

To explore why the expected red effect found in Experiment 1 was not replicated in Experiment 2, a correlation was computed between attractiveness ratings and the question, “[On a scale of 1 to 9] To what extent did the color on which the picture was placed influence your rating?” This analysis was performed to see if the respondents of Experiment 2 were more suspicious of the purpose of the experiment, which might influence attractiveness or reported ratings. As displayed in Figure 3, a significant negative correlation was found between this question and attractiveness ratings \( (r = -0.25; p = .05) \). As no significant correlation
between these two variables was found in Experiment 1, some change from Experiment 1 to Experiment 2 may have influenced respondents’ perceptions and/or behavior. Changes in environment, and their potential effects on attractiveness ratings, are discussed below.

**General Discussion**

**Emotional Arousal and the Red Effect**

The two experiments in this study investigated the impact of emotional arousal on the effect of color on men’s attractiveness ratings (red effect). Participants were presented a series of either emotionally positive or neutral (Exp. 1) or emotionally positive, negative, or neutral (Exp. 2) pictures, and then asked to rate the attractiveness of a woman from a photo bordered in either red or blue. The ANOVA of Experiment 1 was not significant, but a planned comparison analysis motivated by published reports partially replicated previous findings that a red border generally increased men’s ratings of a target woman’s attractiveness (Elliot & Niesta, 2008; Kayser et al., 2010), significantly so only when participants were primed with positive pictures. These findings were primarily hindered by a low number of participants in Experiment 1, which resulted in a nonsignificant ANOVA. However, the effect size of red over blue within the positive picture condition was roughly the same as was found in multiple chromatic conditions of Elliot and Niesta, 2008 (i.e., \( d = 1.67 \) compared to \( d = 1.55 \)). Given the similar trend, our results in the positive picture condition arguably support the original red effect findings.

Due to the weak ANOVA results of Experiment 1, Experiment 2 was conducted with a greater sample size. To better control for environmental variance, the experimenters utilized a closed space (a psychology lab) rather than an open space (a campus computer lab). Experiment 2’s results were also nonsignificant in the positive picture and neutral picture conditions. No planned-comparison analysis was performed on the negative picture condition because the results of negative picture priming on the red effect were not predicted prior to conducting the experiment.

Given the nonsignificant findings of Experiment 2, a final analysis was performed to investigate if any nonexperimental factors may have affected results from Experiment 1 to Experiment 2. The analysis focused on participants’ suspicion levels, which were estimated by using participants’ responses to the question, “[On a scale of 1 to 9]

To what extent did the color on which the picture was placed influence your rating?” As respondents were not informed of the importance of color prior to the study, those who rated its importance higher were likely more suspicious of the influence of color than their peers. Experiment 2’s responses to this question were significantly negatively correlated with attractiveness ratings; Experiment 1’s responses had no significant correlation. That is, in Experiment 2, the more participants believed that color might have had an influence on their judgments, the worse their ratings of the target woman’s photo.

**The Effects of Environment and Suspicion on the Red Effect**

One possible explanation for mitigated attractiveness ratings in Experiment 2 versus Experiment 1 is that respondents in Experiment 2 felt comparatively higher suspicion and distrust. It is possible that the change in experimental setting contributed to this significant negative correlation. Experiment 1 was conducted in an open computer lab on campus, where extraneous students were asked to be quiet during the study but allowed to remain in the room. Experiment 2 was conducted in a smaller, closed lab within the psychology department. Due to the isolated setting of Experiment 2 and the simple nature of the task, it is possible that significant emotional and cognitive interference

![FIGURE 2]

Mean Attractiveness Ratings of Experiment 2 With Standard Error Bars

The two leftmost bars are attractiveness ratings for the woman bordered in red and blue, respectively, following positively arousing pictures. The two middle bars represent attractiveness ratings for the woman bordered in red and blue, respectively, following low-arousing pictures. The two rightmost bars are attractiveness ratings for the woman bordered in red and blue, respectively, following negatively arousing pictures.
may have occurred in Experiment 2 that was not present in Experiment 1. Specifically, isolated participants may have become mildly anxious and untrusting, whereas participants in a computer lab may have felt deindividuated and thus less anxious (Diener, 1980). In several studies, trust has been shown to be a powerful contributor to interpersonal and romantic attraction (Regan, Kocan, & Whitlock, 1998; Singh et al., 2009), so a lack of trust within the participants of Experiment 2 could have taken away from the target woman’s attractiveness, even if the participants were suspicious of the task itself and not the nature of the woman.

Respondents in Experiment 1 had extraneous peers and familiar, open settings to potentially distract them, which may have caused several reactions, two of which are proposed below. First, extraneous factors in the campus computer lab’s open environment (e.g., other students) could have kept participants from speculating too deeply about the purpose of the experiment. Previous studies on the effects of distractor tasks on attentive regulation of emotional experience support the idea that the red effect can be attentively moderated (Knight et al., 2007), and participants in Experiment 2 may have moderated their answers more than participants in Experiment 1 because they did not have extraneous distractors. Indeed, Elliot and Niesta (2008) and Kayser and colleagues (2010) write about the power behind the red effect despite a lack of conscious awareness to it.

Second, diffused identity could have suppressed the moderation of the red effect in Experiment 1. By being in the presence of their peers, participants in Experiment 1 may have felt less vulnerable to potential negative consequences by reporting more extreme scores of attractiveness. Furthermore, in both experiments, the participants physically handed the completed questionnaires to two female experimenters. Even though the questionnaires were anonymous, the isolation of Experiment 2 may have made the participants more aware of the salience of their judgments, and, anticipating the possibility of criticism or derision at being “duped” or laying bare their opinions of a woman, moderated their responses.

**Neurological Models for the Red Effect**

One line of research suggests that sexual responsiveness to the color red may be mediated by the limbic system, particularly the amygdala, which has shown activation upon viewing positive-valence faces (e.g., attractive faces, happy expressions; Aharon et al., 2001; Kranz & Ishai, 2006; Winston, O’Doherty, Kilner, Perrett, & Dolan, 2007) and has been implicated in sexual motivation and responsiveness. Neuroimaging studies have shown an activation of paralimbic areas and the amygdala in men presented with sexually arousing visual stimuli (Hamann, Herman, Nolan, & Wallen, 2004; Stoléru et al., 1999). Everitt (1990) suggested that the amygdala may be involved in associations that predict sexual reinforcement, and Newman (1999) implicated the medial extended amygdala in male mating behavior, female sexual behavior, and various modes of aggression. However, the amygdala has also been shown to be involved in the processing of fear and anger (Whalen et al., 2001), and because red is avoided by infants who have just viewed an angry face (Maier et al., 2009), the amygdala may process red signaling in both positive and negative contexts. Furthermore, if the amygdala does respond to red, it is very likely that it connotes arousal but not valence to the inferior prefrontal cortex, which is currently viewed as the neural site for assessing attractiveness (O’Doherty et al., 2003; Winston et al., 2007).

A second hypothesis posits that dopaminergic (DA) reward pathways through the nucleus accumbens (NAcc) may link the color red to an increase in sexual attraction. Studies have shown that, in rats, dopamine levels within the NAcc and medial preoptic area increase both during the presentation of sexually relevant stimuli (Pfaus et al, 1990) and copulation (Hull, Du, Lorrain, & Matuszewich, 1995; Mas, Gonzalez-Mora,
Methodological Considerations
Methodological limitations may have diminished the strength of our findings. First, the red and blue colors used for this experiment were derived through an online color converter, and the investigators subjectively interpreted by the red color as more pink or “salmon.” This color may not have directly mimicked that used by Elliot and Niesta (2008), thus leaving the present red effect findings incompatible with previous findings. Reviews of color studies have called these oversights a common issue, making replications harder and data potentially less valid (Valdez & Mehrabian, 1994). However, given the strength of the red effect we found in the positive picture condition of Experiment 1, the possibility of incompatibility is not likely. Experiment 1’s results suggest that the red effect can be observed across multiple hues, with different lighting and saturation settings, even if the effect is somewhat subdued at certain settings. This is especially true as multiple monitors were used in Experiment 1, although efforts made post-data-collection showed a modal brightness and saturation that was not very different from the settings used in Experiment 2.

Power was another concern for both experimental conditions. All of the experiments of Elliot and Niesta (2008) had considerably more respondents in each condition, although Experiment 2 approximated the amount of participants in the first experiment described in Elliot and Niesta (2008). ANOVA results of Experiment 1 were limited by the number of participants, but the effect size of the positive picture condition mimicked the effect size previously seen in the chromatic settings used in Experiment 1, although efforts made post-data-collection showed a modal brightness and saturation that was not very different from the settings used in Experiment 2.

It seems clear that determining attractiveness involves contributions from several neurological structures, which makes it difficult to pin-point a single location in the brain for the red effect. However, as this study did not directly measure neurological activity, we have only tentatively suggested likely structures for the red effect. Future neuroimaging studies could attempt to piece together more concrete models.
effect in more explicitly hostile circumstances to explore the moderating effects of social threat and arousal on the red effect.

References


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The patient-provider relationship has a strong impact in the field of medicine and the social sciences in terms of health outcomes, patient satisfaction, and treatment adherence (Ciechanowski, Katon, Russo, & Walker, 2001; Fox & Chelsa, 2008; Kim, Kim, & Boren, 2008; Wright et al., 2006). The patient-provider relationship can be defined as “a dynamic interactional process in which the patient and provider collaborate to carry out negotiated mutual goals in a shared partnership” (Kim et al., 2008, p. 85). Although this definition is ideal, it does not always occur due to time constraints (e.g., primary care setting) and lack of provider training in health communication (Wright et al., 2006).

Minimal training in health communication, time pressures, and economic constraints in the area of managed care can inhibit a provider from engaging in a meaningful clinical relationship with their patients (Fox & Chelsa, 2008). The patient-provider relationship can influence numerous aspects of health care including health outcomes, chronic disease management, treatment adherence, patient satisfaction, and the possible delaying of needed care (Blanchard & Lurie, 2004; Fox & Chelsa, 2008). Matthias et al. (2010) examined patient-provider communication with chronic pain patients and found that patient-centered communication skills not only benefit the patient, but can also alleviate the strain and burden experienced by primary care providers. Stewart (1995) reviewed 21 randomized studies on physician communication and patient outcomes, and determined that providing information, fostering collaboration, and providing support led to improvements in patient outcomes concerning physical and emotional functioning, symptom reduction, and overall quality of life (Fox & Chelsa, 2008).

