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JOURNAL INFORMATION
The Psi Chi Journal of Psychological Research (ISSN 2164-8204) is published quarterly in one volume per year by Psi Chi, Inc., The International Honor Society in Psychology, P.O. Box 709, Chattanooga, TN 37401-0709.

Subscriptions are available on a calendar-year basis only (Spring–Winter). U.S. rates are as follows (four issues): Individual $20; Institution $40.

For international rates or other information, contact Psi Chi Central Office. Printed in the USA. Periodicals postage paid at Chattanooga, TN, and additional mailing offices.

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(423) 756-2044
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psichijournal@psichi.org
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Religiosity and Environmental Attitudes: Engagement in Proenvironmental Behavior

Rebecca J. Baylor and Scott R. Brandhorst*
Southeast Missouri State University

Abstract. The finding that certain religious variables such as stewardship and biblical inerrancy (Sherkat & Ellison, 2007) have a contrasting effect on engagement in proenvironmental behavior (PEB) has complicated the understanding of the religion-environment connection. The present study examined 4 religion-based items and 3 nonreligious items as predictors of public and private PEB. Stewardship, $\beta = .26, p = .02$, and biblical inerrancy, $\beta = -.38, p < .001$, emerged as significant predictors of private PEB. Importantly, participants’ willingness to sacrifice for the environment predicted both public, $\beta = .30, p = .00$, and private, $\beta = .38, p < .001$, PEB. No significant correlation between explicit and implicit concern for the environment ($p = .34$) emerged. Data revealed that implicit concern was not a predictor of either public, $\beta = .08, p = .41$, or private, $\beta = .06, p = .53$, PEB. These results provided evidence that social structures like religion have the potential to benefit and impede progress toward a more sustainable society. Further, the socialization of perceived norms such as stewardship and a willingness to sacrifice within an individual’s religion can help produce a positive change in the relationship people have with their environment.

The influence of religion on the earth’s environmental well-being is an issue that has been heavily debated since White (1967) asserted Christianity’s domination over nature. Coined by Roszak (1992, 1995), ecopsychology research has produced conflicting results regarding whether a positive or negative religion-environment relation exists. Collections such as Proctor’s (2005) Science, Religion, and the Human Experience have emphasized the complexity of such varied relations, stating that the world, the nature of its resources, and the religion of its people are interactive processes that both actively influence and affect one another.

Due to the increasing complexity of global climate change and the rich history of religion-prompted social action, it is imperative that ecopsychology further address any link between these two ideologies. At present, most experimental research has supported White’s thesis. Regardless, all significant findings that have affirmed or refuted the religion-environment connection should be considered analytically. For instance, some Judeo-Christian perspectives uphold the existence of religiously prompted environmental stewardship (Sneep, 2007) and a need to care for God’s creation (DeWitt, Baer, Derr, & Ehlers, 1998). A direct positive correlation between Christianity and ecologically conscious purchasing has also been reported (Pepper, Jackson, & Uzzell, 2011). In contrast, Schultz, Zelezny, and Dalrymple (2000) and Sherkat and Ellison (2007) found negative correlations between proenvironmental behavior (PEB) and biblical literalism, also described as doctrinal fundamentalism (Guth, Kellstedt, Smidt, & Green, 1993). Although self-reported findings have been undoubtedly noteworthy, a more holistic understanding of religious-environment connection could occur through the application of a subsequent analysis, the Implicit Association Test (IAT).

The body of psychological research regarding attitude formation and social behavior has revealed a significant discrepancy between stated (explicit)
and automatic (implicit) attitudes (Greenwald, McGhee, & Schwartz, 1998; Jennings, 2010; Nisbett & Wilson, 1977; Sigall & Page, 1971). Environmental psychology research should consider the variable relationship between PEBs and the differing attitude measurements, which were referred to in the present study as explicit environmental concern (EC) and implicit environmental concern (IC). Additional attempts to examine individual differences among an individual’s tendency to engage in PEB have identified automatic responses to environmental stimuli to be more predictive of spontaneous environmental behaviors than self-reported attitudes (Jennings, 2010). An analysis of attitudes toward the environmentally related topic of genetically modified (GM) foods by Spence and Townsend (2007) demonstrated that implicit and explicit attitudes did not equally predict whether a consumer spontaneously or deliberately ate GM products. Collecting both IAT and survey responses may allow for a more thorough grasp of the effect that certain religion-based variables may have on PEBs, and show whether EC or IC scores better predict either public or private behaviors.

In light of these inconsistencies, recent investigations have differentiated between certain religious and environmental influences to more fully understand the relationship between these variables. Sherkat and Ellison (2007) analyzed the schematic processes that combine to create environmental and religious ideologies to account for the seemingly contradictory findings connecting these two social structures. For instance, their results found that religious activity had a significant positive effect on private environmental behaviors, although a literal belief in the Bible had a negative total effect on political or public PEBs. Likewise, Schultz et al. (2000) made a distinction between human-centered, anthropocentric, and environment-centered, ecocentric, motivations. Their multinational study made the case that Christianity does not negate the need for environmental concern as a whole. Rather, it encourages PEBs for the sake of man and not primarily for the preservation of our ecology.

The goal of this research was to examine the relationship between participants’ religiosity and the extent to which they engage in both public and private PEBs. Sherkat and Ellison’s (2007) structuration model, designed to associate various religious and environmental actions and beliefs, served as the foundation of experimentation. To account for the contradictory findings connecting these two social structures, the researchers analyzed the schematic processes, which combine to create environmental and religious ideologies (Sherkat & Ellison, 2007). As mentioned, religious variables can be interrelated and have different predictive relationships with the public PEB and private PEB criteria. For instance, when interpreting the effect of church attendance on environmental activism, Sherkat and Ellison (2007) concluded that increased attendance boosts political conservatism. Indeed, prior studies have provided evidence that correlations among religious variables were not demonstrative of those variables’ predictions on engagement in different PEBs. Measuring a person’s belief in God has not necessarily revealed how that person feels about protecting God’s earth (i.e., stewardship) nor has it determined if that person holds a literal belief in the Bible (i.e., biblical inerrancy). It is important to distinguish between these religious variables because evidence has suggested their contracting predictions on environmental behavior.

Although not included in Sherkat and Ellison’s (2007) analysis, previous research of environmental attitudes demonstrated a need for the quantitative comparison of participant EC responses and IC scores. The current study presented participants’ responses on both an IAT and a questionnaire. To supplement Sherkat and Ellison’s use of questions from the 1993 General Society Survey, items from the New Environmental Paradigm (NEP; Dunlap & Van Liere, 1978) were included in the analysis. A case for this improved examination was made in an analysis by Schultz et al. (2000) because the reliability and validity of the NEP as a measure of environmental concern is more widely accepted.

Based on existing research, several associations were predicted between religion-based variables and PEB. First, frequency of religious activity was hypothesized (H1) to be inversely related to public PEBs. This prediction was made due to the aforementioned indirect effect of church attendance on political conservatism (Sherkat & Ellison, 2007). In contrast, Hypothesis 2 (H2) assumed that religious activity would be a significant positive predictor of private PEB. Further, although a general belief in God was not assumed to have any predictive significance on the criterion variables, Hypothesis 3 (H3) stated that biblical inerrancy would be a strong negative predictor of (a) public PEB and (b) private PEB. Stewardship was hypothesized (H4) to be a positive predictor of both (a) public and (b) private criterion variables. Apart from the religion-environment connection, an additional hypothesis was made. The previously cited experiments that note an inconsistency between implicit and explicit attitudes led the
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authors to hypothesize (H5) that self-reported EC scores would not be significantly correlated with the IC scores derived from the IAT. Although both EC and IC were included as predictor variables in the regression analyses, their associations with public or private PEBs were specifically noted.

Social constructs including religious schemata affect our objective understanding of issues regarding the environment. The American Psychological Association’s Task Force on the Interface Between Psychology and Global Climate Change dictated that combating global climate change is partially dependent on the ability of a person’s social structures to communicate and amplify the perceived risks associated with a continuance of current behaviors (APA, 2010). Presumably, an examination of an individual’s religion and a subsequent appraisal of the risks posed by climate change would aid the consideration of whether PEBs are being perpetuated as prescriptive norms.

Method

Participants

Undergraduate students were recruited from introductory psychology courses at a midsized midwestern university. One hundred participants (58 women, 42 men, $M_{age} = 20.03, SD = 3.00$) ranged in age from 18 to 35 years and were exempt from a written assignment as a result of their participation in the study. Recruitment of participants for specific session times occurred through the use of sign-up sheets posted on an experimental-research bulletin board in a psychology department hallway. Based on responses from a 5-point scale, the sample expressed moderate concern for the environment ($M = 2.59, SD = 0.89$). Participants reported engaging in religious activity an average of 1.94 days a week ($SD = 2.30$). Fifty-three percent of the 100 participants agreed to the item “I know God exists, and I have no doubt about it.” In comparison, only 3% agreed to the opposing statement “I don’t believe in God.” The participants were predominantly Christian. Sixty-three percent identified as either Protestant Christian ($n = 36$), Evangelical Christian ($n = 6$), or Roman Catholic ($n = 21$). Further, those who selected the religious affiliation other ($n = 23$) often identified with another Western religious denomination (e.g., Christian, Presbyterian, Baptist). Contrarily, only a few participants identified as either Jewish ($n = 4$), Muslim ($n = 2$), Atheist ($n = 4$), or Agnostic ($n = 3$).

Procedure

The experimenter obtained approval from the university’s institutional review board prior to the commencement of the study. Participants entered the research lab, and the investigator instructed they take a seat at any computer of their choosing. In all, the experimental room contained 19 computers, and no study session included more than 16 participants. An Environmental IAT was launched from a Millisecond webpage and appeared on each computer prior to participants’ arrival. Each trial began 5 min after the scheduled research session, at which time consent forms were distributed. Participants completed and signed consent forms. Then the experimenter distributed the Environmental Behaviors Questionnaire. Participants completed the questionnaire first and then clicked start to begin the Environmental IAT that appeared on the computer in front of them. A hand-written participant number appeared in the top right corner of each questionnaire. Prior to beginning the IAT, the experimenter prompted all participants to “Please enter the NUMBER written on your Questionnaire!!!”

Materials

Questionnaire. The Environmental Behaviors Questionnaire created for the present experiment was compiled based on an adaptation from Sherkat and Ellison (2007). Demographic data was recorded through questions about participants’ sex, age, and religiosity. Religiosity was assessed through the following measures: (a) extent of an individual’s belief in God, (b) frequency of participation in religion-related activities, and (c) specific religious faith/denomination. Due to the relatively small and religiously homogenous sample size, the researcher did not include participants’ specific denomination as a religion-based predictor variable. The measure of participants’ belief in God asked participants to indicate “Which of the following statements come closest to what you believe about God?” Response alternatives included “I don’t believe in God”; “I don’t know whether or not there is a God, and I don’t believe there is any way to find out”; “I find myself believing in God some of the time, but not at other times”; “Although I have my doubts, I feel that I do believe in God”; and “I know God exists, and I have no doubts about it.”

In addition to the collection of demographic information, the questionnaire measured both non-religious and religion-based items. A revised 10-item NEP (Dunlap & Van Liere, 1978) was built into the questionnaire to supplement Sherkat and Ellison’s (2007) use of single-item measures included in the
1993 General Social Survey. Nonreligious items measured private environmental behaviors, public environmental behaviors, willingness to sacrifice (WS) for the environment, and explicit concern for the environment. Religion-based items measured participants’ beliefs in stewardship and biblical inerrancy. Respondents were asked to indicate their attitudes on a 5-point Likert-type scale from 1 (strongly agree) to 5 (strongly disagree) for both nonreligious and religion-based subscales.

The private PEB subscale consisted of six items such as “I recycle products I use whenever possible,” \( \alpha = .72 \). Statements such as “I choose not to sign petitions related to environmental concerns,” a reversed-scored item, appeared on the 5-item, public PEB subscale, \( \alpha = .65 \). The WS subscale consisted of two items such as “I would pay much higher prices in order to protect the environment,” \( rs(100) = .74, p < .001 \). To measure explicit concern for the environment, a self-reported EC score was indicated on a scale of 0 (very unconcerned) to 4 (very concerned). Religion-based items were measured with a 2-item stewardship subscale, \( rs(100) = .35, p < .001 \), and a single-item biblical inerrancy scale. The stewardship subscale included the statements “(My religion/faith has influenced my belief that) people should feel personally obligated to protect the environment” and “Human beings should respect nature because it was created by God.” Biblical inerrancy was measured by participants’ level of agreement with the item “The Bible is the actual word of God, and is to be taken literally word for word” (Sherkat & Ellison, 2007, p. 76).

IAT. After completion of the questionnaire, each IAT trial began. The traditional binary response IAT employed in the present study was adapted from Greenwald et al. (1998). Permission to adapt the script was provided through a licensing agreement with Inquisit (Version 3.0.6.0), a program delivered by Millisecond Software. Participants were required to classify 26 total stimuli words including five connotatively green stimuli words, five not green stimuli words, eight generally positive stimuli (e.g., paradise), and eight generally negative stimuli (e.g., sad). Green words like organic or recycling had positive environmental connotations. In contrast, not green words such as pollution and climate change carried a negative environmental connotation. Test trials were presented prior to the collection of data, and the presentation of stimuli was randomized across participants. Further, response latencies were automatically recorded.

**Results**

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Pearson correlations among all variables including both criterion variables are presented in Table 1. In notable contrast to the theoretical assertions of Sneep (2007) and the empirical findings of Sherkat and Ellison (2007), our study found no significant correlation between stewardship and public PEB (\( p = .11 \)), stewardship and private PEB (\( p = .12 \)), or stewardship and WS (\( p = .77 \)). However, a significant positive correlation resulted between stewardship and EC (\( p = .01 \)), and stewardship and amount of religious activity (\( p < .001 \)). The results of Table 1 also demonstrated that (a) public PEB and private PEB strongly intercorrelated (\( p < .001 \)); (b) both public and private PEB positively correlated with WS (\( p < .001 \)) and EC (\( p < .001 \)); (c) biblical inerrancy negatively correlated with the WS (\( p < .001 \)), public PEB (\( p < .001 \)), and private PEB (\( p < .001 \)) variables; (d) biblical inerrancy positively correlated with religious activity (\( p = .01 \)), belief in God (\( p < .001 \)), and stewardship (\( p < .001 \)); and (e) no variable correlated significantly with IC. To examine the independent effect of each of the seven predictor variables, the experimenter conducted a multiple regression analysis for two separate criterion variables including (a) public PEB and (b) private PEB.

Predictability of Variables

**Criterion 1: Public PEB.** To investigate the association among predictor variables and the public PEB criterion, two Pearson’s \( r \) correlations were computed. The experimenter entered religion-based and nonreligious predictor variables into separate models to distinguish the relative contributions of the two types of variables on participants’ engagement in public PEB. The results of these analyses are found in Table 2. Using the enter method, a significant model emerged for the nonreligious variables, \( F(3, 96) = 8.46, p < .001, R^2 = .21 \), and for the religion-based variables, \( F(4, 95) = 2.68, p = .04, R^2 = .10 \). The following nonreligious variables emerged as significant predictors: WS (\( p < .001 \)) and EC (\( p = .04 \)). The adjusted \( R^2 \) estimated that these two variables accounted for 18.40% of the variance in public PEB. Biblical inerrancy (\( p = .01 \)) emerged as a significant negative predictor of public PEB and accounted for 6.30% of the variance in public PEB. Thus, \( H3a \) was supported. Based on the linear regression equations, \( H1 \) and \( H4a \) were unsupported because public PEB was not predicted by religious activity.
or stewardship. Finally, the WS variable was not hypothesized to predict public PEB, but the results showed a positive prediction of the criterion.

**Criterion 2: Private PEB.** The second set of enter method regression analyses, where private PEB served as the criterion variable, revealed distinct and significant religion-based, $F(4, 95) = 4.24, p < .001$, $R^2 = .15$, and nonreligious, $F(3, 96) = 10.32, p < .001$, $R^2 = .24$, models. As shown on Table 2, significant predictors of private PEBs included biblical inerrancy ($p < .001$), stewardship ($p = .016$), and WS ($p < .001$). Combined, the religion-based predictors accounted for 11.60% of the variance in participant engagement in private PEB (adjusted $R^2$). Nonreligious variables accounted for 22.00% of the variance in private PEB. H2 was not confirmed based on the present results because the frequency of religious activity did not emerge as a positive predictor of private PEB. Like H3a, H3b was accepted because biblical inerrancy emerged as a significant negative predictor of private PEB. It should be noted that stewardship emerged as a significant predictor of private PEBs when the variable did not also predict public PEBs. The acceptance of H4b resulted because private PEB was significantly and positively predicted by beliefs in stewardship. Again, the WS variable was not hypothesized to predict private PEB, but the results showed a positive prediction of the criterion.

### Concern: Implicit Versus Explicit

Consistent with previous research related to environmental attitudes (Jennings, 2010; Spence & Townsend, 2007), the results showed no significant correlational relationship between EC and IC scores ($p = .34$). Within the current study, H5 was supported by this insignificant correlation because explicit environmental concern was predicted not to be correlated with participants’ implicit concern toward the environment. Also, the multiple regression analysis results provided evidence that participants’ EC predicted engagement in public PEBs whereas participants’ IC failed to predict either type of PEB. In regard to implicit environmental attitudes specifically, recorded IAT effect scores clearly demonstrated more positive attitudes toward green than not green stimulus words. The large effect size ($d = 1.63$) indicated that participants responded faster for green and positive word combinations than for not green and positive word combinations.

### Discussion

The results of the present study demonstrated that much research is still needed to address the religion-environment connection. Perhaps more important is the idea that social structures like religion have the potential to both benefit and impede progress toward a more sustainable society. This can be inferred, for instance, based on the contrasting predictions of stewardship beliefs and biblical inerrancy on private PEB.

As has been supported by this research, feelings of religious stewardship can have a significant impact on an individual’s engagement in private PEBs. Based on the positive relationship between stewardship and private PEB, it may be beneficial to pursue...
this belief of caring for God's creation further. This is especially true due to the overwhelming evidence demonstrating that a literal belief in the Bible tends to predict less engagement in PEBs like willingness to donate toward environmental causes or recycle (Boyd, 1999; Schultz et al., 2000; Sherkat & Ellison, 2007; White, 1967). Not confirmed by these results, however, were the hypotheses that religious activity and feelings of stewardship would predict engagement in public PEB. The mediocre internal reliability of the public environmental behavior subscale (α = .65) might have contributed to the ability of both religion-based and nonreligious variables to predict public PEB. Nonetheless, the capacity of stewardship to assist in a progression toward sustainability is noteworthy and should be emphasized as a prescriptive norm (DeWitt et al., 1998; Sneep, 2007). The present findings therefore supported the assertion of Sherkat and Ellison (2007) that the multitude of religious and environmental schemata may produce seemingly contradictory relationships.

Overall, the multiple regression analyses revealed that religion-based variables such as beliefs in stewardship can directly predict private PEB while simultaneously failing to predict public PEB. Further, these results showed that a correlation among two variables does not suggest that one variable can be used to reliably predict another. For instance, the present study found participants' EC to be significantly correlated with private PEB, but EC did not also serve as a significant predictor of engagement in private PEBs. Of course, correlational data may sometimes coincide with predictive relationships among variables. In this case, particular attention should be given to participants' WS. Specifically, the WS variable was found to be both significantly correlated and significantly predictive of the PEB criterion variables. A focus on which religion-based factors positively and negatively predict certain PEBs is then just as important as the need to determine the correlation among variables.

Results revealed a significant predictive relationship between self-reported environmental concern and engagement in public PEBs, but the implicit concern failed to predict either public or private PEB. The result was questionable and addressed with caution because of inconsistency with previously mentioned research. However, the outcome confirmed the need to focus research attention on how EC and IC might make contrasting predictors of behavior. Results showed that IC was not a significant negative predictor of public PEB. This finding was noteworthy because previous analyses have found that IAT scores better predict spontaneous behaviors (Jennings, 2010; Spence & Townsend, 2007). Publicly environmental acts such as signing an environmental petition are argued to be more spontaneously performed than deliberate engagement in a private PEB like choosing to recycle regularly. Data from the present study established no significant relationship between IC and the spontaneous public PEB. Despite this shortcoming, future research could enhance the religion-environment understanding by choosing to conduct an additional IAT to measure participants' implicit religiosity. It would be helpful to quantitatively compare automatic religious attitudes with implicit environmental attitude scores.

