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#### EDITOR

MELANIE M. DOMENECH RODRÍGUEZ, PhD  
Utah State University  
Telephone: +1-435-797-3059  
Fax: +1-435-797-1448  
E-mail: melanie.domenech@psichi.org

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Psi Chi Central Office  
Publication and Subscriptions  
P.O. Box 709  
Chattanooga, TN 37401-0709  
(423) 756-2044  
www.psichi.org  
psichijournal@psichi.org

#### ABOUT PSI CHI

Psi Chi is the International Honor Society in Psychology, founded in 1929 for the purposes of encouraging, stimulating, and maintaining excellence in scholarship, and advancing the science of psychology. Membership is open to graduate and undergraduate men and women who are making the study of psychology one of their major interests and who meet the minimum qualifications. Psi Chi is a member of the Association of College Honor Societies (ACHS) and is an affiliate of the American Psychological Association (APA) and the Association for Psychological Science (APS). Psi Chi's sister honor society is Psi Beta, the national honor society in psychology for community and junior colleges.

Psi Chi functions as a federation of chapters located at over 1,100 senior colleges and universities in the U.S., Canada, and Ireland. The Psi Chi Central Office is located in Chattanooga, Tennessee. A Board of Directors, composed of psychology faculty who are Psi Chi members and who are elected by the chapters, guides the affairs of the organization and sets policy with the approval of the chapters.

Psi Chi serves two major goals—one immediate and visibly rewarding to the individual member, the other slower and more difficult to accomplish, but offering greater rewards in the long run. The first of these is the Society's obligation to provide academic recognition to its inductees by the mere fact of membership. The second goal is the obligation of each of the Society's local chapters to nurture the spark of that accomplishment by offering a climate congenial to its creative development. For example, the chapters make active attempts to nourish and stimulate professional growth through programs designed to augment and enhance the regular curriculum and to provide practical experience and fellowship through affiliation with the chapter. In addition, the organization provides programs to help achieve these goals including regional and Society conventions, research award and grant competitions, certificate recognition programs, chapter awards, and Society service projects.

#### JOURNAL PURPOSE STATEMENT

The twofold purpose of the *Psi Chi Journal of Psychological Research* is to foster and reward the scholarly efforts of psychology students as well as to provide them with a valuable learning experience. The articles published in this journal represent the work of undergraduates, graduate students, and faculty. Faculty mentors are identified by an asterisk next to their name or on a separate byline.

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Submissions are accepted for review on an ongoing basis. Although manuscripts are limited to empirical research, they may cover any topical area in the psychological sciences.

1. A cover letter that includes the following:

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- 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. Sponsoring statement (undergraduate first authors only)

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- 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 is removed from the entire manuscript including author note, title page, and method section.
- The manuscript is in Microsoft Word.
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\*Faculty mentor

## Great Indexing News for *Psi Chi Journal*

Melanie M. Domenech Rodríguez  
Editor, *Psi Chi Journal of Psychological Research*

The success of scientific journals is measured by many markers, among them, whether or not they are indexed in well-known databases. Our *Journal* was already indexed in EBSCO Academic Search Complete, which has over 13,690 journals and content dating to 1887 (EBSCO, 2014). Now, I am excited to say that *Psi Chi Journal of Psychological Research* is also listed in PsycINFO, which has nearly 2,500 journals and coverage dating back to 1597 (APA, 2014). The process of being considered for indexing in PsycINFO included a careful review of a year's worth of issues for high-quality content considered of interest to psychologists. Entry into this database is a testament to the excellent work of authors, their mentors, our peer reviewers, associate editors, and editorial staff.

Indexing in PsycINFO is great news for our authors and our Honor Society. For authors, PsycINFO indexing means many more opportunities to have their work reviewed and cited by researchers. The utility to science is clear: higher visibility allows other scientists to move forward based on existing findings by reducing the probability of needless duplication. There is also utility to scientists. More citations, for instance, translate into higher impact indexes for authors. The *h index* is an impact statistic that pertains to authors and is calculated as the number of papers that have been cited at least as many times (e.g., a researcher who has 10 papers that have been cited at least 10 times each would have an *h index* of 10). This index is increasingly used in promotion and tenure decisions as a marker of productivity. Finally, Psi Chi as a society benefits from increased exposure as a leader in advancing the science of psychology.