The collaborative care model has also been linked to positive treatment outcomes (Lee, Mericle, Ayalon, & Arean, 2009; Williams, Unutzer, Lee, & Noël, 2009). Von Korff et al. (1997) describe the collaborative care model as having four components: (a) patient-defined problems along with provider-identified medical problems; (b) collaborative goal setting and treatment

ABSTRACT. The collaborative care model and the patient-provider relationship are associated with encouraging treatment outcomes in medical settings. In order to ascertain if these variables intersected, the goal of this study was to examine the relationship between attitudes toward collaborative care and attitudes toward patient-provider communication in nonphysician clinician students. Sixty-one students currently enrolled in either physician assistant or nurse practitioner programs completed the Physician Belief Scale (PBS) and the Attitudes Toward Health Care Teams Scale (ATHCTS). We found that physician assistants ($M = 85.6, SD = 7.6$) have more positive attitudes toward collaborative care than nurse practitioners ($M = 82.1, SD = 10.9$). These findings have important implications regarding the impact of interdisciplinary care on attitudes toward collaborative care and patient-provider communication.
planning; (c) self-management training; and (d) active follow-up to monitor health status. A meta-analysis performed by Gilbody, Bower, Fletcher, Richards, and Sutton (2006) indicated that in a collaborative model, at least two of the three types of clinicians (case manager, primary care clinician, mental health provider) should work in a primary care setting. The meta-analysis determined that collaborative care models improved treatment adherence as well as health outcomes. It was concluded that in the U.S., there was sufficient evidence to indicate that collaborative care was an effective health care model. Past studies have also indicated that provider attitudes toward collaborative care improved after exposure to working on interdisciplinary teams (Upshur & Weinreb, 2008; Westheimer, Steinley-Bumgarner, & Brownson, 2008). Because of the effectiveness, collaborative care teams are now considered beneficial not only in health care settings (e.g., primary care, geriatrics, pediatrics, oncology, pain management), but for health conditions as well (e.g., coronary heart disease, Alzheimer’s Disease, depression; Alexopoulos et al., 2009; Gallaher et al., 2006; Hunkeler et al., 2006; Katon et al., 2002; Leipzig et al., 2002; Rollman et al., 2009).

The cohesiveness of a collaborative care team can have an impact on patient health outcomes. Significant reductions in patient mortalities have been found where physicians and nurses collaborated effectively and maintained open communication (Leipzig et al., 2002). Although collaborative care can be effective, seven challenges have been determined: differing perspectives, role competitions, differing perceptions of roles, differing socialization processes, physician dominance, and differing perceptions of the physician’s value of collaboration (Leipzig et al., 2002). In addition to these challenges, similar challenges to collaboration have been identified: maintaining professional authority, differing perceptions of professional jargon, role stereotyping, and practical issues (e.g., sharing space; Leipzig et al., 2002).

Despite the effectiveness of collaborative care, team training, communication skills, and attitudes towards the collaborative care framework have not been the focus of education programs for physician assistants or nurse practitioners (Leipzig et al., 2002). Past studies examining health professional student attitudes toward collaborative care identified that “lack of confidence and assertiveness in team situations and perceived problems with the doctor/nurse professional relationship” served as barriers to effective teamwork (Leipzig et al., 2002, p. 5). Past literature has reviewed the use of multidisciplinary educational programs and the results indicated that the trainees appreciated the idea of working on collaborative teams but there were no significant changes in how the trainees viewed other disciplines (e.g., nursing, mental health, physical/occupational therapy; Leipzig et al., 2002).

Summary and Study Overview

Much of the literature on patient-provider communication and attitudes toward collaborative care focuses on physicians and medical students. However, minimal literature exists for nurse practitioners and physician assistants, and more specifically, nurse practitioner and physician assistant students. Little is known about nonphysician clinician student attitudes towards patient communication and attitudes towards collaborative care. Sibille, Green, and Bush (2010) emphasized assessing student attitudes in clinical education because attitudes and beliefs form the foundation of action. Thus, in order to indirectly improve patient-centered care, focusing on attitudes toward patient-provider communication and collaborative care during training is of importance (Sibille et al., 2010). To our knowledge, this is the first study to examine the relationship between attitudes toward patient-provider communication and attitudes toward collaborative care in nonphysician clinician students. The following research questions were examined:

1) Are positive attitudes toward collaborative care a predictor of positive attitudes toward patient-provider communication?

2) Is there a difference in attitudes toward collaborative care and patient-provider communication between physician assistant and nurse practitioner students?

According to the Theory of Planned Behavior (Ajzen & Gilbert-Cote, 2008), attitudes can positively or negatively impact the valued behavior. As the collaborative model of health care continues to develop in not only primary care settings, but in other health settings as well, it is important to examine attitudes toward patient care and the possible impact of these attitudes on patient health outcomes and the effectiveness of the health care team.
Method

Participant Characteristics
Sixty-one students who were enrolled in either physician assistant or nurse practitioner programs located in Missouri, Oklahoma, Arkansas, and Kansas participated in the study. The following demographic information was collected: age, participant sex, race/ethnicity, type of training program, current school status, and current year in program. Additional questions regarding the following were also asked: area of future clinical practice (e.g., primary care, women’s health, geriatrics), prior formal communication skills training, prior experience working on an interdisciplinary team, and the average number of direct patient contact per week. Participants were mostly White (87.1%) and in their first or second year of schooling (45.9%). Approximately 81% of the nonphysician clinician students were women and 18% were men with the mean age being 32.59 years ($SD = 9.71$). Demographic information regarding the study population can be found in Table 1.

Sampling Procedure
All of the recruitment letters were e-mailed by the principal investigator to the department chairs/program directors at each institution with a request that the recruitment letters be disseminated to the students. The participants received an electronic survey via e-mail using the online survey tool Qualtrics. Data collection for this study occurred over a 3-week period. In the first week of data collection, participants were sent a recruitment letter through e-mail that contained the survey link. In the beginning second week of data collection, a reminder letter containing the survey link was sent through e-mail. During the third week of data collection, a final reminder letter containing the survey link was sent through e-mail. If participants wished to be entered into the $25 Wal-Mart gift card drawing, they were prompted to enter their e-mail address which was used for the drawing.

Instruments

Attitudes Toward Health Care Teams Scale (ATHCTS). This scale measures attitudes about whether collaborative care teams have an impact on patient outcomes (Heinemann, Schmitt, Farrell, & Brallier, 1999; Hyer, Fairchild, Abraham, Mezey, & Fulmer, 2000). The questionnaire consists of 21 items with three subscales: (a) attitudes toward team value (11 items), (b) attitudes toward team efficiency (5 items), and (c) attitudes about the physician’s shared role on the team (5 items; Hyer et al., 2000). Responses range from 1 (strongly disagree) to 6 (strongly agree) with higher scores indicating more positive attitudes. The questionnaire was developed as a reliable and valid measure for assessing beliefs toward communication and higher scores indicating more positive beliefs toward patient communication. The PBS was established as a reliable instrument ($\alpha = 0.87$). Additional psychometric properties can be found in the Hyer et al. study.

Physician Belief Scale. The Physician Belief Scale (PBS) assesses beliefs regarding psychosocial aspects of patient care as well as patient-provider communication addressing psychosocial issues (Ashworth, Williamson, & Montano, 1984). The questionnaire consists of 32 items with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores range from 32 to 160 with lower scores indicating more positive beliefs toward patient communication and higher scores indicating more negative beliefs toward patient communication. The PBS was established as a reliable and valid measure for assessing beliefs toward communicating with patients about psychosocial issues ($\alpha = 0.88$; Ashworth, et al., 1984; Jenkins & Fallowfield, 2002; Morgan et al., 2010).

Results
A two-way ANCOVA was conducted to determine the effect of program type (nurse practitioner versus physician assistant) and prior experience with interdisciplinary teams on attitudes toward collaborative care when controlling for hours of direct patient care per week. There was a significant main effect for program type, $F(1, 51) = 4.34, p = .04, \eta^2_p = .08$, and a main effect for prior interdisciplinary experience approaching significance, $F(1, 51) = 3.54, p = .07, \eta^2_p = .07$. The interaction between program type and prior interdisciplinary experience was not significant and the covariate of hours of direct patient care per week did not significantly influence the dependent variable of attitudes.
toward collaborative care. The physician assistants ($M = 85.6, SD = 7.6$) in this study had significantly more positive attitudes toward collaborative care than nurse practitioners ($M = 82.1, SD = 10.9$) and prior experience on an interdisciplinary team ($M = 85.2, SD = 10.9$) resulted in more positive attitudes toward collaborative care, compared to those with no such prior experience ($M = 81.3, SD = 7.3$).

A two-way ANCOVA was conducted to determine the effect of program type and prior communication skills training on attitudes toward patient-provider communication when controlling for hours of direct patient care per week. There was not a significant main effect for program type but a significant main effect was found for prior communication skills training, $F(1, 48) = 4.53$, $p = .04$, $\eta^2_p = .07$. The interaction between program type and prior communication skills training was not significant. The covariate of hours of direct patient care per week did not significantly influence the dependent variable of attitudes toward patient-provider communication. The physician assistants ($M = 80.8, SD = 8.6$) and nurse practitioners ($M = 81.0, SD = 12.3$) in this study had similar attitudes toward patient-provider communication, and those with prior communication skills training ($M = 83.4, SD = 12.4$) had significantly more positive attitudes toward patient-provider communication, compared to those with no prior experience on interdisciplinary teams ($M = 77.6, SD = 7.2$).

### Discussion

In regards to the first research question, positive attitudes toward collaborative care did not significantly predict positive attitudes towards patient-provider communication for physician assistants and nurse practitioners. Furthermore, in regards to the second research question, physician assistants and nurse practitioners did not significantly differ in their attitudes toward collaborative care and patient-provider communication. However, further analyses were performed to control for direct patient contact per week: assessing differences in attitudes toward collaborative care between program types as well as differences between individuals with prior interdisciplinary experience and those with no experience. Regarding program type differences, physician assistants’ positive attitudes towards collaborative care were significantly higher than nurse practitioners’. Furthermore, prior experience working with interdisciplinary teams resulted in more positive attitudes toward collaborative care.

### Table 1

Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>Participant Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>50</td>
<td>80.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>11</td>
<td>17.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td>61</td>
<td>32.59</td>
<td>9.71</td>
<td></td>
</tr>
<tr>
<td>Type of Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>27</td>
<td>43.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>34</td>
<td>54.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American/Black</td>
<td>3</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>2</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>54</td>
<td>87.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latin American</td>
<td>2</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiracial</td>
<td>1</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year in the Program</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1st Year</td>
<td>23</td>
<td>37.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Year</td>
<td>28</td>
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<td></td>
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<td>3rd Year</td>
<td>8</td>
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<tr>
<td>4th Year</td>
<td>1</td>
<td>1.6</td>
<td></td>
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<tr>
<td>Other</td>
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<tr>
<td>Current School Status</td>
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<tr>
<td>Full-time</td>
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<td>59.7</td>
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<tr>
<td>Part-time</td>
<td>24</td>
<td>38.7</td>
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<tr>
<td>Area of Future Practice</td>
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<td></td>
</tr>
<tr>
<td>Primary Care</td>
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<td></td>
</tr>
<tr>
<td>Family Medicine</td>
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<td>17.7</td>
<td></td>
<td></td>
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<tr>
<td>Internal Medicine</td>
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<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td>6</td>
<td>9.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Surgery</td>
<td>3</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>7</td>
<td>11.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatry</td>
<td>3</td>
<td>4.8</td>
<td></td>
<td></td>
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<tr>
<td>Hospital/In-patient</td>
<td>9</td>
<td>14.5</td>
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<tr>
<td>Geriatric Medicine</td>
<td>3</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women’s Health</td>
<td>3</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of Direct Patient Care (per week)</td>
<td>14.93</td>
<td>18.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Communication Skills Training</td>
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<td></td>
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<tr>
<td>Yes</td>
<td>35</td>
<td>56.5</td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td>26</td>
<td>41.9</td>
<td></td>
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<tr>
<td>Prior Experience With Team Care</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36</td>
<td>58.1</td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>40.3</td>
<td></td>
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</tr>
</tbody>
</table>
than in those with no experience, and this finding approached significance.

