131 The Mozart Effect: Dichotic Listening and Visual–Spatial Test Performance
Matthew J. Neltner, Daniel J. O’Connell, and Lawrence Boehm, Thomas More College

136 Effects of Caffeine on Lexical Decision Performance
Edward J. Petruso, Mark V. Gentry, Matthew R. Lemming, and Charles J. Meliska, University of Southern Indiana

143 Teaching Versus Non–Teaching Majors: How Closely Linked Are Personality Factors and Teaching Designation?
Elaine M. Eshbaugh and Helen C. Harton, University of Northern Iowa

148 Glancing Behavior of Participants Using Automated Teller Machines While Bystanders Approach
Anastasia R. Gibson, Kristie Smith, and Aurora Torres, The University of Alabama in Huntsville

152 Sexuality, Gender, and Sport: Does Playing Have a Price?
Brooke A. McKinney and Francis T. McAndrew, Knox College

159 The Effects of Romantic Content in Sitcoms on Perceived Attractiveness of Photographs
Shandee L. Kempf, Jessica H. Lahner, Melissa J. Pecor, and Matthew T. Feldner, University of Wisconsin–Stevens Point

165 Position Announcement: Managing Editor, Psi Chi Journal of Undergraduate Research

164 Reviewers 166 Psi Chi Research Awards and Grants 168 Subscriptions

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The Mozart Effect: Dichotic Listening and Visual–Spatial Test Performance

Matthew J. Neltner
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Recently, scientists have conducted research concerning the phenomenon known as the “Mozart effect,” the ability of Mozart’s music to increase test performance in visual–spatial skills. Rauscher, Shaw, and Ky (1995) proposed the predominant theory about this occurrence and theorized that the music organizes and primes cortical firing patterns in the brain, which generalize to other nonverbal, higher cognitive abilities, such as mathematics or spatial–temporal reasoning. According to the researchers, because Mozart was composing at the age of four, he was probably exploiting the inherent spatial–temporal reasoning processes of the cortex, which he incorporated into his music. It could be inferred therefore, that listening to his music would lead to an increase in spatial–temporal reasoning. Thus, when compared to a control of music or nonmusic, test performance in spatial–temporal reasoning should be significantly better for those persons who listened to Mozart’s music.

The experiment by Rauscher et al. (1995) used the Paper Folding and Cutting (PF&C) subtest of the Stanford-Binet Scale of Intelligence to determine whether the effect actually existed and the extent to which Mozart’s music affected test scores. They found that persons listening to Mozart scored 8–9 points higher on the PF&C subtest than a nonlistening group. The effect proved to be short term though, lasting only 10–15 min after the exposure.

Rideout and Taylor (1997) attempted to replicate the Rauscher et al. (1995) research using the same PF&C subtest, as well as several similar problems they created. Although they noted the nonrobust nature of the effect including individual differences, the researchers still found a significant improvement in test performance after exposure to Mozart’s music.

Although many studies have shown the existence of the Mozart effect, other experimenters have failed to replicate the findings. Nantais and Schellenberg (1999) found the Mozart effect, but suggested that participant preferences (music, silence, narrated story, etc.) may play a large part in increased test performance. Similar increases, the experimenters explained, could be found in pairing any positive stimulus with a less enjoyable one. Steele, Bass, and Crook

Author note. This research was presented at the Mid-America Undergraduate Psychology Research Conference in April 1999. Correspondence concerning this article should be sent to Lawrence Boehm, Department of Psychology, Thomas More College, 333 Thomas More Parkway, Crestview Hills, KY 41017-3428.
(1999) failed to replicate the Rauscher et al. (1995) data; they found no significant effect of Mozart’s music, nor was the strength of the effect between their experiment and the Rauscher et al. study similar. They did discover that participant mood was positively affected after exposure to Mozart’s music.

Considering these results, Wilson and Brown’s (1997) finding that Mozart’s music positively affected paper-and-pencil maze performance raises another question. In the Wilson and Brown study, participants completed more mazes with fewer errors after a 10-min exposure to Mozart’s music than did groups that listened to a relaxation message or silence. It should be noted that this performance enhancement was only evident when Mozart’s music followed the relaxation portion. It was theorized that the repetition and complex patterns associated with classical music, especially Mozart’s, was the cause of the findings. The experimenters did not analyze the significance of the counterbalancing order on the Mozart effect. From this research the question arises, why does relaxation preceding Mozart’s music enhance the Mozart effect?

Given that several studies have demonstrated the Mozart effect, we can speculate about the properties that govern it. One such property could be the locus in the brain where the music has its effect. Such a locus, research has found, could be located in the right hemisphere. Robinson and Solomon (1974) found that the right hemisphere of the brain processes nonspeech auditory stimuli. Using a dichotic listening task, in which a person listens to two simultaneous messages, one in each ear, Kimura (1961) found that both normal and brain-damaged people were more accurate at identifying words presented to their right ear. Similarly, Kimura (1964) found a left-ear advantage for the perception of melodies. According to Kimura’s (1973) model of dichotic listening, a single message presented to one ear reaches both left and right hemispheres via ipsilateral and contralateral pathways. Under dichotic listening conditions, the ipsilateral pathways are inhibited and the contralateral paths convey the message to the opposite hemisphere. Further evidence from animal studies support the notion that contralateral pathways from the ear to the auditory cortex are stronger than ipsilateral pathways (Rosenzweig, 1951). Competition between the dichotic messages appears to be necessary to induce contralateral processing. There is no left- or right-ear advantage when a single stimulus is presented (Dirks, 1964).

More recently, Springer and Deutsch (1993) have also suggested that there is a left-ear advantage for stimuli believed to be processed by the right hemisphere (e.g., musical chords and melodies). In addition, Liotti and Tucker (1995) have stated that there is a great deal of evidence supporting the predominant role of the right hemisphere in human visual–spatial processing. Thus, attending to Mozart’s music in the left ear may enhance any right hemisphere contribution to the Mozart effect. Due to the stimulation of contralateral pathways by the dichotic listening task and hemispheric differences in processing auditory stimuli, we hypothesize that there will be an advantage in visual–spatial task performance when Mozart’s music is presented to the left ear.

**Method**

**Participants**

Fifty-two undergraduates (32 women and 20 men, mean age = 20.9 years) received extra credit in a psychology course for participating.

**Materials and Apparatus**

The experimenters recorded a cassette tape in stereo so that Mozart’s Sonata for two pianos in D Major would be heard in one ear, whereas a progressive relaxation message was present in the other ear. “Progressive Relaxation” by Phyllis Craig (n.d.) served as the relaxation message. An Aiwa model TX388 cassette player and model HPM028 earphones presented the tape dichotically. The researchers constructed two mazes of similar complexity. The construction proceeded as follows: We created the first maze using a computer paint program. The second maze was an inverted and reversed copy of the first. Several line changes in the second maze altered the solution. Thus, the complexity was the same, but the solutions were different. The researchers administered a survey at the end of the experiment to collect demographic and affective information as well as handedness. For the survey, participants rated, on a 7-point scale, their mood that day, their mood when attending to the relaxation message, and their mood when attending to the Mozart piano music. The PF&C task was the same used by Rideout and Taylor (1997), divided into two tests of eight items each. The PF&C test features a diagram of a piece of paper being successively folded, and then a shape is cut out. The participant then determines what shapes would be present in the unfolded paper by selecting the correct multiple-choice answer.

**Design and Procedure**

The experimenters instructed half of the participants to focus their attention exclusively on their right ear; they instructed the other half to focus on their left ear throughout the course of the experiment. The order of stimulus presentation to the attended ear
was completely counterbalanced. Half the participants in each attended-ear group focused on Mozart’s music during the first trial, and then focused on the relaxation message during the following trial (although both auditory stimuli were present in both trials). The remaining participants attended to the relaxation message first and Mozart’s music second.

Participants listened to the tape for the first trial and then completed one of the two PF&C tests, and then one of the two mazes. These exercises were timed by means of a stopwatch. The participants were allowed a maximum of 8 min for the PF&C test and 3 min for the maze. Following the maze, the participants listened to the tape for the second trial. For this trial the earphones were turned around so that the stimuli were going in the opposite ears. Thus, the participant focused on the opposite message (i.e., if they attended to Mozart’s music during the first trial, then the relaxation message would be played into their designated ear for the second trial). They then received the second PF&C test and the second maze. Participants completed the PF&C tests and the mazes in a counterbalanced order. Participants completed the survey after all other testing was finished. A debriefing session concluded the experiment.

Scoring

The experimenters scored the PF&C tests simply as the number of correct responses. For the mazes, the experimenters carefully measured the correct solution in inches creating an answer key for each maze. This key contained the cumulative length of the maze at various points along the correct response. The experimenters determined the total correct length of the participant’s response by comparison to the key. The experimenters divided the correct length by the total length of the maze, and recorded the score as the percentage of the correct response acquired. The experimenters recorded the time (in seconds) taken to complete the PF&C test and the maze.

Results

A mixed-design analysis of variance (ANOVA) with treatment condition (Mozart or relaxation message) as the within-subjects variable and attended ear and counterbalancing order as the between-subjects variables revealed a significant three-way interaction for PF&C scores, $F(1, 48) = 5.30, p < .05$. As illustrated in Figure 1, the left-ear group (i.e., those processing with the right hemisphere) showed an increase in
visual–spatial test performance after listening to Mozart’s music. In contrast, the right-ear group (those processing with the left hemisphere) showed an increase in visual–spatial test performance only when the relaxation message preceded Mozart’s music; when the order of presentation was reversed, the effect is not found. The treatment condition by counterbalancing order interaction was significant for the PF&C scores, $F(1, 48) = 4.60, p < .05$. Finally, the main effect of treatment condition (Mozart or relaxation message) was significant, $F(1, 48) = 5.50, p < .05$. PF&C scores were higher after hearing Mozart ($M = 4.6$) compared to the relaxation message ($M = 4.0$).

We found no significant differences across or between conditions in terms of the time required for completion of the PF&C or maze tests. A mixed-design ANOVA revealed no significant effect for sex or handedness on the PF&C or maze scores. Unfortunately, the maze data were unreliable due to differences in length and route between the two mazes. A Pearson correlation indicated that the distance completed between the two mazes was not similar, $r(51) = –1.159, p < .05$; however, performance on the first PF&C test was more strongly related to performance on the second PF&C, $r(51) = .537, p < .05$. In short, the maze data were invalid due to an error in maze construction, but the PF&C data were reliable.

A significant effect of condition on mood was discovered: $t(51) = –2.93, p < .01$. In other words, participants reported being in a significantly better mood after attending to Mozart’s music.

**Discussion**

The three-way interaction between condition, attended ear, and counterbalancing order gives evidence of the Mozart effect. Compared to the relaxation condition, Mozart’s music enhanced visual–spatial test performance in three of the four counterbalanced conditions. Consider the graphs in Figure 1. For both counterbalancing orders, there is a consistent increase from the relaxation condition to the Mozart condition when the participant attended to the left ear. This increase for the left ear coincides with the hypothesis that there is a right hemisphere dominance for the Mozart effect. However, one cannot conclude the right hemisphere is completely responsible for the Mozart effect considering that the left hemisphere (right-ear group) showed a significant increase, but only after relaxation, as illustrated in Figure 1. The right-ear group findings were unexpected but not unique.

For the left-hemisphere group (i.e., those participants attending to the right ear) to show the Mozart effect, it seems that there is a prerequisite for this hemisphere to be relaxed, also illustrated in Figure 1. For the right-ear group, when Mozart preceded the relaxation message, the PF&C score in the relaxation condition was actually higher, but when relaxation was first, the typical Mozart effect was observed. It is important to note that this study is not the only one to find an effect of counterbalancing order for Mozart’s music and a relaxation message. Wilson and Brown (1997) found that participants performed best when the order progressed from silence to relaxation music and then to Mozart. The question arises: Why is it important that Mozart’s music follow relaxation for the effect to be evident in the left hemisphere?