We at the *Journal* hope to continue sharing

good news of this kind as we move forward with exploring further venues for indexing, especially ones that target international researchers. In addition to improving dissemination of the *Journal*, we will continue to work to provide authors with a high-quality experience with the publication process. Small but noticeable shifts are taking place throughout the year. For example, our usual practice was to conduct a thorough review for APA style once a manuscript had been accepted for publication. However, now all authors will receive a thorough APA style and editorial check from our editorial assistant. This is an important member benefit as even those authors whose work is not published will have an opportunity to receive their usual content feedback from peer reviewers, as well as feedback regarding APA style. The feedback is provided in a supportive and educative manner intended to facilitate learning.

It is my hope that *Journal* readers are enjoying the *Journal's* high-quality articles and our supportive and productive publication process. I would like to thank authors and mentors for their dedication to submitting high quality work. My gratitude, as always, to an excellent *Journal* team that includes a talented editorial assistant (Bradley Cannon), our masterful managing editor (Staci Taylor), and three outstanding associate editors (Debi Brannan, Carlos Escoto, and Shelia Kennison). All of us at the *Journal* will continue to make strides toward continual quality improvement. We look forward to reviewing more of your excellent work.

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# Student Perceptions of Study Time

Kirstie L. Bash and David S. Kreiner\*  
University of Central Missouri

**ABSTRACT.** The ability to assess time accurately is limited. One example is the planning fallacy, defined as the time underestimation to complete larger tasks and the time overestimation for smaller tasks (Kahneman & Tversky, 1979). Accurate time allocations facilitate better time-management skills, which are critical to college students' success. The purpose of this research was to compare perceived study time and actual study time. Sixty-five students participated in a 2-part study consisting of 3 surveys (Internal Control Index, Student Studying Survey, and Demographics Survey) and 1 study log used to report daily study times for 1 week. Data were analyzed using a paired samples *t* test, denoting that students underestimated study time ( $M = -154.25$ ),  $t(64) = -2.73$ ,  $p = .008$ ,  $r = .10$ , and a Pearson *r*, which indicated no correlation between study time and perception of control,  $r(61) = .224$ ,  $p = .083$ . The underestimation of study time suggests that students perceive studying as a larger task, further indicating that students are placing importance on studying.

The ability to assess and evaluate time accurately is limited (e.g., Forsyth & Burt, 2008; Trautwein, Ludtke, Kastens, & Koller, 2006). Accurate time allocations facilitate better time-management skills, which are critical to college students' success. Students who are better at estimating completion time for tasks will be more capable of managing their time successfully. Burt and Kemp (1994) noted that there are two required parts of good time management skills: planning a schedule and keeping a schedule. Despite best efforts to plan and keep time accordingly, time inaccuracies are still present in daily life, as indicated by phenomena such as the planning fallacy (Kahneman & Tversky, 1979).

Kahneman and Tversky (1979) defined the planning fallacy as the time underestimation to complete larger tasks and the time overestimation for smaller tasks, while the individual remains confident during the planning stage. This underestimation indicated by the planning fallacy often results in the inability to complete other tasks. By

underestimating completion time, the individual has reduced his or her allotted time for all other tasks, which can decrease productivity. Conversely, by overestimating completion time, the individual may have time left to devote to other tasks, which can increase productivity. The purpose of this research was to examine the difference between perceived total study time and actual total study time, as well as the relationship between the total study time and the feeling of control.

The first part of the current research focused on the difference between perceived study time and actual study time due to the inability to make accurate time estimations. Buehler, Griffin, and Ross (1994) conducted two experiments that focused on predicting time completion. The first experiment consisted of asking undergraduate students to estimate when their thesis would be completed and submitted. The students submitted their thesis after a mean of 55.5 days, but estimated it would only take a mean of 33.9 days, which indicated an underestimation. Students in the second experiment

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were asked to predict when they would complete two tasks (one academic and one nonacademic) within the next week. Students predicted that the academic task would take approximately 5.8 days; in actuality, the students reported that the task took, on average, 10.7 days to be completed. For the nonacademic task, students predicted that the task would take approximately 5 days, but actually the task took on average 9.2 days. The researchers indicated that participants were overly optimistic in their predictions, despite participants reporting high levels of confidence about the estimations. The results of both experiments suggested an overly optimistic perspective in terms of task completion, as described by the planning fallacy. Both experiments also indicated the tendency to underestimate completion time, which could imply that the individual tasks were perceived as “smaller” or less important, according to the planning fallacy. The underestimation of completion time creates more time for task completion than anticipated, which could severely impact the allocation of time set aside for other important tasks.