Overall, it appeared physician assistants have more positive attitudes towards collaborative care than nurse practitioners. This could be because physician assistant students have less experience with working on interdisciplinary teams (44%) compared to the nurse practitioner students (72%) in this study, therefore they may not have as many clinical experiences to draw from as compared to the nurse practitioner students. However, the reason for this difference was not clearly revealed, and thus future research could assess possible reasons for this difference.

We believe increasing positive attitudes towards collaborative care may translate to more cohesion within collaborative care teams (Ajzen & Gilbert-Cote, 2008). Therefore, the finding that prior experience with interdisciplinary teams positively influences nonphysicians’ attitudes toward collaborative care, suggests that efforts to expose students in training to work on interdisciplinary teams may prove to be beneficial. This may be done through practicum experiences, educational opportunities, and a program atmosphere that promotes the importance of collaborative care.

Another analysis was conducted to determine the effect of program type and prior communication skills training on attitudes toward patient-provider communication while controlling for hours of direct patient contact. Although there appeared to be no significant difference between physician assistant and nurse practitioner’s attitudes towards patient-provider communication, there was a significant difference between individuals who received prior communication skills training and those who had not. Specifically, those who received prior communication skills training had more positive attitudes toward patient-provider communication when compared to those who had not received such training.

Much like the previous finding of individuals with previous interdisciplinary experience, individuals with prior communication skills training have more positive attitudes towards patient-provider communication. This highlights the need for education programs to promote and offer such skills training. As research continues to show a positive relationship between patient-provider communication and better health outcomes, non-physician clinician educational programs should consider making communication skills training a priority. Currently, there are guidelines and models of communication skills training for medical education, but there is still a lack of evidence-based training programs that evaluate the efficacy of these programs (Wong, Saber, Ma, & Roberts, 2009).

**Limitations and Future Research**

As far as limitations for this study, self-report measures were utilized. Thus, individuals may not have been objective in their reporting of attitudes toward collaborative care and patient-provider communication. Also, the study consisted only of physician assistant and nurse practitioner programs from the Midwest United States (i.e., Missouri, Oklahoma, Arkansas, and Kansas). Furthermore, 87.1% of the individuals in this study were White and 80.6% were women. Therefore, results and findings of this study may be difficult to generalize to other parts of the country and to other demographics.

It is important to discuss the effect size for the two significant findings: the main effect for prior communication skills training ($\eta_p^2 = .07$), and the main effect for program type ($\eta_p^2 = .08$). These are considered medium effect sizes (Levine & Hullett, 2002) and their magnitude may have been influenced by the small sample size for the two groups used in the study (Levine & Hullett, 2002).

Lastly, much of the past literature on collaborative care attitudes was focused on primary care. Only 15 participants in the current study’s sample identified primary care as a future practice goal which could have also impacted the outcomes of the study. Having a study population with more trainees interested in specializing in primary care or family medicine may have resulted in attitudes towards collaborative care predicting attitudes toward patient-provider communication.

We found that previous experience with interdisciplinary teams produced more positive attitudes toward collaborative care compared to individuals who did not have such experience. However, the type of interdisciplinary team exposure or with what other professions was unknown. As for future research, it may be beneficial to assess what types of interdisciplinary team experience produce positive attitudes toward collaborative care.

Although it is assumed that positive attitudes towards collaborative care would lead professionals to become more involved with such teams, this causal relationship remains unknown (Ajzen & Gilbert Cote, 2008). Likewise, even if it is assumed that having more positive attitudes toward patient-provider relationship would improve
such relationships, it is unknown if such attitudes translate to an increase in positive patient-provider interactions. Thus, future research that is longitudinal in nature could focus on how attitudes toward collaborative care and the patient-provider relationship impact the individuals’ professional behavior.

Further research is suggested to assess this study’s findings of differences between physician assistant and nurse practitioner attitudes toward collaborative care, when controlling for direct patient contact hours. In our study, physician assistants have more positive attitudes towards collaborative care than nurse practitioners. If this is replicated, research into the causes of this difference should be a focal point. Additionally, future research on the most efficient way for nonphysician clinician educational programs to promote positive attitudes towards collaborative care and patient-provider relationship can be a point of emphasis.

Conclusion
This is the first study to our knowledge examining attitudes toward collaborative care and patient-provider communication in a nonphysician clinician student population. Overall, when controlling for direct patient contact hours per week, physician assistants appeared to have significantly more positive attitudes towards collaborative care than nurse practitioners. Furthermore, individuals who had prior exposure to interdisciplinary teams had more positive attitudes than individuals who did not have such exposure. Lastly, again controlling for direct patient contact hours per week, individuals who had prior communication skills training had more positive attitudes towards the patient-provider relationship than individuals who did not have such training.

According to our findings, physician assistants may have more positive attitudes towards collaborative care than nurse practitioners, when controlling for direct patient contact hours. This difference should most certainly be a focus of future research. Additionally, it was encouraging to see prior experience on interdisciplinary teams and past training in communication skills training increased one’s attitudes toward collaborative care and patient-provider relationships, respectively. Due to past research indicating the benefits that collaborative care and the patient-provider relationship have on health outcomes and treatment adherence, it is promising to see a positive link between attitudes towards collaborative care and the patient-provider relationship. This information will be of importance for the ever-changing practices of primary care delivery and as new trainees and recent graduates begin to adopt the collaborative care model as part of their clinical practice.

References


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Perceptions of Competency as a Function of Accent
Cheryl J. Boucher, Georgina S. Hammock*, Selina D. McLaughlin, and Kelsey N. Henry
Georgia Regents University

ABSTRACT. Verbal communication provides explicit cues about groups and individuals (Lambert, Hodgson, Gardner, & Fillenbaum, 1960). Accented speech reflects individuals’ characteristics such as race, biological sex, social class, and education and functions to categorize individuals according to group membership from which stereotyped evaluations may arise (Riches & Foddy, 1989). Specifically, regional dialects elicit evaluative judgments based on preconceived stereotypes associated with a geographical region (Schenck-Hamlin, 1978). The distinctiveness of the Southern region, due in part to perceptions of its nonstandard dialect, has been consistently established in linguistic and folk dialectology research (Fridland, 2008; Fridland & Bartlett, 2006; Preston, 1993). Based on these findings, the current study evaluated the effect of the Southern accent on perceptions of speaker competency. Regional accent (i.e., Southern and neutral) was systematically varied in audio taped instructions presented to participants. We expected that participants would evaluate the neutral speaker's abilities more positively than the Southerner. As predicted, participants viewed the neutral accented speaker as more competent (e.g., grammatically correct, effective instructor, professional manner) than the Southerner.

Research on the formation of stereotyped evaluations has generated a plethora of empirically derived theories that offer insight into the many nuances of social interaction (Billig & Tajfel, 1973; Jussim, Coleman, & Lerch, 1987; Tajfel, Billig, Bundy, & Flament, 1971). By expanding the scope of social stereotyping to include the influence of regional dialects as a determinant of evaluative perceptions, researchers have consistently established the effect of dialect on accuracy of group identification and categorization of accented speakers’ group membership (Ellis, 1967; Gardner & Taylor, 1968; Lambert et al., 1960; Miller, 1975; Riches & Foddy, 1989; Strongman & Woosley, 1967; Vorster & Proctor, 1976). The present study extends previous findings of evaluations of various American accents by investigating stereotypes of a Southern regional accent.

One area noted for its distinct accent is the southeastern region of the United States. The Southern stereotype reflects the region’s unique distinctiveness characterized by exclusive “regional types” (Reed, 1986) that are both positive and negative. The Dictionary of American Regional English (Hall, 2002) identifies redneck and the American Heritage College Dictionary (Picket et al., 2002) identifies bubba as slang terms synonymous with people from the South. Both derogatory characterizations connote educational and intellectual inferiority. Moreover, Hartigan (2003, p. 96) argues that slurs associated with poor rural Whites (i.e., hillbilly, redneck, and white trash) exist within a

*Faculty mentor
Competency and Accent

Boucher, Hammock, McLaughlin, and Henry

racial construct that partially emanate from perceived “rural versus urban identity and the relative degrees of education vs. backwardness.” Stigma associated with the South also emerges from studies evaluating geographical and dialectical region distinctiveness on perceptions of regional attributes.

Sociolinguistic research focusing on dialectal mapping (Preston, 1993) substantiates the Southern region’s uniqueness. Participants in these studies consistently identified the accurate geographical boundaries of the Southern and Northern divide more often than other geographical regions. Participant evaluations for language correctness produced lower ratings for the distinctive characteristics of the Southern accent than non-Southern accents. These participants labeled all regional speech areas, except for the South, in positive terms (i.e., standard, regular, normal, or everyday). Further supporting the potent influence of accent on evaluative judgments, Southern participants rated their own regional accent lower on language correctness and education measures than they did a non-Southern accent (Fridland, 2008; Fridland & Bartlett, 2006; Fridland, Bartlett, & Kreuz, 2005).

The well documented history of the Southern stereotype operates along a continuum that highlights the disparate range of characteristics associated with the admired Southern gentlemen and the backward redneck (Bernstein, 2000; Reed, 1986). Although many of the common Southern pejoratives have a distant historical connotation (Hartigan, 2003), mass media continue to strengthen the stereotype’s negative aspects through exploitation of the inferior Southerner (Cooke-Jackson & Hansen, 2008). For example, in 2003 a major television network cancelled pilot programming for a modern “hillbilly” reality show in response to pressure from hundreds of businesses, private and public organizations, and 44 members of the House of Representatives (Center for Rural Strategies, 2003). In fact, Senator Robert Byrd repudiated the program’s overt representation and perpetuation of the Southern stereotype (Congressional Record, 2003). Such widespread concern with programming subject matter reflects the persuasive power of both the regional stereotype and media’s portrayal of the Southerner. Moreover, according to Van Dijk (1987), mass media represent a major source of content for everyday communication and, therefore, act as an agent of attitude formation. Further establishing the entrenched position of the Southern stereotype, Reed (1986) argues that a distinct and unique regional classification, unlike any other social categorization, emanates from historical, literary, and media representations of the Southerner.

Although linguistic research on Southern speech (Fridland, 2008; Fridland & Bartlett, 2006; Fridland et al., 2005) adds support for Reed’s (1986) Southern regional typology, these findings emerged in the context of a repeated list of words that was synthesized to accentuate distinctive Southern and Northern vowel variations inherent in each accent. In other words, participants evaluated how Southern each word sounded and made judgments about the degree of correctness and education level of the speaker based on characteristics associated with each region. The current study is designed as a conceptual replication of Fridland and Fridland et al.’s work in that we intended to explore how a Southerner and a speaker without a discernable accent are evaluated when delivering an identical audio presentation. In order to avoid additional confounds arising from differences in individuals’ vocal characteristics and message content, we employed a modified version of Lambert et al.’s (1960) matched-guise technique in conjunction with a scripted neutral message. The matched-guise technique is designed such that a target speaker produces multiple verbal presentations using different accents. To this end, we hypothesized that a Southern accented speaker would be evaluated as less competent than a speaker with a neutral accent when explaining how to download music from a compact disc to an iPod.