Consider the finding in this study that participants reported being in a better mood while listening to Mozart’s music. Bear in mind that the effects of Mozart’s music are most prominent after having been relaxed. In which condition would it be easier to manipulate one’s mood: when the individual is under stress, or when the individual is relaxed? It makes sense that the latter is the case. Taking this difference into consideration, it may be that the Mozart effect is due to a change in affect. Note that no previous experiment has controlled for mood in studying the Mozart effect. This study is no exception; we simply inquired as to participant affect after the experiment. Cash, El-Mallakh, Chamberlain, Bratton, and Li (1997) found that highly structured music, such as classical, can positively affect cognitive test scores as well as mood. Thus, the participants’ mood could play a role in how they perform on a visual–spatial test of reasoning (Nantais & Schellenberg, 1999). Thus, one probable explanation of the Mozart effect is that mood is manipulated, but this possibility requires further investigation.

Rauscher et al. (1995) proposed the prominent theory about Mozart’s music and its influence. The idea was that Mozart had an advanced ability to reason spatially and temporally, and that when he composed, he was creating his music in such a way that it stimulated the spatial–temporal pathways in the brain. Thus, when a person listens to Mozart’s music, this pathway is primed, and so a person scores better on measures of this ability. Using reverse logic on this set of arguments, a composer of inhibited or reduced spatial–temporal reasoning would compose music that inhibits the spatial–temporal reasoning of the listener. This music might inhibit to the hypothesized neurological pathway. Thus, a participant should score lower on tests of spatial–temporal reasoning after listening to this music, if the logic of Rauscher et al. is truly applicable. It seems logical and easier to explain the effects of Mozart as simply a manipulation of mood.
References


Craig, P. (n.d.). *Progressive relaxation [cassette].*


Effects of Caffeine on Lexical Decision Performance

Undergraduates (4 men, 4 women) at a midwestern university participated in a study of the effects of caffeine on lexical decision making. The study also examined the effect of the medium in which caffeine was consumed, that is, water versus cola. Using a within-subjects design counterbalanced for order of presentation, the experimenters compared 4 treatments: caffeinated water, caffeine-free water, caffeinated cola, and caffeine-free cola. Contrary to expectation, caffeine slowed reaction times when consumed in either water or cola. However, caffeine improved lexical decision accuracy when it was consumed in a water-based beverage (Water Joe®); yet, accuracy was also marginally higher relative to control (spring water) after participants drank both caffeinated and decaffeinated cola. These unexpected results may be due to confounds arising from inadequate time to absorb the caffeine. Classical conditioning, whereby participants may come to associate cola taste with caffeine-induced enhancement of mental function, may also explain some of the unexpected results.

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Mark V. Gentry
Matthew R. Lemming
Charles J. Meliska*
University of Southern Indiana

Considered the world’s most widely used drug (Rogers & Dernoncourt, 1998), people consume caffeine in beverages such as coffee, tea, and soft drinks, medications such as appetite suppressants, and foods such as chocolate. Although most people presume that caffeine improves thinking and mood, laboratory studies conducted over several decades have yielded inconsistent findings. In fact, laboratory studies indicate that caffeine may improve, decrease, or have no effect on memory and other mental functions. As Table 1 shows, the literature on caffeine’s psychostimulant effects provides little consistent evidence that regular caffeine use benefits mood or performance, and some studies show caffeine can actually hinder performance. However, because more studies report an increase of mental functioning with caffeine, we expected caffeine to improve accuracy and decrease reaction times in a cognitive task.

The lexical decision task involves measuring accuracy and reaction time of long-term memory retrieval. Researchers have used lexical decision tasks to measure the effects of drugs on mental functioning. Maylor, Rabbitt, and Kingstone (1988) found that alcohol increased lexical decision reaction times, whereas other researchers (Gentry, Hammersley, Hale, Nuwer, & Meliska, 2000; Hale, Gentry, & Meliska, 1999) report that nicotine and cigarette smoking improved lexical decision performance. To our knowledge, the present study is the first to examine caffeine’s effects on lexical decision making. We expected that caffeine consumption would reduce reaction times and increase lexical decision accuracy in people deprived of caffeine for 4 hr.

Method

Participants
The participants were 4 female and 4 male undergraduates at a midwestern university, aged 18 to 22, selected from a pool of respondents to flyer
Potential participants completed a brief phone screening concerning substance habits, health, and commitment to participate. To be a participant, a person had to be a student attending the University of Southern Indiana, be a non-smoker, not be using any psychoactive medication (except caffeine), have no major physical or psychological illnesses, and have a history of caffeine consumption. Those persons selected to participate read an informed consent form explaining the physical and pharmacological conditions incompatible with caffeine consumption. The experimenters paid the participants $25 for participating in five sessions.

### Apparatus and Surveys

The equipment used included an IBM-compatible personal computer with standard VGA monitor, the Micro-Experimental Laboratory (MEL) lexical decision task (Psychology Software Tools, Inc., Pittsburgh, PA), the Sternberg memory task (from MEL), and the Profile of Mood States (POMS, Educational and Industrial Testing Service, San Diego, CA) questionnaire. The POMS measures six different mood scales (Tension/Anxiety, Depression/Dejection, Anger/Hostility, Fatigue/Inertia, Confusion/Bewilderment, and Vigor/Activity); Total Mood Disturbance is calculated by subtracting the Vigor/Activity score from the sum of the other five scales.

### Table 1: Caffeine Studies on Cognitive Functioning

<table>
<thead>
<tr>
<th>Mental task</th>
<th>Caffeine improved</th>
<th>Caffeine inhibited</th>
<th>No effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term memory</td>
<td>Hindmarch et al., 1998; Warburton, 1995</td>
<td></td>
<td>Buffalo et al., 1993 (rhesus monkeys)</td>
</tr>
<tr>
<td>Delayed recall</td>
<td>Warburton, 1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate recall</td>
<td></td>
<td>Warburton, 1995</td>
<td></td>
</tr>
<tr>
<td>Recognition after hearing</td>
<td>Gupta, 1993 (in high impulsives)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual recognition</td>
<td></td>
<td>Gupta, 1993 (in high impulsives)</td>
<td></td>
</tr>
<tr>
<td>Recall of word lists (fast presentation)</td>
<td></td>
<td>Erikson et al., 1985</td>
<td></td>
</tr>
<tr>
<td>Recall of word lists (slow presentation)</td>
<td></td>
<td>Erikson et al., 1985</td>
<td></td>
</tr>
<tr>
<td>“Memory”</td>
<td></td>
<td>Loke, 1988</td>
<td></td>
</tr>
<tr>
<td>Operant learning</td>
<td>Buffalo et al., 1993 (rhesus monkeys)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color and position discrimination</td>
<td>Buffalo et al., 1993 (rhesus monkeys)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
from the sum of the five remaining negative mood factors. The cola-based beverage containing caffeine was Diet Coke®. The commercially available, water-based beverage containing caffeine was Water Joe®. The noncaffeinated “placebos” were Caffeine-Free Diet Coke® and bottled spring water, respectively.

**Procedure**

The Institutional Review Board of the University of Southern Indiana approved all procedures. Using a double-blind, within-subjects design, we tested each participant with each of four lexical templates, under each of the four caffeine conditions. For 4 hr before the start of each session, participants abstained from ingesting caffeine. Each participant performed the lexical task on four separate occasions, separated by 48 hr. To minimize trial, sequence, and learning effects across the four test sessions, the experimenters used four independent sets of 98 paired letter strings. Gentry et al. (2000) describe in detail the construction of these letter string sets. To control for possible effects of testing order, we administered caffeine treatments according to a counterbalanced, Latin square order of administration. Prior to the first session, the participant read and signed the informed consent form; then the experimenter gave the participant either a cola-based or a water-based beverage which contained either caffeine or no caffeine. Across sessions, each participant received all four beverages, a different one at each session. Both participant and experimenter were blind with respect to caffeine content of the beverage. To control for differences in average body size, male participants consumed 12-oz beverages (48 mg caffeine) and female participants consumed 8-oz beverages (32 mg caffeine).

---

**TABLE 1 (continued)**

**Caffeine Studies on Cognitive Functioning**

<table>
<thead>
<tr>
<th>Mental task</th>
<th>Caffeine improved</th>
<th>Caffeine inhibited</th>
<th>No effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroop task</td>
<td></td>
<td></td>
<td>Edwards et al., 1996</td>
</tr>
<tr>
<td>Reaction time</td>
<td>Hindmarch et al., 1998; Durlach, 1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical flicker fusion</td>
<td>Hindmarch et al., 1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention</td>
<td>Warburton, 1995</td>
<td></td>
<td>Buffalo et al., 1993 (rhesus monkeys)</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Warburton, 1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental rotation</td>
<td>Smith &amp; Oscar-Berman, 1990</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental speed tasks</td>
<td>Mitchell &amp; Redman, 1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Psychomotor performance”</td>
<td></td>
<td></td>
<td>Lane, 1997</td>
</tr>
<tr>
<td>Auditory attention</td>
<td>Linde, 1994 (after sleep deprivation)</td>
<td></td>
<td>Linde, 1994 (normal sleep)</td>
</tr>
<tr>
<td>Addition and multiplication</td>
<td>Loke, 1988</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigilance</td>
<td></td>
<td></td>
<td>Loke &amp; Meliska, 1984</td>
</tr>
</tbody>
</table>
To provide time for caffeine absorption, each participant walked with the experimenter in the testing building for 5 min after drinking the beverage. After returning to the laboratory, the participant completed the POMS followed by the lexical decision task and the Sternberg memory task. Because the Sternberg and POMS yielded no significant effects, the remainder of this report focuses solely on the results of the lexical decision task.

For the lexical task, the participant viewed two letter strings on a computer monitor, then decided whether both strings were real words or not. The participant viewed five combinations of paired letter strings: word/related word, word/unrelated word, word/non-word, non-word/word, and non-word/non-word. In this task, a “+” appeared in the center of the screen; then one string of letters would appear above and one below the “+.” Participants pressed the “1” key if both letter strings were words and the “2” key if one or both letter strings were non-words. The researcher remained in the room with the participant to ensure that the instructions were followed. The computer automatically measured accuracy and reaction time with respect to the type of combination.

**Dependent Measures**

There were two dependent measures: accuracy (percent correct) in determining whether both letter strings were words, and reaction time (in milliseconds)—the average time between the appearance of the letter strings and the participant’s response.

**Data Analyses**

The experimenters analyzed reaction time and accuracy data separately, using within-subjects analysis of variance (ANOVA). Interaction effects were analyzed with paired-samples t tests. We used directional (one-tailed) tests to test the main effects of caffeine versus placebo, and nondirectional (two-tailed tests) for the mode effect (water vs. cola) and the Mode × Drug interaction, because differences in mode of caffeine delivery were not expected. Because this was exploratory research, we used lenient standards of statistical significance in which \( p < .10 \) was considered “marginally significant” and interpreted as a result warranting further data analysis and interpretation.

**Results**

The ANOVA showed a significant main effect of caffeine on reaction time. Contrary to expectation, mean reaction time was substantially longer, across lexical decision types, in the caffeine conditions (combined) than in the placebo conditions, \( F(1, 7) = 13.16, p = .008 \); see Figure 1. Thus, participants responded more slowly after drinking the caffeine beverages than they did after drinking the placebo beverages.