Forsyth and Burt (2008) asked participants to indicate how long it would take to complete six everyday tasks. The researchers chose tasks that were considered “everyday” to preserve a sense of familiarity within the task. Forsyth and Burt (2008) reasoned that the more familiar an individual would be with a task, the more accurate the estimation would be for completion time. The researchers reported that participants actually overestimated the amount of time required to complete the tasks. The two studies (Buehler et al., 1994; Forsyth & Burt, 2008) reported different results in terms of overestimations and underestimations. A potential reason for the inconsistency between the two studies is that the Forsyth and Burt (2008) study did not restrict participants to a specific time scale (i.e., minutes or hours), and Buehler et al. (1994) asked participants to estimate in terms of minutes.

The difference between perceived and actual study time is important to examine due to the prevalence of insufficient time-management skills (Eison & Holtschlag, 1989). Although previous research has requested that participants complete more active tasks, the present study required students to report stationary and relatively inactive tasks in regard to studying. As suggested by previous researchers (e.g., Allan, 1979; Hornik, 1984), an individual’s enjoyment and the nature of an activity (i.e., active or passive) can influence the individual’s judgment on the perceived duration

of an activity. Furthermore, Allan (1979) also indicated that there may be a connection between perceived time duration and the frequency in which an individual is engaged in the activity. Because studying is considered a nonactive task, students may perceive time as beginning to “move more slowly.” Disinterest, or a combination of nonactivity and disinterest, may also cause students to perceive that time has slowed down.

Therefore, the first hypothesis was that students would have a tendency to overestimate the amount of study time due to the inactivity (and possible disinterest) associated with studying. Ultimately, students who can make more accurate completion-time estimations for homework, studying, and other academic tasks will be better able to manage their time and potentially increase productivity. Although the current study did not focus on student productivity per se, it did establish that time-management skills and accurate completion time estimates could increase the time students have to complete other tasks, which are linked to productivity.

The second part of the current research focused on the relationship between the feeling of control and study time. Stress-related research conducted by Macan, Shani, Dipboye, and Phillips (1990) reported that lower stress levels were related to a feeling of control in a situation. Furthermore, the research showed that students who practice time-management skills perceive themselves as better performers, which may reduce levels of stress as well. Poor-performing students may become less capable of managing their time efficiently due to higher stress levels (Macan et al., 1990; Misra & McKean, 2000). Students who study and become familiar with the materials presented in class may exhibit less stress, which may ultimately lead to the feeling of being in control. Case and Gunstone (2003) conducted 11 interviews to report students’ attitudes about time. Students claimed that situations causing strict time demands were considered to be unrealistic, regardless of time investments and efforts (Case & Gunstone, 2003). The researchers also observed a language distinction between students who felt in control (time management) and those who felt out of control (time-consuming tasks). Although some students classified time as either “wasted” or “wisely spent,” the majority agreed that time management was a critical factor in achieving success. Accurately estimating time for specific tasks may facilitate better time management skills for university students. The



perception of control is important for individuals to feel confident and maintain less stress, especially when the individuals practice time-management strategies (Macan et al., 1990). For the current study, the perception of control may also have been important for students to maintain confidence and less stress relating to their academics. For these reasons, the second hypothesis maintained that the feeling of control would be positively correlated with the amount of study time.

## Method

### Participants

Sixty-five students from the University of Central Missouri, a moderately-sized Midwest university, were recruited for this research study. A minimum sample size of 60 was established because it would allow a correlation coefficient of medium size (.30) to be significant at the .05 level. Participants were 18 years of age or older ( $M = 20.62$ ,  $SD = 5.79$ ) and currently enrolled in classes. Because all participants met these two criteria, all participants were allowed to participate in the study. The sample consisted of 46 women (70.8%) and 16 men (29.2%). Forty-two students were classified as first-year students, 13 students were sophomores, 6 students were juniors, and 4 students were seniors. Participants were recruited using the SONA system, the psychological science department's online participant management system, which allowed students to view and sign up for available research studies. Participants were compensated for their time by being awarded with research credits that could be applied as credit in their psychology courses. Given the nature of how participants were recruited, participants were considered part of a convenience sample.