Method

Participants

Twenty-one men and 43 women were recruited from a moderately sized Southeastern university. The number of participants was slightly lower than the 69 participants suggested by the power analysis. The study was advertised in psychology classes and through the university’s electronic recruiting system. Participants volunteered for this study and received required course credit or extra credit depending on their instructors’ policies as compensation for participation. Participants ranged in age from 18 to 39 (M = 21.72, SD = 5.15). Approximately 54% described themselves as White, 25% as Black, and 13% classified themselves as “other.” Eighty-three percent of participants described themselves as Southerners as defined by being raised in a Southern state.
Thirteen participants in the neutral condition incorrectly answered the manipulation check evaluating perception of the speaker’s accent (i.e., Where do you think Zack is from?) resulting in the exclusion of their data. Although the excluded participants represent a large percentage of the neutral condition, the accent effect remained significant after the data was removed. Analyses reflect data from the remaining 51 participants.

**Design**

The design was a randomized two group experimental design. Groups comprised of a maximum of 10 participants listened to an audio recording and completed questionnaires. The type of accent was manipulated so that approximately half of the participants were exposed to a person using a Southern accent and half were exposed to a more neutral accent. After excluding data from 13 participants in the neutral condition, the remaining 18 participants comprised the neutral condition and 31 participants made up the Southern condition. Participants were similar in characteristics (i.e., sex, age, race, state where raised) across both conditions with slightly more non-Southerners ($n = 6$) in the neutral condition than the Southern condition ($n = 2$).

**Materials**

Participants received questionnaire packets instructing them to rate the speaker Zack on 8 competency traits: reliable source of information, grammatically correct, unknowledgeable about the subject matter, effective instructor, persuasive presenter, unprofessional manner, articulate speaker, and unsophisticated demeanor. All competencies, even if phrased negatively, were rated on a 5-point scale ranging from 1 to 5 with the highest rating indicating a more positive evaluation (i.e., very professional) and the lowest rating reflecting a more negative evaluation (i.e., very unprofessional). The competency measure created for this study was used to explore perceptions on each of the eight characteristics associated with the quality and effectiveness of a speaker delivering an instructional audio presentation. In this study, competency items produced a Cronbach’s alpha of .80. Due to the matched guise of the speaker by which voice characteristics did not vary, it is expected that any differences in competency ratings for the Southern and neutral speaker can be attributed to the manipulation of accent. Participants also answered comprehension questions regarding the presentation content in order to bolster the cover story. Finally, participants disclosed personal information in response to questions about sex, age, and race/ethnicity, and state in which they were raised.

**Procedure**

Upon participants’ arrival we explained the study's purported purpose evaluating the effects of verbal versus written stimuli on comprehension. Having obtained IRB approval for use of deception, we employed a cover story in order to elicit genuine responses from participants. Participants were told that they were assigned to the verbal condition, which consisted of an audio recording rather than a written transcript. Advised that participation was voluntary, participants read and signed the informed consent form indicating their voluntary participation. At this point, we randomly assigned participants to one of two possible conditions, Southern or neutral accent. Based on a modified version of Lambert et al.’s (1960) matched-guise technique, the same speaker read an identical set of instructions in both the Southern accent, characterized by the long-syllable drawl, and the neutral accent lacking specific regional distinctiveness. The speaker was a White man born and raised in the Southern United States who spoke in a Southern and neutral accent. Based on previous research investigating perceptions of male and female voices, common sex stereotypes underlie evaluative judgments based on speakers’ sex (Linek, Gerjets, & Scheiter, 2010). Participants in Nass, Moon, and Green’s (1997) study judged computerized female voices more competent in love and relationship issues than male voices and males voices more competent in computer knowledge than females voices. Therefore, by employing a man to deliver a computer related message, we increased the salience of accent and minimized potential confounds of speaker sex or message content. Vocal tone and pauses remained consistent in both guises, such that the speaker’s voice differed only in accent. After instructing participants to listen quietly, the audio presentation was played. The recorded message for both the Southern and the neutral accented speaker was 1 min in duration and identical in content—instructions for downloading music from a CD to an iPod.

Following the audio presentation, participants received questionnaire packets that included written directions on how to proceed. Upon completion of the questionnaires, we debriefed...
the participants regarding the true nature of the study. In addition to the formal questionnaires, immediately following the debriefing session, we asked participants what they thought about the speaker, where they thought he was from, and the reasoning in support of their perceptions. After the informal discussion, we thanked and dismissed the participants.

Results

Correlational analysis of the relationships between the dependent variables revealed statistically significant correlations (r’s ranged from .05 to .70). Therefore, a multivariate analysis of variance (MANOVA) was used to analyze the responses to the evaluation items on the questionnaire. An alpha level of .05 was adopted for all analyses. Preliminary analyses were conducted to determine if the MANOVA assumptions were met. Box’s M test was used to determine whether variances were homogeneous. The test suggested no violation of this assumption.

As predicted, the MANOVA conducted on the competency variables revealed a significant main effect for the independent variable, accent, $F(8, 40) = 7.96$, $p = .00$, $\eta^2 = .61$. Subsequent univariate tests indicated that accent influenced perceptions of the speaker on five of the eight competency items excluding reliable source of information, unknowledgeable about the subject matter, and persuasive presenter. Participants perceived the non-Southerner as a more effective instructor and articulate speaker than the Southerner. Further, although

<table>
<thead>
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</tr>
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<tbody>
<tr>
<td><strong>Univariate Effect: Significant Main Effects of Accent</strong></td>
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<tr>
<td><strong>Accent</strong></td>
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<tr>
<td>Reliable Source of Information</td>
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<tr>
<td>Grammatically Correct</td>
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<tr>
<td>Unknowledgeable About Subject Matter</td>
</tr>
<tr>
<td>Effective Instructor</td>
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<tr>
<td>Persuasive Presenter</td>
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<tr>
<td>Unprofessional Manner</td>
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<tr>
<td>Articulate Speaker</td>
</tr>
<tr>
<td>Unsophisticated Demeanor</td>
</tr>
</tbody>
</table>

*Greater means indicate a more positive evaluation.

Discussion

We predicted a more negative evaluation of the Southern accented speaker than the neutral accented speaker due to pervasive stereotyped attitudes that consistently emerge in evaluative judgments of Southerners in previous research. As hypothesized, participants viewed the Southern speaker as less competent than the non-Southerner. This result becomes even more interesting when considering 83% of participants self-identified as Southern but stereotyped their ingroup member more negatively than the non-Southerner. Similarly, Tennessee participants in Fridland and Bartlett’s (2006) research evaluated the Southern dialect more negatively than they did other regional dialects. These findings further point to the powerful effect of the Southern accent in eliciting stereotyped perceptions. Indeed, the effect size associated with accent was very large ($\eta^2 = .61$).

Perhaps the most surprising result is the non-Southerner sounded more grammatically correct than the Southerner even though within each speaker guise the script was identical in wording. For example, instead of using the Southern pronoun variant “y’all” both speakers used the standard grammatical form “you”. Is it possible that participants in the Southern condition perceived the speaker’s words differently due to their expectations of how Southerners sound? Exactly what words participants perceived the Southerner to say cannot be ascertained from the current study but presents an interesting subject for further investigation.

Future research should address several limitations encountered in this study. First, the neutral speaker may have been erroneously associated with the research team. Following the debriefing session, several participants in the neutral condition who believed the speaker was from the South suggested the speaker was a member of the research team. Perhaps these participants assumed the neutral speaker to be a Southerner because of their perceived association between the speaker and the Southern university in which the study occurred. Some participants may have evaluated the neutral speaker based on the presumed relationship with
the researchers rather than the speaker's voice. Therefore, disclosing more detailed information differentiating the speaker from the research team should alleviate this problem. Additionally, because stereotypes may vary between Southern rural and Southern urban accents, which may further reflect social class perceptions (Eckert, 2004; Luhman, 1990), the speaker's accent should ideally depict less distinctive social status characteristics while maintaining a strong Southern quality.

The speaker in the current study spoke with a Southern rural accent in order to ensure a strong manipulation. While the accent manipulation check confirmed that all the participants in the Southern condition identified the speaker as Southern, the rural accent may have prompted stereotypical thinking associated with economically deprived regions historically known for underperforming schools (MDC Inc., 2004). Indeed, Hartigan (2003) pointed out that one common distinction made between rural and urban regions reflect notions of the uneducated and educated Southerner, respectively. The negative evaluations in the current study may have been elicited because participants perceived the rural Southerner as uneducated. Therefore, the speaker's accent should ideally depict less distinctive rural characteristics associated with lower socioeconomic status. Future research should also focus on more realistic encounters as opposed to the scripted speech used in this study that may not generalize to more natural, spontaneous conversation styles. The scope of this study pertained to limited aspects related to perceptions of a Southerner accented speaker amongst a small sample of college students. However, these results, taken with previous findings, warrant further investigation as opportunities to interact with diverse accented individuals continue to increase due to rapidly advancing digital communication technologies.

This study's results pertain to global communication dynamics and its impact on social and business networking in which electronic voice interaction may, in some cases, be as prevalent as face-to-face encounters. When initial contacts occur via electronic means, first impressions based on speech characteristics, such as accent, likely result in perceptions of group membership within a geographical region. If individuals hold prejudices about a particular regional accented group, akin to Reed's (1986) distinct regional typology, stereotyped evaluations may follow.

Due to burgeoning communication technologies, dialects and accents extend beyond geographical boundaries at a greater rate than before the digital age. However, despite negative Southern stereotypes, some Southerners gained prestige and renown such as the 15 Southern American Presidents (The White House, n.d.). Perhaps these presidential candidates' exceptional educational achievements, prominent social status, or other sociodemographic characteristics exceeded and violated stereotypical assumptions about Southerners' inferior standing. Although complex processes beyond the scope of this study's design affect perceptions of presidential candidates differently than a single exposure to a Southern speaker, an important question remains. Do Southerners with less prestigious status than elected presidents have the ability to escape negative stereotypes associated with their accent?

This question not only pertains to Southerners but individuals with other nonstandard accents whether regional or foreign. In their study investigating ethnicity, nonstandard English accents, and employability, Carlson and McHenry (2006) found that nonstandard accented speakers (i.e., African American Vernacular English, Spanish and Asian influenced English) received lower status and employability ratings than standard American English speakers, regardless of speaker ethnicity. These authors suggested that individuals with a nonstandard accent who seek employment should avail themselves to speech modification therapies in order to become bidialectical. Amid the current milieu of diversity and pluralism awareness campaigns in employment and educational settings, the suggestion to modify an inherently unique characteristic indelibly linked to one's culture, ethnicity, and geographical region seems antiquated. As early as 1990, Reed lamented the rising trend of university courses designed to train Southern accents based on the assumption that standard American English speech provides more opportunity for success. According to Matsuda (1991), an attorney who argued in the 9th Circuit Court of Appeals for the protection of accented individuals from discriminatory hiring practices, “accent discrimination” remains alive and well.