Understanding how religiosity influences public or private environmental engagements may be best pursued through an elimination of as many of the current study's limitations as possible. As stated, increasing the internal reliability of the public PEB subscale used would help advance research in this field of study. Particular attention could also be made on eliminating confounds among participants. For instance, the undergraduate psychology students who partook might not be a representative sample of all students in this age group. Therefore, results should not be generalized across the population. The experimenter collected data from undergraduate student volunteers who were not randomly selected participants, which could have affected results. Also, unlike in previous experiments, the effects of sex, socioeconomic status, and age were not controlled for. Future researchers may want to survey a more religiously diverse sample of participants. Doing so would allow an experimenter to include participants' religious denomination as a predictor of public and private PEBs. Further, there was no attempt to mask the Environmental Behaviors Questionnaire or the Environmental Attitudes IAT used in the current study. Doing so would help ensure the internal validity of the results of a future study, especially in regard to reported EC. Throughout the months of data collection, experimental sessions were held at various times during the day, which could have affected IAT reaction scores. Further, to encourage a more scientific understanding of the religion environment, connection researchers could also expand the current findings in a variety of contexts.

This study only addressed which existing religion-related and nonreligious variables predicted PEB. These results did not reflect which treatments are most effective at prompting certain public or
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private behaviors. To make a positive impact and increase the occurrence of sustainable action at the individual level, subsequent research needs to focus on how to increase engagement in PEBs. For instance, the ability of the WS variable to significantly predict engagement in public and private PEBs suggests that more attention should be given to the factors that increase an individual’s willingness to make sacrifices for the environment. Perhaps participants’ WS could be reliably predicted by factors left unexamined in the present investigation. Also, the lack of correlation found between IC and EC within this study revealed a potential concern regarding participants’ awareness of their own automatic attitudes. This should lead researchers to develop and test a couple important questions regarding this topic. First, do individuals who explicitly report concern for the state of the environment feel as if their personal participation in private PEB helps propagate an actual improvement of environmental conditions? This question is worth asking because EC predicted public but not private PEB. Further, searching for an answer may lend insight about how and when explicit proenvironmental attitudes do predict private PEB. Second, is an individual’s IC for the environment correlated with or predictive of their implicit attitudes toward religion? Perhaps, the study of religiosity and environmental action could benefit from a more developed consideration of these concerns.

As the debate first credited to White (1967) continues, it is important to recognize that a complexity of reasons contribute to the current ecological crisis. Engagement in both public and private behavior will be necessary to address the complexity of future problems, which arise from the current state of our human-environment connection. The APA’s Psychology and Global Climate Change Task Force indicated that successful adaption to the evolving world of climate change will, at least partially, depend on the ability of the WS variable to significantly predict on how to increase engagement in PEBs. For instance, Boyd, H. H. (1999). Christianity and the environment in the American public. Journal for the Scientific Study of Religion, 38, 36–44. doi:10.2307/1387582


Inquisit (Version 3.0.6.0) [Computer software]. Seattle, WA: Millisecond Software LLC.


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Biological Significance in Human Causal Learning

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ABSTRACT. The present study was conducted to assess the influence of fearful cues on human causal learning, specifically on extinction and spontaneous recovery of causal relationships. Two experiments employed a learning reversal procedure, in which two cues (i.e., X and Y) were first paired with two outcomes (i.e., O₁ and O₂), followed by a reversal of these relationships. In other words, the treatment consisted of X-O₁ and Y-O₂ pairings in Phase 1, followed by X-O₂ and Y-O₁ pairings in Phase 2. Experiment 1 manipulated the nature of the cues across groups according to a 2 (artificial vs. naturalistic stimuli) x 2 (low vs. high fear level) factorial design and found a reversal of the causal roles of X and Y cues, which was not affected by the nature of the cues. Experiment 2 replicated the main treatment of Experiment 1 involving artificial stimuli as cues and, additionally, found a noticeable effect of a 5-min interval on the causal roles of both X and Y cues (i.e., spontaneous recovery), a result that was seemingly stronger for the condition trained with fearful stimuli. In other words, although prior differences in the causal ratings of X and Y tended to disappear following the retention interval in both high and low fear conditions, this effect was found to be stronger in the high fear condition than in the low fear condition. Possible explanations for these findings as well as directions for future research are discussed.

Pharmacological as well as cognitive-behavioral approaches have been the choice of treatment for many anxiety disorders such as posttraumatic stress disorder (Gogella, Caroni, Luthi, & Herry, 2009; Hermans et al., 2005). Due to the well-documented persistence of conditioned behavior following extinction, many animal and human causal learning studies have examined a multitude of reasons why previously extinguished conditioned responses tend to recover (Costanzi, Cannas, Sarauilli, Rossi-Arnaud, & Cestari, 2011; Hermans et al., 2005; Huff, Hernandez, Blanding, & LaBar, 2009; Robbins, 1990; Yamamoto et al., 2009). However, most research in human causal learning has been conducted using preparations that employ biologically neutral stimuli, a limitation that makes it difficult to generalize the findings from the human learning laboratory to the treatment of anxiety-related problems. According to Domjan (2005), Pavlovian conditioning is more robust when biologically relevant cues are employed. Domjan’s functional perspective implies that Pavlovian conditioning is the most effective when it occurs under natural conditions, and utilizes cues that are both salient and ecologically relevant. For example, taste aversion learning can be achieved in a single trial even when the unconditioned stimulus (US) is delayed for an extended period of time. Accordingly, the present research sought to examine the role of biologically significant cues in human causal learning phenomena involving outcome inference. Specifically, our study used a computer-based task to assess if the emotional content of the cues can affect extinction of causal relationships, as assessed in a reversal of stimulus discrimination treatment, and spontaneous recovery thereof. By determining whether a relationship exists between the biological
significance of stimuli and the interference effects, we aimed to provide insight for future studies and treatments regarding anxiety disorders.

Early research on human causal learning (Dickinson, Shanks, & Evenden, 1984; Shanks & Dickinson, 1987; Shanks, Holyoak, & Medin, 1996) revealed that the processes involved in the acquisition and expression of information about causal relationships mirror those processes involved in animal conditioning. Early animal conditioning paradigms revealed that nonhuman animals are just as sensitive as humans to event contingencies (Shanks & Dickinson, 1987). Such findings have helped to fundamentally shape many contemporary conditioning theories regarding human causality judgment or event contingencies. Traditionally, early human learning studies employed computer-based tasks in which biologically neutral stimuli were presented to participants. For example, in a study examining the role played by temporal contiguity and perceived contingency in the detection of causal relations, Shanks and Dickinson (1987) employed an experimental setup consisting of a computer “video-game,” in which participants were asked to rate the causal effectiveness of instrumental responses such as pressing various keys on a keyboard in producing an outcome. The outcome in their study was the presentation of an illuminated triangle on a computer screen. Notably, the stimuli used were biologically neutral, consistent with the early tradition in human learning research, in which biologically significant stimuli such as shocks and food were not usually employed.

More recently, however, some research conducted in the human learning laboratory has employed biologically significant stimuli. For example, Lovibond, Saunders, Weidemann, and Mitchell (2008) used a human avoidance-learning preparation in which participants were able to avoid electric shocks by pressing a particular button. Using a computer task, participants were told that, for every other trial, they would be presented with two stimuli, one of which would be followed by the electrocutaneous stimulus, which then played the role of a surrogate conditioned stimulus (CS) for 5 s, followed by a 10-s waiting period, and a possible shock lasting for 0.5 s, which served as the US. Additionally, participants were informed that response buttons might light up while a particular colored square was presented and that pressing a particular button might terminate the shock. Receiving a shock was contingent on whether participants pressed the right response button; pressing the correct response button canceled shocks, and pressing the wrong response button did not allow participants to avoid shocks. Those who received Pavlovian contingencies prior to instrumental conditioning learned the relationship between the stimulus and the outcome much faster than those who did not receive this training. These findings suggested that simply practicing an avoidance response could reduce anxiety by eliminating the expectancy of a fearful outcome. However, although the study found that shock expectancy and skin conductance declined as a function of the availability of an avoidance response, shock expectancy (i.e., fear) increased on trials with no available avoidance response.

Conditioned fear extinction and reinstatement have also been observed in humans through a fear-potentiated startle paradigm (Norrholm et al., 2006). This consisted of fear conditioning in which participants were presented with colored lights (i.e., the CSs) and a blast of air to the throat (i.e., the US), followed by extinction after a period of 24 hr. Reinstatement of fear was observed following unpaired presentations of the US.

One of the first studies to demonstrate reinstatement of fear in human conditioning was Hermans et al. (2005). Similar to that of other researchers (Alvarez, Johnson, & Grillon, 2007; Norrholm et al., 2006), Hermans et al. (2005) employed an experimental treatment comprising several phases: stimulus selection, acquisition, extinction, reinstatement, and postreinstatement test phase. The study found a significant reinstatement effect on the ratings of the US expectancy. More specifically, participants in the study were presented with pictures of men and women with little to no emotional expression on the background of a computer screen. CS and US were selected based on individual fear ratings on an 11-point Likert-type scale ranging from 0 (not fearful at all) to 10 (very fearful). Additionally, the threshold of fear was determined when the experimenter attached electrodes to participants and gradually increased the level of the electrocutaneous stimuli until it was reported to be unpleasant by the participant. During the acquisition phase, participants were told that they would be presented with two stimuli, one of which would be followed by the electrocutaneous stimuli. In their study, the + and - signs referred to either the presence or absence of the US, following the presentation of the CS. Therefore, the CS+ was always followed by the aversive stimuli (or US), and the CS- was never followed by the US. Subsequent to this stage, participants were asked to identify
contingencies between stimuli that had been previously presented. Upon correct identification of the two stimuli, participants had to determine whether the CSs were followed by the US, and they were then asked to rate the extent to which they expected the CS+. The association between the CS+ and US was then extinguished through 24 trials involving CS+ presentations without the US. US expectancy and fear ratings were assessed again following extinction. Half of the participants were presented with the US again and the other half were not. The postreinstatement test phase evaluated the impact of the reinstatement procedure. Similarly to the work of Norrholm et al. (2006), the results of Hermans et al. (2005) supported the view that extinction does not lead to the unlearning of a CS-US association.

In a similar vein, research by Effting and Kindt (2007) examining avoidance learning and renewal found that renewal of shock expectancy and renewal seems to be higher when testing takes place in the fear acquisition context (e.g., ABA renewal design) compared to testing in a novel context (e.g., ABC renewal design). Moreover, several other researchers examining the role of extinction in human causal learning have obtained similar findings (Bouton & Swartzentruber, 1991; Nelson, Gregory, & Sanjuel, 2012). Research examining human causal learning in anxiety disorders have shown that, despite cognitive and behavioral treatment success rates of approximately 85% for anxiety disorders, fear return occurs in as many as 30 to 50% of these individuals (Boschen, Neumann, & Waters, 2009; Yamamoto et al., 2009). Return of fear following extinction seems to be mostly attributed to passage of time (e.g., spontaneous recovery) or a change of the context (e.g., renewal effect; Effting & Kindt, 2007; Hermans et al., 2005; McLean & Foa, 2011).

In spite of the growing list of studies to employ biologically significant stimuli in the human causal learning literature, limitations remain when applying those findings into treatment settings. Due to limitations in human causal learning studies, clinical treatments have relied on evidence from some animal studies (Costanz et al., 2011; Maren & Chang, 2006). For example, studies utilizing animal models of posttraumatic stress disorder have been able to show that conditioned fear is subject to spontaneous recovery following extinction (Costanzi et al., 2011; Robbins, 1990; Yamamoto et al., 2009). Specifically, some animal studies have shown that the time between training and extinction plays a pivotal role in causal learning and affects the efficacy of long-term extinction in animal models (Corley, Caruso, & Takahashi, 2012; Costanzi et al., 2011; Maren & Chang, 2006; Robbins, 1990; Schreurs, Smith-Bell, & Burhans, 2011; Yamamoto et al., 2009).

### Study Overview

Determining how to minimize the return of fear following extinction is imperative to the development of more effective treatments for anxiety disorders (Huff et al., 2009). Although previous research has focused on the role of temporal proximity and contextual cues in the recovery of a response, some studies have examined the relevance of biologically significant stimuli in the return of fear or spontaneous recovery. Prior research has studied human avoidance learning through the use of electric shocks (Alvarez et al., 2007; Effting & Kindt, 2007; Hermans et al., 2005; Lovibond et al., 2008; Norrholm et al., 2006). The present research aimed to explore the possibility of studying these phenomena in human causal learning without any need of aversive stimulation (e.g., shocks) by employing a computer-based experimental task devised to provide the presentation of stimuli of either low- or high-biological significance. Instead, the preparation employed in the present experiments used cues consisting of pictures that, presumably, would elicit either a mild emotional reaction of fear (i.e., international symbols for hazardous materials and poisonous animals) or no fear reaction (i.e., geometrical figures and fruits). This experimental setup would allow for an economic, yet realistic, study of learning processes involved in anxiety/fear disorders through a human learning paradigm.

The present study aimed to ascertain whether the emotional content of the cues might determine the occurrence of outcome interference phenomena in human causal learning. To test this, the experiment employed a learning reversal procedure, in which pairings of X and Y cues with O1 and O2, respectively (i.e., X-O1 and Y-O2 pairings) were followed by a reversal of these relationships (i.e., X-O2 and Y-O1 pairings). X and Y cues referred to the type of stimulus presented to participants, and O1 and O2 referred to the possible outcomes associated with the cues. In our learning reversal task, O1 meant that a person was found dead, and O2 consisted of a person found alive. The study was conducted in two separate experiments, Experiments 1 and 2. In Experiment 1, the nature of the cues were manipulated across groups according to a 2 (artificial vs. high stimulus) x 2 (low vs.
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high fear level) factorial design. Experiment 2 was virtually identical to Experiment 1, with the critical addition of a delayed test in order to test for spontaneous recovery of responding following extinction. However, Experiment 2 only included two of the conditions of Experiment 1, namely, those given artificial stimuli (i.e., it did not include the artificial vs. naturalistic stimuli manipulation of Experiment 1).

Method

Participants
Thirty undergraduate students (10 men and 20 women) from a psychology course at a northeastern university participated in Experiment 1. Their average age was 18.90 years (SEM = 0.36). Participants were randomly assigned to one of four groups (i.e., participants were asked to pick a piece of paper from a bag, which contained a number corresponding to their group assignment), which were artificial low fear (A-L), artificial high fear (A-H), naturalistic low fear (N-L), and naturalistic high fear (N-H). This random assignment resulted in nine, six, eight, and seven participants respectively. In Experiment 2, participants were 19 undergraduate students (6 men and 13 women), also from a psychology course at a northeastern university. Their average age was 20.47 years (SEM = 0.32). Random assignment of participants was 9 and 10 participants for groups A-L and A-H, respectively. In accordance with our a priori exclusion criterion, the data of those participants who failed to discriminate between X-O₁ and Y-O₂ during the first phase of Experiment 1 were removed from the analysis. Specifically, in order for the data to be included in the analysis, the participant had to rate X higher than Y in Test 1. In Experiment 1, five participants failed to meet our exclusion criterion; two from each of groups A-L and A-H, and one from group N-L. Thus, the final number of participants involved in our study was 25 A-L (n = 7), A-H (n = 4), N-L (n = 7), and N-H (n = 7). In Experiment 2, one participant from group A-L failed to meet this criterion. Thus, the resulting sample was composed of 18 participants: A-L (n = 8) and A-H (n = 10). Groups in our study were uneven due to our small sample size and the data removal of participants who failed to discriminate between X-O₁ and Y-O₂ during the first phase of the experiment.

Apparatus
The apparatus consisted of Lenovo™ R61 laptops with 2.00 GHz Intel® Core™ Duo processors to conduct our study. The computers were arranged in a relatively small (12" x 9"), room at the psychology department at a northeastern university.

Procedure
Prior to conducting this study, approval was granted by the institutional review board at a northeastern university. The experimental preparation employed in this experiment (i.e., risk evaluation task) consisted of a simple task in which participants were asked to pretend that they were epidemiologists requested to study the information in a series of fictitious files in order to subsequently rate certain events as possible causes of death. The instructions presented to participants read as follows.

You are a renowned epidemiologist who has been assigned a case involving mysterious deaths in an apartment building in New York City. You have been granted access to the files of the case, which contain evidence carefully collected by the New York Police Department. You will first need to study this evidence to accurately identify the cause or causes of the deaths. However, because this is sensitive information, the judge has set some restrictions in your access to the files; they will be released one by one, and for a limited time only. Also, you are not allowed to take notes. Thus, you will need to pay attention and try to remember the evidence in order to complete your report later.

In your report, you will use numeric values in a scale from -10 to +10 to answer a series of questions regarding the evidence you previously reviewed. In this scale, -10 means not at all, 0 means not sure, and +10 means very much (you will be reminded of the meaning of these values again). Any value between -10 and +10 is a valid answer.

Good luck!

The cues were presented within one of three horizontally arranged panels, which were constantly present at the upper half of the screen. The presentation of each of the cues in the panels was random on each trial (i.e., the randomization is determined by the experimental program). The size of these panels was 215 x 200 (h x w) pixels, and they were separated by 35 pixels between the closest borders of each panel. These panels were embedded into a larger panel measuring 705 x 300 (h x w) pixels. The outcome was presented
in a separate panel measuring 705 x 215 (h x w) pixels, allocated at the bottom half of the screen. On each trial, the cues were presented for 4 s. The outcomes were presented for 4 s. The offset of the cue presentation coincided with the onset of the outcome presentation. The duration of the intertrial interval was also 4 s.

As can be appreciated in Table 1, the treatment in Phases 1 and 2 was identical in both Experiments 1 and 2. Phase 1 treatment consisted of the presentation on the computer screen of different trials involving the cues and outcomes in an observational stage. Specifically, all participants received five pairings of a cue, X, with O1 (i.e., the person was found dead), interspersed with five pairings of a second cue, Y, with O2 (i.e., the person was found alive). Based on previously learned observations, the participants had to determine the appropriate outcomes for the X and Y cues.

Of critical importance, the stimuli serving as X and Y cues were manipulated across groups according to a 2 (artificial vs. naturalistic stimuli) x 2 (low vs. high fear level) factorial design. Thus, there were four groups in this experiment: group A-L, in which the stimuli for X and Y were a circle and triangle; group A-H, in which X and Y were the symbols for radioactive and chemical materials; group N-L, in which stimuli for X and Y were berries and nipple fruits; and lastly group N-H, in which stimuli for X and Y were a snake and a scorpion. The stimuli serving as X and Y cues were counterbalanced within each group.

At the end of Phase 1 training, a causality test was given. In the test phase, the stimuli presented during training were presented on a single screen along with the following question: “How responsible is [stimulus name] for the observed cases of death?” Participants were asked to rate the causal status of X and Y cues along with the following question: “How responsible is [stimulus name] for the observed cases of death?” Participants were asked to rate the causal status of X and Y cues across groups.

Figure 1, the causal roles of the cues in Experiment 1 were reversed from Test 1 to Test 2, with no apparent differences across groups. This finding was confirmed by a 2 (artificial vs. naturalistic stimuli) x 2 (low vs. high fear level) x 2 (X vs. Y cue) Analysis of Variance (ANOVA), which revealed only a significant Test x Cue interaction, $F(1, 21) = 147.38, p < .001, MSeffect = 6464.60$. The main effects and the remaining interactions were not significant.

In Experiment 2, the retention interval affected the causal ratings of X and Y in both groups, although such impact seemed stronger for group A-H than for group A-L. Unfortunately, an ANOVA could not be performed due to zero variance in the ratings of X in Test 1 and of Y in Test 2 for both groups (all participants gave ratings of 10). For the sake of simplicity, instead of conducting nonparametric analyses, we performed a series of t tests on the remaining comparisons of

### RESULTS

The results of the Experiments 1 and 2 are shown in Figures 1 and 2, respectively. As can be seen in Figure 1, the causal roles of the cues in Experiment 1 were reversed from Test 1 to Test 2, with no apparent differences across groups. This finding was confirmed by a 2 (artificial vs. naturalistic stimuli) x 2 (low vs. high fear level) x 2 (X vs. Y cue) Analysis of Variance (ANOVA), which revealed only a significant Test x Cue interaction, $F(1, 21) = 147.38, p < .001, MSeffect = 6464.60$. The main effects and the remaining interactions were not significant.