### Materials

The materials for this study consisted of the Internal Control Index (ICI), a Student Studying Survey, a short demographics survey, and a weekly study log. The Internal Control Index (Duttweiler, 1984), which was provided with the consent of Patricia Duttweiler, consisted of 28 statements. The index contained statements such as, "When faced with a problem, I \_\_\_\_\_ try to forget it" and "If I want something, I \_\_\_\_\_ work hard to get it." Students ranked how well each statement represented them on a scale of rarely (less than 10% of the time) to usually (about 90% of the time); for example, "When faced with a problem, I *rarely* try to forget it" (Duttweiler, 1984). The Student Studying Survey,

developed specifically for the use in this research study, consisted of four questions:

- 1) On average, how many hours a week do you study? (open-ended response)
- 2) Do you tend to study more during the day or at night? (answer choice: day or night)
- 3) Do you set aside time specifically for studying? (answer choice: yes or no)
- 4) In terms of time management, do you feel in control of the time you spend? (answer choice: yes or no).

Questions 2 and 3 of the Student Study Survey were not analyzed in the present study as they were not directly relevant to the primary hypotheses. The demographics survey consisted of basic questions such as age, participant sex, and class rank. The weekly study log was developed for students to log their study times for one week during the course of this research study. The study log was numbered in order to keep all participant surveys and materials together for pretest and posttest analysis.

### Procedures

Typical procedures were followed for obtaining Institutional Review Board approval prior to data collection. Participants began the study by reading and signing the consent form. The research study was divided into two parts. The first part required participants to complete the Internal Control Index (ICI), a Student Studying Survey, and a short demographics survey. Upon completion, participants submitted their surveys to the researcher. Participants then received the numbered weekly study log to monitor and record their total study time for the duration of 1 week. The weekly study log indicated one row for each day of the week (e.g., Sunday, Monday). Each day had two study sessions for which the students indicated their "start time" and "stop time" while studying. Participants were informed both verbally and in written format to indicate any other study sessions on the blank area to the side of each day on the study log. Participants were not restricted to the two provided study sessions on the weekly study log. Participants were asked to sum their total study times for each day and the researcher confirmed the total during data analysis. The researcher verbally informed participants that "homework" should not be included in study time, and that

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the research was only directed towards the “act of studying.” However, no operational definition of studying was given to the participants.

The numbers given to the participants were not linked to their identities; the numbers were simply used for grouping surveys and study logs. Participants were given instructions on how to log their study times throughout the week. For part 2, participants returned with the completed study log in exactly one week. Participants turned in the weekly study log and were then asked to complete the Internal Control Index, the Student Studying Survey, and demographics survey once more. Participants submitted the surveys from part 2 and were given a debriefing statement and the opportunity to ask any questions.

### Results

Data were analyzed using a repeated measures *t* test and a Pearson *r*. The assumptions for the repeated measures *t* test were tested and met prior to analysis. The repeated measures *t* test was used to analyze the data relevant to the first hypothesis, which stated that students would have the tendency to overestimate the amount of studying each week. Two estimations were used to compare the accuracy of both estimations with their actual study time, which was indicated by their student study log. The first estimation, labeled the pretest estimation, came from Question 1 of the Student Studying Survey that asked participants to estimate how many hours they studied each week. The pretest estimation was completed before the participants were exposed to the student study log for the week. The second estimation, labeled the posttest estimation, also came from Question 1 of the Student Studying Survey and was completed after the participants were exposed to the student study log for the week. The study log, which participants used to indicate their actual study times, was used to compare both estimations with the actual time spent studying for the entire week.

Comparing the pretest estimations (based on Question 1 of the Student Studying Survey from part 1) and the student study log, students underestimated their study time ( $M = -154.25$ ),  $t(64) = -2.73$ ,  $p = .008$ ,  $r = .10$ . Comparing the posttest estimations (based on Question 1 of the Student Studying Survey from part 2) and the student study log, students underestimated their study time even more ( $M = -188.86$ ),  $t(64) = -5.52$ ,  $p < .001$ ,  $r = .32$ . Comparing the pretest estimations and posttest estimations showed no significant difference

( $M = 34.62$ ),  $t(64) = .844$ ,  $p = .402$ ,  $r = .01$ . The descriptive statistics for each measure are presented in Table 1. Unfortunately, the multiple *t* tests used for analyses might have caused the experiment-wise probability to be slightly inflated, which should be noted when interpreting the results.

The Pearson *r* was used to analyze the second hypothesis, which stated that study time and the perception of being in control would be positively correlated. The Internal Control Index was utilized to determine if students felt in control, the Internal Control Index and the study log for each participant was used to determine if there was a relationship between study time and the feeling of control. The correlation was not statistically significant,  $r(61) = .224$ ,  $p = .083$ . Four students were excluded from the correlational analysis due to incomplete survey responses on the Internal Control Index. The descriptive statistics for the pretest and posttest Internal Control Indexes are presented in Table 2.