The ANOVA on accuracy scores showed a significant (one-tailed) main effect of beverage type (i.e., whether the beverage was cola-based or water-based), \( F(1, 7) = 4.22, p = .039 \). However, the Drug × Beverage Type interaction approached marginal significance, \( F(1, 7) = 3.49, p = .092 \). Due to the exploratory nature of the study, we felt this interaction warranted further analysis. Paired-samples t tests showed, as expected, that accuracy was significantly higher after consuming caffeinated water (Water Joe®) than after consuming placebo (spring) water, \( t(7) = 2.19, p = .039 \) (one-tailed; see Figure 2); however, accuracy was also marginally higher after consuming the Caffeine-Free Diet Coke® (placebo) than after placebo water, \( t(7) = 2.07, p = .064 \) (two-tailed). Caffeine-Free Diet Coke® and Diet Coke® did not differ significantly.

**Discussion**

Most of the previous studies we reviewed showed, as expected, that caffeine reduced reaction time on various cognitive tasks (Hindmarch, Quinlan, Moore, & Parkin, 1998; Mitchell & Redman, 1992). These previous results conflict with the present findings, which indicate that caffeine, whether in cola or water, slowed lexical decision response times substantially for all five lexical decision types. This finding suggests that caffeine ingestion may actually reduce response speed with some kinds of cognitive tasks, while increasing response speed with others.

If the slower responding with caffeine occurred because participants were contemplating the stimuli more carefully, prior to responding, then caffeine drinkers might be expected to display greater accuracy than placebo drinkers. Our findings partially support this interpretation. Participants responded more accurately, relative to placebo, when they consumed caffeine in the water-based beverage, Water Joe®; however, consuming caffeine in cola did not improve accuracy, relative to the caffeine-free cola. Furthermore, consuming the caffeine-free cola unexpectedly produced marginally higher accuracy than did consuming spring water. Although the presence or absence of caffeine could account for the differences in the water groups, it cannot explain why caffeine had no effect in the cola-based beverages, or why placebo cola produced marginally greater accuracy than spring water. Only the beverage characteristics and experimental confounds can explain the later two findings.

A possible confound exists due to not enough time being allowed to elapse between drinking the...
CAFFEINE AND LEXICAL DECISIONS

Petruso, Gentry, Lemming, and Meliska

FIGURE 1

Reaction time (in milliseconds) with each of the five lexical decision types: word/related word (WRW), word/unrelated word (WUW), word/non-word (WNW), non-word/non-word (NWNW), and non-word/word (NWW). Caffeine slowed reaction times ($p < .05$) for all lexical decision types, regardless of mode of consumption (water vs. cola).

![Graph showing reaction times for different lexical decision types with caffeine and placebo conditions.](image)

The 10 min allowed (the 5-min walk plus about 5 min to complete the POMS) may not have been adequate, because absorbing significant blood levels of caffeine may require 30–45 min (Julian, 1998). Had the experimenters allowed more time for absorption, the effects of the caffeine might have been greater. Nevertheless, Hindmarch et al. (1998) found caffeine enhanced performance 10 min after oral ingestion (in tea), suggesting that caffeine is capable of producing detectable effects within 10 min or so of oral ingestion.

Another plausible explanation involves a classically conditioned placebo effect. Suppose caffeine improves decision accuracy in some domains, and this effect can be measured in lexical decision task accuracy. Whenever someone drinks a caffeinated cola, that individual might experience an increase in some aspects of cognitive functioning. Caffeine would be an unconditioned stimulus leading to the unconditioned response: improved cognitive functioning. However, the person would also experience the taste of cola. In this way, the cola taste would be paired with the caffeine-induced cognitive enhancement, making the taste a conditioned stimulus, eventually leading to a conditioned response: improved cognitive functioning. This form of conditioning might explain why we found no significant difference in accuracy between the Diet Coke® and the Caffeine-Free Diet Coke®. The Caffeine-Free Diet Coke® has nearly the same taste as Diet Coke®, leading to the conditioned response: increased cognitive functioning, leading to a higher accuracy score. This effect would also explain why caffeine in water produced a rise in accuracy, up to the level obtained in both cola conditions, but spring water did not.

To test this idea, one could add ingredients to caffeine-free cola to alter its taste, to determine whether accuracy after consuming the beverage is still on par with accuracy after drinking diet cola. One could attempt to recreate the hypothesized classical conditioning: Two drinks could be made to taste dif-
ferently by, say, adding a little salt to the caffeinated water but not to the spring water. After many trials, the participant would be tested with salted spring water. The hypothesis predicts that after consuming salted spring water, participants will be more accurate than after unsalted spring water.

**References**


CAFFEINE AND LEXICAL DECISIONS □ Petruso, Gentry, Lemming, and Meliska


Teaching Versus Non–Teaching Majors: How Closely Linked Are Personality Factors and Teaching Designation?

The purpose of this study was to examine how 3 aspects of personality (self-esteem, agreeableness, and self-concept clarity) relate to female students' designation of a teaching versus non–teaching major. Students completed measures of self-esteem, agreeableness, and self-concept clarity, along with a demographic questionnaire. Female education majors (n = 54) had higher self-esteem and agreeableness than female non–education majors (n = 77). Self-concept clarity tended to be higher in education majors than non–education majors, although this difference was not statistically significant. These findings are encouraging because they imply that education majors have valuable and important qualities, such as self-esteem and agreeableness. These results support previous research that has found college major and career choice often overlap with personality. Recommendations for future research and implications for counselors in academic and career settings are discussed.

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Recently, the educational system in the United States has come under fire (Hurn, 1993). Many critics doubt that students are reaching their educational potential as they progress through the school system. They contend that students are able to pass high school without basic knowledge and that our school system is critically in need of evaluation. Critics of the educational outcomes of students have at times focused their blame toward the teachers (Hurn, 1993). Is this position justified, or are teachers shouldering too much of the criticism for what is not under their control? This study takes a closer look at those students who have chosen to become educators. Are they well-suited to be teachers? Specifically, the relation between three personality variables and the designation of teaching versus non–teaching major was examined in college students.

It seems elementary that personality has an impact on the college major and career one chooses. However, the jury is still out on the magnitude of this impact. Certain studies suggest that personality is instrumental in predicting career choice and success (Holland, 1966). Conversely, other studies support the idea that people with diverse personalities are just as likely to choose a certain profession and excel (Hogan, Hogan, & Roberts, 1996; Hough & Schneider, 1996; Lancaster, Colarelli, King, & Beehr, 1994). Previous research regarding personality and choice of career by industrial–organizational (I/O) psychologists, centers on Holland's six congruence–achievement personality types (Holland, 1966, 1985), whereas research by personality psychologists centers on the Big Five model of personality (McCrae & Costa, 1985).

Holland’s six categories, created to relate to occupational choice, include realistic, investigative, artistic, social, enterprising, and conventional (Holland, 1966). The realistic type is associated with a preference for dealing with objects, tools, and machines, whereas the investigative type is associated with preference for examination of physical, biological, and cultural phenomenon. Persons who are artistic prefer to use materials to create art forms, whereas per-
sons who are social enjoy informing and training others. Enterprising and conventional types prefer to work with others for organizational and economic gain and to work with explicit, systematic, and ordered data, respectively (Holland, 1985).

Holland (1985) theorizes that a certain category is associated with a group of careers. If a person chooses a career that is congruent with his or her personality type, this choice will increase job achievement, stability, and satisfaction. For example, investigative people are well suited for careers as biologists and physicists, whereas social personalities are congruent with careers in teaching or social work (Holland, 1985). Although Holland stresses the importance of congruence as a determinant of worker satisfaction and performance, research findings have not universally supported his theory (e.g., Camp & Chartrand, 1992; Heesacker, Elliott, & Howe, 1988; Salomone & Sheehan, 1985).

A smaller body of research focusing on personality factors and occupational choice centers on the Big Five model of personality (McCrae & Costa, 1985) with its factors of openness, neuroticism, conscientiousness, agreeableness, and extraversion. The Big Five model is useful in identifying an individual’s strengths, such as leadership abilities and social poise (McCrae & Costa, 1985). In general, research has supported the Big Five’s ability to predict career success (Goodstein & Lanyon, 1999; Judge, Higgins, Thoresen, & Barrick, 1999).

It is especially important to explore the relation between personality and choice of major or occupation in women. Most studies on personality and career or major choice have used men as participants, presumably because men have been the traditional breadwinners in our society and, until recently, were more likely to seek higher education than women. Personality and career choice may be less overlapping in women than men (Gottfredson & Holland, 1975; Raphael & Gorman, 1986; Wolfe & Betz, 1981), because women historically have been more limited in career choice. Holland (1985) admitted that his theory may not apply to all women because women have not had sufficient opportunities to develop their interests and abilities in all areas.

Some researchers argue that Holland’s theory may only apply to certain women, particularly those who are nontraditional (Raphael & Gorman, 1986; Wolfe & Betz, 1981). This theory may be less applicable to traditional women because these women are less likely to pursue career goals. Other results have disputed these findings (Betz, Heesacker, & Shuttleworth, 1990). Miller and colleagues compared the personalities of female college students enrolled in four majors using Holland’s theory (Miller, Heck, & Prior, 1988). Their findings demonstrated a modest relation between major and personality. Students majoring in social work tended to be social, whereas business majors were more enterprising. In addition, students majoring in music and math were more artistic and investigative, respectively.

Although research comparing personality traits of educators or potential educators to the general population is scarce, many sources emphasize the personality traits that are desirable in a teacher. Literature stresses the need for teachers to have high self-esteem because this trait promotes better teacher–student relations and the development of self-esteem in students (Maples, 1992; McCarty, 1993). The field of education also requires teachers to be adaptable, flexible, and agreeable in order to meet the needs of students, parents, administrators, and fellow teachers and work in a constantly changing environment (Nelson, 1998). An educator must have somewhat of a “people pleaser” personality in order to satisfy a diverse group of people (Hurn, 1993).

No studies have considered the newer concept of self-concept clarity in relation to teachers or teaching majors. Self-concept clarity refers to the extent to which one’s self-beliefs are internally consistent, stable, and defined confidently and clearly (Campbell et al., 1996). Effective teachers need a high level of self-concept clarity and, therefore, a clear sense of who they are in order to lead a class successfully and confidently. Because educators must have the self-concept clarity to want to dedicate themselves to a field in which they may not always receive adequate compensation and recognition, this attribute may be even more important. Those persons concerned with education would hope students who are majoring in education would possess the qualities of self-esteem, agreeableness, and self-concept clarity in order to meet the demands of the profession.

We hypothesized that education majors would show higher self-esteem, agreeableness, and self-concept clarity than non-education majors. These hypotheses were tested at the University of Northern Iowa (UNI), a historical teachers college with a large percentage of education majors and a strong teaching program.

Method

Participants

Participants were female Introduction to Psychology students (n = 156) who received course credit for their involvement with the study. The mean age of the sample was 18.5 years, with a range of 18 to 26. Most students were classified as college freshmen (83%). The overwhelming majority of participants classified
themselves as White/Caucasian (99%), and virtually all (99%) reported they had been raised in the Midwest.

We coded majors as either education (n = 54), non-education (n = 77), or undecided (n = 25) and dropped undecided participants from further analysis. Education majors included such specialties as elementary education (n = 42), early childhood education (n = 3), special education (n = 3), and secondary education (n = 6).

**Procedure**

Participants, in groups of 16 to 22, read and signed an informed consent form before participating in the study, then they completed demographic, self-esteem, agreeableness, and self-concept clarity measures. We debriefed and thanked the participants for their involvement following the study.

**Measures**

**Demographics.** Participants completed a demographic questionnaire with items on age, ethnic background, high school grade point average (GPA), college GPA, ACT score, college grade classification (e.g., freshman, sophomore), and college major.