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### TABLE 1

<table>
<thead>
<tr>
<th>Design of Experiments</th>
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<tr>
<td><strong>Experiment 1</strong></td>
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<td><strong>Experiment 2</strong></td>
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<td>Phase 1</td>
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<td>$5X→0, 5Y→0_1$</td>
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Note. X and Y were the cues, which were paired with the outcomes, O1 and O2. The nature of the outcomes was identical in all groups, whereas the nature of the cues was varied across groups.

The arrow (→) means “followed by,” and the delay of Experiment 2 consisted of a 5-min interval during which the participants were requested to leave the experimental room and wait in the hallway before being allowed to proceed with the experiment (see text for details).
relevance. There were no significant differences between groups on the causal ratings of Y in Test 1 and on the causal ratings of X in Test 2 (ps > .19). Therefore, the results of Experiment 2 replicated the main finding of Experiment 1, namely, that the learning reversal was not affected by the nature of the cues.

More importantly, the results of Test 3 in Experiment 2 revealed that the retention interval had a stronger impact for group A-H than for group A-L. Between-group comparisons found no difference in the causal ratings of X, t(16) = 0.86, p = .39, and a marginally significant difference for the ratings of Y, t(16) = 2.07, p = .054. Interestingly, for group A-L, causal ratings of X were significantly lower than the causal ratings of Y, t(14) = 2.46, p = .02, whereas such difference was completely abolished for group A-H, t(18) = 1.16, p = .25. A close inspection of Figure 2 indicates that, although both groups experienced a decline in the ratings of Y combined with an increase in the ratings of X, these changes were more marked for group A-H than for group A-L. Thus, it seems that spontaneous recovery was stronger for group A-H.

**Discussion**

The present study aimed to ascertain if the occurrence of outcome interference phenomena such as extinction could be modulated by the use of cues of intrinsic biological significance in a human causal learning preparation. The results of the present study were inconclusive, given our failure to observe any detectable influence of the presumed biological significance of the cues on outcome interference. In both Experiments 1 and 2, the reversal of discrimination was comparable in all experimental groups regardless of the nature of the stimuli employed for X and Y cues.

Although our main assumptions were not supported, the findings of Experiment 2 suggested that our experimental task may actually be appropriate for use in research studying fear relapse, renewal, or extinction processes. Although spontaneous recovery occurred in both conditions, it was found to be more robust in group A-H (e.g., hazard symbols) than in group A-L (e.g., geometrical figures), a result that might be due to the hazard symbols evoking a slightly higher level of fear than that of the geometrical figures. Preconditioned associations between hazard symbols and presumed danger levels might or might not have influenced the intensity of spontaneous recovery observed within this particular group. Pinedo and Miller’s (2005) comprehensive literature review alluded to Pavlov’s (1927) study of phenomena such as extinction and counterconditioning (i.e., CS-US pairings followed by pairings of the CS with a different US, typically of different motivational values such as tone-shock pairings followed by tone-food pairings). Of critical importance to the current study, the interpolation of a retention interval between counterconditioning and testing also resulted in partial recovery of the first-learned CS-US association. This effect was explained by Pinedo and Miller (2005) as potentially due to an integration of the memories of conditioning and extinction, thereby resulting in an increase in responding due to the combined
Some limitations of the current research included the use of a small sample, which could have influenced our findings. It is important to consider the fact that students from specific psychology classes were offered an opportunity to participate in the study as opposed to a more diverse group of participants, which could have influenced the findings of this research. Intra- and interindividual differences or experiences in general might have contributed to whether participants found stimuli to be of either low or high fear. For example, pre-conditioned associations between hazard symbols and presumed danger levels might have influenced the intensity of spontaneous recovery observed in group A-H. Moreover, a portion of data was withdrawn from our final analysis due to the failure of some participants to properly discriminate between X-O and Y-O relationships. This was a necessary prerequisite to exclusively conduct our analysis on the data from those participants who correctly learned the cue-outcome relationships. Such a protocol was determined prior to starting the data collection, but might have negatively impacted the study’s external validity. Perhaps the predetermined protocol for the removal of data based on a criterion might have imposed a ceiling effect on our findings, rendering the variation in the distribution of our data insufficient, meaning that the participants who were not eliminated by the criterion were probably the ones who responded in a very similar fashion. An increase in our sample size could have minimized such a possible effect. Moreover, the findings of this research might or might not have been unique to the specific class group that participated and could raise questions about our ability to generalize these findings to other populations and subpopulations.

Future research regarding spontaneous recovery and extinction can be studied more effectively by engaging specific populations affected by anxiety disorders, while simultaneously incorporating stimuli that are meaningful to that group. In addition, as previously mentioned, the stimuli used in the current experiment might not have been powerful enough to elicit the level of fear that was originally anticipated. Therefore, this implies that future research regarding causal learning through the use of human learning tasks would presumably benefit from incorporating a greater variety of biologically relevant cues, as well as possibly incorporating more graphic and gruesome pictures. Considering the type of biologically significant stimuli employed in our study, another possible direction for future research regarding stimuli selection would include the use of more intrinsically emotional cues that elicit an immediate mental state or reaction.

Relapse and/or spontaneous recovery of conditioned fear continues to be a major concern for clinicians treating a plethora of anxiety disorders (Huff et al., 2009). In our study, we sought to determine whether the emotional significance of cues played a role in relapse following the extinction of a previously learned association. We found that the emotional significance of stimuli did not influence the rate of extinction in a learning reversal procedure, as evidenced by its comparable occurrence across all experimental conditions, regardless of the nature of the cue. However, in Experiment 2, spontaneous recovery was found to be more vigorous within group A-H (e.g., with hazard symbols as cues) than in group A-L (e.g., with geometrical figures as cues). Our findings simply suggested that, although biological significance of stimuli failed to have a strong impact on outcome interference phenomena (e.g., extinction), its influence was apparent in spontaneous recovery of an extinguished response, which is something that should be accounted for by clinicians designing new treatments for anxiety disorders.

Our findings concurred with previous research showing that extinction does not lead to the unlearning of the CS-US association (Hermans et al., 2005, Norrholm et al., 2006). Clinical implications of our findings suggested that previously extinguished responses can recover whether the cues are biologically significant or neutral. In other words, emotionally neutral stimuli are not immune to the effects of spontaneous recovery or relapse. Such an implication is imperative for clinical treatment approaches to anxiety disorders. Successful advances in anxiety treatment should incorporate therapies that account for the influence of time posttreatment. Additionally, the present research implied that clinicians treating anxiety disorders should be mindful of all related stimuli that can serve as a potential trigger, regardless of its biological significance, while ensuring that their approaches are individually tailored to help protect against the risk of unsuccessful treatment or relapse.

References
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startle in a virtual environment. Learning and Memory, 14, 247–253. doi:10.1101/lm.493707


Proceedings of the National Academy of Sciences, 103, 18020–18025. doi:10.1073/pnas.0608398103


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Working It Out: Examining the Psychological Effects of Music on Moderate-Intensity Exercise

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Columbus State University

ABSTRACT. Exercise has been demonstrated to benefit mood and music may increase this effect. In the present study, exercise was hypothesized to increase pleasant and aroused mood, and decrease tiredness more significantly in those who listened to music. Listening to music while exercising was also hypothesized to lead to lower perceived exertion and higher exercise enjoyment. Participants (N = 148) recruited from undergraduate physical education courses completed 20 min of moderately paced walking, with or without a personal music player. Mixed model Analyses of Variance revealed that exercise significantly increased participant mood in all measured dimensions (ps ≤ .001). Analyses also supported the moderating role of music to the effect of exercise on mood pleasantness because those who listened to music during exercise reported feeling significantly more pleasant after exercise than those who did not listen to music (p = .009, d = 0.42). Using an independent-samples t test, exercise enjoyment was significantly higher among participants who exercised with music (p = .049, d = 0.33). Because this study examined moderate-intensity walking, recommended by the Centers for Disease Control and Prevention (2011a) to those beginning physical activity, results demonstrated that music may provide a valuable and accessible addition to an exercise program. The theoretical implications of these results in promoting exercise adherence are discussed within the context of the theory of planned behavior (Ajzen, 1991).

Exercise is an essential contributor to both physical and mental health. The Centers for Disease Control and Prevention (CDC; 2011a) reported that regular exercise lowers the risk for developing cardiovascular disease, type 2 diabetes, and certain cancers. Exercise has been linked to immediate mood benefit (Hansen, Stevens, & Coast, 2001) and reduced risk of developing depression over time (van Gool et al., 2007), and exercise therapy has been demonstrated to be as beneficial as treatment with antidepressant medication in individuals with major depressive disorder (Blumenthal et al., 2007; Craft & Perna, 2004). Despite these findings, approximately 49% of adult Americans do not achieve minimum exercise recommendations (National Center for Health Statistics, 2011).

Individuals’ likelihood of engaging in exercise may be predicted in part by their judgments about exercise, and research has indicated that positive psychological response to exercise affects an individuals’ beliefs about exercise, which increases their likelihood of exercising (Rhodes, Fiala, & Conner, 2009). Therefore, research on the moderators of the psychological effects of exercise is needed to effectively encourage a more positive exercise experience so that individuals may be effectively inspired to begin and/or maintain exercise routines.

Exercise can boost various dimensions of mood (Rocheleau, Webster, Bryan, & Frazier, 2004), and the mood benefit of exercise is a major predictor of exercise adherence (Papandonatos et al., 2012). Amplifying the mood benefit of exercise...
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of time. Therefore, if music lowers perceived exertion, they may work harder or for a longer duration (Biagini et al., 2012; Karageorghis & Priest, 2012a). If individuals perceive themselves to be working at a lower level of exertion, perhaps because music provides a distraction (Biagini et al., 2012; Karageorghis & Priest, 2012b), this may lower perceived exertion during physical activity. A recent meta-analysis indicated that those who listened to music rated their perceived exertion at approximately 10% less than those who exercised without music following exercise (Hayakawa et al., 2000). However, other research has not supported the advantageous effect of exercising with music on tiredness and fatigue (Plante, Gustafson, Brecht, Imberi, & Sanchez, 2011). Although overall mood appears to increase from exercising with music, an effect for pleasant mood has not been directly indicated (Hayakawa et al., 2000). The present study investigated the effects of music and exercise on overall mood in the areas of pleasantness, arousal, and tiredness in order to corroborate current literature and extend findings to the lower intensity exercise modality of walking. Mood benefit from exercise may relate to perception and enjoyment of exercise.

Exercise enjoyment is also a predictor of maintaining the behavioral change necessary to adhere to an exercise routine (Papandonatos et al., 2012). One study indicated that, among participants engaging in high-intensity exercise, those exercising with music rated exercise as more enjoyable than those exercising without music (Miller, Swank, Manire, Robertson, & Wheeler, 2010). However, another study found no significant differences in enjoyment between exercising with music and a control condition without music (Plante et al., 2011). Because exercise enjoyment may impact adherence to an exercise routine, this variable was measured in the present study to address discrepancies in the literature and investigate whether the effect extends to lighter intensity exercise. If music is found to influence exercise enjoyment, it may be related to lower perceived exertion among music listeners.

Studies have indicated that listening to music may lower perceived exertion during physical activity, perhaps because music provides a distraction (Biagini et al., 2012; Karageorghis & Priest, 2012a). If individuals perceive themselves to be working less, they may work harder or for a longer duration of time. Therefore, if music lowers perceived exertion, listening to music may improve exercise performance and productivity. A recent meta-analysis indicated that those who listened to music rated their perceived exertion at approximately 10% less than those who exercised without music following low- to moderate-intensity exercise (Karageorghis & Priest, 2012b). In much of this research, however, participants were provided with preselected music from the researchers (Karageorghis & Priest, 2012b). The present research therefore sought to determine whether the influence of music on perceived exercise exertion extends to conditions where participants listen to self-selected music.

The purpose of the present study was to replicate and extend research on the various psychological effects of exercising with music. We predicted that exercise would have a significant effect on mood such that participants would rate their moods as more pleasant, less tired, and more aroused after exercise than before exercise. We also expected a significant interaction between exercise and music such that, although no differences would be detected between groups before exercise, participants who exercised with music would have more pleasant, less tired, and more aroused moods following exercise than those who exercised without music. Next, we hypothesized that those who exercised with music would have lower ratings of perceived exertion than those who exercised without music and that those who exercised with music would have higher ratings of exercise enjoyment than those who exercised without music.

Method

Participants

Data were collected from 148 undergraduate students at a southeastern university (107 women and 41 men). Participants’ ages ranged from 18 to 52 (M = 22.25, SD = 5.13) with 43.9% White, 43.2% Black, and 12.9% other (5.4% multiracial, 2.0% Asian, 1.4% Native American, and 3.4% preferring not to answer). Seventy-three participants were randomly assigned to exercise with music, and 75 were assigned to exercise without music. Although exact numbers are not available, approximately four participants concurrently enrolled in psychology classes might have received credit for participation depending upon the discretion of their particular course instructors. Otherwise, participants did not receive compensation for their participation.

Materials

Before the study, participants were instructed to bring their iPods or MP3 players so that, if assigned to exercise with music, they could listen to their own self-selected music. All participants were instructed to walk at a moderate intensity for 20

SUMMER 2015

PSI CHI JOURNAL OF PSYCHOLOGICAL RESEARCH

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min, the minimum exercise duration indicated to result in immediate mood benefit in several dimensions at moderate intensities (Hansen et al., 2001).

**Measures**

**Mood response.** Mood responses were measured within the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988) both before and after exercise for pleasantness using the Pleasant-Unpleasant scale (Cronbach’s α = .85 preexercise and .86 postexercise), arousal using Arousal-Calm scale (Cronbach’s α = .51 preexercise and .55 postexercise), and tiredness using the Positive-Tired scale (Cronbach’s α = .83 preexercise and .80 postexercise). In this measure, participants reported their moods on a four-item scale ranging from *definitely do not feel* to *definitely feel* in respect to 16 adjectives including *lively, tired, content,* and *fed up.* The BMIS has been indicated to have good factorial validity (Mayer & Gaschke, 1988) and good test-retest reliability in a repeated measures design (Mayer & Hansen, 1995).

**Exercise enjoyment.** After exercise, exercise enjoyment was measured on the short form of the Physical Activity Enjoyment Scale (PACES-8), which had a Cronbach’s alpha of .88 in this sample and was demonstrated to have convergent validity in its correlation with related physical and psychological changes following exercise in a population of older adults (Mullen et al., 2011). The PACES-8 required participants to rate their appraisal of the previous physical activity on a 7-point Likert-type scale based on agreement to items such as “I find it pleasurable” and “It’s no fun at all.”

**Perceived exercise exertion.** Finally, participants were asked to rate their perceived exertion during exercise from 6 (*no exertion*) to 20 (*maximal exertion*) on Borg’s Rating of Perceived Exertion Scale (RPE; Borg, 1982), a one-item measure widely used in exercise research (Karageorghis & Priest, 2012a) and validated in its high correlation with measured heart rate of exercise participants (Borg, 1982).

**Procedure**

Upon receiving institutional review board approval (IRB# 13-035 and IRB# 13-063) data collection was conducted throughout spring and summer semesters. Students attending various physical fitness courses were recruited during class time at the campus recreation center. Potential participants were provided with the Physical Activity Readiness Questionnaire (PAR-Q), a self-assessment tool which, based on answers to health questions, recommends either engaging in exercise or consulting with a physician before activity (Thomas, Reading, & Shephard, 1992). Participants were advised to follow PAR-Q recommendations based on their responses, but no participants were excluded by the researcher. Additionally, participants were given an informed consent form to consider and sign.

Upon providing consent, individuals were given the first mood survey (BMIS) to complete along with instructions randomly assigning them to one of two conditions: exercise with music or exercise without music. However, if participants had forgotten their iPod (approximately 11 participants total), they were automatically assigned to exercise without music. Participants with iPods assigned to exercise without music were offered the option of leaving their iPods in the locked classroom or carrying the devices with them while walking without wearing headphones.

Participants were instructed to walk at a moderate intensity on the indoor track at the campus recreation center for 20 min as timed by the researcher. To control walking intensity, participants in each data collection group were provided with specific guidelines for exercising at a moderate intensity as outlined by the CDC (2011b), described to participants as enough physical effort to breathe harder than normal, but at a level at which they would still be able to carry on a normal conversation. After completing their assigned exercise, participants were provided with the final survey packet (RPE, BMIS, PACES-8). Upon submission of their completed surveys, participants were thanked and provided with a debriefing flyer.

**Results**

Data collection time (spring and summer semesters) was included as a between-subjects variable in Analyses of Variance (ANOVA), but no significant differences were found between these groups on any measured variables. Therefore, data from both collection periods were combined in subsequent analyses. Research has indicated that exercise motivation may differ by race, with White participants significantly more likely than Black or other participants to be motivated to exercise for psychological benefits such as enjoyment and revitalization (Egli, Bland, Melton, & Czech, 2011). Thus, analyses were conducted to identify potential differences in exercise response by race. No significant differences between racial groups (White, Black, and other) were detected within...
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were specifically predicted. Simple effects were probed for significant differences (see Table 1). Mood pleasantness was not significantly different between groups before exercise, $t(137) = 1.27, p = .21$, but those who listened to music during exercise reported feeling significantly more pleasant after exercise than those who did not listen to music, $U = 1908.00, p = .009, d = .42$ (see Figure 1). A similar pattern was observed for tiredness in that there was no difference in mood before exercise, $U = 2075.00, p = .15$, but those who listened to music during exercise reported feeling less tired after exercise than those who did not listen to music, $U = 2003.50, p = .026, d = .37$. Finally, there was no significant difference between groups before, $t(137) = 0.83, p = .41$, or after, $U = 2028.00, p = .22$, exercise for arousal. These results contributed partial support of the second hypothesis.

Exercise enjoyment and perceived exertion data were also analyzed for group differences. Contrary to the third hypothesis, ratings of perceived exertion were not significantly less for those who exercised with music, $U = 2628.00, p = .78$. Supporting the fourth hypothesis, exercise enjoyment was significantly higher among those who exercised with music ($M = 40.58, SD = 9.97$) than those who exercised without music ($M = 37.47, SD = 8.95$), $t(145) = 1.99, p = .049, d = 0.33$.

Discussion

The present research replicated and extended a number of previous findings. Exercise had a significant effect on all mood dimensions, lowering tiredness and boosting aroused and pleasant moods, which aligned with widespread findings in current research (Hansen et al., 2001). The effects of exercise explained a significant portion of the changes between pre- and postexercise mood, accounting for 23% of the variance in tiredness, 17% of the variance in pleasantness, and 8% of the variance in arousal. The study also found a medium effect of music in decreasing postexercise tiredness ($d = .37$), which replicated previous research (Biagini et al., 2012; Hayakawa et al., 2000), and a medium effect of music in increasing postexercise pleasant mood, a previously unmeasured mood dimension. These results suggested that music and exercise may combine to increase energy and positive mood significantly more than exercise alone. With regard to exercise enjoyment, participants who listened to music during exercise rated their exercise as more enjoyable than those who exercised without music, and this effect size was medium ($d = .33$). The positive effect of music on
enjoyment has been indicated in previous research using high-intensity exercise (Miller et al., 2010), but this effect has not been previously supported for low- to moderate-intensity exercise (Plante et al., 2011).

Contrary to our predictions, no effect was indicated for perceived exertion. The findings of lower tiredness in those who exercised with music suggested the potential presence of this physiological effect. However, data were strongly leptokurtic, suggesting that walking intensity might have been fairly consistent among participants. Another possible explanation for lack of difference is that, in order to control exercise intensity, participants were given specific instructions to maintain a moderate walking pace. Potentially, the participants might have viewed the RPE scale as a “test” on whether they followed instructions and chose the response corresponding to a moderate intensity. Although moderate was not specifically worded on the RPE scale, participants were likely familiar with this scale because it was part of the physical education curriculum. On the other hand, the consistent data might have reflected that participants were simply following instructions, and intensity was sufficiently controlled. Additionally, no evidence of an interaction for the arousal dimension was obtained. Although it is possible that listening to music while exercising does not boost mood along this dimension, it should be noted that the Arousal-Calm scale demonstrated low internal reliability (Cronbach’s αs = .55 preexercise and .51 postexercise), which might have inflated error variability.