### Discussion and Conclusion

The first hypothesis of this study, which stated that students would have a tendency to overestimate the amount of study time, was not supported by the results. Participants actually underestimated their study time by approximately three hours. The second hypothesis, which stated that study time would be positively correlated with the feeling of control, was also not supported. The correlational analysis indicated that there was no significant relationship between study time and perception of control.

The time underestimation suggests that students perceive study time as a larger task, as illustrated by the planning fallacy, which further suggests that studying is considered a high priority. Because the underestimation of study time could result in reduced time available for other tasks, student efficiency could be diminished in the future. Students in this study underestimated their study times by a mean of approximately three hours. However, regardless of underestimation or overestimation, the discrepancy between estimated

**TABLE 1**

**Descriptive Statistics for the Pretest and Posttest Study Time (in Min) Estimations ( $N = 65$ )**

Measures	<i>M</i>	<i>SD</i>
Pretest Estimation	649.39	519.19
Study Log	803.63	519.98
Posttest Estimation	614.77	409.69



time and actual time creates a difficulty in accurate and appropriate time management, which is the underlying issue discussed in the planning fallacy. The time discrepancies for this study could be a result of the sample, which consisted primarily of first-year students. First-year students, and potentially nontraditional students, may have not developed appropriate college-level study habits. Buehler et al. (1994) noted that individuals are able to make more realistic estimations for completion time when using past experience to influence the estimations. Because first-year students have had limited experience with college-level studying, these students may be limited in their abilities to make accurate estimations of study time.

The results of the correlational analysis suggest that students felt in control of the time they spent, regardless of the amount of time spent studying. Although study time across students ranged from approximately 1 hr to 48 hrs, the majority of students indicated feeling in control of the time spent studying. In fact, further examination of the descriptive statistics show that 52 out of 65 students reported feeling in control on the pretest survey and 54 students reported feeling in control on the posttest survey. Despite the increase from 52 to 54, this difference was not indicative of a significant increase between the pretest and posttest survey. A potential implication of these results could indicate that students became more aware of the time they spent when required to log their study time, which made the students feel more in control of their time. Unfortunately, the increase was too small to determine any definitive conclusions about student awareness during and after study time logging.

The U.S. Department of Education (2011) recommended that for one credit hour of in-class instruction, students should be required to complete two hours of outside work. Therefore, students should expect an average week to consist of three hours of in-class instruction and six hours of outside work per class. For example, a student enrolled in 12 credit hours should be spending approximately 12 hrs in class and 24 hrs of outside class work each week for a total of 36 hrs per week.

Participants in the current study indicated from their study logs that they were studying an average of 14 hrs per week, which suggested that the participants did not take into account the number of credit hours in which they were enrolled. Access to the number of credit hours enrolled in would have shed light on the number of hours the students should have been studying, as recommended by the U.S. Department of Education (2011). Typically, students are enrolled in 12 credit hrs in order to reach full-time status. Unfortunately, the Department of Education (2011) does not provide detailed descriptions on what is considered “outside class work.” Although the current results suggest that students are studying only 14 hrs per week, instead of the recommended 24 hrs, this does not take into account the amount of time spent on other academic activities, such as homework and reading assignments. Given the ambiguity of “outside work” and difficulty with distinguishing between actual studying and other academic activities, the findings on whether students are studying the required amount cannot be conclusively determined.

The results of the current study may be beneficial for universities that provide academic enrichment courses to students, specifically first-year students. Academic enrichment courses typically provide students with the resources and workshops to succeed academically, such as time-management skills, college adjustment skills, and extra assistance with courses and programs of study selection. By applying the time-underestimation finding to programs similar to academic enrichment, universities could place more emphasis on better time-management practices to highlight the time necessary for academic success. In fact, Misra and McKean (2000) suggested that encouraging student involvement in time-management seminars may improve student success. Academic enrichment courses would give students the opportunity to experience the challenges often faced with scheduling tasks and managing time to complete tasks.

An important limitation of this study was that the distinction between “small” tasks and “large” tasks may vary across students. For example, a first-year college student could perceive an eight page essay as a large task, but a graduate student may perceive that same essay as a small task. This task distinction can be due to individual perceptions and experiences. A second limitation of this study was the difficulty students had with distinguishing

**TABLE 2**

**Descriptive Statistics for the Internal Control Index (N = 61)**

Measures	<i>M</i>	<i>SD</i>
Pretest ICI	103.71	1.28
Posttest ICI	105.00	1.47

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between homework and studying. Although some homework assignments can be utilized as a study tool, for this research we focused specifically on the act of studying (e.g., through study methods such as note cards or reading the class textbook).