**Self-esteem.** The 10-item version of the Rosenberg Self-Esteem Inventory (1965) measured global, personal feelings of self-worth. Participants rated the items by circling either SD (strongly disagree), D (disagree), A (agree), or SA (strongly agree) on this 12-item scale. Sample items include “I feel that I have a number of good qualities” and “I am able to do things as well as most other people.” Higher scores indicate higher self-esteem. This well-known and often-used measure has high internal consistency and has been validated across many studies (Blascovich & Tomaka, 1991). The coefficient alpha was .76.

**Agreeableness.** The agreeableness subscale of the NEO-FFI personality scale (Costa & McCrae, 1992) measured agreeableness. Participants circled SD (strongly disagree), D (disagree), N (neutral), A (agree), or SA (strongly agree) on this 12-item scale. Sample items include “I try to be courteous to everyone I meet” and “I generally try to be thoughtful and considerate.” Higher scores indicate higher agreeableness. This scale has convergent and discriminant validity and measures a stable trait (Hendriks, Hofstee, & de Raad, 1999). The coefficient alpha on this measure was .70.

**Self-concept clarity.** Self-concept clarity refers to the extent to which one’s self-beliefs are consistent, stable, and clearly defined (Campbell et al., 1996). Campbell and colleagues’ (1996) 12-item Likert scale, with choices ranging from 1 (strongly disagree) to 5 (strongly agree), measured this concept. Examples of items are “Sometimes I think I know other people better than I know myself” (reverse scored) and “In general, I have a clear sense of who I am and what I am.” Higher scores indicate higher self-concept clarity. The authors of the scale have shown a test–retest reliability of .79 over a 4-month period and an internal reliability of .86 (Campbell et al., 1996). The coefficient alpha in the current study was .81.

**Plan of Analysis**

We grouped female students majoring in elementary education, early childhood education, special education, and all types of secondary education (e.g., social science, English, biology) for comparison with non–education majors using independent-samples t tests. Dependent variables included self-esteem, agreeableness, self-concept clarity, high school GPA, college GPA, ACT score, age, and classification (e.g., freshman, sophomore). Cohen’s d (1988) ascertained effect sizes; Cohen suggests that an effect size of .20–.49 is considered a small effect, .50–.79 a medium effect, and .80 and above a large effect.

We set our significance level for each of the hypothesized variables (self-esteem, agreeableness, self-concept clarity) at .05. Because we also tested several variables that were not included in our hypotheses such as demographic data, we set our overall significance level for these t tests at .05. Using a Bonferroni’s procedure, this decision level resulted in independent significance levels of .01.

**Results**

We hypothesized that teaching majors would be higher in self-esteem, agreeableness, and self-concept clarity than non–teaching majors. In general, the results supported these hypotheses. Education majors had higher self-esteem than non–education majors, t(129) = 2.10, p = .04, d = .37 (Table 1). Education majors were also higher in agreeableness than non–education majors, t(129) = 2.42, p = .02, d = .43 (Table 1). Finally, those students with a teaching designation tended to have higher self-concept clarity than non–teaching majors, although this difference was not statistically significant at the .05 level, t(129) = 1.67, p = .10, d = .29 (Table 1).

It should be noted that all personality factors (self-esteem, agreeableness, and self-concept clarity) showed strong positive relations with each other. Self-esteem was correlated with agreeableness, r(129) = .35, p < .01, and self-concept clarity, r(129) = .66, p < .01, and agreeableness and self-concept clarity were correlated, r(129) = .29, p < .01.

Education and non–education majors had similar high school GPAs, t(126) = .53, p = .59, and college GPAs, t(81) = 1.13, p = .26. (Some participants did not indicate a college GPA because they were in their
first semester of college). Differences in ACT scores between education and non–education majors were not significant at the .05 level, \( t(126) = 1.70, p = .11 \). Education majors were likely to be slightly younger than non–education majors, though this difference was not significant at the .05 level, \( t(129) = 1.99, p = .10 \). Several outliers on age strongly affected this analysis. When the analysis was run excluding the three participants over the age of 23, teaching designation and age were not as closely linked, \( t(124) = 1.49, p = .21 \). Education majors were likely to be at a slightly lower college grade level than non–education majors, \( t(129) = 2.90, p = .11 \); however, the most common classification for both groups was freshman, and only 5% (\( n = 8 \)) of the participants were upperclassmen.

### Discussion

Education majors had higher self-esteem and agreeableness than non–education majors. In addition, education majors tended to have higher self-concept clarity than non–education majors, though this difference was not statistically significant. These results suggest that there are a few personality traits that may be more prominent in education majors than in students with other majors, at least among women. These results are good news for parents with children in the school system and for persons who value education in society. Though teaching may not be a high-status or well-paid position, there are few, if any, jobs in society that carry as much obligation and potential to influence the future (Hurn, 1993). It is certainly a comforting finding that persons with high levels of self-esteem, agreeableness, and self-concept clarity may be drawn to be educators.

It is possible that being an education major causes a change in a person’s personality, but we do not think this is likely because a vast majority of the students in this study were freshmen or sophomores. Most students had not begun to take classes in the education department and were still completing their general education requirements at the time of the study. There is also a need to follow those students who are prospective education majors as freshmen and sophomores to see if they actually graduate with teaching degrees and pursue careers in education.

It is important to point out the positive relation between the three personality variables of self-esteem, agreeableness, and self-concept clarity. It may be that part of the reason they show a relation to the designation of a teaching major is because of their correlations with each other. Future research should separate these factors and determine which, if any, are most important in the choice of teaching or non–teaching major.

Education and non–education majors had similar high school GPAs and ACT scores; this finding refutes the stereotype that teachers are often not as intelligent as persons in other professional positions. It does not provide defense to the myth that teaching is for the intellectually inferior or support the quip, “Those who can, do; those who can’t, teach.” This finding is encouraging as it portrays educators in a positive light.

The UNI education program has some unique characteristics that may make the present sample of teaching majors different from similar samples at other universities. UNI was formerly known as Iowa State Teachers College. As recently as the 1960s, a teaching degree was the only degree that could be earned at this university. Thirty years later, the teacher education program remains strong and prominent. The results of this study may have been influenced by the pool of potential teachers that UNI draws. Those persons who are excellent students and want to become educators may enroll at UNI due to the reputation of the teaching college. On the other hand, those persons who attend UNI and are

### Table 1

<table>
<thead>
<tr>
<th>Major</th>
<th>Self-esteem</th>
<th>Agreeableness</th>
<th>Self-concept clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non–Education (( n = 77 ))</td>
<td>30.23(^a)</td>
<td>46.46(^a)</td>
<td>40.82(^b)</td>
</tr>
<tr>
<td>M</td>
<td>32.00</td>
<td>48.72</td>
<td>43.26</td>
</tr>
<tr>
<td>SD</td>
<td>4.73</td>
<td>4.93</td>
<td>9.19</td>
</tr>
<tr>
<td>Education (( n = 54 ))</td>
<td>32.00</td>
<td>48.72</td>
<td>43.26</td>
</tr>
<tr>
<td>M</td>
<td>4.72</td>
<td>5.19</td>
<td>6.62</td>
</tr>
</tbody>
</table>

\(^a\) Indicates majors differ at the .05 level.
\(^b\) Indicates majors differ at the .10 level.
undecided about their major may be more likely to choose education than they would be at another university. The number of education majors and the quality of the program may influence undecided students to be educators.

Although this study lends support to previous research that suggests personality and major or career choice are related, the reader should be cautious in generalizing the results to other fields. Perhaps the desire to teach is a unique factor and the differences in personality between non-teaching majors would not be so apparent. Participants in this study represented many diverse majors, but we were not able to explore all of them because most only had a handful of representatives.

This research may be useful to academic counselors who assist students in choosing majors, as well as to personnel psychologists who help employers and employees in workplace settings. More research is needed to determine if certain characteristics increase a person’s performance and satisfaction in a major or career because published studies often conflict with one another. It is crucial that researchers explore this facet because of its implications and consequences for career and academic counseling. If such personality tests are useful in projecting the future, academic counselors may want to provide access to personality measures to help indecisive students find a major. If they are not found to be useful, this technique could do students more harm than good by encouraging them down career paths to unsatisfying and poor-fitting occupational positions.

If students are not reaching their educational potential, critics should take a closer look before blaming the teachers. Students who plan to be educators seem to have at least some of the prescribed qualities required to be effective and successful in the classroom. Perhaps critics of education should focus their attention elsewhere to improve the quality of education in the United States; the quality of potential teachers may not be lacking. Despite low wages and the demands of the profession, it seems self-confident and agreeable students are choosing to become teachers.

References


Costa, P. T., Jr., & McCrae, R. R. (1992). Revised NEO Personality Inventory (NEO PI-R) and the NEO Five-Factor Inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources.


Glancing Behavior of Participants Using Automated Teller Machines While Bystanders Approach

We designed this naturalistic observation to discover a relation between the frequency of glancing behavior of a participant and the proximity of a bystander. The 4 investigators observed 108 participants using an automated teller machine (ATM) while at least 1 bystander waited behind each participant. Pertinent data included the approximate age of the participant, the number of bystanders waiting to use the ATM, the proximity of the bystander, and the frequency of glances from the participant to the bystander. Contrary to previous data, these results showed that as the proximity between bystander and participant decreased, glancing behavior increased, (p < .05).

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The emergence of the automated teller machine (ATM) has created a unique social situation. Although consumers expect banking and the handling of personal accounts to be confidential or private, banking at an ATM often takes place in a public environment without accommodations for privacy. While ATM customers are using the machine, another person may be waiting behind them, encroaching on their personal space, and causing them to feel their territory is being invaded. ATM customers therefore must compensate for this lack of privacy by producing their own privacy “barriers” through the use of nonverbal behaviors.

What, exactly, is the territorial classification of an ATM? According to Knapp and Hall (1997), there is a distinction between public and primary territories. Public territories do not belong to one person exclusively and have temporary boundaries, whereas primary territories belong exclusively to one person and consist as such throughout time. An ATM would thus be considered public territory. Knapp and Hall also suggested that ownership of a territory could be identified by the mere presence of a person within the territory. Consequently, they would consider an ATM territory to belong to the person using it at the time.

Because ATMs do not have clearly defined territorial boundaries, we must look at the construct of personal space in order to define ATM territorial boundaries. The personal space demands of each ATM customer will establish the boundaries of the ATM territory. Hall (1966) established definitions of personal space that have become the basis for the study of spatial communication. He describes four spatial zones: intimate distance (0–18 in.; 0–46 cm), personal distance (18 in–4 ft; 46 cm–1.2 m), social distance (4–12 ft; 1.2–3.7 m), and public distance (12–25 ft; 3.7–7.6 m). His definition of personal and social distance is of particular interest to this study. After a pilot observation we noticed that most bystanders positioned themselves within social distances with respect to the ATM customer even though the ATM is a public territory and calls for the use of public distances. This predicament could be explained in light of Hayduk’s (1994) study. Hayduk found that spatial preference and stop distance within personal space were situation dependent. The socially awkward situation created at ATMs requires the bystander to stand at the more social 4-ft (1.2-m) distance rather than the public 12-ft (3.7-m) distance. It may be that the bystander is making a compromise by giving the...
participant privacy while simultaneously standing at a closer distance to indicate to other bystanders that his position in line is secured.