As a society, people typically understand that they “should” exercise, but most Americans do not regularly exercise and therefore do not receive the health benefits (CDC, 2011a). Music may provide a potential avenue for intervention. Exercise enjoyment and positive mood changes following exercise were demonstrated to predict exercise adherence (Papandonatos et al., 2007), and these postexercise mood and enjoyment effects were enhanced by the use of music in the current study. Because those beginning an exercise regimen are recommended to start with moderate-intensity exercises such as walking (CDC, 2011), this study was especially applicable to those wishing to begin and maintain an exercise program. Also, instructing participants to listen to their own music in the music condition demonstrated that the mood benefits of music are easily accessible.

To situate the present findings within the larger context of health and exercise behaviors, it may help to consider the theory of planned behavior (TPB; Ajzen, 1991). According to the TPB, behavior can be predicted from intentions to engage in this behavior, although stronger intentions to perform a given behavior are predicted by positive attitudes, higher perceived behavior control, and positive subjective norms (Ajzen, 1991). The TPB has been particularly useful when predicting health-related behaviors, with meta-analyses demonstrating the utility of the TPB in explaining behaviors related to condom use (Albarracín, Johnson, Fishbein, & Muellerleile, 2001), health screenings (Cooke & French, 2008),

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means for Each Mood Dimension for Music and Control Groups Before and After Exercise</strong></td>
</tr>
<tr>
<td>Brief Mood Introspection Scale</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Pleasant-Unpleasant</td>
</tr>
<tr>
<td>Music</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Positive-Tired</td>
</tr>
<tr>
<td>Music</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Arousal-Calm</td>
</tr>
<tr>
<td>Music</td>
</tr>
<tr>
<td>Control</td>
</tr>
</tbody>
</table>

**FIGURE 1**

**Pleasant Mood Means**

Note. Changes in mean mood ratings within the pleasantness dimension for music and control groups before and after exercise.
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and exercise behavior (Downs & Hausenblas, 2005; Hausenblas, Carron, & Mack, 1997). In each of these meta-analyses, attitude toward the target behavior was found to be the strongest predictor of behavior intentions, which has implications for the present research.

We have argued that listening to music while exercising may increase exercise adherence by boosting the positive impact of exercise on mood and exercise enjoyment. Within the context of the TPB, heightened positive mood and greater exercise enjoyment may create more positive attitudes toward exercise, which could increase intentions to exercise. An alternative or additional way that increased mood and enjoyment could increase exercise adherence is through anticipated affect. Anticipated affect refers to whether, after performing or not performing a behavior, a person expects to experience positive or negative emotions (Richard, van der Pligt, & de Vries, 1996). When considered as a separate component within the TPB model, anticipated affect significantly predicted behavioral intentions beyond the other three components of the model (Rivis, Sheeran, & Armitage, 2009). Therefore, positive mood and enjoyment when exercising with music may not only improve attitudes toward exercise behavior, but also increase the positivity of anticipated affect after performing exercise, improving intentions to engage in exercise behaviors.

Findings of the present research may provide important contributions to promoting physical and psychological health by helping individuals maintain productive and enjoyable exercise routines. Therefore, future research may address limitations in the present research. In our data collection, a small portion of participants who had forgotten to bring an iPod or MP3 player (approximately 11 total) were automatically assigned to exercise without music, which might have clustered forgetful, potentially less-motivated individuals into the no-music group. Although motivation may or may not affect psychological response to exercise, it could have potentially affected exercise performance. Additionally, an individual who brought an iPod but was assigned to exercise without music might similarly have exhibited less enthusiasm or motivation, which could have potentially affected exercise performance. On the other hand, in the current study, the music group (M = 10.62, SD = 2.35) and no-music group (M = 10.39, SD = 2.11) did not significantly differ in their ratings of exertion on the RPE scale (p = .77), which might indicate that participants in both groups exercised at a similar moderate intensity per instructions. However, future research may implement another measure such as a heart rate monitor in order to more accurately measure intensity and further ensure that no differences exist in exercise performance between groups. Furthermore, additional physiological measures may be used in the future to add depth to findings of the current study by determining whether BMI mood dimensions of tiredness and arousal also correspond to accompanying physiological states.

Although positive psychological effects of music have been indicated for athletic (Biagini et al., 2012) and nonathletic populations (Hayakawa et al., 2000), future research might collect fitness information from participants to determine whether participants at various fitness levels respond differently to music. The data in this particular study were collected from undergraduate students enrolled in various physical education courses, and although these courses are required for all students to receive a bachelor’s degree and might have reflected various fitness levels, the sample was not entirely representative of populations starting an exercise routine. Therefore, future research may choose to investigate the effects of exercise and music specifically from a population of individuals who do not regularly exercise to extend the findings of present research.

Furthermore, although the present study detected no differences in response to exercise by race (White, Black, and other), future research may investigate potential differences between racial groups comprising “other” or those not represented in this sample. Lastly, the benefits of music may be accessible to the individual as suggested in the present study, as well as to groups in fitness class settings (Hayakawa et al., 2000), so future research might continue to investigate the applicability of music and group fitness settings in maintaining exercise adherence. In conclusion, this study found additional support for the psychological benefits of exercising with music and extended the previous research by indicating the pleasant mood and exercise enjoyment effects of music during moderate-intensity walking. These results called for future research investigating the use of music in sustaining exercise adherence, particularly by strengthening predictors to future exercise behavior within the TPB.
References


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SUMMER 2015

PSI CHI JOURNAL OF PSYCHOLOGICAL RESEARCH
ABSTRACT. Arnett (2000) postulated that, in industrialized nations, many people between 18 and 29 experience the stage of emerging adulthood (EA). Researchers including Arnett have suggested that EA might be limited to individuals of certain education and income levels. We investigated how income and education influence EA traits. Participants completed the Inventory of the Dimensions of Emerging Adulthood (IDEA) to measure the extent to which they exhibited EA traits. The IDEA and demographic survey were distributed through our university’s general psychology subject pool and social media. Results from the study indicated that participants with more education exhibited more EA traits, $F(6, 346) = 6.94, p < .001$, partial $R^2 = .11$. Furthermore, there was a significant interaction between family and/or personal income and EA traits, $F(42, 303) = 2.03, p = .006$, partial $R^2 = .11$. Participants who reported lower personal incomes expressed more EA traits. Likewise, participants who grew up in families that earned around $75,000 exhibited more EA traits compared to families with lower or higher income levels. The results suggested that emerging adulthood is experienced by individuals with more education and a middle class financial background.

Emerging Adulthood: A College Student, Middle Class Perk?
Rebecca L. Smith, Ann M. Carroll, Kathryn T. Callaghan,
Mara A. Rowcliffe, Molly A. Sullivan, and Debra C. Steckler*
University of Mary Washington

Although Erik Erikson’s eight life stages have become universally accepted, Arnett (2000, 2004) proposed a new stage in personal development referred to as emerging adulthood. This stage occurs after adolescence but before adulthood, thus describing people between ages 18 and 29. Arnett postulated this stage because he noticed that the onset of certain major life events such as marriage, parenthood, and the establishment of permanent careers occurred at a later age than before in industrialized societies (Arnett, 2000, 2004, 2006). Additionally, more people enroll in postsecondary education after high school (Arnett, 2000, 2006). Arnett stated that the number of Americans continuing education after high school has increased exponentially since the 1940s, from 14% to over 60% by the 1990s (Arnett, 2000; Arnett & Tabor, 1994). This delayed entry into the real world led Arnett to characterize emerging adulthood as a period of five distinct traits: possibilities, instability, exploration, self-focus, and feeling in-between (Arnett & Tabor, 1994; Reifman, Colwell, & Arnett, 2007).

However, some researchers (Hendry & Kloep, 2010; Marcotte, 2012) have questioned the universality of emerging adulthood, arguing that this developmental period is merely the consequence of a change in cultural norms and expectations for young adults rather than a valid developmental stage. Arnett’s research (2000) included participants of various socioeconomic statuses, education levels, and cultures. Therefore, he maintained that emerging adulthood is a universally experienced stage that is applicable to all people regardless of education level, socioeconomic status, and culture. The results of the current study expanded on this debate by investigating whether emerging adulthood is dependent upon various factors including education and income level.

The Forgotten Half
Most of the previous research regarding emerging adulthood has focused predominantly on college students, most of whom are from the upper or
middle class. As a result, individuals who did not attend college or those who come from lower income families have often been referred to as the forgotten half (Hendry & Kloep, 2010; William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988). People may fall into the forgotten half because they either opt out of or are financially unable to attend college. College serves as the means by which researchers gain access to their participants. Therefore, those who do not attend college are relatively inaccessible to researchers (Arnett, 2000).

Members of the forgotten half may not attend college for various reasons. They may enter the workforce immediately following high school, enlist in the military, or become pregnant at a young age and choose not to enter college. Also, members of the forgotten half may not attend college because they do not have the financial means to do so. For traditionally aged students, college provides the time to explore personal identity by delaying entry into the “real” world and allowing time to search for the ideal major of study. Higher education allows for instability and self-focus, and the forgotten half individuals may feel more of an urgency to commit to a career and life path without college.

Higher socioeconomic status affords more opportunities to explore interests, lifestyles, identities, residencies, and career paths, rather than committing to any specific options. Being financially secure permits individuals to focus on their own needs and long-term goals. Therefore, it is reasonable to assert that a higher socioeconomic status predisposes an individual to manifest the five traits associated with emerging adulthood.

To explore certain life factors and circumstances associated with emerging adulthood, we investigated the effects between education level and family and personal income on emerging adulthood. Our first hypothesis was that participants with higher levels of education would express more emerging adulthood traits. Our second hypothesis was that participants with higher socioeconomic status, determined by either their family or their personal incomes, would exhibit more emerging adulthood traits.

Method

Participants
A total of 362 people participated. All participants were between the ages of 18 and 29 (M = 21.86, SD = 2.63). Of the total number of participants, 29.8% were men and 70.2% were women. Most of the participants were European American and had either some college education or a bachelor’s degree. Few participants (n = 23) indicated they had no college education and comprised the forgotten half population in the present study. Participants reported each parent’s level of education along with their family and personal income. A small proportion of participants (n = 22) indicated coming from families making about $25,000 or less. Nearly half (41.8%) of the participants identified themselves as financially independent from their parents. Of those participants, most made around $25,000 or around $50,000 (see Table 1).

Measures

Emerging adulthood traits. We used a modified version of Arnett’s (2007) Inventory of the Dimensions of Emerging Adulthood (IDÉA) to address the extent to which participants exhibited traits of emerging adulthood (Reifman et al., 2007). The scale has strong internal reliability, with a Cronbach’s α of .85. This measure included 31 questions with possible responses ranging from 1 (strongly disagree) to 6 (strongly agree). Arnett’s original measure included a 4-point Likert-type scale. However, the current study extended the response range to reflect the subtle variation in responses that would not have been captured in a 4-point scale, adding 2 (disagree) and 5 (agree) to the possible response options. Despite expanding the range of response options for this measure, the scale maintained strong internal reliability with a Cronbach’s α of .88. Scores were summed, and a higher score on the IDEA indicated greater identification with emerging adulthood traits. A sample item from the survey asks, “Is this period of your life a time of personal freedom?”

Income. Due to the proposed role of socioeconomic status in the experience of emerging adulthood traits, for the purposes of the present study, we chose to examine both participants’ combined annual family income levels and their annual personal income levels. We distinguished among the various income levels by dividing them into eight possible income categories, which we used to simplify the discussion of our results. In the present study, participants reported the combined annual amount made by the family in which the participant was raised as well as the annual amount made by the participant individually, if applicable. All of the reported figures were estimations based on the income categories provided, using Thompson and Hickey’s (2005) personal
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income chart as the guiding framework. There were seven levels of income responses for the family income variable, which were categorized as: (a) less than $10,000, (b) around $25,000, (c) around $50,000, (d) around $75,000, (e) around $100,000, (f) around $125,000, (g) and $200,000 or more. The same categories of income responses were used for the personal income variable, with an eighth option for Not financially independent.

We believed that both the socioeconomic class in which participants were raised in addition to their current socioeconomic standing would impact their responses. Thus, both were taken into consideration. If participants indicated they had an annual personal income, their responses were used in both the family income and personal income categories. However, if participants indicated that they did not earn a personal income, their responses were only used in the family income category.

Demographics. Participants completed a measure in which they reported age, sex, racial and ethnic background, education level, parents’ education level, combined annual family income level, and annual personal income level, if applicable.

Procedure

After institutional review board approval (2012-024) was given, we recruited participants using our university’s general psychology subject pool and social media including Facebook® and Twitter®. We posted a link to the survey on our personal social media websites and encouraged friends to share the link in order to recruit participants. Participants from the subject pool took the survey online using provided computers. Each student from the subject pool was compensated with credit toward completing the general psychology course at a relatively small co-ed liberal arts university of about 4,000 undergraduate students. Participants recruited through social media were provided with a hyperlink that enabled them to take the survey from their own computer. Participants who accessed the survey through social media websites were not compensated in any way. Participants first read and accepted the terms of the informed consent, and then completed the IDEA followed by the demographic questionnaire to avoid priming. The order in which the measures were given was not randomized.

Results

The goal of the present study was to determine if education level and family and/or personal income mitigated expression of emerging adulthood traits. Therefore, a one-way Analysis of Variance (ANOVA) was conducted to examine the effect of education level on participants’ IDEA scores. After removing three participants whose scores on the IDEA were outliers due to the fact that they selected the first response option for every item, the results showed a significant difference among IDEA scores,

### TABLE 1

<table>
<thead>
<tr>
<th>Demographic</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/Ethnicity</td>
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<tr>
<td>European American</td>
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</tr>
<tr>
<td>Hispanic</td>
<td>4.4</td>
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<tr>
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<tr>
<td>Arab/Middle Eastern</td>
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<tr>
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<td>Associate’s degree or equivalent</td>
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<td>Master’s degree</td>
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<td>Less than $10,000</td>
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<td>16.6</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>18.5</td>
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<tr>
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<tr>
<td>Less than $10,000</td>
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<tr>
<td>Around $25,000</td>
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<tr>
<td>Around $125,000</td>
<td>0.3</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>0.3</td>
</tr>
</tbody>
</table>
$F(6, 346) = 6.94, p < .001$, partial $R^2 = .11$, power 100%. The effect size indicated that approximately 10.7% of the variance in emerging adulthood traits was due to participants’ level of education. Next, we conducted Tukey Honest Significant Difference (HSD) post-hoc analyses (see Figure 1). Participants who achieved only some high school ($n = 6$) showed significantly fewer emerging adulthood traits than participants with some college ($n = 119$), an associate’s degree or vocational certificate ($n = 19$), a bachelor’s degree ($n = 157$), a master’s degree ($n = 28$), and a doctoral degree ($n = 7$). Additionally, participants who achieved only a high school diploma or equivalent ($n = 17$) showed significantly fewer emerging adulthood traits than those who obtained only some college and those who had a bachelor’s degree.

A 7 x 8 factorial ANOVA (family income: less than $10,000, around $25,000, around $50,000, around $75,000, around $100,000, around $125,000, $200,000 or more x personal income: less than $10,000, around $25,000, around $50,000, around $75,000, around $100,000, around $125,000, $200,000 or more, not financially independent) was conducted to determine the effect of family and/or personal income on IDEA scores. Results showed a significant interaction, $F(42, 306) = 2.03, p = .006$, partial $R^2 = .11$, power 98.7%. The effect size indicated that approximately 11.4% of the variance in emerging adulthood traits was due to participants’ personal or family income. Tukey HSD post-hoc analyses revealed significant differences in IDEA scores based on personal incomes when family income was around $75,000 (see Figure 2). Specifically, participants whose personal incomes were less than $10,000 ($n = 4$) showed more emerging adulthood traits than those with personal incomes of around $25,000 ($n = 11$) and around $100,000 ($n = 1$). Moreover, participants whose personal incomes were around $25,000 displayed more emerging adulthood traits than those with personal incomes of around $100,000. Participants who indicated that they made around $50,000 ($n = 15$) exhibited more emerging adulthood traits than those who indicated that they made around $100,000. Lastly, participants who were not financially independent ($n = 42$) showed more emerging adulthood traits than those whose personal income was around $100,000.

**Discussion**

Our studies sought to discover some of the life factors that contributed to the expression of emerging adulthood because we postulated that the forgotten half does not experience this developmental stage (Hendry & Kloep, 2010; Marcotte, 2012). The results from our study supported our first hypothesis that participants who attended college showed more emerging adulthood traits than people who did not attend college. Contrary to our second hypothesis, we found that participants who were

**FIGURE 1**

Mean Inventory of the Dimensions of Emerging Adulthood (IDEA) Scores Based on Education Level

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Mean IDEA Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school*</td>
<td>114.00</td>
</tr>
<tr>
<td>High school*</td>
<td>114.94</td>
</tr>
<tr>
<td>Some college*</td>
<td>147.00</td>
</tr>
<tr>
<td>Associate’s*</td>
<td>147.26</td>
</tr>
<tr>
<td>Bachelor’s*</td>
<td>147.08</td>
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<tr>
<td>Master’s*</td>
<td>134.54</td>
</tr>
<tr>
<td>Doctoral*</td>
<td>145.29</td>
</tr>
</tbody>
</table>

Note. The IDEA is from Arnett (Reifman, Colwell, & Arnett, 2007).
*Participants with some high school differed significantly from participants with some college, an associate’s, bachelor’s, master’s, and doctoral degrees.

**FIGURE 2**

Mean Inventory of the Dimensions of Emerging Adulthood (IDEA) Scores for Family Income at $75,000 Based on Personal Income Levels

<table>
<thead>
<tr>
<th>Personal Income Level</th>
<th>Mean IDEA Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000*</td>
<td>160.25</td>
</tr>
<tr>
<td>$25,000*</td>
<td>134.00</td>
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<tr>
<td>$50,000*</td>
<td>142.73</td>
</tr>
<tr>
<td>$100,000**</td>
<td>81.00</td>
</tr>
<tr>
<td>Not independent*</td>
<td>147.83</td>
</tr>
</tbody>
</table>

Note. The IDEA is from Arnett (Reifman, Colwell, & Arnett, 2007).
*Participants earning less than $10,000 showed significantly more emerging adulthood traits than those earning around $25,000.
**Participants earning around $100,000 showed significantly fewer emerging adulthood traits than all other personal income levels and those who were not independent.
of a lower personal income level expressed more emerging adulthood traits than those of a higher personal income level. However, participants who grew up in a family of middle income level, earning approximately $75,000 per year, were more likely to exhibit more emerging adulthood traits than those who grew up in families with either lower or higher income levels.

Higher education, specifically four-year colleges and beyond, emphasizes the importance of questioning, exploring, and experimenting. Therefore, it is logical that places of higher education instill a sense of emerging adulthood in their students. However, it was surprising to find that people who reported a lower personal income showed more emerging adulthood traits. This finding could have been a result of the unequal distribution of participants among personal income levels. People of a lower socioeconomic status often have fewer opportunities to attend college due to financial limitations and responsibilities (Levine & Levine, 2012). Nevertheless, the results from the present study suggested that financially independent individuals make less money because they are less established in their career. Therefore, they are still progressing through this developmental stage. However, these participants came from a family that earned about $75,000 per year, so one could speculate that they might have had more opportunities to attend college and explore. Families that fall within this income category are generally accepted as middle class (Thompson & Hickey, 2005), and the middle class may encourage values such as hard work, higher education, and the desire for “something better” for their children that particularly align with the emerging adulthood’s ideals of possibilities, exploration, and self-focus. The middle class may epitomize the traditional American values of exploration and constant improvement (Middle Class American, n.d.). Families that earn around $25,000 or less per year may be constrained from fostering such notions out of necessity that adolescents work to contribute financially or the inability to fund higher education. On the other hand, families that earn around $100,000 or above may not find it necessary to obtain such education because they have more resources and job opportunities through networking to fall back on.