A third limitation of this study was the inability to treat studying as a specific task in a similar fashion as previous research. Previous research studies (e.g., Buehler et al., 1994; Burt & Kemp, 1994) asked participants to estimate the duration of a task, and then asked the participants to spend time completing that task. In this study, the researchers simply asked students to indicate how long they spent on the task of studying each week, then asked the students to log their study time. For the current research design, participants were not asked to give an estimation, which would have been consistent with previous research designs. Asking participants to indicate their average study times, this did not reflect the estimation technique as employed in previous research. Further limitations of this study consisted of the sample being comprised predominantly of women and first-year students. A fourth limitation of this study was the self-reported measures in terms of both the pretest and posttest estimations, as well as the student study log. All these items required students to self-report the information, which left room for students to forget to log their study time causing incomplete data.

Future research should include extending the time students have to use the student study log to facilitate a better perspective of actual study time for students. Specific questions, such as course load and other extracurricular activities, would gauge the time constraints students have for studying. Additional information such as upcoming exams and assignments may also be utilized to assess actual study time. For example, if a student has no exams in the week during the student study log, then the amount of studying may be limited. However, if a student has two exams in the week during the student study log, then the amount of studying may increase.

Examining the effect of task segmentation (Forsyth & Burt, 2008) may also prove to be valuable in examining study habits. Students are often instructed that the most effective method of studying is to divide studying throughout several days prior to an exam, which in essence, is the incorporation of task segmentation and studying. The concept of task segmentation can, in some ways, be applied to the current study by comparing the average study times for students who participate

in task segmentation to the students who do not. By doing so, researchers can determine if students who utilize task segmentation are more effectively learning the material than those who do not. The additional variable of effective learning could be applied to the current study with a few revisions in order to measure effective learning for both styles.

Although the current study has limitations, it does shed light on the study habits of undergraduate students and the application to study time of the planning fallacy. Students who are more capable of establishing accurate predictions of task completion will be able to participate in better time management practices, and typically individuals perceive themselves as being better performers when time-management activities are practiced (Macan et al., 1990). The results of the current study may also aid students in better understanding the limitations of estimating the time required to complete essential academic tasks, as well as bringing to attention the challenges that students may face when allotting time for these tasks. The underestimation of study time observed in the current study suggests that students perceive studying to be a "larger" or more important task, which requires more emphasis and time.

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*Author Note.* Kirstie L. Bash, Department of Psychological Sciences, University of Central Missouri; David. S. Kreiner,

Department of Psychological Sciences, University of Central Missouri.

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Correspondence concerning this article should be addressed to Kirstie Bash, University of Central Missouri, Lovinger 1114, Warrensburg, MO 64093. E-mail: [bashkirstie@gmail.com](mailto:bashkirstie@gmail.com)

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# Social Anxiety, Observed Performance, and Perceived Social Competencies in Late-Adolescent Friendships

Brittany N. Kuder and Rachel L. Grover\*  
Loyola University Maryland

**ABSTRACT.** The functioning of socially anxious college students in friendships is surprisingly unexplored, given the prevalence and severity of psychopathology as well as the importance of close social relationships at this developmental stage. The current study sought to examine the perceived social competencies of socially anxious late adolescents and their observable behavior in conversation with friends. A sample of 54 undergraduate students completed the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) and the Interpersonal Competence Questionnaire (ICQ; Buhrmester, Furman, Wittenberg, & Reis, 1988). In addition, each was videotaped in a 10 min conversation with a friend, and coders rated each interaction using the Social Performance Rating Scale (SPRS; Fydrich, Chambless, Perry, Buergener, & Beazley, 1998). General social anxiety (Total SAS-A) scores were significantly negatively correlated with perceived general interpersonal competencies ( $r = -.51, p < .001$ ), comfort ( $r = -.27, p = .05$ ), and length ( $r = -.34, p = .01$ ), such that those with higher social anxiety reported lower competencies in social situations and displayed less comfort and either very short or very long talking turns. Theoretical and practical implications of the findings are discussed.