Regardless of the reason, the inappropriate distances taken by bystanders constitute a territorial encroachment. Lyman and Scott (1967) have researched human territorial boundaries and have defined three types of territorial encroachments: violation, contamination, and invasion. Whereas violation concerns unwarranted and circumvented use of a territory and contamination concerns pollution of a territory, invasion involves an unentitled crossing of a boundary that alters the territory’s social meaning. Using Lyman and Scott’s definition of invasion, the approach of a bystander may constitute an invasion of the ATM user’s territory. Acknowledging the definitions put forth by Knapp and Hall (1997) and Lyman and Scott, we designed the present study around an environment that would allow the glancing behavior of a participant to be observed as the participant’s public territory was being invaded by an approaching bystander.

Knapp and Hall (1997) stated that an invasion of a public territory is less severe than an invasion of a primary territory. When a public territory is invaded, the person holding the territory will be less inclined to use direct verbal reactions and more inclined instead to use subtle nonverbal cues to convey that the invasive behavior is inappropriate. These nonverbal cues include glares, shuffling of papers, or leaning away from the invader (Knapp & Hall, 1997). When discussing an invasion of intimate space within a public setting, Knapp and Hall stated that most people react with rigid posture, tense muscles, and eyes fixed on infinity or only briefly glancing at others. An illustration of this sort of invasion can be seen when strangers ride in an elevator together; most often strangers will not make eye contact with each other in an elevator. Likewise, Lyman and Scott (1967) reported that eye contact between strangers who were positioned far apart would be more frequent than eye contact between strangers who were positioned within close proximity of each other. These findings suggest that when a territory is invaded, people will normally react with rigidity and will not make eye contact with the invader as the invader approaches nearer.

Finally, we considered whether or not behavior would change when the bystander and participant are of differing sexes. Two separate studies by Remland, Jones, and Brinkman (1991, 1995) implied results contrary to those expressed by past studies on different sex dyads and personal space. Remland et al. (1991, 1995) found no differences in gender when measuring personal distances between dyads of several different cultures. Because the Remland et al. (1991, 1995) findings were significant, we predicted that sex roles would have no effect on the findings of this study.

The social situation created by ATMs is complex. The ATM itself is a public territory that calls for public spatial distances. However, bystanders do not usually stand at public distances when waiting to use the machine; instead, they position themselves within social distances of the ATM customer. Considering that the use of an ATM demands privacy, the fact that most bystanders stand closer than they should to the ATM customer may cause the customer to respond uniquely to this complex situation. We designed the present study to equate the approach of a bystander to a participant ATM user as an invasion of personal space and made the following predictions concerning the participants nonverbal behavior: (a) Bystanders would naturally not enter and violate the participant’s 4-ft (1.2-m) radial circle of space. We made this prediction because a distance closer than 4 ft (1.2 m) is a personal or even intimate distance. Because using an ATM is a public phenomenon, these distances are inappropriate for ATM banking. (b) Participants would glance at the bystander less frequently as the bystander approached closer to the participants’ 4-ft (1.2-m) radial circle of personal space.

Method

Participants

We observed ATM customers only if they approached the machine when unaccompanied and if there was another person behind them waiting to use the machine. We observed a total of 46 women and 62 men (93 Caucasian, 12 African American, and 3 Asian American). Ages ranged between the late teens to the early 70s. Because this study was a systematic naturalistic observation, participants did not complete a consent form.

Design

We designed this naturalistic observation to measure the frequency of over-the-shoulder glancing behavior that participants emitted toward bystanders while the participants were using an ATM. Glancing behavior included any visual scanning that involved the participant actually turning his/her head in any direction, as bystanders typically could be positioned on either side of the participant. We categorized glancing behavior as either glancing or nonglancing. The categories for distance were 1–2.9 ft (0.3–0.9 m), 3–3.9 ft (0.9–1.2 m), and 4 or more ft (≥ 1.2 m). Finally, we noted the stop distance of the bystander
in relation to the participant and the frequency of violation of the participant’s 4-ft (1.2-m) radial circle of personal space as the bystander approached. If the stop distance encroached upon the participant’s 4-ft (1.2-m) radial circle of personal space, we considered the approach a violation of personal space.

Location and Time
We observed four different locations during this study. The location for the outdoor ATMs included one outside a mall and one in an urban shopping area. The two indoor ATMs observed were inside discount department stores. There was no need to obtain consent to observe these machines because they were located in highly populated and highly public locations and because there was no one person who directly staffed the machine. These locations provided ample space for the investigators to assume an observable distance (no more than 30 yards [27.4 m] away) without being obtrusive. In order to not arouse participants’ suspicion and anxiety, we made all observations during daylight hours, between 12 and 2 p.m. on weekdays.

Materials
The only materials we used for this experiment included a public ATM and a data sheet. We structured the data sheet to facilitate the recording of participant age, sex, ethnicity, and glancing behavior as well as the number of bystanders waiting behind the participant, the stop distance of the bystander, and the occurrence of any verbal contact between the participant and the bystander.

Procedure
Before any observations took place we measured and marked semicircles with 4-ft (1.2-m), 3-ft (0.9-m), 2-ft (0.6-m), and 1-ft (0.3-m) radii surrounding the ATM in order to make accurate decisions on bystander’s proximity. We then practiced judging stop distance by taking turns standing as a bystander while the other investigator estimated the distance. This practice was continued until we were able to judge distance by sight accurately. After that, we erased the chalk semicircle so as not to influence the stop distances of bystanders.

During participant observation, we remained in inconspicuous locations where we could view the ATM. For the outside machines, when a parking space was available within view of the machine, we remained in our car; otherwise we sat on the grass in order to make observations.

We monitored the nonverbal behavior of individuals who approached the machine and recorded data only if the participant used the machine while a bystander waited for the machine to be free. We recorded the approximate age of the participant, the number of bystanders waiting behind the participant, the sex of the participant, the stop distance of the bystander, the ethnicity of the participant (African American, Asian American, Hispanic, Caucasian, other), and the glancing behavior of the participant. In addition, we recorded whether or not the bystander and the participant spoke to each other and any other relevant information. The stop distance of the bystander was recorded at the initial distance of the bystander (i.e., if the bystander moved back after the participant glanced, the new distance was not recorded).

Results
Concerning our first hypothesis, the data revealed that bystanders violated the participant’s 4-ft (1.2-m) personal space radius 48.15% of the time. If a bystander’s stop distance was within the participant’s 4-ft (1.2-m) radial circle of personal space, the bystander was considered to be violating the participant’s personal (18 in.–4 ft; 46 cm–1.2 m) distance. This percentage contradicted the original hypothesis that bystanders would not invade the personal distance of the participant but would keep a more social or even public distance when waiting to use the ATM.

The data were then analyzed by a two-way chi-square (Glancing Behavior × Proximity). The results reflected a significant relation between proximity and glancing behavior that was opposite of our second hypothesis, χ²(2, N = 108) = 11.02, p < .05. The contingency coefficient for effect size was 0.093. It seems that the frequency of glancing increased when proximal distance between participant and bystander decreased, and not the reverse as previous research predicted (see Table 1).

Discussion
Our findings contradicted reports in previous literature on the frequency of glancing and proximal distance between strangers. Hall (1966) found that people’s posture became increasingly rigid and eye contact was minimal in situations that called for closer spatial distances. However, his research did not use ATMs as the location of observation; his study was conducted using a subway system as the observation location. The situation created at an ATM is emphatically different than the situation created on a crowded subway because using the ATM calls for accessing personal bank accounts, a situation that demands privacy. The results of this study also contradicted the
predictions of Lyman and Scott (1967), which stated that glancing frequency should decrease as the proximity of strangers decreased. However, they never studied the social structure of strangers using an ATM. The complex social circumstances surrounding the ATM may well call for adaptive behaviors that were not present during Lyman and Scott’s study.

Perhaps these results are better explained in light of Knapp and Hall’s (1997) study. This study revealed that a person would use subtle nonverbal cues to indicate to another person that a public territory was being invaded. It could be that the increased frequency in glancing behavior occurred because the participant needed to provide a cue to the bystander that he or she is invading privacy. If this is actually the case, then it seems appropriate that glancing frequency would increase because the bystander is not maintaining a public (12–25 ft; 3.7–7.6 m) distance but is invading a personal (18 in.–4 ft; 46 cm–1.2 m) distance.

The observed results also contradicted the prediction that bystanders would not violate the participant’s 4-ft (1.2-m) radial circle of personal space. This finding could relate to Hayduk’s (1994) study that found that spatial preference and stop distance was situation dependent. The unique situation created between participant and bystander at an ATM might naturally call for closer positioning. It might be that bystanders do not wish to risk standing off at the more appropriate public distance in fear that they would be compromising their position in line.

However contradictory these finding are to previous research, glancing behavior significantly increased as bystanders approached nearer to a person using an ATM. According to Hall (1966), brief glancing behavior was displayed when a person’s intimate-distance personal space was invaded. Perhaps the increased frequency of glancing behavior by participants as bystanders crossed over the 4-ft (1.2-m) radial circle of personal space indicated that the participants felt their space was being invaded and consequently felt threatened. If future researchers find that participants are actually feeling “invaded” or encroached upon when using the ATM, system designers could use this information to design ATMs that allow customers to feel more secure while accessing private account information. The design of new ATM booths could include a barrier or enclosure that is at least 4 ft (1.2 m) in radius from the point where the customer would stand to make transactions. The newly designed ATM would not only allow the customer to feel more comfortable, but it might also reduce the amount of personal assaults that take place at ATMs.

Future researchers could improve this study in three ways. First, they could follow our method but also make observations during nighttime hours. Participants might be more alert and cautious when there is less light available for their banking transactions. It would be interesting to see whether or not proximity or glancing behavior are influenced by the amount of sunlight at hand. Second, researchers could factor for the number of bystanders waiting behind each participant. We might expect different glancing behavior from the participant based on the number of bystanders. A participant may feel less threatened and suspicious if more than one person were waiting for the machine and would not glance as frequently. If only one bystander is present, the participant might not feel as comfortable making a banking transaction and might thereby exhibit more glancing behavior. Finally, researchers could establish some type of interrater reliability for measuring the stop distances of bystanders. The nature of this study does not allow the observer to make observations too near the machine (so as not to influence the participant’s glancing behavior). Because the observer is positioned at some distance from the machine, it is difficult to determine stop distances accurately. It is important that all judgments on stop distances be agreed upon by at least two observers.

References

Sexuality, Gender, and Sport: Does Playing Have a Price?

Ninety-one undergraduate students (43 varsity athletes, 48 nonathletes) completed questionnaires assessing their attitudes toward homosexuality and their perception of stereotypes, sexuality, and values of athletes in various sports. The results indicated that attitudes toward homosexuality, sex of participant, and status as an athlete were predictors of the degree to which students were aware of and endorsed stereotypes about the values and sexuality of athletes. The groups had consensus regarding which sports had the largest and smallest proportion of gay participants for both men’s and women’s sports.

Sport has historically been a male domain that plays an integral role in socializing men and boys into traditional gender roles. Female perspectives or any values not consistent with a traditional heterosexual male sex role have not been easily integrated into the world of sports. Thus, participation in sports may have different effects for men and boys than for women and girls. For men, being an athlete may be an endorsement of traditional values and an affirmation that one is a “real man” in every way. For women, participation in sports goes against the grain of the traditional female sex role and may leave the extent of a woman’s identification with traditional feminine qualities very much open to question.

Given this background, it is perhaps not surprising that men who embrace the traditional ideologies of sport are more likely to hold sexist and antihomosexual attitudes (Harry, 1995). This attitude has created difficulties for women as their participation in sports has accelerated over the past 20 years. Early written opinions on women and sports (See Cahn, 1996, and Griffin, 1992, for descriptions of these early opinions) were clearly intended to discourage women from participating in athletics. Women were warned that athletic activity could harm their reproductive systems, masculinize them via deeper voices, more facial hair, and overdeveloped muscles, and create a tendency toward lesbianism. The risk of becoming less feminine or being perceived as a lesbian operated as one of many effective deterrents that delayed the participation of women in sports on a large scale (Griffin, 1998).