While Reed (1990) spoke of intolerance for Southern accents and Matsuda (1991) of foreign accent discrimination, both argued that true cultural diversity necessarily includes linguistic pluralism as dialect and accent reveals place of origin. Similarly, O’Hara (2007) suggested that regionalism may be one of the remaining
acceptable “isms” left in tac despite mounting societal efforts to expunge many forms of repugnant discriminatory behavior. As a teacher educator on the subject of diversity in educational settings, O’Hara (2007) provided an informative perspective on strategies to overcome dialect discrimination and regionalism within the classroom. Based on her qualitative study in which teacher interns read about and responded to region and dialect based biases, O’Hara concluded that one of the most important endeavors for future educators is to provide a safe learning environment in which students are made aware of negative biases and regional stereotypes. In this way, educators would expose regional and accent discrimination as a form of bigotry such that these behaviors would be added to the long list of unacceptable discriminatory practices.

References


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Individuals have sought effective coping techniques in response to the variety of acute and chronic painful situations that they encounter, handling this spectrum of pain with many strategies (Tse, Pun, & Benzie, 2005). For many reasons, people use psychological pain management methods, such as breathing techniques and distraction, rather than medications—some by choice and some due to necessity (e.g., in many emergency situations there is no access to analgesic pain management). Because we cannot always rely on analgesics and because pain medications can be costly (Gustavsson, et al., 2012) or lead to adverse effects such as dependency and abuse (Maxwell, 2011), it is important that we explore alternative methods of pain relief and consider how to get the best results from these methods. Current research focuses on the potential benefits of social support as an alternative coping strategy in painful situations and considers personality variables that may facilitate its effectiveness.

Social support seems to be an ideal strategy—something that one might seek out for the express purpose of reducing pain immediately and long term—for managing pain and includes little to no side effects and little to no cost. Indeed, research over the past few decades has demonstrated that social support has beneficial effects on the psychological and physical well-being of those suffering from chronic illness (Holtzman, Newth, & Delongis, 2004). Social support has been endorsed as an effective strategy for pain management, as an option for people in pain that provides positive social benefits and can provide a buffering effect for pain through various means including physical/tangible support, affection, reassurance, and emotional support (Brody, 2012; Wilson, 2007). It is important to explore the situations in which social support is most effective. Rather than assuming that social support is positively correlated with pain outcomes for all patients, we should consider...
factors of effective social support, as well as which individuals will respond most positively to that type of support.

**Personality and Health**

Personality is associated with overall health. For example, Jerant, Chapman, and Franks (2008) noted that individuals with lower levels of extraversion have been found to have lower levels of self-reported health. In a study on quality of life in patients with Parkinson’s disease, Dubayova et al. (2009) found that extraversion indirectly influenced quality of life in patients with chronic diseases—high extraversion led people to be sociable, prefer changes, crave excitement, and act impulsively while low extraversion led individuals to be more self-centered and more sensitive to stress. Dubayova and colleagues (2009) hypothesized that extraversion was correlated with the level of coping with chronic disease, thus influencing the level of quality of life. Factors associated with extraversion have been linked with creating a positive cycle when dealing with depression. Cukrowicz, Franzese, Thorp, Cheavens, and Lynch (2008) found that extroverts in their sample were less likely to withdraw from relationships when feeling depressed; this was posited to increase social support which in turn could increase the efforts of extroverts to maintain social relationships even in times of depression, creating a positive cycle. It seems likely that this pattern may hold true for extroverts experiencing physical pain.

**Personality and Pain Management**

Lynn and Eysenck (1961) supported Eysenck’s previous assertions that extraversion would be positively correlated with pain tolerance levels, explaining this finding by suggesting that individuals higher in extraversion inhibit painful stimuli more quickly than those low in extraversion, and that those low in extraversion would be quicker to condition a fearful response to future pain. Likewise, Ramirez-Maestre, Lopez Martinez, and Zarazaga (2004) considered various personality traits and chronic pain, and found that high-level extraversion predicted a greater use of active and effective strategies for handling pain. In this case, introverts may need more aid in learning how to use (and how to use most effectively and appropriately) coping strategies for managing pain. In a study investigating the chronic pain associated with rheumatoid arthritis, individuals scoring higher in extraversion were more likely than introverts to use and benefit from cognitive reframing (Newth & Delongis, 2004).

In an additional study on chronic pain caused by rheumatoid arthritis, Holtzman et al. (2004) examined the role of satisfaction and disappointment with support in coping and pain severity, and found that support influenced pain severity through encouraging specific coping strategies as well as by affecting the effectiveness with which these coping strategies were employed. Their research supported interpersonal models of coping and suggested “that coping does not occur in a social vacuum and that interpersonal factors are important contextual factors in understanding coping and its effects...findings from the current study indicate that social support and coping are inextricably linked” (Holtzman et al., 2004, p. 690). In essence, social support provides just what it is suggested that people need in order to reduce the level of perceived pain—social support encourages people to effectively use coping strategies.

Finally, Moldovan, Onac, Vantu, Szentagotai, and Onac (2009) cited two psychological factors that influence pain outcomes: pain catastrophizing and response expectancies. They suggested that high levels of pain do not necessarily produce high emotional distress, but that it is the interpretation of events that explains our feelings and behaviors. These findings suggest that by influencing the interpretation of events (or pain), certainly a role that social support might be able to play, we can impact the perception of pain and thus influence pain tolerance. These findings imply that perhaps we need to increase the types of social support that reduce pain catastrophizing (e.g., providing a levelheaded appraisal of the situation, reducing distress,) and increasing positive expectations of pain outcomes (promoting positive thinking for the person in pain).

**Need for Further Research**

The previously mentioned studies have looked at the issues of personality type, social support, and pain management, but it is important to consider these three issues in conjunction. We must consider the possibility that personality type might influence the effectiveness of using particular methods in reducing pain. As it is important for each individual to know the best setting for them to learn, the best way for them to handle frustration, the best way to express creativity, and so forth, perhaps it is equally important to begin to understand that individuals may have individual pain management styles,
influenced by various factors potentially including personality type. Because social support relates clearly to extraversion, this might be an excellent first place to look for connections. Past research points to extraversion as being a factor in coping with pain, and to social support being effective in pain management, but is social support more effective for those who rank higher in extraversion? Would these findings help to explain the discrepancy in pain outcomes between extroverts (who have been seen to respond more positively in painful situations) and introverts? If social support is not particularly effective for those low in extraversion, should we encourage the use of social support techniques only among those for whom it is most effective, or perhaps “teach” individuals low in extraversion how to seek and effectively benefit from social support? This information could help us in responding to both acute and chronic pain, and in assessing just how important social support is for various individuals.

Additional variables of interest. Importantly, previous research has identified additional variables that are associated with pain tolerance, namely biological sex and sports participation. Specifically, previous research showed that women seek treatment for pain more frequently than men (Wilson, 2006) and are more likely to report pain than males (Leboeuf-Yde, Nielsen, Kyvik, Fejer, & Hartvigsen, 2009). Ryan and Foster (1967) found that athletes reported higher levels of pain tolerance than nonathletes. We considered it important to include these additional and potentially influential variables as covariates in order to obtain a clearer understanding of the factors that influence pain perception.

The current study focused on the combination of personality, perceptions of pain tolerance, and preference for social support. The following research questions and hypotheses were addressed: First, is extraversion related to pain tolerance and a preference for certain pain management techniques? The primary hypotheses were that those high in extraversion would rate themselves as having a higher pain tolerance than those low in extraversion, and that individuals high in extraversion would have a higher preference for social support as a method for pain management than those low in extraversion. Additional research questions were explored. Specifically, sex differences in pain tolerance were explored. Men were expected to report higher levels of pain tolerance than women. Associations between participation in organized sports and pain tolerance were also explored, and we expected that individuals who participated in sports would report higher levels of pain tolerance than non-participants. Finally, associations between pain tolerance and the remaining personality dimensions (openness to new experiences, agreeableness, conscientiousness, and neuroticism) were explored without specific predictions.

Method

Participants

The participants in this study consisted of 95 college students (46 women and 43 men, 6 unreported) attending a private university. All participants were undergraduate students. An additional demographic that was considered important was involvement in sports; 36 participants in the study were participants in organized sports (12 women, 21 men, 3 unreported), 59 were not (34 women, 22 men, 3 unreported).

Sampling Procedures

Participants from psychology courses within the university were invited to participate and offered extra credit within those courses. Participation was self-selected; participation was not required in any courses. Data were collected on campus during free period in an unoccupied classroom; the survey was distributed and collected by the experimenter. After participation, participants were debriefed and thanked, and professors were notified of the names of participating students via e-mail in order for participants to receive extra credit. The procedure and measures used were reviewed and approved by the university’s Institutional Review Board.

Measures

The materials for the survey included a questionnaire packet consisting of the informed consent form, a personality assessment, the pain assessment questionnaire, and an explanation. The informed consent included a request for contact information from the students (name and e-mail address) to invite those who completed the survey to participate in a potential follow-up study.

Personality assessment. The personality assessment included 60 questions taken from the International Personality Item Pool website (http://ipip.ori.org) to assess five personality dimensions that were analogous to the Big 5 (i.e., 10 questions for the personality traits of openness to new experiences, conscientiousness,
agreeableness, and neuroticism and 20 questions to gauge levels of extraversion). These items have a Cronbach’s alpha ratings of .82 (agreeableness), .79 (conscientiousness), .86 (neuroticism), .84 (openness), and .91 (extraversion).

**Pain experience and management.** This pain assessment questionnaire was developed by the researcher as no previously existing questionnaire was found to meet the needs of this research. Namely, this questionnaire featured several questions assessing interpretations of pain and preference for various pain management methods. The pain experience and management questions included one question about pain tolerance: “Rate your overall physical pain tolerance on a scale of 1-5. Would you estimate that you are more sensitive than others.” The rating scale ranged from 1 (more sensitive than others) to 5 (much better at tolerating physical pain than others) and invited participants to report their preferred pain management methods (e.g., “Which of the following pain management techniques do you use? Please circle all that apply: breathing, meditation, relaxation, swearing, yelling, physical support from a friend [hand holding, back massage, etc.], emotional support from a friend [talking, distraction, etc.], gritting teeth, holding breath, taking pain medicine, other ______”). Participants also were asked to choose social support, nonsocial support, or neither for the strategy that they felt was most helpful, that they used most often, and that they preferred.

**Results**

Descriptive statistics are reported for the pain tolerance ratings, the personality assessment scales, the selection of pain management techniques used, and the most helpful, most frequently used, and preferred pain management technique categorized by type (social or nonsocial). See Tables 1, 2, and 3. Measured on a Likert-type scale, the ratings of pain tolerance were considered interval level for the purposes of statistical analyses. The pain tolerance distribution was nonnormal, (skewness = -.27, kurtosis = -.41, Kolmogrov-Smirnov, p < .001). Thus, this distribution was log transformed to normalize the distribution. This transformed variable was used in all analyses including pain tolerance.

**Primary Analyses**

**Association between extraversion and pain tolerance.** A positive association between extraversion and pain tolerance was expected. To test this hypothesis, a Pearson correlation analysis was conducted on extraversion scores and self-reported pain tolerance ratings. The results of this analysis yielded support for the hypothesis, $r = .22$, $p = .02$ (1-tailed). However, this association was different for women ($r = .11$, $p = .25$) and men ($r = .35$, $p = .01$).