Social anxiety, discernible by overwhelming worry and self-consciousness in social situations, may reduce quality of life and impair the ability to fulfill daily living responsibilities, achieve educational goals, operate in the workplace, and function in both novel and everyday social situations (Stein & Kean, 2000). Even individuals with subthreshold forms of social anxiety may experience many of these functional impairments (Dell'Osso et al., 2003). Recent estimates rank social anxiety as the second most common psychiatric disorder, with a 12-month prevalence of 6.8% (Kessler, Chiu, Demler, & Walters, 2005) and a lifetime prevalence of 12.1% (Kessler, Berglund et al., 2005). Social anxiety proves to be both a serious and common issue, especially because few community members seek treatment and are thus left unaccounted in these statistics (Stein, Torgrud, & Walker, 2000).

The severity of social anxiety is further underscored by its early typical age of onset, in early to middle adolescence (Mannuzza, Fyer, Liebowitz, & Klein, 1990). Of the estimated 17 million U.S. adults who suffer from social anxiety, 75% of them developed social anxiety by the age of 15, and 90% of them by the age of 23 (Kessler, Berglund et al., 2005). Adolescence is a particularly vulnerable time for social anxiety due to increases in social demands and heightened fears of negative social evaluations (Westenberg, Gullone, Bokhorst, Heyne, & King, 2007). For the first time, most adolescents begin to spend more time with peers than with their parents (Crosnoe, 2000). To cope with their anxiety, socially anxious adolescents may withdraw from social interactions, thus limiting their social contact at a time when close friendships are of increasing importance to development (Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010).

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Compared to their nonanxious peers, socially anxious teens report greater difficulties in cultivating intimacy and companionship in their friendships (Vernberg, Abwender, Ewell, & Beery, 1992), lower levels of peer acceptance and support (La Greca & Lopez, 1998) and more negative treatment by classmates (Blote, Duvekot, Schalk, Tuinenburg, & Westenberg, 2010). Negative social experiences such as these likely reinforce anxious behavior, deterring or disabling those with social anxiety from behaving more successfully in social interactions (Rapee & Heimberg, 1997).

Because socially anxious adolescents are often shy and behaviorally inhibited, even those who have built and sustained friendships are vulnerable to reductions in social support when changes in their lives occur. Life transitions often disrupt friendships, a significant repercussion considering the protective function of social support during stressful times (Norris & Kaniasty, 1996). Among the most difficult transitions to negotiate is that of young adults to college life, particularly in their first year of study (Giddan, 1988). Relocated youth with social anxiety, such as those leaving their parents' homes to attend college, often withdraw from relationships, resulting in lower companionship and intimacy in their friendships (Biggs, Vernberg, & Wu, 2011). In their new environments, students encounter a greater number and diversity of social interactions, leading to greater uncertainty concerning appropriate behaviors (Thompson & Rapee, 2002). Additionally, they must adapt to greater independence and responsibility, while adjusting to changes not only in their friendship networks but also in their living arrangements, academic environments, and divisions of time. In the most recent National College Health Assessment conducted by the American College Health Association (2012), 11.2% of college students surveyed disclosed having been diagnosed as having an anxiety disorder, 64.9% reported having experienced overwhelming anxiety within the preceding 12 months, and 44.1% indicated that anxiety had, at some point in their college education, affected their academic performance.

The development of new, close-college friendships, as well as the competencies to initiate and strengthen those friendships, are integral to students' well-being (Emmons & Diener, 1986). Precollege friendships often diminish in quality and quantity within students' first year of college, requiring them to find new sources of social support (Oswald & Clark, 2003; Shaver, Furman,

& Buhrmester, 1985). Students' sociability strongly relates to life satisfaction (Emmons & Diener, 1986) and to academic achievement (Hojat, Vogel, Zeleznik, & Borenstein, 1988). In addition to unhappiness and academic struggles, failure to develop new friendships can result in a state of persistent loneliness (Asendorpf, 2000) and friend-sickness, the "preoccupation with and concern for the loss of or change in precollege friendships," which relates to social concerns, poor self-esteem, and discrepancies between expectations of social situations and the actual experiences of those situations (Paul & Brier, 2001, p. 77).

In addressing the social difficulties faced by socially anxious persons, it is important to identify the factors contributing to these struggles. Theorists have historically attributed the problems of socially anxious individuals to behavioral deficiencies that elicit the negative reactions of others, leaving them feeling punished by the demands of certain social situations and consequentially overcome with anxiety (e.g., Curran, 1977). Yet the behavioral assessment of social performance in socially anxious individuals has returned mixed results: some studies have found socially anxious participants to perform significantly worse on individual behaviors as well as global measures (e.g., Twentyman & McFall, 1975), but others have found them to perform worse only on global measures (e.g., Beidel, Turner, & Dancu, 1985), and others have not found significant differences between the behaviors of socially anxious participants and nonanxious participants (e.g., Rapee & Lim, 1992).