Fortunately, later research made it clear that female athletes can display traditionally male characteristics in sports without sacrificing femininity (Marsh & Jackson, 1986), and female athletes do not seem to experience any measurable role conflict between their identity as women and their identity as athletes (Allison, 1991). Nevertheless, negative stereotypes of female athletes as “mannish” lesbians may persist, and female athletes frequently adopt an almost apologetic...
attitude about their participation in sports as a way of managing this lesbian stigma (Blinde & Taub, 1992; Felsbin, 1974; Lenskyj, 1991). Several authors (e.g., Del Ray, 1977; Griffin, 1998) have described the pressures placed on female athletes and female coaches to publicly conform to a traditional heterosexual image. Female athletes are encouraged to wear long hair and makeup while competing, and female coaches often wear skirts and high heels in spite of the discomfort this might cause while coaching. Professional sports organizations such as the Ladies Professional Golf Association (LPGA) employ image consultants to help athletes maintain what they perceive to be a desirable (i.e., feminine) image for their sport. The media often focus on married female athletes, female athletes with children, and female athletes who have public relationships with men as a way of countering the lesbian stereotype often associated with sport. Women who are lesbians frequently report a fear that being open about their sexual orientation will expose them to harassment and discrimination and jeopardize their careers (Griffin, 1998).

The lesbian stereotype is more of a problem in some sports than in others. Women have participated in a variety of individual sports such as swimming, tennis, gymnastics, and figure skating for quite some time, and these sports have become more “acceptable” at least in part by virtue of the length of time that women have been involved as participants. Hence, these individual sports may not carry the same negative baggage for women that traditionally male team sports such as basketball would. A study by Del Ray (1977), utilizing the Attitudes Toward Women Scale (Spence & Helmreich, 1978), revealed that female tennis players and swimmers expressed more liberal and less traditional attitudes about the role of women than female softball and basketball players who were more likely to endorse stereotypically traditional views of women. Del Ray interpreted these findings as evidence that women playing traditionally male sports were more defensive and apologetic as a consequence of their choice of sport.

The present study had several goals, all of which were related to the ultimate end of extending what is now known about the relation between participation in sport and perceptions of sexuality. Although the study is primarily concerned with the perceptions of female athletes, we also collected data concerning perceptions of male athletes to provide a contrast. In this study, we directly measured attitudes toward homosexuality to see if they predicted other beliefs about the relation between sex and sport. Some of the specific questions of interest include the following: How do judgments about the sexuality of athletes relate to one’s attitudes about homosexuality in general? Are the alleged stereotypes of female athletes as lesbians and male athletes as heterosexual still real? Do they in fact differ from sport to sport? We predicted that the more a sport is a team sport traditionally played by men, the more likely women participating in that sport will be perceived as lesbians. In contrast, men involved with traditional team sports will be least likely to be perceived as gay. We pursued these questions by comparing the responses of male and female college athletes with other students who do not participate in sports.

Method

Participant

Participants were 91 undergraduates (29 men, 62 women) from a midwestern liberal arts college. Some participants were volunteers from introductory psychology classes participating for extra credit; others were volunteers from the student body who were recruited individually. Forty-three students (19 men, 24 women) were classified as athletes using the criterion that they had participated in at least one full season of a varsity intercollegiate sport in college. Forty-eight students (10 men, 38 women) were categorized as nonathletes.

Materials and Procedure

All participants completed an eight-page questionnaire. The first 10 questions were selected from Herek’s (1984) 38-item Condemnation–Tolerance Scale of attitudes toward homosexuality. We selected items on the basis of their relevance to college-aged people and issues of interest in this study. The participants rated statements such as “Homosexuality is a sin” or “I would like to have gay friends” on a 5-point Likert scale with the higher end of the scale corresponding to the more positive attitude (tolerance) toward homosexuality. We summed scores from the 10 statements to provide an “attitude toward homosexuality” score that could range from 10 to 50, with 10 reflecting a condemnation of homosexuality and 50 being an extremely open tolerance of homosexuality. The Condemnation–Tolerance Scale was followed by a series of filler items that concealed the specific focus of the study. On these filler items, the participants rated the religiosity, political leanings (liberal/conservative), and femininity/masculinity of themselves, female athletes, and male athletes on separate 7-point scales, with a score of 1 indicating not religious, politically conservative, or feminine, respectively.

Next, participants indicated the extent of agreement with 11 statements pertaining to the sexuality...
of athletes, homophobia, and beliefs about athletes (e.g., “Female athletes are often stereotyped as lesbians” and “I feel that looking and acting masculine is important so others don’t think I am gay”). Agreement with each statement was measured with a 5-point Likert scale ranging from 1 indicating strongly disagree to 5 indicating strongly agree. Then, the participants ranked 12 sports according to the proportion of athletes in that sport who are probably gay/lesbian, with a rank of 1 assigned to the sport with the greatest proportion of homosexual participants and 12 assigned to the sport with the smallest proportion of homosexual participants. Participants ranked sports for men and women separately. The final six items on the questionnaire were for the athletes only, and they addressed specific issues relevant to athletes (e.g., “I believe that others question my femininity because I am an athlete” and “I would be comfortable with a gay teammate”). Some of the questions in this portion of the questionnaire were answered only by men, others only by women.

Participants from introductory psychology classes filled out the questionnaires in a group during class time. The participants completed all questionnaires anonymously, and they signed a separate form at the end of the study to receive credit for participation. Participants from outside of class filled out the questionnaire individually and anonymously and either returned it to the experimenter in person or sent it to her mailbox.

**Results**

We used the traditional alpha level of .05 to determine the significance of the results of all statistical tests, although the actual obtained level of probability is reported for each analysis. We conducted a series of $2 \times 2$ analyses of variance to determine the effects of participant athletic status and sex on ratings related to attitudes toward homosexuality and stereotypes of athletes.

Regarding attitudes toward homosexuality, significant main effects were found for both athletic status, $F(1, 87) = 16.47, p < .001$, and sex of participant, $F(1, 87) = 19.79, p < .001$. Nonathletes ($M = 40.94, SD = 5.67$) had significantly more positive attitudes toward homosexuality than athletes ($M = 34.79, SD = 9.16$), and women ($M = 40.77, SD = 5.68$) had more positive attitudes than men ($M = 32.17, SD =$
A significant interaction between athletic status and sex is illustrated in Figure 1, \( F(1, 87) = 9.02, p < .003 \). This interaction indicates that being an athlete is more strongly related to attitudes toward homosexuality for men than it is for women, as a Tukey test revealed that male athletes were significantly \((p < .05)\) less tolerant of homosexuality than any of the other groups, HSD = 5.65.

An analysis of the statement “Female athletes are stereotyped as lesbians” yielded no significant main effects for athletic status, \( F(1, 87) = .37, p > .05 \), or for sex, \( F(1, 87) = .24, p > .05 \). There was, however, a significant interaction, \( F(1, 87) = 8.48, p < .02 \). The conservative Tukey test failed to reveal exactly which differences between means were significant, HSD = 1.09. However, this interaction, pictured in Figure 2, reveals that athletic status had opposite effects for men and women, with male nonathletes and female athletes more likely to believe that a lesbian stereotype exists for female athletes.

Regarding the stereotype of male athletes as heterosexual, significant main effects were found for athletic status, \( F(1, 87) = 5.60, p < .02 \), and sex of participant, \( F(1, 87) = 3.87, p < .05 \). Athletes \((M = 1.35, SD = .48)\) were even less likely than nonathletes \((M = 1.71, SD = .74)\) to think that male athletes would ever be stereotyped as gay, and men \((M = 1.28, SD = .45)\) overall were less likely to think so than women \((M = 1.66, SD = .70)\). There was no significant interaction for this variable, \( F(1, 87) = 1.06, p > .05 \). Along these same lines, two questions assessed the belief that there is a smaller proportion of gay males among athletes than there are in the population at large. One question was “I believe that there is a higher proportion of gay males among athletes than in the general population” (Item 4), and the other was “I believe that very few male athletes are gay” (Item 6). The analyses of both of these items revealed a significant effect for athletic status, with athletes endorsing the heterosexual male athlete stereotype more than nonathletes, \( F(1, 87) = 11.77, p < .05; F(1, 87) = 9.63, p < .05 \). A significant interaction between sex and athletic status was found for each of these questions, \( F(1, 87) = 3.54, p < .05; F(1, 87) = 3.94, p < .05 \), indicating that male athletes in particular endorsed this stereotype more strongly than either male or female nonathletes (Item 4–HSD = .80, \( M = 3.95, 3.42, 2.70, 3.05 \); Item 6–HSD = .77, \( M = 3.74, 3.08, 2.60, 2.76 \)) for male
athletes, female athletes, male nonathletes, female
nonathletes, respectively). There were no significant
main effects for sex on either of these items, \(F(1, 87)
= .17, p > .05; F(1, 87) = 1.4, p > .05\). There were two
corresponding items concerning the belief that there
was a “higher proportion of lesbians among athletes
than in the general population” and the belief that
“most female athletes are lesbians,” but we found no
significant main effects or interactions for these items.

Statements that were applicable to athletes only
were analyzed via \(t\) tests. The analyses revealed that
female athletes would be significantly more comfort-
able with a gay teammate, \(t(40) = 2.90, p < .007\), \(M = 4.29\)
versus 3.39, \(SD = .86\) versus 1.09, or a gay coach,
\(t(40) = 3.36, p < .002\), \(M = 4.33\) versus 3.17, \(SD = .82\)
versus 1.3. Male athletes were significantly more likely
than female athletes to think that they would get a negative response from coaches and
teammates if they were openly gay, \(t(40) = 3.75, p < .001\), \(M = 4.11\)
versus 2.96, \(SD = .83\) versus 1.16.

We conducted correlational analyses among 26
variables separately for each of the four groups (male
athletes, male nonathletes, female athletes, female
nonathletes). The filler items were included in this
analysis on the chance that they might provide inter-
esting relations with other variables. Because of the
large number of analyses and in the interest of read-

ability, we present only the most relevant, interest-
ing, and significant relations. Although nonsignificant
findings may occasionally be quite revealing in
the test of a hypothesis, none of the nonsignificant
relations seemed particularly enlightening, and
hence they are not reported here.

The primary variable of interest in these analy-

ses was the attitude toward homosexuality score; one
goal of this study was to uncover what other variables
might be predicted by this variable. Not surprisingly,
positive attitudes toward homosexuality predicted
higher levels of comfort for a gay coach or a gay team-
mate for both male (coach: \(r[17] = .69\); teammate:
\(r[16] = .70, p < .001\)) and female athletes (coach:
\(r[22] = .67\); teammate: \(r[22] = .78, p < .0001\)).

Female athletes and female nonathletes shared
three common correlational patterns. Both groups
displayed a significant tendency for low tolerance of
homosexuality scores to be related to a concern for
acting feminine so that others would not think they
are lesbians (athletes: \(r[22] = -.72, p < .0001\);
nonathletes: \(r[36] = -.48, p < .002\)). Both female
groups also showed a significant relation between
positive attitudes toward homosexuality and a percep-
tion of male athletes as politically conservative (ath-
letes: \(r[22] = -.44, p < .03\); nonathletes: \(r[32] = -.40,
p < .02\)). Similarly, women who exhibited positive at-
Sexuality, Gender, and Sport

McKinney and McAndrew

The mean ranking of each of the 12 male sports and female sports was computed and ordered from 1 to 12, with 1 being the sport with the most gay participants and 12 being the sport with the fewest gay participants. The rankings for the male sports are displayed in Table 1, and the rankings for the female sports are displayed in Table 2; the ranks were fairly consistent across the four groups. Participants ranked the traditionally female/individual sports, such as figure skating, gymnastics, and swimming, as having the fewest lesbians, and team sports such as rugby, softball, and basketball as most likely to involve lesbians. Even team sports that have been primarily played by women in the United States, such as field hockey, were perceived as having a fairly large lesbian contingent. Remarkably, the rankings of the male sports were almost a mirror image of the female sports, with individual sports such as figure skating, gymnastics, and swimming perceived as the sports with the greatest number of gay athletes and team sports such as football and basketball perceived as having the fewest gay athletes.