**Association between extraversion and preference for social support in painful situations.** We expected a positive association between extraversion and preference for social support (emotional or physical support) as a pain management technique. Thus, those participants who favored pain

<table>
<thead>
<tr>
<th>Measure</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Tolerance</td>
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<td>1.00</td>
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<tr>
<td>Pain Tolerance (log)</td>
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<td>.14</td>
</tr>
<tr>
<td>Extraversion</td>
<td>3.44</td>
<td>.73</td>
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<tr>
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<td>.75</td>
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<tr>
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<td>.62</td>
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<tr>
<td>Openness</td>
<td>3.47</td>
<td>.69</td>
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<tr>
<td>Agreeableness</td>
<td>3.95</td>
<td>.61</td>
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<tr>
<th>Technique</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>68</td>
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<tr>
<td>Emotional Social Support</td>
<td>56</td>
</tr>
<tr>
<td>Gritting Teeth</td>
<td>33</td>
</tr>
<tr>
<td>Holding Breath</td>
<td>19</td>
</tr>
<tr>
<td>Meditation</td>
<td>21</td>
</tr>
<tr>
<td>Physical Social Support</td>
<td>37</td>
</tr>
<tr>
<td>Relaxation</td>
<td>61</td>
</tr>
<tr>
<td>Swearing</td>
<td>55</td>
</tr>
<tr>
<td>Taking Medicine</td>
<td>34</td>
</tr>
<tr>
<td>Yelling</td>
<td>34</td>
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<table>
<thead>
<tr>
<th>Category</th>
<th>Most Helpful</th>
<th>Most Frequent</th>
<th>Preferred</th>
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<tbody>
<tr>
<td>Social Support</td>
<td>20%</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Non-social Support</td>
<td>62%</td>
<td>67%</td>
<td>49%</td>
</tr>
<tr>
<td>None/Other</td>
<td>18%</td>
<td>16%</td>
<td>34%</td>
</tr>
</tbody>
</table>
tolerance techniques including social support would have higher extraversion scores than those participants who did not indicate a preference for such pain tolerance techniques. An independent group’s *t* test revealed no statistically significant support for this hypothesis, *t*(60) = -0.63, *p* = .53 (2-tailed).

**Secondary Analyses**

**Sex and pain tolerance.** An independent groups *t* test was conducted to observe any differences between men and women in self-reported pain tolerance. This *t* test supported the hypothesis that men (*M* = .58, *SD* = .13) would rate their pain tolerance higher than women (*M* = .50, *SD* = .14), *t*(85) = -3.05, *p* = .002 (1-tailed).

**Participation in organized sports and pain tolerance.** Potential differences in pain tolerance as a function of participation in organized sports were explored. Because sex was associated with pain tolerance in the previous analysis, it had the potential to moderate the association between participation in sports and pain tolerance. Thus, a 2 (sex) x 2 (sports participation) ANOVA was performed on the pain tolerance scores. The results of this analysis indicated a main effect for sports participation, *F*(1, 83) = 4.33, *p* = .04, *η*² = .04, with those participants with sports experience indicating a higher tolerance for pain than those without sports experience. The interaction between sex and sports participation was significant, *F*(1, 83) = 4.79, *p* = .03, *η*² = .05. Sports participants (regardless of biological sex) indicated a higher tolerance for pain than nonsports participants, but nonparticipant men rated their pain tolerance as being only minimally lower than sports participant men, whereas women who did not participate in sports rated their pain tolerance as being well below the pain tolerance of their sports participant counterparts (see Figure 1).

**Additional personality factors and pain tolerance.** To explore any potential associations between personality and pain tolerance, a series of Pearson correlations were conducted on the pain tolerance ratings and the scores of the remaining personality scales (i.e., neuroticism, openness, conscientiousness, and agreeableness). A strong, negative association was found between neuroticism and pain tolerance, *r* = -0.33, *p* = .001 (2-tailed). Associations were not found between pain tolerance and openness, conscientiousness, or agreeableness (see Table 4).

Because of the strong association found between neuroticism and pain tolerance, a stepwise regression was conducted to determine if neuroticism explained variance in pain tolerance above and beyond the extraversion variable. In Step 1, with pain tolerance as the dependent variable, extraversion was entered as the independent variable; a significant model was achieved, *F*(1, 90) = 4.50, *p* = .037, with 5% of the variability in pain tolerance explained by extraversion. In Step 2, with the addition of neuroticism as a second independent variable, another significant model was found, *F*(2, 89) = 7.03, *p* = .001. Neuroticism was a valuable addition in the explanation of variance in pain tolerance, now with 14% of the variance being explained by extraversion and neuroticism (see Table 5).

**Neuroticism, participation in sports, sex, and pain tolerance.** Due to the strong association between perceptions of pain tolerance and neuroticism, potential differences in pain tolerance as a function of neuroticism, sex, and participation in organized sports were explored. A 2 (sex) x 2 (sports participation) x 2 (high and low neuroticism) ANOVA was conducted on the pain tolerance scores. The results of this analysis revealed a main effect for sports participation, *F*(1, 79) = 4.68, *p* = .03, *η*² = .04. Those who participated in sports

### Table 4

<table>
<thead>
<tr>
<th>Measure</th>
<th><em>r</em></th>
<th><em>p</em></th>
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<tbody>
<tr>
<td>Extraversion</td>
<td>.22</td>
<td>.04</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>- .33</td>
<td>.01</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.00</td>
<td>.99</td>
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<tr>
<td>Agreeableness</td>
<td>.00</td>
<td>.98</td>
</tr>
<tr>
<td>Openness</td>
<td>- .01</td>
<td>.78</td>
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</table>

Note: All analyses were 2-tailed.

### Table 5

<table>
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<tr>
<th>Step and Variable</th>
<th>B</th>
<th>SE B</th>
<th><em>β</em></th>
<th><em>R</em>²</th>
<th><em>ΔR</em>²</th>
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</thead>
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<tr>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Extraversion</td>
<td>.04</td>
<td>.02</td>
<td>.22</td>
<td>.05*</td>
<td></td>
</tr>
<tr>
<td>Step 2:</td>
<td></td>
<td></td>
<td></td>
<td>.14**</td>
<td>.09**</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.03</td>
<td>.02</td>
<td>.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.06</td>
<td>.02</td>
<td>-.30*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p* < .05, *p* < .01.
Pain Tolerance, Social Support, and Personality

Mican

(M = .59, SD = .14) reported higher pain tolerance than those who did not participate in sports (M = .51, SD = .14). These main effects were superseded by a three-way interaction $F(1, 79) = 4.79, p = .03, \eta^2 = .05$. We found that while women participating in sports who rate themselves as high in neuroticism have a higher pain tolerance than women who also participate in sports but rate themselves as low in neuroticism, all women (high and low in neuroticism) who did not participate in sports rated their pain tolerance levels as lower than their athletic counterparts (regardless of neuroticism scores). We see a different trend in men. Men participating in sports who rate themselves as low in neuroticism rate their pain tolerance as lower than those participating in sports who rate themselves as high in neuroticism, while men not participating in sports display the opposite trend. For men not participating in sports we see a pattern similar to women who do not participate in sports; those who fall into the high neuroticism category rate their pain tolerance as higher than those in the low neuroticism group (see Figure 2).

Discussion

The purpose of this study was to examine the relationship between perceptions of pain tolerance, personality, and social support as a method of pain management. The hypotheses in this study included a prediction of positive associations between extraversion and self-reported pain tolerance and between extraversion and preference for social support as a method of pain management. These variables were measured with a survey, and analyses showed partial support for these hypotheses. The association between self-reported pain tolerance and extraversion was positive. We found that more extraverted individuals rated their pain tolerance levels more highly compared to those scoring low in extraversion. These findings were consistent with previous research in the area of extraversion and pain tolerance (Lynn & Eysenck, 1961). The association between preference for social support as a pain management method and extraversion was not statistically significant. Follow-up analyses revealed an unexpected and strong negative association between neuroticism and self-reported pain tolerance. A regression analysis showed that together, extraversion and neuroticism accounted for 14% of the variability in pain tolerance ratings, suggesting that personality variables play a large role in the perception of pain and pain tolerance. This finding supports previous research showing a negative correlation between neuroticism and pain tolerance (i.e., those higher in neuroticism rate themselves as having a significantly lower pain tolerance; Ramirez-Maestre et al., 2004). Additionally, this finding suggests that extraversion is not the only personality variable to play a large role in perceived pain tolerance; similarly, neuroticism may play a role in preference for and the efficacy of various methods of pain reduction. Findings for sex and pain tolerance supported our expectations. Women, on average, rated their pain tolerance as being lower than men.

Sex was considered as having the potential to modify the previously explored variables of personality, participation in sports, and pain tolerance.
perceptions. Potential differences in pain tolerance among athletes vs. nonathletes as a function of sex were explored. Ignoring the possibility that sex was moderating findings regarding personality, participation in sports, and pain tolerance may have acted as confounding variables. For women sports participants, we saw a negative correlation between neuroticism levels and pain tolerance ratings (higher levels of neuroticism were correlated with lower pain tolerance ratings). Regardless of neuroticism, these ratings were higher than pain tolerance ratings for women nonsports participants. The pain tolerance ratings of women nonsports participants did not strongly correlate to neuroticism levels (nonparticipant women both low and high in neuroticism rated their pain tolerance similarly—both lower than sports participating women). For men, we see nearly the opposite in the area of sports participation. Men participating in sports showed a slight positive correlation between neuroticism and pain tolerance ratings, where those low in neuroticism rated their pain tolerance as lower than those high in neuroticism (this is the reverse of what we saw in women sports participants). Where for women not participating in sports we saw nearly equal pain tolerance ratings, with men we found a negative correlation; lower levels of neuroticism were correlated with higher pain tolerance ratings.

It is clear that personality type plays a role in how individuals experience painful situations. As such, it follows that we must also expect differences in the efficacy of various pain management methods when we look at different personality types. When considering individuals high or low in personality variables (particularly extraversion and neuroticism), we must expect different outcomes and therefore encourage different methods of coping; some may respond very well to social support but be unable to seek out social support, or may seek out forms of social support that are not conducive to wellness. We are offered the opportunity to tailor recovery to each individual in yet another way when we considerer their personality type and the methods of support that might have the most positive outcomes for that type. Although we cannot definitively draw conclusions about the type of people that will respond most positively to social support, the data in this study allows us to consider how to mitigate the potential negative effects of certain personality variables on health, wellness, and pain perception.

**Limitations**
Some of the major potential confounds within the present research include threats to external validity (i.e., the college sophomore problem; Jackson, 2012), and the issue of pain tolerance being self-reported rather than a true measure of actual pain tolerance. Because the sample was relatively limited to a traditional-aged college student population, we cannot assume that these results necessarily can be extended to the general population. Another important limitation to consider is that this study relied on self-report data, rather than measures of actual pain tolerance. It is likely that some do not have a true gauge on their actual pain tolerance, or would rate themselves much differently based on their most recent painful experience (e.g., perhaps being able to clearly recall the pain of a recent injury would change an individual’s perception of their pain tolerance), and thus we must remember that these data only present information about self-perceptions of pain tolerance rather than truly measuring pain tolerance. Finally, there is a possibility of experimenter effect as the target variables and hypothesis were known to the experimenter when administering the survey. There is also a possibility of participant effect as participants were asked to give identifying information that may have made some participants omit information.