In accordance with our first hypothesis, those with a master’s degree or above should have shown more emerging adulthood traits than those with a high school diploma. However, no significant differences were found. Participants who obtained above a master’s degree only constituted a small proportion of our sample, which could have skewed the results. Furthermore, it is possible that these individuals generally exhibited fewer emerging adulthood traits than expected because the highly focused nature of their programs may not allow for a great deal of personal experimentation and exploration. At this point in their educational career, people might have already chosen a career path. Additionally, it is possible that age might have mitigated the expression of emerging adulthood traits in those with master’s degrees or above because many people opt to take a break between undergraduate and graduate school to gain work experience or greater financial security. As a result, many people with a degree beyond that of a bachelor’s may be older and more likely to have already progressed through this developmental stage.

It is also interesting to note that individuals who were raised in families earning approximately $50,000 per year did not significantly differ in their expression of emerging adulthood traits. For the purposes of the present study, these individuals were classified as middle class. However, due to financial constraints, they might not have had as many opportunities for personal exploration as those individuals whose families would be considered upper middle class, earning approximately $75,000 per year. Given inflation, a combined annual family income of $50,000 may not be sufficient to provide children with the opportunity and leisure to experience this developmental stage.

Our study was limited in that we did not assess participants’ marital and parental statuses. Additionally, participants estimated their combined family income without consulting with their parents for accurate information. Likewise, the childhood familial situation was not included, so the effect of divorce, for example, was not taken into consideration. Our sample population was also fairly homogenous in racial and ethnic background, education level, and income level. The lack of variability among participants within the present study resulted in unequal representations among groups. Moreover, although we were studying the forgotten half, the current study was limited in that there was a small sample size of noncollege participants compared to college participants. Lastly, our study utilized social media sites to access participants. Therefore, the self-selection bias could have skewed the responses.

In the future, researchers could ameliorate the gaps in the present study by posing questions
related to participants’ current life circumstances and their family history and dynamics, as well as obtaining more accurate reports of family income levels. More importantly, future studies should focus on achieving greater variability in the sample population, especially by sampling more members of the forgotten half. Emerging adulthood is a developmental stage that emphasizes values shared by individualistic cultures. Therefore, future researchers should look at a possible difference between urban and rural populations as well as less individualistic cultures (Arnett & Taber, 1994; Imamoğlu & Karakitaplıoğlu-Aygün, 2004).

Furthermore, future studies could examine the impact of technology on the expression of emerging adulthood. Technology can serve as an avenue to virtually experiment with different versions of the self, thereby creating an age of exploration and possibilities (Arnett, 2000). Access to technology varies broadly depending on the development of the nation. Therefore, a difference could exist in emerging adulthood expression between developed and developing countries. Studies that focus on the role of and access to technology in emerging adulthood could also shed greater light on within-nation differences, both cultural and socioeconomic, as they relate to this developmental stage.

It may be possible that individuals who do not attend college experience a type of emerging adulthood. However, the traits may manifest themselves differently. Additional studies that focus solely on the forgotten half would be advantageous to examine the differences in their developmental paths through young adulthood. Such alterations and expansions in future studies would allow for greater extrapolation of some of the life factors and traits associated with emerging adulthood.

Our findings lent support to the debate regarding the universality of Arnett’s emerging adulthood (Hendry & Kloep, 2010), suggesting that it may not be a universally experienced developmental stage. More research must be done to explore the forgotten half and to determine if emerging adulthood is solely a college student, middle class perk. The present study and future research is important because it contributes to knowledge of human psychosocial development.

References

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This research was supported by the Department of Psychology, University of Mary Washington, VA. Rebecca Smith and Ann Carroll contributed equally as lead authors of this study.

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ABSTRACT. The current study aimed to understand college-age Facebook® users’ perceptions of others’ self-disclosure, and additionally sought to determine what actions participants were likely to take when they perceived that a post was inappropriate. Participants \((N = 150)\) were asked to read mock Facebook newsfeeds and to respond to items that assessed their perception of the appropriateness or inappropriateness of each user’s posts (romantic relationship drama, negative emotion, passive aggression, and frequent status updates), as well as how they would respond to such posts. Results indicated that posts related to romantic relationship drama were rated by most as inappropriate or very inappropriate \((74.0\%; \ p < .001)\). Passive aggressive posts were also rated as inappropriate or very inappropriate more often than the other types of posts. In addition, for participants who perceived that romantic relationship drama posts were inappropriate, they reported that they would be most likely to ignore \((63\%)\), block \((19\%)\), or defriend \((10\%)\) someone who made similar types of posts, \(p < .001\). Further, results revealed some sex and racial/ethnic group differences in regard to perceptions and actions. The current research added to the knowledge base about the types of Facebook self-disclosure that college-age users find to be inappropriate and identified actions that users are likely to take when they have such perceptions.

College Students’ Perceptions of Inappropriate and Appropriate Facebook Disclosures
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Facebook® made its debut in 2004. Since that time, it has become one of the most popular social networking sites and currently has 1.32 billion monthly active users (Facebook, 2014). There were 140 times more Facebook users in 2011 than in 2005 (Anderson, Fagan, Woodnutt, & Chamorro-Premuzic, 2012). A recent investigation of college students reported that Facebook users who participated in a study spent an average of 4.83 hr on Facebook per week while only going out with friends for an average of 3.5 hr per week (Chou & Edge, 2012). Thus, due to Facebook’s overwhelming popularity in today’s culture, particularly with young people (Anderson et al., 2012), researchers have investigated antecedents of Facebook use, how people utilize Facebook, and the effects of Facebook use (Anderson et al., 2012).

An important area that has been examined is how Facebook profiles and posts are perceived. Although research has been conducted on users’ perceptions of their own profiles and posts (Christofides, Muise, & Desmarais, 2009; Peluchette & Karl, 2010) and on how potential employers perceive potential employees’ Facebook profiles (Kluemper & Rosen, 2009), less published research has examined how Facebook users perceive other Facebook users’ posts. This is an area in need of more research because it is known that most people on Facebook spend their time examining other users’ communications (Wise, Alhabash, & Park, 2010). In addition, a recent literature review about Facebook culture suggested that an area for future research should be to investigate problematic behaviors and the consequences of such behaviors (Anderson et al.,...
Social acceptance is seen as a fundamental human need. A lack of social acceptance has been shown to be associated with poor outcomes such as lowered self-esteem, hurt feelings, anxiety, and depression (DeWall & Bushman, 2011). One way that people fulfill this need for social acceptance is by affiliations with others. More specifically, according to Maslow’s (1943) classic theory, individuals have a fundamental need to be affiliated with other humans and to feel a sense of belongingness. Self-disclosure has often been cited as being a critical component to forming and maintaining interpersonal relationships (Sprecher & Hendrick, 2004; Sprecher, Treger, Wondra, Hilaire, & Wallpe, 2013). Self-disclosure has been described as a process in which people reveal information about themselves that would not otherwise be known to others (Adler & Proctor, 2007). Self-disclosure has been found to be associated with a host of positive relational outcomes including relational esteem and satisfaction (Sprecher & Hendrick, 2004).

Examining self-disclosure is particularly relevant in the Facebook environment given that self-disclosure is an integral part of Facebook interactions. Researchers have found that a greater need for popularity, defined as doing things in order to be perceived as well-liked among an individual’s peer group (Santor, Messorvey, & Kusumakar, 2000), predicted self-disclosure on Facebook (Christofides et al., 2009). Furthermore, participants in Christofides et al.’s (2009) study reported that they tended to disclose more personal information on Facebook than they did in other settings. The researchers speculated that the environment of Facebook might itself encourage self-disclosure because an individual must actively disclose information in order to be popular among their social network. Thus, popularity and self-disclosure on Facebook are inextricably linked. In addition, other research has found that the self-image a person wished to convey to others was related to the types of content that were displayed in that person’s Facebook posts; those who wished to be portrayed as hardworking, fun, or friendly did not tend to post inappropriate content on their Facebook pages (Peluchette & Karl, 2010).

Some researchers have examined how others perceived self-disclosure on Facebook. Forest and Wood (2012) conducted a series of three studies aimed at understanding how people with low self-esteem viewed social interaction on Facebook and to what extent their self-disclosure led to social rewards on Facebook. Participants’ posts were analyzed by the researchers and by strangers. The authors found that people with low self-esteem tended to post things on Facebook that were perceived by others unfavorably. This was largely because the posts were perceived by others to be low in positivity and high in negativity. Likewise, Utz (2010) found that participants rated a mock Facebook user as more popular if the user had an extraverted looking profile, defined as having a lively facial expression in the profile picture and longer text, as opposed to an introverted looking profile such as a picture of the user sitting alone facing a river with shorter text. In addition, others have indicated that users of Facebook and other social networking sites were likely to delete posted messages or not respond to posts when they perceived posts as being negative (Forest & Wood, 2012; Tokunaga, 2011).

The current study aimed to clarify what Facebook users perceived to be inappropriate types of posts made by other Facebook users as well as what actions were most likely to be taken when an individual perceived that a post was inappropriate. Further clarification was needed on this topic for several reasons. First, little research existed on the perceptions of other Facebook users’ posts and the associated actions that are likely to ensue from posts that are perceived to be inappropriate. Second, although Forest and Wood (2012) examined perceptions of Facebook users’ posts, they did so specifically within the context of examining users with low versus high self-esteem. Further, they were mostly interested in perceptions and actions taken toward posts that exhibited certain emotions. Our study went a step further by studying both emotions and specific content in posts, and how Facebook users in general might perceive and react to various types of posts. Additionally, Tokunaga (2011) examined in an open-ended format what users of various social networking sites found to be the most negative events that led to relationship strain. However, some of the results were not relevant to Facebook (e.g., ranking disparities of top friends) and so the current study aimed to focus solely on Facebook. Finally, the present study included a preliminary examination of demographic group differences in perceptions and reactions to other Facebook posts.
Facebook users’ posts, one of the first known studies to do so. Thus, our study added to the literature in several important ways.

Specifically, the present study sought to answer several research questions. The first research question we examined was: What types of posts were most frequently perceived as inappropriate by Facebook users? Based on previous research (Forest & Wood, 2012; Tokunaga, 2011), we predicted that posts that expressed romantic relationship drama, negative emotion, and passive aggression would have a higher proportion of inappropriate perceptions than frequent status updates or neutral posts. Specifically, posts that portray romantic relationship drama and passive aggression may be viewed as more inappropriate than posts displaying negative emotion because raters might view the former two categories as being more intimate and thus less appropriate for public posting (Bazarova, 2012). Second, we aimed to answer the following question: What actions were most of the Facebook users likely to take when they perceived that a post was inappropriate? Based on previous research (Forest & Wood, 2012; Tokunaga, 2011), we predicted that a higher proportion of participants would take action against or ignore a post that was viewed as inappropriate as opposed to posting a positive comment. Finally, we also examined how perceptions of posts and actions taken toward posts varied as a function of age, sex, and race/ethnicity because this has not typically been included in studies that have examined perceptions of other Facebook users’ posts. Hence, due to the lack of studies on this particular topic, we had no a priori hypotheses about how age, sex, or race/ethnicity would vary in terms of perceptions or actions taken.

Method

Participants

The data were from 150 undergraduate students at a university in the southern United States who had current or past Facebook accounts. The students’ ages ranged from 18 to 33 years (M = 19.44, SD = 2.01). Seventy percent (n = 105) of participants were women. The ethnic composition was 50.0% European American (n = 75), 40.0% African American (n = 60), 6.7% Hispanic American (n = 10), and 3.3% other ethnicities, not specified (n = 5). Ninety-four percent (n = 141) of participants reported currently having a Facebook account. Most participants (74.0%, n = 111) had used Facebook for two years or longer and reported checking their Facebook account multiple times per day (64.0%, n = 96). In addition, most participants (59.3%, n = 89) reported having 400 or more Facebook friends. The sample characteristics of Facebook usage in the current study were similar to other studies about Facebook that have used college student samples (Hargittai, 2008; Tong, Van Der Heide, Langwell, & Walther, 2008).

Materials

Newsfeed content. To develop the stimulus materials, the researchers met as a group and conceptualized categories of the most likely posts that college-age Facebook users would find inappropriate. This was a necessary step because previous researchers had not directly examined the different types of posts that users found to be inappropriate. The categories were romantic relationship drama, negative emotion, passive aggression, and frequent status updates. As a precautionary and confirmatory step, the second author informally polled 20 college students in an open-ended fashion about what types of Facebook posts they perceived to be most inappropriate. The results of the informal poll mirrored the four distinct categories originally conceptualized by the researchers. Thus, mock newsfeeds were subsequently created to depict each category as well as an additional control category, which was labeled as neutral. In addition, two independent reviewers assessed the mock newsfeeds (i.e., correctly matched posts from the mock newsfeeds to their corresponding categories) to help address the face validity of each category.

Each newsfeed had posts from two or three simulated Facebook users, each of whom posted two or three times per mock newsfeed. The newsfeeds were developed by the researchers for use in the current study and illustrated one or more of the following types of posts: romantic relationship drama, negative emotion, passive aggression, frequent status updates, and neutral posts. We opted to use what we believed were unisex names and avoided the use of photographs for profile pictures so that we could reduce the likelihood of participants utilizing sex stereotypes in their evaluations. However, it must be noted that a few of the posts did contain sex-specific terminology.

Romantic relationship drama posts were defined as negative content that aired intimate details about a person’s romantic relationship with their partner (i.e., “My boyfriend is a lying jerk! If you see him tonight, remind him that his girlfriend is at home waiting for him.” “After all we’ve been through, my boyfriend treats me like this?” and...
“My boyfriend has time to spend with his friends, but not with ME?”). Passive aggressive posts were defined as specific negative behaviors or wrongdoing of another person without directly revealing the identity of that other person (i.e., “If you won’t give me the time of day to talk it out, then I’m not going to bother trying anymore” and “So much for being ‘best friends.’ Friends don’t ditch friends”). Negative emotion posts were defined as the expression of negative feelings such as complaining (e.g., “UGH Today sucked. EVERYTHING has gone wrong. The universe hates me” and “My front left tire is flat AND I have a parking ticket. Awesome”). Frequent status updates were defined as posts that frequently updated the detailed whereabouts of a person (i.e., “Going to dinner and then the movies,” “Just got home from the salon,” and “Getting my nails done”). Finally, neutral posts were defined as positive or neutral announcements (e.g., “Happy birthday little sister! Love you!” and “The family comes into town today. I can’t wait to see everybody”).

**Measure of inappropriateness.** To assess participants’ perceptions of the appropriateness for each of the mock users’ posts, they were asked to respond to items about each mock user’s posts (e.g., “In general, how would you describe Jordan’s status updates?”) on a 4-point scale (very inappropriate, inappropriate, appropriate, very appropriate). Additionally, participants were asked how they would respond to each mock Facebook user if they were a friend of yours and updated his or her statuses most of the time similarly to the above.” The response options were: *post positive comments, ignore, post negative comments, block* (which means to remove a Facebook user from a person’s friend list, thus rendering that Facebook user unable to view any content on or post on the person’s Facebook page).

**Procedures**

After receiving institutional review board approval for the present study, all participants read and signed the informed consent before participating. Participants were college students enrolled in introductory level psychology courses who completed the study materials in a classroom setting in exchange for research participation points that were a part of their course grade. Participants were asked to answer demographic questions and then read three mock Facebook newsfeeds. After reading each mock newsfeed, participants were asked to answer the questions about the newsfeed posts. Specifically, participants read a total of 18 posts and answered questions between every five to seven posts.

**Results**

**Perceptions of Inappropriateness and Actions Toward Posts**

Chi-squared tests were conducted to determine differences in the proportion of participants who chose the different perception categories (very inappropriate, inappropriate, appropriate, and very appropriate) for all five of the posts. As can be seen in Table 1, participants were statistically significantly more likely to rate the romantic relationship drama posts as inappropriate (49.3%) compared to the other three perception categories. However, for the passive aggressive posts, most were likely to be rated by participants as either inappropriate (46.0%) or appropriate (44.7%) as compared to the other perception categories. Most participants rated both the negative emotion posts (56.7%) and frequent status updates (62.0%) as appropriate compared to the other perception categories. Finally, most participants rated the neutral posts as very appropriate (48.7%) compared to the other perception categories.

Then, a number of Cochran’s Q tests were conducted to determine within-subject trends when selecting perception categories (very inappropriate, inappropriate, appropriate, and very appropriate). Cochran’s Q tests indicated that the proportion of participants who chose the inappropriate and very inappropriate categories was statistically significantly different across types of posts (please refer to Table 1 for specific statistical results). According to post-hoc comparisons (McNemar’s test, which is the appropriate post-hoc test for Cochran’s Q), romantic relationship drama was statistically significantly more often rated as very inappropriate compared to the other types of posts, followed by passive aggressive posts, which were rated as very inappropriate more often than negative emotion, frequent status updates, and neutral posts (see Table 1). Negative emotion, frequent status updates, and neutral posts did not differ from one another in the proportion of participants in the very inappropriate category. In addition, romantic relationship drama and passive aggressive posts were more likely to be rated as inappropriate by participants than the other types of posts, which were followed by negative emotion posts, then by frequent status updates, and finally

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Very Inappropriate (%)</th>
<th>Inappropriate (%)</th>
<th>Appropriate (%)</th>
<th>Very Appropriate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative emotion</td>
<td>56.7%</td>
<td>44.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent updates</td>
<td>62.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
<td>48.7%</td>
</tr>
<tr>
<td>Romantic</td>
<td></td>
<td></td>
<td>49.3%</td>
<td></td>
</tr>
<tr>
<td>Passive-aggressive</td>
<td></td>
<td></td>
<td>46.0%</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1: Participants’ perceptions of the appropriateness of different post types.**
by the neutral posts.

Chi-squared tests were conducted to determine what actions most participants were likely to take when they perceived that a post was inappropriate. To run these analyses, we first combined ratings of very inappropriate and inappropriate into one group, simply referred to as perceived inappropriate posts. Chi-squared tests indicated statistically significant differences in proportions across actions only for the romantic relationship drama posts and the frequent status updates. As can be seen in Table 2, out of the participants who perceived the relationship drama posts as inappropriate, the most likely response was to ignore them (63.1%). Note that a statistically significant number of these participants also reported that they would most likely block or defriend (28.9%, combined) someone who posted romantic relationship drama types of posts. Although most participants did not rate the frequent status updates as inappropriate, for those who did, their most reported response would be to ignore the posts (83.3%). The action choices for the negative emotion, passive aggressive, and neutral posts were selected by equal or less than 10% of the participants. We had hypothesized that a higher proportion of participants would take action against or ignore a post that was perceived as inappropriate as opposed to posting a positive comment. However, our hypothesis was only partially supported because this was not uniformly true across all types of posts.

**Perceptions of and Action Toward Posts by Demographic Groups**

As an exploratory step, we examined differences between age, sex, and race/ethnicity in the perception of inappropriateness of the posts. First, Spearman’s rho correlation analyses were conducted to determine the statistical dependence between age and perceptions of inappropriateness by type of post in a ranked order from 4 (very inappropriate) to 1 (very appropriate). Correlations revealed no statistically significant relationship between age and the percentage of participants who perceived the posts as very inappropriate, inappropriate, appropriate, or very appropriate, \( r(149) \) range -0.13 to 0.05, all \( p \) values > .05. Next, chi-squared tests were conducted to determine differences in the percentage of participants who perceived the posts as very inappropriate, inappropriate, appropriate, and very appropriate broken down by sex and race/ethnicity. As can be seen in Table 3, men and women were not significantly different in their perceptions of appropriateness of the posts. However, there were significant differences between racial/ethnic groups on the perceptions of appropriateness for romantic relationship drama and passive aggressive posts. When the choices for appropriate and very appropriate were combined into one group, African American participants rated the romantic relationship drama (43.33%) and passive aggressive (70.00%) posts as significantly less inappropriate.