Discussion

It appears that the stereotypes of individuals who cross traditional gendered sporting lines are alive and well among college students, at least under some circumstances. Women participating in team sports, and men competing in individual sports considered acceptable for women, are more likely to be perceived as homosexual than are athletes who stick with more sex-role traditional sports. Male nonathletes and female athletes were most aware that a lesbian stereotype exists for many women’s sports, but male athletes and female nonathletes were most likely to believe that the stereotype was true if they were familiar with it. The four groups of students were unanimous in their rankings of figure skating, gymnastics, and swimming as the “most gay” male sports and basketball and football as the “least gay” male sports. For women’s sports, participants perceived figure skating and gymnastics as least gay and rugby, basketball, and other traditionally male team sports as the most common sporting outlets for lesbians.

Attitudes toward homosexuality proved to be an especially salient variable for predicting concerns about
being perceived as gay, and for athletes it was an excellent predictor of reactions to gay teammates or coaches. There was also support for the belief expressed by other researchers (e.g., Harry, 1995) that sports reinforce traditional heterosexual sex roles for men, as male athletes in particular displayed very traditional thinking about perceptions of sport and gender roles. They also displayed relatively little acceptance of homosexuality. In short, the results of this study are consistent with much of what earlier researchers have proposed about the relation among sex, sports, and broader attitudes toward sexuality. In some respects, this result is especially disheartening given the relatively liberal (politically speaking) nature of the population from which this sample was drawn.

In spite of the success that women are currently experiencing in a wide variety of sports at all levels of competition, psychological barriers remain even as legal ones have been lifted. The problem may be especially difficult to deal with because the data from most research to date indicate that the men most involved with sports also seem to have the most traditional attitudes about the relation between sex and athletics. The present study indicated that these attitudes are part of a much more extensive schema of attitudes involving other issues such as homosexuality; future research must attempt to uncover the nature of the relation that attitudes about sports has to other sex-role issues.

References


The Effects of Romantic Content in Sitcoms on Perceived Attractiveness of Photographs

This study evaluated the potential priming effect of romance in comedy television programming on attraction. Participants completed a questionnaire about themselves, including a shyness scale (Cheek & Buss, 1981). After completing the questionnaire, they watched a comedy with or without romantic content and then evaluated the attractiveness of a series of photographs. No differences between conditions were found in the attractiveness ratings of the photographs. Sex differences were found for the shyness scale such that women had lower scores than did men.

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The effects of television programming on behavior have received research attention in several contexts. For example, violent television influences aggressive behavior in both adults (Thomas, 1982) and children (Huesmann, Eron, Berkowitz, & Chaffee, 1992; Liebert & Sprafkin, 1988). Likewise, Sprafkin, Liebert, and Poulos (1975) found that children who viewed a prosocial episode of television were more helpful than were children who viewed a neutral episode. Television programming depicting integrated interactions facilitated more positive racial attitudes and decreased prejudice, thus providing additional evidence of television’s effects on behavior (Bogatz & Ball, 1971; Gorn, Goldberg, & Kanungo, 1976). Television programming influences a range of behaviors.

To explain these effects, Berkowitz (1965) suggested that television programs may prime certain thoughts that are then translated into behavior. In one classic study, Higgins, Rholes, and Jones (1977) primed participants with either a list of positive or a list of negative traits prior to evaluating an individual’s risky behavior. Participants’ evaluations of the individual were consistent with the primed traits. Similarly, television coverage of political elections appears to influence or prime the issues voters consider important in making their final candidate choices (Kinder, 1998).

Although no studies have directly investigated the effect of romantic and humorous content of television programs on perceived attractiveness, research has investigated the effects of humor and romantic mood on attraction in other contexts. Murstein and Brust (1985) argue that humor is a factor in, and may even precede, attraction. Murstein and Brust tested this hypothesis by presenting comic strips, cartoons, and jokes to couples who agreed to participate. The participants then rated the comics for humor. Participants then rated how much they liked and loved their partners and how probable it was they would marry, and they filled out liking and love scales. The study showed that rating of the humorous material was associated with loving, liking, and predisposition to marry.

Gold, Ryckman, and Mosley (1984) found that induced romantic mood in men elevated their rated attraction of women. The romantic mood was induced via a one-to-one conversation with a female confederate about various topics while the confeder-
ate maintained eye contact and leaned toward the participant. A control condition introduced the female confederate to the participants, but excluded the conversation with her. Romantic mood induction participants rated the female confederate as more attractive on measures of liking, love, and limerence than did the control participants.

In light of these findings, we hypothesized that television programs with humorous and romantic content might prime individuals to perceive others as being more attractive. More specifically, we hypothesized that a television show rated high in humor would elevate rated attractiveness of photographs of opposite-sex persons. We also hypothesized that a humorous and romantic program would elevate rated attractiveness of the photos more than the humor-alone condition due to potential relationship priming effects of romantic programming.

We also included a measure of shyness (Cheek & Buss, 1981) in this study. Because participants made evaluations of others, we thought that social anxiety might play a role in evaluating others as well as interacting with them (e.g., Bruch, Giordano, & Pearl, 1986). Previous research has demonstrated that shy people are less responsive to social stimuli (Kagan, Reznick, & Snidman 1988). The shyness scale correlates with other measures of anxiety such as social avoidance and distress, interaction anxiousness, and social reticence (Cheek & Buss, 1981). In their initial research to develop the shyness scale, Cheek and Buss (1981) found that scores from the shyness scale were positively related to the questions measuring the extent to which shyness is a problem in one’s life and negatively related to the trait “extroversion” and also to self-esteem. Behaviorally, they found that people scoring high on the shyness scale tended to talk less, engage in less eye contact, and were rated by others as more tense, unfriendly, and inhibited than people who scored low (Cheek & Buss, 1981). Therefore, there are differences in the ways shy and non-shy people respond to social stimuli such as rating photographs. By evaluating shyness scores we hope to account for the effect that social anxiety has on the evaluations of others.

### Method

#### Participants

The participants were 80 female and 84 male undergraduate students (mean age = 19) enrolled in an introductory psychology course at the University of Wisconsin–Stevens Point. The students agreed to participate in return for credit to fulfill a requirement for the introductory psychology class.

#### Materials

**Pretest.** Sixty undergraduate students prerated the humor, romance, excitement, and attractiveness of an episode of a popular television program. Four episodes of each of the following television programs were tested: *Friends,* *Home Improvement,* *Dr. Quinn,* and *Seinfeld.* There were four groups of 15 participants each that viewed four episodes of one program (e.g., four episodes of *Friends,* etc.). Participants rated each attribute of each of the episodes on a scale of −5 (*not at all*) to +5 (*very*), with 0 representing a neutral rating. Ratings of +5 corresponded to responses such as *very funny* or *very exciting* and ratings of −5 corresponded to responses such as *not at all funny* or *not at all exciting.* No intervening labels were provided on these scales other than a rating of 0, which corresponded to responses such as *neither funny nor not funny* and *neither exciting nor not exciting.* Mean ratings for the episodes are shown in Table 1.

Based on these ratings, two different episodes of *Friends* and two different episodes of *Home Improvement* were chosen as stimulus materials. The episodes of *Friends* were rated as being equivalent to each other in the amount of inherent humor, *t*(28) = 0.26, *ns,*...
and they were rated as containing different levels of romance, \( t(28) = 3.71, p < 0.01 \). The episodes of *Friends* were also rated as being equivalent to each other in excitement, \( t(28) = 0.21, ns \), and attractiveness of characters, \( t(28) = 0.00, ns \). The episodes of *Home Improvement* were rated as being equivalent to each other in the amount of humor, \( t(28) = 0.89, ns \), and they were rated as containing marginally different levels of romance, \( t(28) = 1.60, p < 0.12 \). *Home Improvement* episodes were also equivalent to each other in rated excitement, \( t(28) = 1.12, ns \), and attractiveness of characters, \( t(28) = 0.12, ns \).

**Photos.** Two sets of photographs were prepared for evaluation. One set contained 10 different head-and-shoulder photographs of men, and the other set contained 10 different head-and-shoulder photographs of women. The photographs were intended to be representative of average-looking young adults. The photos were prerated by a group of 18 men or 18 women; men rated photos of women and women rated photos of men. A 7-point Likert scale was used to assess participant’s rating of the photographs (1 = not at all attractive, 4 = moderately attractive, and 7 = extremely attractive). There were no other intervening labels given on these Likert scales. The attractiveness of the male and female photos was rated as being average \( (M = 3.22, SD = 1.05 \) and \( M = 3.30, SD = 1.09 \), respectively). The photographs were obtained from digital photographs taken from a geographically different university, thus ensuring that no participants would know any of the people in the photographs. Each set of photographs was placed in a Microsoft PowerPoint 97 file for a slide-show presentation to participants.

**Testing instruments.** We devised a six-item questionnaire, which assessed how attractive, romantic, and humorous participants perceived themselves to be. Participants rated their perceptions on a 7-point Likert scale \( (e.g., 1 = \text{not at all attractive}, 4 = \text{moderately attractive}, \text{and } 7 = \text{extremely attractive}) \). The questionnaire also assessed whether or not participants were currently dating. In addition to this questionnaire, participants also completed a shyness scale \( (\text{Cheek \\& Buss, } 1981) \), which evaluated their social anxiety and inhibitions. To illustrate, 2 of the 13 items on the shyness scale were: “I am somewhat socially awkward” and “I am more shy with members of the opposite sex.” Participants rated each of the 13 statements by indicating if the item was either very uncharacteristic or untrue, strongly disagree; uncharacteristic; neutral; characteristic; or very characteristic or true, strongly agree. Measures of internal consistency for the scale yielded a Cronbach’s alpha of 0.90 and an average inter-item correlation of 0.39.

**Procedure**

Men and women, in sex-specific groups, were randomly assigned to one of five viewing conditions: (a) a romantic episode of *Friends* (21 men and 14 women), (b) a romantic episode of *Home Improvement* (15 men and 10 women), (c) an unromantic episode of *Friends* (17 men and 18 women), (d) an unromantic episode of *Home Improvement* (13 men and 20 women), or (e) no episode viewed (18 men and 18 women).

When participants arrived at their designated times, they entered a standard classroom, seated themselves, and were instructed to read and sign a statement of consent if they agreed to all of the conditions. Once all participants had signed the consent forms, experimenters handed out a questionnaire and instructed the participants to complete it. After completing the questionnaires, four of the groups watched a randomly selected episode of either *Friends* or *Home Improvement*. These episodes were shown, sans commercials, in their entirety. The final length of each program was approximately 20 min.

After viewing the assigned episode, participants viewed a set of 10 pictures of people of the opposite sex on a television monitor located in the front of the classroom; the monitor was connected to a computer. Each picture was shown for 40 s; this interval allowed participants to answer questions about each photograph. While each photograph was presented, participants used the 7-point Likert scale to rate the photo in three different categories: attractiveness, sex appeal, and likability.

Control participants (18 men and 18 women) rated their respective sets of photographs without viewing a television program. These participants completed the consent form and the demographic questionnaire and then rated the photographs. After rating the photographs, all participants were thanked, debriefed, and given credit for their participation.