**Future Research**
The current research illuminated the areas of personality type and preference for various pain management methods. Perhaps one of the greatest contributions of this work is to provide a foundation of data for future research, as it discusses factors that were previously not considered on conjunction with one another, and shows interactions that were unexpected yet statistically significant. For each of these factors—sex, sports participation, neuroticism ratings, and extraversion ratings—we saw some association with pain tolerance ratings. Although these findings did not always follow predicted patterns, they offer many potential arenas for further study and for real-world application. An exploration of the causal relations among these factors would be a helpful step, potentially leading to valuable treatment options; by beginning to tease out these questions, we can begin to find practical methods that might increase pain tolerance. We might consider encouraging sports participation in both women and men who rate as high in neuroticism as a method to increase pain tolerance as a preventative method. Perhaps
a combination of social support and physical support (exercising with a friend or participating in group sports or even group physical therapy) might be a key in boosting pain tolerance and recovery from painful situations. There are many potential applications for this and other information that has yet to be gathered in this area.

A suggested follow up to the current study involves a true experiment to gauge the effectiveness of social support for high and low extraverts in a painful situations (i.e., having high and low extraverts complete a cold pressor test with and without social support from a friend and gathering data on their rating of the amount of pain caused). Looking at these factors in real-world situations, whether artificial (e.g., performing a cold pressor test) or natural (e.g., collecting data from individuals who are undergoing painful procedures or are facing a condition that causes pain) rather than gathering data from self-report surveys might provide a more accurate account of how individuals truly perform in these situations, rather than their potentially inaccurate perceptions of themselves.

Similarly, based on findings about personality type and pain tolerance, it would be fascinating to look at working with personality factors as a method for pain reduction. Perhaps we could help introverts adopt (even temporarily) some of the traits that aid extraverts in managing pain—including seeking out effective and appropriate social support. Additionally, because we know that neuroticism is strongly associated with pain tolerance ratings, one step to take might be to look at how we can lower the level of neuroticism among individuals experiencing pain (can we reduce catastrophizing and improve the interpretations of painful situations as a way of reducing pain? what type of social support is most effective in doing this?), or if those scoring higher in neuroticism have heightened arousal levels lowering the overall level of arousal might be a key factor in raising pain tolerance. Other possibilities for further study could explore the types of social support (emotional or physical) that are most effective. If we can understand the factors about the person experiencing pain and the individual providing social support that maximize the effectiveness of this strategy for pain management, we can make it more a more accessible and potent strategy for handling painful situations.

Summary
This research supports the existing literature in finding support for the various hypotheses that were influenced by previous research (e.g., extraversion, sex, and athleticism being associated with pain tolerance). We further expand on previous data by observing these variables in conjunction with one another—looking at women and men in sports and observing the differences that are found when adding a second variable to the initial question, or looking at sex and extraversion in combination and how this relates to pain tolerance ratings. Previous reports have focused on one variable (e.g., focusing on extraversion ratings and ignoring sex) or excluded other variables altogether (e.g., previous studies looking at athleticism and pain tolerance while ignoring sex and focusing solely on men). These variables were found to have significant moderating effects on the data, and thus it was important to synthesize these variables rather than considering each individually. By doing this, we found unexpected results that add completely new information to the existing data. This takes the research in the area of pain tolerance one step further, and provides something of a connecting link that will aid future studies that begin to look at these variables in a real-world setting and move past the survey format.

References


**Author Note.**

Frances L. Mican, Department of Psychology, Bellarmine University.

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### PSI CHI AWARDS

Psi Chi sponsors a variety of award competitions each year. Listed below is a brief overview. For more information, please visit [www.psichi.org/Awards](http://www.psichi.org/Awards)

<table>
<thead>
<tr>
<th>Name of Award</th>
<th>Description of Award</th>
<th>Submission Deadline</th>
<th>Who Can Apply</th>
<th>Award Amount/Prize</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bandura Graduate Research Award</strong></td>
<td>Awards the student submitting best overall empirical study; cosponsored by APS</td>
<td>February 1</td>
<td>Graduate</td>
<td>• Travel expense to APS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Plaque</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3yr APS membership</td>
</tr>
<tr>
<td><strong>Cousins Chapter Award</strong></td>
<td>Presented to one chapter that best achieves Psi Chi’s purpose</td>
<td>February 1</td>
<td>Chapter</td>
<td>• One $3,500 award</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Travel to APA</td>
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<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td><strong>Newman Graduate Research Award</strong></td>
<td>Awards the student submitting best overall empirical study; cosponsored by APA</td>
<td>February 1</td>
<td>Graduate</td>
<td>• Travel expense to APA</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3yr journal subscription</td>
</tr>
<tr>
<td><strong>Kay Wilson Leadership Award</strong></td>
<td>Awards one chapter president who demonstrates excellence in the leadership of the local chapter</td>
<td>April 1</td>
<td>Chapter President (chapter nomination)</td>
<td>• One $500 award</td>
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<tr>
<td></td>
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<td></td>
<td>• Travel to APA</td>
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<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td><strong>Allyn &amp; Bacon Psychology Awards</strong></td>
<td>Awards for the best overall empirical study submitted</td>
<td>May 1</td>
<td>Undergraduate</td>
<td>• 1st place—$1,000</td>
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<td></td>
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<td></td>
<td>• 2nd place—$650</td>
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<td></td>
<td></td>
<td>• 3rd place—$350</td>
</tr>
<tr>
<td><strong>Guilford Undergraduate Research Awards</strong></td>
<td>Awards for the best overall research papers submitted</td>
<td>May 1</td>
<td>Undergraduate</td>
<td>• 1st place—$1,000</td>
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<td></td>
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<td></td>
<td></td>
<td>• 2nd place—$650</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 3rd place—$350</td>
</tr>
<tr>
<td><strong>Building Bonds Awards</strong></td>
<td>Awards to recognize collaborative activity by a Psi Chi and Psi Beta chapter</td>
<td>June 1</td>
<td>Chapter</td>
<td>• $100 award</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td><strong>Model Chapter Awards</strong></td>
<td>All chapters meeting the five criteria will receive $100</td>
<td>June 30</td>
<td>Chapters</td>
<td>• $100 each chapter</td>
</tr>
<tr>
<td><strong>Diversity Article Awards</strong></td>
<td>Awards for best Eye on Psi Chi articles published by student authors on diversity issues</td>
<td>July 1</td>
<td>Graduate</td>
<td>• Four $300 awards</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Undergraduate</td>
<td></td>
</tr>
<tr>
<td><strong>Regional Research Awards</strong></td>
<td>Up to 78 awards presented for the best research papers submitted as Psi Chi posters for the regional conventions</td>
<td>Deadlines Vary, Fall/Winter</td>
<td>Graduate</td>
<td>• $300 each (number varies)</td>
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<tr>
<td></td>
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<td>Undergraduate</td>
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</tr>
<tr>
<td><strong>Denmark Faculty Advisor Award</strong></td>
<td>To one outstanding faculty advisor nominated by the chapter who best achieves Psi Chi’s purposes</td>
<td>December 1</td>
<td>Faculty Advisor (chapter nomination)</td>
<td>• Travel expense to APA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td><strong>Kay Wilson Officer Team Leadership Award</strong></td>
<td>Awards the best chapter officer team for exceptional leadership as a group</td>
<td>December 1</td>
<td>Chapter</td>
<td>• $2,000 award ($1,000 for chapter + $1,000 for officers)</td>
</tr>
<tr>
<td><strong>Regional Chapter Awards</strong></td>
<td>Presented to one chapter in each of the six regions that best achieve Psi Chi’s purpose</td>
<td>December 1</td>
<td>Chapter</td>
<td>• Six $500 awards</td>
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<td>• Plaque</td>
</tr>
<tr>
<td><strong>Regional Faculty Advisor Awards</strong></td>
<td>To six outstanding faculty advisors (one per region) who best achieve Psi Chi’s purpose</td>
<td>December 1</td>
<td>Faculty Advisor (chapter nomination)</td>
<td>• Six $500 awards</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Plaque</td>
</tr>
<tr>
<td><strong>Society Annual Convention Research Awards</strong></td>
<td>Up to 8 awards (4 grad, 4 undergrad) presented for the best research papers submitted for APA/APS conventions</td>
<td>December 1</td>
<td>Graduate</td>
<td>• $500 graduate (number varies)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Undergraduate</td>
<td>• $300 undergraduate (number varies)</td>
</tr>
</tbody>
</table>
RESEARCH AWARDS

Bandura Award | February 1
All psychology graduate students who are Psi Chi members and graduate student affiliates of the Association for Psychological Science (APS) are eligible to submit their research for the Albert Bandura Graduate Research Award. The winner receives the following: (1) travel expenses to attend the APS National Convention to receive the award, (2) a three-year membership in APS, including subscriptions to all APS journals, and (3) two engraved plaques, one for the winner and one for the winner’s psychology department as a permanent honor to the winner. This award is presented during the APS opening ceremony at the APS National Convention.

Newman Award | February 1
All psychology graduate students are eligible to submit their research for the Edwin B. Newman Graduate Research Award. The winner receives the following: (1) travel expenses to attend the APA/Psi Chi Society Convention to receive the award, (2) a three-year subscription to an APA journal of the winner’s choice, and (3) two engraved plaques, one for the winner and one for the winner’s psychology department as a permanent honor to the winner. This award is presented annually to the best chapter that best achieves Psi Chi’s purpose. The award includes (1) travel expenses to attend the APA/Psi Chi Society Annual Convention to receive the award, and (3) a plaque to display in the winning chapter’s department.

Regional Chapter Awards | Deadlines Vary (Fall/Winter)
All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the Regional Research Awards. Up to 78 cash awards of $300 each are presented to students submitting the best overall empirical research papers. The awards are $1,000 for first place, $650 for second place, and $350 for third place.

Diversity Article Awards | July 1
Four awards of $500 each are available for the best Eye on Psi Chi articles published by student authors on diversity issues, including but not limited to ethnic minority, GLBT, gender, and physical disability. The submission cannot contain faculty primary authors or coauthors. Both graduate and undergraduate Psi Chi members are eligible for the award.

Regional Research Awards | Deadlines Vary (Fall/Winter)
All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the Regional Research Awards. Up to 8 awards (up to $300 undergraduate; $500 graduate) are presented to students submitting the best research papers for APA/APS conventions.

Society Annual Convention Research Awards | December 1
All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the Society Annual Convention Research Awards. Up to 8 awards (up to $300 undergraduate; $500 graduate) are presented to students submitting the best research papers for APA/APS conventions.

CHAPTER AND ADVISOR AWARDS

Cousins Chapter Award | February 1
The Ruth Hubbard Cousins Chapter Award is presented annually to the one chapter that best achieves Psi Chi’s purpose. The winning chapter receives: (1) a check for $3,500, (2) travel expenses for one chapter officer to attend the APA/Psi Chi Society Annual Convention to receive the award, and (3) a plaque to display in the winning chapter’s department.