### Table 1

**Perceptions of Appropriateness by Type of Post**

<table>
<thead>
<tr>
<th>Type of Post</th>
<th>Very Inappropriate</th>
<th>Inappropriate</th>
<th>Appropriate</th>
<th>Very Appropriate</th>
<th>( \chi^2 )</th>
<th>( p &lt; )</th>
<th>( \phi )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romantic relationship drama</td>
<td>37 (24.7)(^a)</td>
<td>74 (49.3)(^a)</td>
<td>35 (23.3)(^a)</td>
<td>4 (2.7)(^a)</td>
<td>65.63</td>
<td>.001</td>
<td>.38</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>3 (2.0)(^a)</td>
<td>48 (32.0)(^a)</td>
<td>85 (56.7)(^a)</td>
<td>14 (9.3)(^a)</td>
<td>109.61</td>
<td>.001</td>
<td>.49</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>11 (7.3)(^a)</td>
<td>69 (46.0)(^a)</td>
<td>67 (44.7)(^a)</td>
<td>3 (2.0)(^a)</td>
<td>100.10</td>
<td>.001</td>
<td>.47</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>3 (2.0)(^a)</td>
<td>15 (10.0)(^a)</td>
<td>93 (62.0)(^a)</td>
<td>39 (26.0)(^a)</td>
<td>127.44</td>
<td>.001</td>
<td>.53</td>
</tr>
<tr>
<td>Neutral</td>
<td>8 (5.3)(^a)</td>
<td>1 (0.7)(^a)</td>
<td>68 (45.3)(^b)</td>
<td>73 (48.7)(^b)</td>
<td>117.25</td>
<td>.001</td>
<td>.51</td>
</tr>
</tbody>
</table>

Note: Given the number of comparisons conducted, the Bonferroni correction was calculated for the comparisons, and the significance level was set at \( p < .01 \).

### Table 2

**Action Toward Post by Participants With Perceptions of Inappropriateness**

<table>
<thead>
<tr>
<th>Type of Post</th>
<th>Post positive comments</th>
<th>Ignore</th>
<th>Post negative comments</th>
<th>Block</th>
<th>Defriend</th>
<th>( \chi^2 )</th>
<th>( p &lt; )</th>
<th>( \phi )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romantic relationship drama</td>
<td>6 (5.4)(^a)</td>
<td>70 (63.1)(^a)</td>
<td>3 (2.7)(^a)</td>
<td>21 (18.9)(^a)</td>
<td>11 (9.9)(^a)</td>
<td>37.31</td>
<td>.001</td>
<td>.50</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>13 (26.0)</td>
<td>25 (50.0)</td>
<td>0 (0.0)</td>
<td>7 (14.0)</td>
<td>5 (10.0)</td>
<td>8.53</td>
<td>.074</td>
<td>.24</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>9 (11.3)</td>
<td>54 (67.5)</td>
<td>3 (3.7)</td>
<td>8 (10.0)</td>
<td>6 (7.5)</td>
<td>9.20</td>
<td>.065</td>
<td>.28</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>1 (5.6)(^a)</td>
<td>15 (83.3)(^a)</td>
<td>0 (0.0)</td>
<td>2 (11.1)(^a)</td>
<td>0 (0.0)(^a)</td>
<td>19.00</td>
<td>.001</td>
<td>.36</td>
</tr>
<tr>
<td>Neutral</td>
<td>7 (77.8)</td>
<td>1 (11.1)</td>
<td>1 (11.1)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>7.98</td>
<td>.019</td>
<td>.23</td>
</tr>
</tbody>
</table>

Note: Given the number of comparisons conducted, the Bonferroni correction was calculated for the comparisons, and the significance level was set at \( p < .01 \).

\(^{a-c}\) row means categories with the same letter are not significantly different at \( p < .05 \) using \( \chi^2 \) test as post-hoc test.
than the other ethnic groups (European Americans and other ethnicities had percentages of ≤ 30.00% for romantic relationship drama and ≤ 50.00% for passive aggressive posts), χ²(df = 2) range 4.00 to 7.64, p = .025 to p = .012, and φ = .12 to φ = .34.

Similarly, we tested possible differences in age, sex, and race/ethnicity in the actions that participants would likely take. Age did not significantly correlate with actions toward any of the posts, ns(148) range -0.07 to 0.01, all p > .05. Chi-squared tests indicated significant differences in the proportion of men and women in their response to the negative emotion, χ²(df = 1) = 17.91, p = .031, φ = .32, and neutral posts, χ²(df = 1) = 11.40, p = .034, φ = .28. For both of these types of posts, men were significantly more likely than women to ignore the posts (see Table 4 for additional information regarding comparisons by sex). Table 4 also shows that there were significant differences between racial/ethnic groups on the passive aggressive posts. African American participants were more likely to report that they would post positive comments on the passive aggressive posts than the other ethnicity groups, which were more likely to ignore or take a negative action (i.e., post a negative comment, block, or defriend). χ²(df = 2) range 3.20 to 5.70, all p < .05, φ range .05 to .82.

**Discussion**

The purpose of the present study was to examine the proportions of Facebook users who perceived various types of posts as inappropriate and to examine the reported actions users would likely take when they perceived posts as inappropriate. Overall, the results indicated that romantic relationship drama was rated as the most inappropriate type of

<table>
<thead>
<tr>
<th>TABLE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Group Analyses in Perceptions of Appropriateness by Type of Post</td>
</tr>
</tbody>
</table>

### Perception by Sex

<table>
<thead>
<tr>
<th></th>
<th>Very inappropriate</th>
<th>Inappropriate</th>
<th>Appropriate</th>
<th>Very appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M%</td>
<td>F%</td>
<td>M%</td>
<td>F%</td>
</tr>
<tr>
<td>Romantic relationship drama</td>
<td>20.0</td>
<td>26.7</td>
<td>51.1</td>
<td>48.6</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>3.0</td>
<td>2.0</td>
<td>57.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>13.3</td>
<td>4.8</td>
<td>40.0</td>
<td>48.6</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>2.2</td>
<td>1.9</td>
<td>6.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Neutral</td>
<td>2.2</td>
<td>6.7</td>
<td>0.0</td>
<td>1.0</td>
</tr>
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</table>

### Perception by Race/Ethnicity

<table>
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<tr>
<th></th>
<th>EA%</th>
<th>AA%</th>
<th>Other%</th>
<th>EA%</th>
<th>AA%</th>
<th>Other%</th>
<th>EA%</th>
<th>AA%</th>
<th>Other%</th>
<th>X²</th>
<th>p</th>
<th>φ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romantic relationship drama</td>
<td>30.7</td>
<td>13.3</td>
<td>40.0</td>
<td>57.3</td>
<td>43.3</td>
<td>33.3</td>
<td>10.7</td>
<td>40.0</td>
<td>20.0</td>
<td>1.3</td>
<td>3.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>2.7</td>
<td>1.7</td>
<td>0.0</td>
<td>36.0</td>
<td>26.7</td>
<td>33.3</td>
<td>52.0</td>
<td>61.7</td>
<td>60.0</td>
<td>9.3</td>
<td>10.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>10.7</td>
<td>3.3</td>
<td>6.7</td>
<td>61.3</td>
<td>26.7</td>
<td>46.7</td>
<td>26.7</td>
<td>68.3</td>
<td>40.0</td>
<td>1.3</td>
<td>1.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>0.0</td>
<td>5.0</td>
<td>0.0</td>
<td>10.7</td>
<td>6.7</td>
<td>20.0</td>
<td>62.7</td>
<td>60.0</td>
<td>66.7</td>
<td>26.7</td>
<td>28.3</td>
<td>13.3</td>
</tr>
<tr>
<td>Neutral</td>
<td>6.7</td>
<td>3.3</td>
<td>6.7</td>
<td>0.0</td>
<td>0.0</td>
<td>6.7</td>
<td>40.0</td>
<td>53.3</td>
<td>40.0</td>
<td>53.3</td>
<td>43.3</td>
<td>46.7</td>
</tr>
</tbody>
</table>

*Note: M = Male participants; F = Female participants; EA = European American participants; AA = African American participants; Other = Hispanic, Asian, or other ethnic group participants. Given the number of comparisons conducted, the Bonferroni correction was calculated for the comparisons, and the significance level was set at p < .01.*
per post, followed by passive aggressive types of posts. Participants were most likely to rate the posts that contained romantic relationship drama as either very inappropriate or inappropriate. Participants were divided in rating the passive aggressive posts, which about half perceived as appropriate and the other half perceived as inappropriate. Negative emotion, frequent status updates, and neutral posts were all considered to be appropriate or very appropriate by most participants. Thus, our hypothesis was partially supported because two of the posts (i.e., romantic relationship drama and passive aggressive posts) had a higher proportion of participants who rated them as more inappropriate than the frequent status updates and neutral posts like we predicted. The other type of post (i.e., negative emotion) was not perceived to be more inappropriate, which was contrary to our prediction.

In response to the type of posts, participants reported how likely they would be to take action. Specifically, we were interested to know what participants would do when they perceived that a post was inappropriate. Romantic relationship drama was the most likely to lead participants to report that they would take a negative action in return, specifically, blocking or defriending someone who made posts of this nature. However, overwhelmingly, participants were most likely to simply ignore the romantic relationship drama when they perceived it as inappropriate. Although it was reported that negative and intimate public Facebook posts were typically viewed as less favorable than positive and nonintimate public posts (Bazarova, 2012), it may be that responding to a post in a negative way is avoided to minimize relational strain. Tokunaga (2011) reported that negative events on social networking sites such as denying friend requests or deleting public messages were often met with

### Table 4
Demographic Group Analyses in Reported Action Toward Type of Post

<table>
<thead>
<tr>
<th>Action by Sex</th>
<th>Post positive comments</th>
<th>Ignore</th>
<th>Post negative comments</th>
<th>Block</th>
<th>Defriend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M% F% M% F% M% F% M% F% M% F%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romantic relationship drama</td>
<td>6.7 19.0</td>
<td>73.3 54.3</td>
<td>2.2 1.9</td>
<td>11.1 15.3</td>
<td>6.7 9.5</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>24.4 36.2</td>
<td>73.3 43.8</td>
<td>2.3 0.0</td>
<td>0.0 12.4</td>
<td>0.0 7.6</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>15.6 21.0</td>
<td>73.3 64.8</td>
<td>2.2 2.9</td>
<td>6.7 6.7</td>
<td>2.2 4.8</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>28.9 27.6</td>
<td>71.1 69.5</td>
<td>0.0 1.0</td>
<td>0.0 2.0</td>
<td>0.0 0.0</td>
</tr>
<tr>
<td>Neutral</td>
<td>53.3 77.1</td>
<td>42.2 22.9</td>
<td>4.5 0.0</td>
<td>0.0 0.0</td>
<td>0.0 0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action by Race/Ethnicity</th>
<th>Post positive comments</th>
<th>Ignore</th>
<th>Post negative comments</th>
<th>Block</th>
<th>Defriend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EA% AA% Other% EA% AA% Other%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romantic relationship drama</td>
<td>9.3 23.3</td>
<td>13.3 57.3</td>
<td>63.3 60.0</td>
<td>2.7 0.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>22.7 48.3</td>
<td>20.0 60.0</td>
<td>43.3 53.3</td>
<td>0.0 1.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Passive aggression</td>
<td>9.3 33.3</td>
<td>13.3 72.0</td>
<td>61.7 66.7</td>
<td>1.3 1.7</td>
<td>13.3</td>
</tr>
<tr>
<td>Frequent status updates</td>
<td>28.0 25.0</td>
<td>40.0 70.7</td>
<td>71.7 60.0</td>
<td>0.0 1.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Neutral</td>
<td>73.3 65.0</td>
<td>73.3 26.7</td>
<td>33.3 26.0</td>
<td>0.0 1.7</td>
<td>0.7</td>
</tr>
</tbody>
</table>

*Note.* M = Male participants; F = Female participants; EA = European American participants; AA = African American participants; Other = Hispanic, Asian, or other ethnic group participants.

Given the number of comparisons conducted, the Bonferroni correction was calculated for the comparisons, and the significance level was set at $p < .01$. 

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confrontations and relational strain. Hence, given that many people use Facebook as a way to increase social capital (Ellison, Steinfield, & Lampe, 2011), it logically follows that more people would ignore a post that they perceived to be inappropriate rather than taking a negative action as a way to keep relational strain at a minimum and avoid a possible reduction in social capital.

However, a significant proportion of participants reported that they would most likely take action against someone who posted romantic relationship drama on a regular basis, yet this was not the case for negative emotion or passive aggressive posts. Perhaps posts that are made about negative events in a romantic relationship are viewed as the most highly intimate, and thus the most inappropriate types of posts for public self-disclosure on Facebook. Although research has been conducted on perceptions of intimate public Facebook disclosures (Bazarova, 2012), the existing research has not fully addressed why disclosures made about romantic relationships may elicit more negative actions than other types of self-disclosures. This is an area in need of more in-depth examination.

In regard to demographic group differences, African American participants tended to perceive the romantic relationship drama and passive aggressive posts as more appropriate than the other ethnic groups. African Americans were also more likely than the other ethnic groups to report that they would post positive comments in response to a passive aggressive type of post. This may be related to the finding that African American participants were more likely than the other ethnic groups to perceive passive aggressive posts as appropriate. Our results suggested that race/ethnicity may be an important demographic variable to explore in future studies that examine perceptions of Facebook posts because we know of no published research studies that have examined differences in perceptions of other Facebook users’ posts by racial groups. However, recent work found that African Americans tended to express themselves on their Facebook profiles differently than European Americans (DeAndrea, Shaw, & Levine, 2010). Further, in another study, researchers were able to correctly identify with 95% accuracy whether a Facebook user was African American or European American based on the user’s pattern of using “likes” (Kosinski, Stillwell, & Graepel, 2013). The authors stated that liking online content varies by groups, and thus accurate predictions can be made. It may be that there are different “rules” for Facebook use by racial/ethnic groups. This is an area ripe for further exploration. In addition, we found a sex difference in type of response to posts: Men were more likely than women to ignore the negative emotion and neutral posts. A recent study found that women were more likely than men to post public messages as well as send private messages (Muscanel & Guadagno, 2012). Further, in the same study mentioned above, the researchers were able to correctly distinguish between men and women Facebook users by their patterns of “likes” with 93% accuracy (Kosinski et al., 2013). Again, it appears that there may be differences in how men and women utilize Facebook with women perhaps being more likely to take an active approach to certain types of Facebook use.

In all, although there are positive aspects associated with self-disclosure, it is not without risks (Sprecher & Hendrick, 2004). The results of the current study suggested that other users do not view all types of self-disclosure on Facebook positively. Some types of posts such as romantic relationship drama posts may be considered what has been termed by some as a Facebook faux pas (Karl, Peluchette, & Schlaegel, 2010). Facebook users who post personal information publicly (e.g., in a status update) are judged as more inappropriate than those who send personal information in private messages (Bazarova, 2011).

The results of the current study suggested that Facebook users may want to be careful about what type of information they disclose or post publicly because other users are likely to judge some types of posts harshly. Our results were in line with a growing body of evidence that Facebook users make judgments about other Facebook users on a range of variables such as the level of perceived popularity, attractiveness, and credibility (Utz, 2010; Walther, Van Der Heide, Kim, Westerman, & Tong, 2008) and even how happy their lives appear to be (Chou & Edge, 2012).

Our results about the perceptions of Facebook self-disclosure must also be compared to how self-disclosure is perceived in other offline contexts. The results of our study regarding perceptions of Facebook self-disclosure mirrored results from similar studies of offline self-disclosure. In general, it has been found that negative self-disclosure among casual acquaintances is perceived as inappropriate, perhaps because negative disclosures are viewed as being too intimate for casual conversations (Howell & Conway, 1990). Further, people who made positive self-disclosures were viewed as more socially and...
Perceptions of Facebook Disclosure

A recent study investigated perceived outcomes of Facebook status updates and found that users are more likely to ignore or take action against status updates that are perceived as inappropriate. The study compared positive and negative status updates and found that more negative status updates received a variety of negative emotions such as confusion, anxiety, depressed feelings, and relational strain, which led to decreases in social capital by being ignored, blocked, or removed from other users’ friend lists. This is consistent with previous research that suggests people tend to repeat behaviors that result in positive social outcomes, or increases in social capital, while avoiding behaviors that come with too many costs (Sabatelli & Shehan, 1993).

Additionally, the study found that more negative status updates were received less social rewards, or likes, from Facebook users than positive status updates (Forest & Wood, 2012). This is consistent with the social exchange and equity frameworks (Brandtzæg, Lüders, & Skjetne, 2010; Ellison et al., 2011), which posits that people strive to maximize the benefits accrued from social relationships based on a system of costs and rewards. People tend to repeat behaviors that result in positive social outcomes or increases in social capital, while avoiding behaviors that come with too many costs (Sabatelli & Shehan, 1993).

The researchers also suggested that it is common for Facebook users to have experienced a perceived social injustice through their Facebook interactions, which, in turn, has led Facebook users to report a variety of negative emotions such as confusion, anxiety, depressed feelings, and relational strain (Tokunaga, 2011). The current study’s results also indicated that Facebook users are likely to ignore or take action against users who posted status updates that were viewed by other users as inappropriate. Facebook outcomes have often been tested using the conceptual model of the social exchange and equity frameworks (Brandtzæg, Lüders, & Skjetne, 2010; Ellison et al., 2011), which posits that people strive to maximize the benefits accrued from social relationships based on a system of costs and rewards. However, we believe that the mock newsfeeds were adequate because the results of the study were consistent with our expectations. Additionally, in the current study, participants were asked to report their likely action if the Facebook user were a friend of theirs, but some research has suggested that the current study did not ask participants to rate how realistic they found the newsfeeds, which could have possibly influenced participants’ responses. It was not possible to totally eliminate measurement error. However, we believe that the mock newsfeeds were adequate because the results of the study were consistent with our expectations. Additionally, in the current study, participants were asked to report their likely action if the Facebook user were a friend of theirs, but some research has suggested that other types of relationships may prompt different types of actions (Forest & Wood, 2012; Tokunaga, 2011).
2011). Future studies should investigate how perceptions and actions vary by type of relationship between Facebook users.

Despite these limitations, the current research added to the knowledge base about the types of Facebook self-disclosure that college-age users find to be inappropriate and identified actions that users are likely to take when they have such perceptions. The results of the present study can be of use not only to Facebook users, but also to those who work closely with young adults such as therapists and educators. This research addressed a need that Anderson et al. (2012) noted, specifically, that more studies examining problematic Facebook behavior should be conducted. As more studies are conducted on this topic, individuals can enhance their level of understanding of the importance of social interactions via Facebook.

References

Tokunaga, R. S. (2011). Friend me or you’ll strain us: Understanding negative events that occur over social networking sites. Cyberpsychology, Behavior, and Social Networking, 14, 425–432. doi:10.1089/cyber.2010.0140
Utz, S. (2010). Show me your friends and I will tell you what type of...
person you are: How one’s profile, number of friends, and type of
friends influence impression formation on social network sites.
doi:10.1111/j.1083-6101.2010.01522.x
Walther, J. B., Van Der Heide, B., Kim, S., Westerman, D., & Tong, S. T.
(2008). The role of friends’ appearance and behavior on evaluations
of individuals on Facebook: Are we known by the company we keep?
Human Communication Research, 34, 28–49. doi:10.1111/j.1468-
2958.2007.00312.x
research in the social sciences. Perspectives on Psychological
social information seeking on Facebook. Cyberpsychology, Behavior,
and Social Networking, 13, 552–562. doi:10.1089/cyber.2009.0365
social enhancement and social compensation hypothesis; predicting
Facebook and offline popularity from sociability and self-esteem, and
mapping the meanings of popularity with semantic networks. Journal
j.1083-6101.2008.01429.x

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Carbondale.

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mentors for this study. Taylor Roche and Eleanor Prichard
were undergraduate psychology student researchers. Rebecca
Kietlinski was a graduate level psychology student researcher.
All authors are Psi Chi members. A previous version of this
study was presented at the annual Southwestern Psychological
Association’s convention in Oklahoma City, OK, in April 2012.