**Results**

Men’s ratings of the attractiveness of female photographs and women’s ratings of the attractiveness of male photographs were examined by one-way analyses of variance (ANOVAs). Means and standard deviations of the attractiveness, sex appeal, and likability ratings are shown in Table 2.

Women evaluated men’s attractiveness equally in all conditions, \( F(4, 75) = 0.94, ns \). The women’s ratings of likability of the male photographs were also equivalent across conditions, \( F(4, 75) = 0.61, ns \). The women’s rating of the sex appeal of the male photographs was marginally significant, \( F(4, 74) = 2.21, p = 0.08 \), with the male photographs rated as more sexu-
ally appealing after viewing episodes of *Home Improvement* (M = 2.72 and 3.04) than after viewing *Friends* (M = 2.35 and 2.62). The sex-appeal condition contains one less participant for the second episode of *Friends*, because one participant did not supply a response for the sex-appeal rating.

An ANOVA on men’s ratings of the attractiveness of the female photographs showed no differences between conditions, $F(4, 79) = .06$, ns. The sex appeal of the photographs, $F(4, 79) = .66$, ns, and the reported likability of the photographs, $F(4, 79) = 2.00$, $p = .10$, also yielded nonsignificant effects.

An ANOVA performed on the shyness scale revealed significant sex differences; men (M = 33.05, SD = 6.20) scored higher on the shyness scale than women (M = 29.75, SD = 6.88), $F(1, 161) = 10.36$, $p < .01$. Shyness scale scores were not a function of the participants’ dating status or how romantic, humorous, or attractive they perceived themselves to be, nor did it play a role in participants’ evaluations of the photos.

### Discussion

We hypothesized there would be a relation between romance, humor, and perceived attractiveness. The results did not support our hypothesis that humor would increase perceived attractiveness in comparison to a control. Our results also did not support the hypothesis that a combination of humor and romance would further elevate ratings of perceived attractiveness.

Several possibilities may account for the lack of the predicted relation. First, although only marginally significant, women tended to provide lower attractiveness evaluations for photographs after viewing either of the episodes of *Friends* than when the women viewed *Home Improvement*. We did not find that pattern of results for the men in this study. This finding might possibly be attributed to the fact that the female actors on *Friends* are perceived as being higher than average in attractiveness, which may have introduced a process of self-comparison that was expressed in the lower evaluations. This explanation is consistent with results by Dion, Berscheid, and Walter (1972) showing that individuals may be more jealous of attractive stimulus persons of the same sex than of the opposite sex. Also in accordance with Dion et al.’s study, Simpson, Gangestad, and Lerma (1990) demonstrated that individuals who are involved in a dating relationship may perceive same-sex individuals who are highly attractive as threatening to the self and may potentially degrade their existing relationship with opposite sex-individuals, viewing their partners as less desirable.

This possibility may be investigated in future research by including episodes of different television programs in which the attractiveness of main characters is varied. The attractiveness of these characters could be measured, and the effect of the attractiveness of the characters on participants’ perceived attractiveness of others could be measured. It is likely, as indicated by this study, that as the attractiveness of

<table>
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<th>TABLE 2</th>
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<td><strong>Mean Ratings of Attraction, Sex Appeal, and Likability of Photographs for Groups Viewing an Episode of <em>Friends</em> or <em>Home Improvement</em></strong></td>
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<td><strong>Episode</strong></td>
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<td><em>Home Improvement</em> 1 (Nonromantic)</td>
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<td><em>Home Improvement</em> 2 (Romantic)</td>
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<tr>
<td>Control</td>
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characters of the same sex as participants increases, the participants’ perceived attractiveness of others would decrease.

Another possible reason for the lack of a relation between television romance, humor, and perceived attractiveness involves the stimulus materials used. We carefully chose the episodes to be equivalent in the variables of interest. In particular, for each program, we believed it was important to compare two episodes equivalent in humor that differed in the amount of romantic content. Although the two episodes of *Friends* were equivalent in humor, as were the two episodes of *Home Improvement*, the *Home Improvement* episodes were only marginally different in romantic content. This marginal difference may have reduced the effect of romance for groups viewing the *Home Improvement* episodes. The nonsignificant difference between groups viewing the *Friends* episodes, which were significantly different in romantic content, seems to indicate that the effects television romance have on perceived attractiveness are not sufficiently greater than that of humor to produce significant differences.

A final explanation is that a relation between television romance, humor, and perceived attractiveness simply does not exist. The lack of differences in perceived attractiveness between the participants who viewed a television episode and the control-condition participants suggests that may be the case. Although we failed to demonstrate a relation between our variables of interest, it still seems plausible that types of television or other media content other than that which has been investigated may affect behavior. Investigations into potentially positive effects of television programming on behavior seem to be important avenues for future inquiry.

This study revealed that men were more socially shy than were women. Although it did not interact with factors of this study, the finding may call for more research investigating sex differences in social shyness. For example, Bruch et al.’s (1986) investigation of shyness demonstrated that shy individuals are less satisfied with their own physical appearance, are less socially confident, and are less effective in interpersonal interactions. It may be that shyness does differ between the sexes around the age of entry into college. Sex differences with regard to shyness may be studied by administering the social shyness scale to larger groups of people of differing age groups to see if there is a consistent trend of differences.

References


Sincere appreciation is expressed for the hard work on the part of the following individuals who served as reviewers for this issue. Without the assistance of such dedicated professionals, the *Psi Chi Journal* simply would not be able to function!

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Position Announcement:
Managing Editor,
*Psi Chi Journal of Undergraduate Research*

The Psi Chi National Council seeks applications for the position of Managing Editor for the *Psi Chi Journal of Undergraduate Research*. The editorial term is for three years, with the option to renew once. In its sixth year, the journal is a national quarterly journal publishing empirical articles from all areas of psychology. All articles must have an undergraduate Psi Chi member as the first author, though the journal also publishes invited articles on pedagogical topics authored by academic psychologists.

Psi Chi is a national honor society whose purpose is to encourage, stimulate, and maintain excellence in scholarship of the individual members in all fields, particularly in psychology, and to advance the science of psychology. The *Psi Chi Journal of Undergraduate Research* reflects this purpose. To that end, its purpose is to foster and reward the scholarly efforts of undergraduate psychology students as well as to provide them with a valuable learning experience.

The successful candidate should have extensive experience in working with undergraduate research. Prior editorial experience at the editor or associate editor level is preferred, and prior experience as a reviewer for undergraduate journals in psychology also will be a consideration. Psi Chi is committed to continuing to build its journal into the premier journal of undergraduate scholarship in psychology. Therefore, we seek an individual who is committed to expanding the journal’s scope and reputation for excellence. The managing editor cannot be a current member of the Psi Chi National Council. Interested applicants should send a letter of intent detailing their relevant experiences and qualifications for the position, a copy of their curriculum vitae, and a statement of their philosophy for the journal to the Journal Editor Search Committee, Psi Chi National Office, P.O. Box 709, Chattanooga, TN 37401-0709. Review of applications will begin May 1, 2001. We anticipate that the successful candidate will begin his or her term August 1, 2001.
Psi Chi Research Awards and Grants

Psi Chi annually sponsors national undergraduate and graduate research award competitions, as well as research awards for members submitting the best research for the regional and national paper/poster sessions. Members are encouraged to begin research papers early to submit for presentation at local, state, regional, or national conventions. Chapters are encouraged to provide an opportunity for members to rehearse their papers before an audience prior to presenting them at a convention.

In addition, Psi Chi also sponsors programs to fund student and faculty research. Descriptions of the award/grant competitions follow. Further information and submission forms may be obtained from Psi Chi’s national website (www.psichi.org) or from the Psi Chi National Office, P.O. Box 709, Chattanooga, TN 37401-0709; telephone: (423) 756-2044; e-mail: psichi@psichi.org.

Guilford Awards

All Psi Chi undergraduate members are eligible to submit their research for the Psi Chi/J. P. Guilford Undergraduate Research Awards. Cash awards are $1,000 for first place, $650 for second place, and $350 for third place. In addition, all winners and their faculty research advisors receive award certificates. The abstracts of the winning papers, as well as photographs and brief biographies of the top three winners, are published in Eye on Psi Chi. The deadline for this award is May 1 (postmark).

Allyn & Bacon Awards

The Psi Chi/Allyn & Bacon Psychology Awards, sponsored by Allyn & Bacon Publishers, are open to all undergraduate Psi Chi members and are awarded to those who submit the best overall empirical research papers. The awards are $500 for first place, $300 for second place, and $200 for third place. In addition, all winners and their faculty research advisors receive award certificates. The abstracts of the winning papers, as well as photographs and brief biographies of the top three winners, are published in Eye on Psi Chi. The deadline for this award is April 1 (postmark).

Erlbaum Awards

The new Psi Chi/Erlbaum Awards in Cognitive Science, sponsored by publisher Lawrence Erlbaum Associates, Inc., are open to all Psi Chi undergraduate and graduate Psi Chi members and are awarded to those who submit the best overall empirical studies in the area of cognitive science. The awards are $500 for the first-place graduate student and $500 for the first-place undergraduate student. In addition, the winners and their faculty research advisors receive award certificates. The abstracts of the winning papers, as well as photo-
graphs and brief biographies of the top two winners, are to be published in *Eye on Psi Chi*. The deadline for this award is April 1 (postmark).

**Newman Graduate Award**

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**Regional Research Awards**

All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the Regional Research Awards. Cash awards of $300 each are presented to students submitting the best research papers to Psi Chi sessions at regional conventions. The number of awards in each region vary with the size of the regions; 78 awards of $300 each are available for the 2000–2001 year. Award monies are distributed at the conventions following the presentations. The Psi Chi regional vice-presidents each send a Call for Papers and a letter to the Psi Chi chapters in their respective regions during the fall. These letters include information about the Regional Research Awards, the regional conventions, and submission deadlines for Psi Chi programs. Deadlines for submissions vary according to region and sometimes from year to year; check your fall regional mailing or Psi Chi’s national website (www.psichi.org) for details.

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All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the National Convention Research Awards. Cash awards of $300 each are presented to students submitting the best research for Psi Chi sessions at the APA and APS national conventions. Up to eight awards are given: four for the APA Convention and four for the APS Convention. Award monies are distributed at the conventions following the presentations. A Call for Proposals is mailed to all chapters in the fall and is also available from the Psi Chi National Office or the Psi Chi national website (www.psichi.org). The deadline for submissions to the Psi Chi student sessions at both the APA and APS conventions is December 1 (postmark).

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All undergraduate Psi Chi members are eligible to apply for these undergraduate research grants. The purpose of this program is to provide funds for members to defray the cost of conducting a research project. Applicants may request up to $1,500 for each project. A total of $45,000 has been allotted for this student grant program. The deadline for this grant program is October 1 (postmark).

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All current faculty advisors and coadvisors who have served an active Psi Chi chapter for at least one year are eligible to apply for these new faculty advisor research grants. The purpose of this program is to provide funds for advisors to defray the direct costs of conducting a research project (no stipends included). Two grants will be awarded annually within each of Psi Chi’s six regions. The maximum amount of each grant will be $2,000. The deadline for this grant program is June 1 (postmark).
The Psi Chi Journal of Undergraduate Research is a national, fully reviewed, quarterly journal dedicated to the publication of undergraduate student research. All active Psi Chi chapters receive one complimentary subscription to the journal. We encourage each chapter to see that an additional subscription is obtained for the school library and that other organizations and interested individuals are made aware of its availability. Every effort has been made to provide a high-quality publication and yet offer the journal at affordable subscription rates to ensure its availability to all interested students, faculty members, and institutions. Back issues and bulk orders for classroom use are also available.

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