Kay Wilson Leadership Award | April 1
The Kay Wilson Leadership Award for Outstanding Chapter Presidents is presented annually to the one chapter president who demonstrates excellence in leadership of the local chapter. The winning Psi Chi chapter officer receives: (1) a $500 cash award, (2) travel expenses for the chapter president to attend and make a short presentation at the APA/Psi Chi Society Annual Convention to receive the award, and (3) an engraved plaque commemorating the award.

Building Bonds Awards | June 1
Building Bonds Awards of $100 each and a plaque are presented annually to recognize collaborative activity by a Psi Chi and a Psi Beta chapter.

Model Chapter Awards | June 30
Model Chapter Awards of $100 each are presented annually to recognize and reward Psi Chi chapters that consistently maintain outstanding records of membership inductions, chapter correspondence, service projects, and other criteria associated with being an outstanding chapter. All chapters submitting evidence of meeting these criteria are designated as winners.

Denmark Faculty Advisor Award | December 1
The Florence L. Denmark Faculty Advisor Award is presented annually to the one Psi Chi faculty advisor who best achieves Psi Chi’s purpose. The award includes (1) travel expenses to attend the APA/Psi Chi Society Annual Convention to receive the award, and (2) an engraved plaque. The award is intended to recognize Psi Chi faculty advisors for their outstanding service to the chapter and to Psi Chi.

Kay Wilson Officer Team Leadership Award | December 1
The Kay Wilson Officer Team Leadership Award is presented annually to the best chapter officer team who demonstrates exceptional leadership as a group. The winning Psi Chi chapter officer receives: (1) a $2,000 cash award ($1,000 for chapter and $1,000 for officers), and (2) travel expenses to attend the APA/Psi Chi Society Annual Convention to receive the award.

Regional Chapter Awards | December 1
The Regional Chapter Awards provide annual recognition for one chapter in each region that best achieves Psi Chi’s purpose. Each winning chapter receives a check for $500 and a plaque to display in the winning chapter’s department. The awards are intended to perpetuate the chapters, to identify chapters as role models for others, and to promote the purposes of Psi Chi.

Regional Faculty Advisor Awards | December 1
This award is presented annually to one Psi Chi faculty advisor from each region who best achieves Psi Chi’s purpose. The award is to recognize and reward actively involved chapter advisors. The winning faculty advisor from each region will receive $500 and a plaque.
## PSI CHI RESEARCH GRANTS

Psi Chi sponsors a variety of grants each year. Listed below is a brief overview. For more information, please visit [www.psichi.org/Awards/completelist_awards.aspx](http://www.psichi.org/Awards/completelist_awards.aspx)

<table>
<thead>
<tr>
<th>Name of Grant</th>
<th>Description of Grant</th>
<th>Submission Deadline</th>
<th>Who Can Apply?</th>
<th>Award Amount/Prize</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Assistantship Grants</td>
<td>Provides funding for teaching and research graduate assistantships during any academic semester</td>
<td>January 1</td>
<td>Graduate</td>
<td>Eight assistantships of $3,000</td>
</tr>
<tr>
<td>Collaboration Grants</td>
<td>Provides funds for a Psi Chi chapter and a Psi Beta chapter to collaborate on a shared activity</td>
<td>January 20 to June 1</td>
<td>Chapter</td>
<td>Four $500 grants</td>
</tr>
<tr>
<td>FBI NCAVC Internship Grants</td>
<td>Provides living expenses for a 14-week unpaid FBI NCAVC internship to conduct research</td>
<td>February 1 to June 1</td>
<td>Graduate, Undergraduate</td>
<td>Two grants, up to $7,000 each</td>
</tr>
<tr>
<td>APS Summer Research Grants</td>
<td>Provides opportunities to conduct research during the summer with sponsors who are APS members</td>
<td>March 1</td>
<td>Undergraduate</td>
<td>Six $5,000 grants ($3,500 student + $1,500 sponsor)</td>
</tr>
<tr>
<td>CUR Summer Research Grants</td>
<td>Provides opportunities to conduct research during the summer with sponsors who are CUR members</td>
<td>March 1</td>
<td>Undergraduate</td>
<td>Two $5,000 grants ($3,500 student + $1,500 sponsor)</td>
</tr>
<tr>
<td>SRC Summer Research Grants</td>
<td>Provides opportunities to conduct research during the summer with sponsors who are SDRC members</td>
<td>March 1</td>
<td>Undergraduate</td>
<td>Two $5,000 grants ($3,500 student + $1,500 sponsor)</td>
</tr>
<tr>
<td>Summer Research Grants</td>
<td>Provides opportunities to conduct research during the summer at recognized research institutions</td>
<td>March 1</td>
<td>Undergraduate</td>
<td>Fourteen $5,000 grants ($3,500 student + $1,500 sponsor)</td>
</tr>
<tr>
<td>Faculty Advisor Research Grants</td>
<td>Provides funding for the direct costs of a project to support faculty advisors' empirical research</td>
<td>June 1</td>
<td>Faculty Advisor</td>
<td>Twelve grants, up to $2,000 each</td>
</tr>
<tr>
<td>STP Assessment Resource Grants</td>
<td>Supports projects to develop assessment tests, instruments, and processes for the APA Guidelines for the Undergraduate Psychology Major</td>
<td>June 1</td>
<td>Psi Chi Faculty Members</td>
<td>Three $2,000 grants</td>
</tr>
<tr>
<td>APAGS/Psi Chi Junior Scientist Fellowships</td>
<td>Provides funding for a 1st-year or 2nd-year graduate-level project</td>
<td>June 30</td>
<td>Graduate Psi Chi Members, APAGS Members</td>
<td>Four fellowships, $1,000 each</td>
</tr>
<tr>
<td>SuperLab Research Grants</td>
<td>Two awards for conducting the best computer-based research</td>
<td>October 1</td>
<td>Graduate, Undergraduate</td>
<td>SuperLab software, Response pad</td>
</tr>
<tr>
<td>Thelma Hunt Research Grants</td>
<td>Enables members to complete empirical research on a question directly related to Psi Chi</td>
<td>October 1</td>
<td>Faculty, Graduate, Undergraduate</td>
<td>Two grants up to $3,000 each</td>
</tr>
<tr>
<td>Undergraduate Psychology Research Conference Grants</td>
<td>To support local/regional undergraduate psychology conferences. Total grant money available is $15,000</td>
<td>October 1</td>
<td>Sponsor(s) of local and regional conference</td>
<td>Up to $1,000 each (number varies)</td>
</tr>
<tr>
<td>Regional Travel Grants</td>
<td>Provides $3,000 per region to assist students with travel expenses to a regional convention</td>
<td>Deadlines Vary, Winter/Spring</td>
<td>Graduate, Undergraduate</td>
<td>Up to $300 each (number varies)</td>
</tr>
<tr>
<td>Graduate Research Grants</td>
<td>To provide funds for graduate students to conduct a research project. Total grant money available is $20,000</td>
<td>November 1 to February 1</td>
<td>Graduate</td>
<td>Up to $1,500 each (number varies)</td>
</tr>
<tr>
<td>Mamie Phipps Clark Research Grants</td>
<td>Enables members to conduct a research project focusing on ethnic minorities. Total grant money available is $10,000</td>
<td>November 1 to February 1</td>
<td>Faculty, Graduate, Undergraduate</td>
<td>Up to $1,500 each (number varies)</td>
</tr>
<tr>
<td>Undergraduate Research Grants</td>
<td>Funding to defray the cost of conducting a research project. Total grant money available is $35,000</td>
<td>November 1 to February 1</td>
<td>Undergraduate</td>
<td>Up to $1,500 each (number varies)</td>
</tr>
</tbody>
</table>
The purpose of this program is to provide funds for advisors to defray the direct costs of conducting a research project (no stipends included). Twelve grants of up to $2,000 are available annually.

**STP Assessment Resource Grants | June 1**
All Psi Chi faculty members are eligible for these grants, which support projects to develop assessment tests, instruments, and processes. Psi Chi will award three $2,000 grants.

**APAGS Junior Scientist Fellowships | June 30**
All Psi Chi and APAGS members entering their first or second year of graduate school are eligible for these fellowships that provide funding for direct costs of psychological science research projects. Applicants must be a member of both organizations at the time of submission to be eligible.

**SuperLab Research Grants | Oct 1**
All undergraduate and graduate Psi Chi members are eligible to apply for these research grants. Grant winners receive a copy of SuperLab experimental lab software and a response pad from Cedrus®.

**Thelma Hunt Research Grants | Oct 1**
All Psi Chi student and faculty members are eligible to apply for a Thelma Hunt Research Grant. Up to two grants of up to $3,000 each are presented annually to enable members to complete empirical research that addresses a question directly related to Psi Chi.

**Undergraduate Psychology Research Conference Grants | Oct 1**
The purpose of this program is to provide funds for local/regional undergraduate psychology research conferences. Funding is intended for conferences that will invite student research presenters from at least three schools in the area and will notify all Psi Chi chapters in the geographic area of the conference. The maximum grant for each conference is $1,000.

**Regional Travel Grants | Deadlines Vary (Winter/Spring)**
All graduate and undergraduate Psi Chi members are eligible for these regional travel grants that provide funding to assist students with travel expenses to a regional convention. Each grant offers up to $300 each; $3000 is available per region.

**Graduate Research Grants | November 1 & February 1**
The purpose of this program is to provide funds for graduate student members to defray the cost of conducting a research project. Applicants may request up to $1,500 for each project. A total of $20,000 has been allotted for this student grant program.

**Mamie Phipps Clark Research Grants | November 1 & February 1**
All Psi Chi members (faculty, graduate and undergraduate students) are eligible for the Mamie Phipps Clark Research Grant. Each grant offers up to $1,500 to defray the costs of conducting a research project focusing on ethnic minorities. Total funding available is $10,000 per year, and the program begins in 2012.

**Undergraduate Research Grants | November 1 & February 1**
The purpose of this program is to provide funds for undergraduate student members to defray the cost of conducting a research project. Applicants may request up to $1,500 for each project. A total of $30,000 has been allotted for this student grant program.
Online Journal Submission Process

All Psi Chi undergraduates, graduates, and faculty* are invited to submit their research to the Psi Chi Journal of Psychological Research through the new web based manuscript submission, tracking, and peer review software solution. Better than email submissions used in the past, this software allows users to create personal accounts to make the submission process more efficient.

Four items are required for all submissions:

1) **Cover Letter**
   Include primary author's education status, manuscript originality statement, and IRB approval

2) **Sponsoring Statement**
   Undergraduate first authors only

3) **Cover Page**
   Author names, school affiliation, and any author note

4) **Masked Manuscript**
   MS Word with all personal information removed

Simply register an account, then click Submit Manuscript:

1) **Upload Files**
   Files can be removed, replaced, or reorganized

2) **Enter Manuscript Information**
   This includes title, abstract, authors, and keywords.

3) **Review Manuscript Material**
   Summary of all information/files submitted

4) **Submit Manuscript**
   Receive email confirmation

New software benefits:

- Allows users to track their manuscripts' progress
- Inserts multiple files including cover letters, manuscripts, and figures
- Permits users to prioritize files and coauthors
- Checks for mistakes in the submission process and points out any errors
- Streamlines the process for authors and reviewers

* Psi Chi member ID number required