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The Relationship Between Participation in Alcoholics Anonymous and Social Anxiety

Jared C. Moser and Cynthia L. Turk*, Washburn University
Jenna G. Glover*, Utah State University

ABSTRACT. Alcohol use disorders and social anxiety disorders are commonly comorbid. Fear of negative evaluation may impair the ability of socially anxious individuals to participate in treatments such as Alcoholics Anonymous (AA), which is provided in a group format. The current study recruited AA participants (N = 376) anonymously through advertisements on Facebook®. Participants completed a demographic questionnaire, the Michigan Alcohol Screening Test, the Social Interaction Anxiety Scale, and the Mood and Anxiety Symptom Questionnaire-Short Form. Hierarchical regressions demonstrated that higher levels of social anxiety are associated with significantly (p = .04) less AA engagement and with a significantly (p = .04) shorter length of sobriety after controlling for anxiety and depression. Consistent with previous research, AA engagement was predictive of length of sobriety. Results indicated that participants who maintained long-term participation in AA (i.e., 20 years or more) demonstrated significantly (p = .007) less social anxiety relative to those who were in early in recovery (i.e., less than 5 years of participation in AA). Clinical implications are discussed including a need for alternative or supplemental treatments for individuals with alcohol use disorders who are affected by social anxiety.
and, consequently, with their ability to benefit from AA. Book and colleagues (2009), in one of the few studies looking at this issue, found that socially anxious individuals were five times less likely to attend AA meetings and eight times less likely to participate when in attendance.

Book and colleagues (2009) examined a sample predominantly comprised of women who were actively participating in an intensive outpatient treatment program. The current study sought to build upon these findings by examining a more diverse sample of individuals with AUD from the community. The current study further sought to control for anxiety and depression in order to focus more closely on how social anxiety affects individuals throughout the recovery timeline. It was hypothesized that social anxiety would have a negative impact on long-term participation in AA and long-term sobriety, even after controlling for general anxiety and depression. AA attendance is related to positive psychosocial outcomes including reduced social anxiety (Terra et al., 2008). Consequently, it was also hypothesized that participants who maintained long-term participation in AA would demonstrate lower social anxiety relative to those who were earlier in recovery.

**Method**

**Participants**
Participants were 509 individuals recruited through advertisements on Facebook®. Individuals who did not identify as a recovering alcoholic, failed to submit complete surveys, or did not pass data validation checks (n = 133) were eliminated from data analysis. The participants included in data analysis were 376 self-identified recovering alcoholics (185 men, 191 women). Participants reported ages ranging from 19 to 79 years (M = 46.47; SD = 9.52). Participants self-identified ethnicity/race as European American/White (88.6%), Hispanic/Latino (2.9%), Native American (2.1%), African American/Black (1.9%), and other/preferred not to self-identify (4.5%).

**Measures**
A demographic questionnaire included self-reports of basic information (e.g., age, sex, ethnicity). Participants were also asked several alcoholism-related questions (e.g., “How long have you currently been sober?” and “How long have you been attending AA meetings?”).

The Michigan Alcohol Screening Test (MAST; Selzer, 1971) is widely used to identify alcohol dependence in clinical and research settings. Participants answered Yes or No to 22 items relating to problematic alcohol use (e.g., “Can you stop drinking without difficulty after one or two drinks?”). A total score of 22 is possible. A score of 0 to 2 indicates no apparent alcohol problem; a score of 3 to 5 is indicative of early or middle problem-drinking behavior; and a score of 6 or more is indicative of problem-drinking behavior. Given that the target population was recovering alcoholics, participants were asked to consider their entire lifetime when responding. The MAST shows high internal consistency (α = .86–.96; Connor, Grier, Feeney, & Young, 2007). Daeppen et al. (1996) found the MAST to have high convergent validity with the Diagnostic Severity Index (ASI; McLellan, Luborsky, Woody, & O’Brien, 1980). The MAST has also been shown to have high convergent validity with the Diagnostic Interview Schedule (Rogers, 2001).

The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a widely used 20-item measure developed for assessing social interaction anxiety (e.g., “I have difficulty making eye contact with others”). Participants rate the degree to which each statement is characteristic or true of them on a 5-point Likert-type scale from 0 (not at all) to 4 (extremely). A total score of 60 is possible. A score of 34 or more is indicative of possible social anxiety disorder. The SIAS is one of the most widely used measures of social anxiety and has been shown to have good internal consistency (α = .88–.94) and high test-retest reliability (α = .92; Mattick & Clarke, 1998)

The Mood and Anxiety Symptom Questionnaire-Short Form (MASQ; Clark & Watson, 1991) is a 62-item measure assessing symptoms that commonly occur in mood and anxiety disorders. Participants rate symptoms on a 5-point Likert-type scale from 1 (not at all) to 5 (extremely). Rather than clinical cutoff scores, the MASQ consists of four subscales that assess mood and anxiety symptoms dimensionally. The General Distress: Anxious Arousal (ANA) subscale is comprised of items that assess physical arousal associated with anxiety (e.g., “Felt faint”). The General Distress: Depressive Symptoms (GDD) subscale assesses negative affect associated with depression (e.g., “Felt worthless”). And, the Anhedonic Depression (AD) subscale includes items that assess symptoms characteristic of depressive disorders but not anxiety (e.g., “Thought about suicide or death”). The MASQ subscales have
good internal consistency (α = .81–.93). Watson et al. (1995) found that the anxiety subscales show high convergent validity with other anxiety scales such as the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988) and the anxiety scale of the Profile of Mood States (POMS; McNaire, Lorr, & Dropplemann, 1971). Watson et al. (1995) also found that the depression subscales show high convergent validity with other depression scales such as the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the depression scale of POMS (McNaire et al., 1971).

Procedure
Institutional review board approval was obtained before collecting data. All participants gave informed consent and were treated according to American Psychological Association ethical guidelines (APA, 2002).

An advertisement requesting participation appeared on the computer screen of targeted individuals as they navigated Facebook. Targeted individuals were those who lived in English-speaking regions and had indicated an interest in recovery-related topics by “liking” Facebook pages such as The Big Book of Alcoholics Anonymous. The advertisement linked participants to the informed consent on SurveyMonkey™. Participants then completed a demographics questionnaire, the MAST, the SIAS, and MASQ. In lieu of debriefing, the conclusion of the survey displayed a link to the Substance Abuse and Mental Health Services Administration website location where individuals could find professional help for substance abuse and other mental health issues.

Results
All participants were categorized as problem drinkers on the MAST with a mean score of 15.31 (SD = 3.40). Table 1 shows the mean scores and standard deviations on each instrument along with the correlations between measures. The SIAS was significantly positively correlated with all measures of anxiety and depression, and significantly negatively correlated with length of AA participation and sobriety.

It was hypothesized that social anxiety would predict AA attendance after controlling for anxiety and depression. Hierarchical regression was used to examine the ability of the MASQ subscales and the SIAS to predict months of sobriety. To control for anxiety and depression, the MASQ subscales (GDA, ANA, GDD, AD) were entered in a block in the first step of the regression equation, R = .14, R² = .007, F(4, 340) = 1.57, p = .18. The SIAS was a significant predictor when entered into the second step of the regression equation, R = .18, R² = .03, F change (1, 339) = 4.37, p = .04. See Table 2 for a summary of the final regression equation.

It was hypothesized that social anxiety would predict length of sobriety after controlling for anxiety and depression. Hierarchical regression was used to examine the ability of the MASQ subscales and the SIAS to predict months of sobriety. To control for anxiety and depression, the MASQ subscales (GDA, ANA, GDD, AD) were entered in
a block in the first step of the regression equation, \( R = .17, R^2 = .03, F(4, 339) = 2.47, p = .045 \). The SIAS was a significant predictor when entered into the second step of the regression equation, \( R = .20, R^2 = .04, F_{\text{change}} (1, 338) = 4.18, p = .04 \). See Table 3 for a summary of the final regression equation.

To test the prediction that individuals who maintain long-term participation in AA demonstrate lower social anxiety relative to those who are earlier in recovery, participants were categorized into 5-year groups based on length of AA participation (i.e., participated less than 5 years, participated 5–9.9 years, participated 10–14.9 years, participated 15–19.9 years, participated more than 20 years). As shown in Figure 1, there was a continuous downward trend in SIAS scores, and an Analysis of Variance comparing these 5-year groups was significant, \( F (4, 371) = 3.59, p = .007, \eta^2 = .04 \). Post-hoc comparisons using the Tukey Honestly Significant Difference test indicated that the mean SIAS score for the participants with less than 5 years (\( M = 32.21, SD = 16.38 \)) was significantly higher than the participants with more than 20 years (\( M = 23.55, SD = 17.19 \)). No other significant differences were found.

**Discussion**

The hypothesis that greater social anxiety would be associated with less AA engagement and a shorter duration of sobriety after controlling for anxiety and depression was supported. These findings built upon those of Book et al. (2009). Furthermore, AA engagement and length of sobriety were highly positively correlated, consistent with other studies showing a relationship between AA involvement and a reduction in alcohol use (Tonigan, Toscova, & Miller, 1996). Evidence that social anxiety may pose a barrier to AA participation, which may then affect sobriety, suggests a possible need for alternative or supplemental treatments for those affected by social anxiety.

The mechanisms by which social anxiety affects AA involvement and sobriety need additional research. By its very nature of offering help through self-help group meetings, AA’s main benefits may come through the creation of new social networks to support sobriety (Groh et al., 2008), a task that is likely difficult for socially anxious individuals. The fear of social scrutiny that is characteristic of social anxiety may reduce the chances that these individuals will be able to gain the full benefit of participation in AA. It is also possible that social anxiety might be a mechanism by which relapse occurs such as self-medication in order to cope with routine daily tasks that involve social contact. Future research should focus on individuals early in recovery and high in social anxiety to more closely examine how social anxiety affects the trajectory of participation in treatment and sobriety.

It was hypothesized that individuals who maintain long-term participation in AA would demonstrate lower social anxiety relative to those who were early in recovery. As length of sobriety increased, social anxiety decreased. This effect could be due to the attrition of socially anxious individuals from AA participation. Alternatively, it is possible that sobriety itself has a positive impact on social anxiety as it does on general anxiety and depression (Shivani, Goldsmith, & Anthenelli, 2002). It is also possible that, if socially anxious individuals persist with attending AA, attendance serves as a form of exposure treatment, which helps to decrease their social anxiety over time.
A limitation of the current study was the cross-sectional design, which limited the conclusions that could be made regarding the direction of causality. Longitudinal studies examining socially anxious substance abusers are needed. Additionally, problems with alcohol and social anxiety were based exclusively on online self-report measures, which could not control for cognitive and situational factors affecting participants’ responses. Future studies should examine this population with longitudinal methods in order to better ascertain base level mood and anxiety, and also to assess if these personality traits improve with time and AA participation, or if individuals backslide on sobriety goals as is indicated by the current research.

This study had a number of unique strengths. The participants of this study comprised a more diverse sample from the community than has been seen in previous research. A novel method for recruiting a sample of AA members that protects anonymity and allows for recruiting a relatively large number of participants was used. Researchers interested in studying AA participants might find this approach useful.

In summary, social anxiety is predictive of less AA engagement and a significantly shorter length of sobriety after controlling for anxiety and depression, highlighting the unique influence of fear of negative evaluation on those in recovery. As AA is the most widely accessed program by AUD treatment seekers (Weisner, Greenfield, & Room, 1995), understanding the capability of individuals with an AUD and social anxiety to participate in and benefit from the program is vital for recommending the best course of treatment.

References


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Nyctophobia: From Imagined to Realistic Fears of the Dark
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ABSTRACT. Fear is a quick response, which allows for a reply to an imminent threat (Coelho & Purkis, 2009). The lack of any kind of visual stimuli increases anxiety, uncertainty, and tension (Grillon, Pellowski, Merikangas, & Davis, 1997) and thus can lead to fear of the dark. It may be that the unrealistic fear of the dark transforms to a more realistic fear in adults. Participants in the present study included 31 male and 91 female undergraduates attending a small private university. Participants rated different fears including the fear of the dark, completed an anxiety survey modified to examine fear of the dark, and rated their comfort in regard to images taken at locations both during the day and at night. Over 50% of all participants rated the dark within their top 5 fears. Significant differences were found between all 7 pairs of day/night photos, indicating that participants were more uncomfortable with the night photos. Effect sizes ranged from 0.65 to 1.63. There were also significant sex differences for all but one of the paired photos. Effect sizes ranged from 0.42 to 0.80. Future studies could create a fear of the dark inventory to use along with images or actual nighttime walkthroughs.

Fear is a quick response, which allows for a reply to an imminent threat (Coelho & Purkis, 2009). According to Begley (2007), “the primitive nature of fear means that it can be triggered [not only by words] but by images that make a beeline for the brain’s emotional regions” (p. 3). Thus, fear is a basic emotion that can be experienced in all developmental stages (Berk, 2011; Bhugra, 2006). Fears may include fears of thunder and lightning, the dark, and supernatural beings in early childhood (Berk, 2011) to fear of death in later stages of development (Florian & Mikulincer, 1997; Wink & Scott, 2005). Fears developed early in life could affect the lives of individuals as they age. There are very few studies that examine fear of the dark in adults. Thus, the current study sought to examine this type of fear in college students.

Learning Fear
Early studies of learning fears focused on the classical conditioning model of learning (Field, 2006). One of the most famous examples is that of Little Albert. Watson and Rayner (1920) discovered that a neutral-conditioned stimulus paired with an aversive unconditioned stimulus may over time lead to a conditioned fear response with just the presentation of the conditioned stimulus. Although there have been numerous examples supporting that fear can be learned through classical conditioning, many researchers believe that this is an insufficient explanation of the development of fear (Field, 2006). There are various reasons for this belief. One is that vast quantities of individuals do not have, or cannot remember, a conditioning experience before the development of their phobia (Field, 2006). This lack of memory of a conditioning experience is common among people with phobias, which shows that the memory is not necessary for the development of the phobia (Adler & Cook-Nobles, 2011). Another reason that conditioning may not be an appropriate explanation of learning fear is that not all people who experience a trauma or unconditioned stimuli develop a phobia (Field, 2006).

A more appropriate model of learning fear may be the nonassociative perspective, which says that fears reflect a more innate response based on...
evolutionary cues (Coelho & Purkis, 2009). Fear has been essential to human and other mammalian evolution (Ohman & Mineka, 2001). What makes fears so easy for humans to learn is their preparedness to learn. Evolution requires organisms to form fears and phobias in response to stimuli that are survival relevant (Ohman & Mineka, 2001). The evolutionary dominance in the brain overpowers the brain’s ability to reason because “fear tends to overrule reason” (Begley, 2007, p. 2). Because of this, it is easy to evoke reasons for fear that lie in our evolutionary past, making it easy to react to a threat that is really nonexistent (Begley, 2007). This may be why many people are afraid of the dark at one point in their lives. When this fear of the dark is strong, a specific phobia can develop.

Nyctophobia: Fear of the Dark
A specific phobia is an extreme irrational fear of a particular identified stimulus that results in anxiety symptoms, distress, and voluntary avoidance (Flatt & King, 2010). Specific phobias are the third most common of all mental disorders; 10 to 12% of individuals will experience at least one phobia throughout their lives (Adler & Cook-Nobles, 2011). Common phobias include fear of public speaking, meeting new people, heights, specific animals, tight spaces, injections and/or blood, and certain aspects of nature (Meltzer et al., 2008; Seim & Spates, 2010). These phobic anxieties can be severe enough to lead to significant social and work-related problems (Adler & Cook-Nobles, 2011). About 8 to 10% of young people suffer from symptoms that obstruct their daily lives and school performance (Flatt & King, 2010).

Many studies have demonstrated that humans are afraid of the dark (Berk, 2011; Grillon et al., 1997; King, Muris, & Ollendick, 2005; Meltzer et al., 2008; Nasar & Jones, 1997). The lack of any kind of visual stimuli increases anxiety, uncertainty, and tension in people (Grillon et al., 1997). Children are at greater risk for this fear (Grillon et al., 1997). Fear of the dark is common in children and is considered a normal response during development (King et al., 2005; Meltzer et al., 2008). Darkness facilitates a startle response in the brain that increases anxiety (Grillon et al., 1997). The brain is wired to “flinch first and ask questions later” (Begley, 2007, p. 2). Most of the time, this fear is short-lived, but in some cases the fear can be very problematic. It can persist throughout development and strengthen in magnitude (King et al., 2005).

It is also important to examine culture in order to fully grasp how darkness can affect an individual. The impact of folk tales and stories play an important role during the development of people (Bhugra, 2006). This idea of storytelling can lead to the formation of a collective unconsciousness that can help to explain how fears can be seen all over the world (Bhugra, 2006). Studies have shown how ethnic and cultural differences have had an effect on specific fears, and not all people express fears the same way (Meltzer et al., 2008). One study found that children from the Middle East and West Indies show a much higher rate of fear of the dark than most White American children (Meltzer et al., 2008). A reason for this may be that children in cultures that do not encourage individualism may form fears easier than children in environments that are very individualistic (Meltzer et al., 2008).

Darkness: A Realistic Fear
Children develop certain fears in response to specific points in their development due to environmental factors, which may not be rational or realistic. Older children, on the other hand, tend to have more realistic fears (Meltzer et al., 2008). In the adult population, the frequency of specific phobias is believed to be quite high (Seim & Spates, 2010). Roughly between 11 and 12% of men and women will endure some kind of phobic symptoms at some time in their lives (Seim & Spates, 2010). However, there is little evidence discussing the prevalence of specific fears in college-age individuals (Seim &Spates, 2010). Adler and Cook-Nobles (2011) found that roughly one third of college-aged individuals suffer from significant specific phobic symptoms.

Seim and Spates (2010) also found that a sample of college students had phobic symptoms of spiders (38%), public speaking (31%), snakes (22%), heights (18%), and injections (16%). It is very possible that these fears can affect the performance of students in their education and social lives (Seim & Spates, 2010). Seim and Spates (2010) found that 18.6% of their sample claimed that they had a fear that was not formally addressed in the survey, and 1.4% of them stated that they had a fear of the dark. However, the researchers did not officially examine these findings. Seim and Spates stated that “the true prevalence of these ‘atypical’ fears cannot be accessed via this study . . . thus, it is possible that the prevalence of some of these fears may be higher than the current figures suggest” (p. 52). It is very possible that specific phobias such as fear of the dark may be quite prevalent on college campuses.
Nyctophobia to victimization (Rader & Cossman, 2011). Women have also been shown to fear for others in regard to them being attacked (Jackson, 2009). Women feel that they are less able to defend themselves if they were to be attacked (Caiazza, 2005). The idea of what may happen at night evokes higher levels of fear in individuals (Nasar & Jones, 1997).

Roughly 40% of Americans claim that they would be afraid to walk within 1 mile of their homes at night (Berke, 1994). People believe that, even if they are afraid when no danger is present, their reactions may save them if there is ever a situation where a threat exists (Nasar & Jones, 1997). Nasar and Jones examined how aspects of concealment, hiding places, and dark spots had an effect on how people viewed fear of crime in the dark. In their study, participants included a small group of female college students who were asked to walk around a college campus while verbally recording their levels of fear. The researchers found that the participants felt a decreased sense of safety when there were numerous places for other people to hide in the dark such as shrubs or parked cars. In this type of climate, an approaching stranger can produce a certain level of fear in another person. However, it is not necessary for that person to see the stranger. The knowledge that the stranger may be there is enough to induce fear (Nasar & Jones, 1997).

Women are more likely than men to see themselves as having a higher probability of being victimized (Caiazza, 2005; Fetchenhauer & Buunk, 2005). This is especially true for younger women (Jackson, 2009; Nasar & Jones, 1997). Women fear crime more though, in reality, they are less often the victims of a violent crime (Fetchenhauer & Buunk, 2005). However, sexual victimization is still reported in high levels. For example, 50% of women attending college reported some kind of sexual aggression, and 25% of that population reported an attempted or completed rape (Fisher, Cullen, & Turner, 2000; Koss, Gidycz, & Wisniewski, 1987). It is possible that, because of this, women feel that they are less able to defend themselves if they were to be attacked (Jackson, 2009). Women have also been shown to fear for others in regard to victimization (Rader & Cossman, 2011).

Current Study
A significant amount of fear of darkness may exist in college students. This fear may be a classical fear seen in conditioned children that has not been outgrown or it could have evolved into more of a realistic fear of the dark that plays to people’s fear of being victimized in the dark. For the current study we predicted that a significant fear of darkness would be found at a college campus. We also predicted that, following the information given by Nasar and Jones (1997), fear levels would be heightened when individuals were presented with scenarios where someone could be concealing themselves by using the dark. Specifically, we predicted that nighttime photos would be rated as less comfortable than daytime photos. A within subjects design was used because all participants rated both the day and nighttime photos.

Method
Participants
Participants consisted of 122 undergraduate students recruited from various academic departments at a small private university in the Southeast. The sample included 31 male and 91 female participants. Nine participants did not complete the fear-rating measure correctly, so their responses were excluded from analyses using that measure. The ages of students ranged from 18 to 35, with an average age of 20 ($SD = 2.45$). Most of the sample was European American (59%), 14% were Latino/Latina, 8% were African American, 5% were Caribbean, 5% were Asian American, and 5% reported other. Additionally, 25% of the sample were seniors, 30% were juniors, 33% were sophomores, and 10% were first-year students.

Following institutional review board approval, participants were gathered via convenience sampling. Most were asked to either fill out a packet during class time or were provided web addresses to complete it online. Other participants were collected via word of mouth throughout the university campus. All participants were asked to volunteer by completing a paper survey packet or the survey online after agreeing to participate in the study. It is possible that students received extra credit in classes for participation in this study.

Materials
Each participant received either a paper questionnaire packet or a link to an online survey. Each survey contained a written consent form, a demographics questionnaire, a phobia-rating
questionnaire (see Appendix A), the Zung Self-Rating Anxiety Scale (Zung, 1971) modified for darkness (SAS-Darkness or SAS-D), and a fear-of-the dark picture-rating scale (see Appendix B). The demographics questionnaire, the phobia-rating questionnaire, and the fear-of-the-dark picture-rating scale were created by the authors of the present study.

The phobia-rating questionnaire gives a list of 10 common phobias based on research lists used by Meltzer et al. (2008) and Seim and Spates (2010). Participants were asked to rank the phobias on a 1 (most fearful) to 10 (least fearful) scale. Participants used each and every number only once. This measure is located in Appendix A.

The SAS consists of 20 items that are scored on a 4-point scale including some or little of the time, some of the time, good part of the time, most or all of the time (Zung, 1971). In the present study, participants answered the 20 items in regard to their feelings about the dark. The 4-point Likert-type scale answers were kept exactly the same as the original instrument to retain the highest level of validity as possible. Scores ranged from 20 to 80 with scores over 50 suggesting the presence of a meaningful fear of the dark (Zung, 1971). Higher scores represent higher levels of anxiety. Alpha ratings for the original instrument were .80. In the current study, the measure demonstrated high reliability (α = .86). This survey is in the public domain and is free to use for research purposes.

For the final part of this study, participants were asked to complete a fear-of-the-dark picture-rating survey. The images in this survey were created by the current authors and were taken to best resemble sample images published in Nasar and Jones’s (1997) study. Similar to the campus walkthrough used in Nasar and Jones’s (1997) study, the pictures in this survey used aspects of the environment such as areas of concealment as well as areas of openness to elicit participants’ reactions. The survey consisted of 14 pictures: seven daytime photos and seven nighttime photos. A sample of these photos is located in Appendix B. The pictures were paired so that accurate comparisons could be made. Each photo pair was taken at the same place but at different times of the day (one during the daytime and one at nighttime). Participants were asked to rate, on a Likert-type scale, how comfortable they would feel if they were at the location in each picture. Scores ranged from 1 (very comfortable) to 7 (very uncomfortable). Participants were also asked to briefly explain why they rated each photo the way they did. This question was open-ended to facilitate any possible responses that participants had. The series of 14 photographs were shown to each participant in a random order to best eliminate any external confounds.

**Procedure**

Due to the nature of the present study, participants were told that the purpose of the study was to collect data on specific fears. Participants were also told that they could quit at any time if they did not feel comfortable continuing.

At the beginning of each survey, participants read a written consent form or virtual assent form. For the paper surveys, consent forms were separated from the questionnaire packets and collected independently from the surveys to ensure participants’ confidentiality. For the online participants, no physical written consent was collected. Instead participants read an exact copy of the consent form that was in the written packets online and were asked to voluntarily give their assent to participate in the study. Participants answered each item in the survey to the best of their abilities and to not leave any items blank. All instructions were also available at the top of each questionnaire.

After each paper questionnaire packet was collected, participants were given a short debriefing on the study by the authors. They were told exactly what the study was about and were given the opportunity to ask any questions or express concerns. Participants who completed the study online were given the same debriefing information.

**Results**

Out of the 122 participants, only 10 people rated the dark as their primary fear. However, 54% of all participants rated the dark within their top five fears. Fear of specific animals was rated first by the most participants (n = 20). Figure 1 shows how often each fear was given a rating as most frightful.

The SAS-D had a large range of responses from 20, which is the lowest possible score, to 65. The average score was a 34.93 (SD = 8.76), which indicated a low level of anxiety. However, 5% of participants scored over 50, which indicated a high level of anxiety.

In addition to examining anxiety levels, paired-samples t tests were also calculated to compare participants’ fear of the dark within the day and nighttime photos. The purpose of this measure was to examine if participants were less comfortable with the nighttime photos. For all seven paired
photographs, a significant difference was found. Results of these t tests and effect sizes are found in Table 1. Participants rated themselves more uncomfortable if they were at the nighttime locations. The photograph of the nighttime alleyway had the highest average score of all the nighttime photos (M = 5.37, SD = 1.55). This was a significant difference from the photograph of the nighttime gazebo, which had the lowest average score (M = 2.48, SD = 1.47). The nighttime walkway, field, and path had averages 4.75, 4.71 and 4.72, respectively (SDs were 1.68, 2.11, and 1.81, respectively). The nighttime parking lot had an average score of 4.05 (SD = 1.76). The nighttime street had an average score of 3.72 (SD = 1.74).

Independent-samples t tests were calculated to examine possible sex differences in ratings of the seven nighttime photographs as well as scores on the SAS-D. Results of the t tests and effect sizes are located in Table 2. Men scored significantly lower on all but one of the photographs (showing lower amounts of fear) and also scored lower on the SAS-D. Pearson’s correlations were calculated to examine relationships between comfort associated with each of the seven nighttime photographs and the total on the SAS-D. Correlational analyses are located in Table 3. Significant positive relationships were found between all seven photographs and the SAS-D total, indicating that the higher a participant scored on the SAS-D the more likely they were to rate a photograph as being more uncomfortable.

This also means that, if a participant was to rate one photograph as being more uncomfortable, he or she was more likely to rate the other photographs as more uncomfortable. Correlations were also run using Spearman’s Rho coefficient to compare the rating of participants’ fear of the dark with the seven nighttime photos and the SAS-D total. Significant negative relationships were found between how participants ranked the fear of the dark and total SAS-D scores, as well as three of the seven photographs: the nighttime parking lot, pathway, and gazebo. This indicated that the closer to 1 a participant ranked fear of the dark, the more likely he or she was to score higher on the SAS-D or rate the four photographs as being more uncomfortable.

Finally, responses were recorded from the open-ended questions asked in the picture-rating survey. On all seven of the nighttime images, participants expressed some concern of being victimized. For the nighttime alleyway image, which was rated the most uncomfortable, 100% of participants who answered the open-ended question mentioned some concern about being victimized at the location or who/what might be hiding at the location. This was a big difference from the nighttime gazebo image that was rated as being the most comfortable. Less than 10% of participants who answered the open-ended question linked to this image had any concerns with victimization. The majority of answers actually dealt with being comfortable at this particular location. Although the other images varied in answers, 50% or more of the participants expressed concerns with being victimized in the dark.

**Discussion**

It was expected that more individuals would rate fear of the dark higher than what was actually recorded for the present study. Although participants in general might not have ranked fear of the dark as one of their top fears or scored low on the SAS-D, their scores on the photographs told researchers that there was a level of fear present. Participants rated all seven of the nighttime photos as more fear inducing than the paired daytime photos. Because the day and nighttime photos were paired, it was possible to eliminate location as the cause of this difference. However, there were differences in photograph scores due to the location of the photograph. As stated earlier, there were big differences between the nighttime alleyway photo and the nighttime gazebo photo. The nighttime
alleyway photo had an average rating of 5.37, which put it on the uncomfortable side of the 7-point Likert-type scale. This was also the image that was given the highest rating of 7 by participants. In contrast, the nighttime gazebo image was only given an average rating of 2.48, which actually falls on the comfortable side of the 7-point Likert-type scale. It was also not uncommon to see participants give this image a rating of 1.

Further examination of what participants stated in their written responses to each photograph may help to understand such a big difference, even between the nighttime images. A very common written response, regardless of which nighttime image was viewed, was simply that the dark itself was a key factor in making the location uncomfortable. Lack of people and limited light sources were also common factors among all images.

In regard to the photograph of the nighttime alleyway, common responses that participants gave to indicate why they felt uncomfortable had a lot to do with being victimized. Responses such as the possibility of being attacked or the location being dangerous were frequent. Some even reported the fear of gang activity at the location. One participant indicated that he or she thought it might be a place for a murderer to “dump a body.”

On the other hand, responses toward the nighttime gazebo image were very different. The average person felt comfortable at this location and indicated so in the written responses. Common responses indicated that the location was well lit, beautiful, romantic, and peaceful. This shows some indication that, though the dark has an effect on how frightened people feel in a certain location, their level of fear has a lot to do with the location itself.

It is also imperative to consider the significant participant sex differences found between the nighttime images. Women reported feeling less comfortable than men with all of the nighttime photos except the gazebo. The participant sex differences could be related to the possible victimization that can occur at night or in certain locations. For example, Turchick, Probst, Irvin, Chau, and Gidycz (2010) reported that cases of female victimization were more likely to involve scenarios that took place in an outdoor environment. Future research on fear of the dark in adults should assess victimization as a cause of fear perhaps through the use of interviews or open-ended questions.

There were a few limitations regarding measurement and generalizability in the current study. First, although directions were read to individuals

| TABLE 1 |
| Results of Dependent t Test Examining Differences Between Daytime and Nighttime Photographs |
| Measure | M | Difference in M | SD | df | t | p | Cohen’s d |
| Daytime alleyway | 3.83 | -1.54 | 1.33 | 121 | -12.79 | .000 | 1.16 |
| Nighttime alleyway | 5.37 | | | | | | |
| Daytime walkway | 1.70 | -3.05 | 2.46 | 121 | -13.71 | .000 | 0.74 |
| Nighttime walkway | 4.75 | | | | | | |
| Daytime field | 1.98 | -2.73 | 2.27 | 121 | -13.32 | .000 | 1.20 |
| Nighttime field | 4.71 | | | | | | |
| Daytime parking lot | 1.70 | -2.34 | 1.78 | 121 | -14.54 | .000 | 0.65 |
| Nighttime parking lot | 4.05 | | | | | | |
| Daytime path | 2.36 | -2.36 | 1.85 | 121 | -14.06 | .000 | 1.63 |
| Nighttime path | 4.72 | | | | | | |
| Daytime gazebo | 1.43 | -1.04 | 1.63 | 121 | -7.13 | .000 | 0.64 |
| Nighttime gazebo | 2.48 | | | | | | |
| Daytime street | 1.68 | -2.04 | 1.72 | 121 | -13.16 | .000 | 1.19 |
| Nighttime street | 3.72 | | | | | | |

Note: Day and nighttime photographs are compared. Statistics and significance values for paired-samples t tests are given.

| TABLE 2 |
| Gender Differences in Ratings of Daytime and Nighttime Photographs |
| Measure | Men | Women |
| Measure | M | SD | M | SD |
| Daytime alleyway | 4.61 | 1.82 | 5.63 | 1.37 |
| Nighttime alleyway | 3.81 | 1.70 | 5.08 | 1.56 |
| Nighttime field | 3.97 | 2.26 | 4.97 | 2.01 |
| Nighttime parking lot | 2.94 | 1.77 | 4.43 | 1.59 |
| Nighttime path | 3.68 | 1.90 | 5.08 | 1.63 |
| Nighttime gazebo | 2.13 | 1.31 | 2.59 | 1.51 |
| Nighttime street | 2.87 | 1.63 | 4.01 | 1.68 |
| SAS Total | 31.16 | 7.66 | 36.23 | 8.78 |

Note: Nighttime photographs and SAS totals are compared between men and women. Statistics and significance values are given. t test is significant at p < .05.
(in cases of paper surveys) and printed on every survey (paper and online), nine participants did not fill out the fear-rating questionnaire correctly, and their results could not be used in the analyses that included this measure. It might also be that this lack of following directions led to very low scores on the SAS-D. If a participant did not follow the directions and used the priming information to answer the questions relating to their feelings about the dark, participants might have just been scoring their levels of general anxiety. For this reason, we do not suggest utilization of this instrument as a research tool for examining specific fear. An actual fear of the dark inventory should be developed and used in future studies in this area. Future studies may also want to look at what results could be found if an actual day and nighttime walkthrough was conducted that closely resembled the study by Nasar and Jones (1997).

It is important to note that convenience sampling was used for the present study, so the generalizability of the findings is limited. The study findings may be generalizable to a college sample, but future research should include a community sample to increase the generalizability. It also came to our attention that location might have been another limitation. Although no image was taken on the university campus, some participants local to the area knew where the images were taken and seemed to be more comfortable with the location. It may be advantageous to use images from locations away from the university campus to eliminate any familiarity with them.

In conclusion, fear of the dark in adults is an important topic that deserves further examination. Unfortunately, much of the previous research has focused on children, and there are limited research studies and measurement options for examining fear of the dark in adulthood. This may be an interesting avenue of research to delve into because not only could it bring a light to a group of people who are not being helped with their specific phobia, but it could also lead to new ideas of how to plan and develop populated environments. If this fear of the dark in an adult population really is dependent on aspects of concealment and victimization while in the dark, researchers may be able to come up with new ideas of how to eliminate such fears by eliminating the very elements of which individuals are afraid. If this fear can become more understood, it may be possible to eliminate adults’ monsters that may be hiding in the dark.

References


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<th>Table 3</th>
<th>Correlations for Fear of Darkness Ranking, Nighttime Photos, and Darkness Anxiety Scores</th>
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<td><strong>Fear of Darkness Ranking</strong></td>
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Note: r and significance values are given. The seven photos listed are the nighttime images.

Row 1 (Fear of Dark Ranking) was correlated using Spearman’s Rho to account for Ranked data; Rows 2–9 used Pearson’s r. “Correlation is significant at p < .05 (2-tailed).” “Correlation is significant at p < .01 (2-tailed).” “Correlation is significant at p < .000 (2-tailed).”

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APPENDIX A
List of Fears and Phobias

Below is a list of 10 common fears and phobias. Rank them from 1 to 10, with 1 being the most frightful to you and 10 being the least. Please use each and every number (1–10) only once. Do not leave any fears out. If you are not afraid of any item on the list, please rank them in the order that you think you would be most fearful.

- Public Speaking
- Specific Animals (spiders, snakes, insects, etc.)
- Heights
- The Dark
- Tight Enclosed Spaces
- Injections
- Blood
- Crowds of People
- Meeting New People
- Certain Aspects of Nature (storms, thunder, water, etc.)

APPENDIX B
Fear of the Dark Rating Scale

DIRECTIONS: Below is a series of 14 photographs. After looking at each photograph, please answer each question pertaining to any picture. Each picture will have two questions linked to it. The first question associated with each picture asks to rate how comfortable or uncomfortable you would be if you were at the location in the image. Scores will be rated from 1 (the most comfortable) to 7 (the most uncomfortable) with 4 being neither comfortable nor uncomfortable. The second questions associated with each picture asks you to briefly explain what about being in the place the picture was taken made you rate it the way you did. Please do not leave any items blank. All your responses are anonymous and will be kept strictly confidential.

Day and Nighttime Alleyway

Question 1
How comfortable or uncomfortable would you be if you were at this location?
Comforatable 1 2 3 4 5 6 7 Uncomfortable

Question 2
Please explain briefly as to what about the image makes you either comfortable or uncomfortable.

Day and Nighttime Gazebo

Question 1
How comfortable or uncomfortable would you be if you were at this location?
Comforatable 1 2 3 4 5 6 7 Uncomfortable

Question 2
Please explain briefly as to what about the image makes you either comfortable or uncomfortable.
Journal Submissions

The Psi Chi Journal of Psychological Research encourages all Psi Chi members—undergraduate students, graduate students, and faculty—to submit manuscripts for publication. Submissions are accepted for review throughout the year. Although manuscripts are limited to empirical research, they may cover any topical area in the psychological sciences.

Submission basics:

- Please send ALL submissions and inquiries through our portal. Manuscripts are peer reviewed, which takes approximately 10–12 weeks.
- Authors’ work is judged in comparison to others at their developmental level.
- Once the work is peer reviewed, the primary author will receive e-mail notification (approximately three months after initial submission) for
  - acceptance,
  - acceptance with minor revisions,
  - the encouragement for major revisions and resubmission, or
  - rejection.

- Accepted manuscripts are generally published within a year after initial submission according to submission dates, revision turnaround time, and at the discretion of the Editor.
- If you have any questions about the submission process, please e-mail the Managing Editor at psichijournal@psichi.org.

What to Submit:

1. A cover letter that includes
   - identifying information for the primary author, including an e-mail address;
   - the primary author’s Psi Chi membership ID number;
   - a description of the primary author’s educational status (e.g., an estimated or actual date of graduation, or description of faculty appointment);
   - a statement that the manuscript is original (not published or accepted for publication elsewhere); and
   - a statement that the research was carried out with approval of an institutional review board and following proper procedures for the protection of human participants or animal subjects.

2. For research papers with an undergraduate listed as the first author, submit a sponsoring statement that specifies
   - the research adhered to APA ethical standards;
   - the mentor has read and critiqued the manuscript on

3. A cover page in APA style (with manuscript title, authors’ names, institutional affiliations, and possibly an author note).

4. A masked manuscript following these guidelines:
   - All authors’ identifying information (e.g., name and school) is removed from all sections of the entire manuscript.
   - The manuscript is in Microsoft Word®.
   - The manuscript includes figures, tables, and charts generated in either Microsoft Word or Excel®.
   - Scanned images or illustrations (black and white only, no color) must have a resolution of at least 600 dpi resolution.
   - The manuscript must adhere to APA style.
Journal Submissions

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Author Checklist:

Prior to submission, check:

1. Is the primary author a Psi Chi member?
   - The first author of a submitted manuscript must be a member of Psi Chi at the time of submission.
   - Additional authors may include non-Psi Chi members.

2. Is the manuscript empirical?
   - Empirical articles include original data collection, secondary data analysis, or meta-analysis.

3. Is the contribution original?
   - Only original manuscripts (not published or accepted for publication elsewhere) will be accepted.

4. Is this paper ready to be judged by reviewers?
   - Reviewers will be prompted to evaluate your paper based on the level of work expected of undergraduate students, graduate students, or faculty.
   - Authors who completed their research as an undergraduate student may submit it after graduation; however, if those students are enrolled in a graduate program, the work will be compared to that of graduate students rather than other undergraduates.

5. Is the research timely?
   - The Editor reserves the right not to review projects completed more than one year before submission.

6. For faculty authors, is a student coauthor included?
   - Faculty must have at least one student coauthor. All authors who submit work they completed as an undergraduate must have a faculty mentor who has reviewed the manuscript and affirmed the work was primarily that of the student(s).

7. Is the manuscript fewer than 35 pages including all references, tables, figures, and appendices?

8. Has the manuscript been written according to APA Style?
   - All manuscripts must be prepared according to the Publication Manual of the American Psychological Association (6th ed.).
   - Refer to the “Checklist for Manuscript Submission” found on APA’s website to check the accuracy of your paper for APA style prior to submission.

9. Does the manuscript reference other *Psi Chi Journal* articles? (We highly encourage this!)
Four items are required for all submissions:

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

2) Sponsor Statement
Undergraduate first authors only

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

4) Masked Manuscript
MS Word with all personal information removed

Simply register an account, then click Submit Manuscript:

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

2) Enter Manuscript Information
E.g., title, abstract, authors, keywords, etc.

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

4) Submit Manuscript
Receive email confirmation

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

* Psi Chi member ID number required

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