Furthermore, the ability of socially anxious persons to demonstrate appropriate and successful social behaviors may depend upon the demands of the social situation in which they are studied. Observers do not rate socially anxious and nonanxious participants' public speaking performances differently, but participants with social anxiety rate their performances significantly worse than do nonanxious controls, such that there is a significantly greater discrepancy between self and observer ratings for anxious individuals than for controls (Alden & Wallace, 1995; Rapee & Lim, 1992; Voncken & Bogels, 2008). Socially anxious participants also underestimate their performances in videotaped conversations with a confederate more so than nonanxious participants, although they do receive significantly lower observer performance ratings than nonanxious participants (Stopa & Clark, 1993; Voncken & Bogels, 2008).

Findings of socially anxious persons' inaccurate

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perceptions influenced the development of new models of social anxiety that emphasize the role of cognitions in influencing behavior. Recent cognitive models (notably, Clark & Wells, 1995; Rapee & Heimberg, 1997) suggest that those with social anxiety have distorted perceptions of their social competencies, and multiple studies have indeed shown that socially anxious individuals underestimate the successfulness of their performances in various situations (Alden & Wallace, 1995; Rapee & Lim, 1992; Stopa & Clark, 1993; Voncken & Bogels, 2008). In contrast with traditional conceptualizations of social anxiety that emphasized deficient social skills (e.g., Curran, 1977), these cognitive models proposed that cognitions intended to reduce anxiety lead to the adoption of safety and avoidance behaviors that are received negatively and rated as unsuccessful by others (Clark & Wells, 1995; Rapee & Heimberg, 1997). For example, individuals with social anxiety may speak in brief utterances not because they think that such is the most acceptable and successful mode of behavior, but in order to avoid saying something judged to be unacceptable or unfitting.

In both speech and conversation situations, socially anxious participants perceive themselves as having performance deficits, but performance deficits are only observed in conversation scenarios (Alden & Wallace, 1995; Rapee & Lim, 1992; Stopa & Clark, 1993; Voncken & Bogels, 2008). Yet performance has previously been observed in conversation scenarios when the conversation partner is a stranger (e.g., Voncken & Bogels, 2008). Studying whether socially anxious individuals perform worse and perceive themselves as performing worse in conversations with friends may help to illustrate the effects of social anxiety on the friendships and overall well-being of late adolescents attending college. The present study begins to address this gap in the literature by comparing the observed performance of socially anxious individuals in conversations with friends to that of nonanxious individuals in order to investigate if socially anxious participants display performance deficits in this particular scenario. In consideration of previous findings that socially anxious persons display significant performance deficits in conversation scenarios (Stopa & Clark, 1993; Voncken & Bogels, 2008), we hypothesized that those with higher social anxiety would indeed perform worse in conversation with a friend than would those with lower social anxiety.

Socially anxious individuals have been shown

to report inaccurate perceptions of their social competencies (Alden & Wallace, 1995; Rapee & Lim, 1992; Stopa & Clark, 1993; Voncken & Bogels, 2008), which are thought to contribute to anxiety and thwart social performance (Clark & Wells, 1995; Rapee & Heimberg, 1997). As such, we hypothesized that those with higher levels of social anxiety would perceive and report lower competencies than their nonanxious counterparts. Additionally, we anticipated that there would be a significant relation between perceived social competence and observed social performance in conversations with a friend such that those with lower perceived competence would display less successful behaviors during the video-taped conversation task.

## Method

### Participants

Participants volunteered for the study by registering on a psychology department research portal over the span of one academic year. At the study's completion, they received credit in introductory psychology courses as compensation. The group of 54 participants was comprised of 16 men and 38 women between the ages of 18 and 21 ( $M = 18.65$ ,  $SD = 0.78$ ) recruited through convenience sampling in a Mid-Atlantic Jesuit university's psychology department. Although this mean age is not representative of late adolescents, it does well represent traditional, first-year college students with whom we are particularly interested as they navigate major life transitions and new social landscapes (Giddan, 1988). No selection criteria were included beyond participants fitting into the age range of 18 to 21 years and holding current college enrollment. Participants were primarily White (85%,  $n = 46$ ), 7% ( $n = 4$ ) were Asian/Pacific Islander, 6% ( $n = 3$ ) were Hispanic, and 2% ( $n = 1$ ) were Black. All participants gave written consent to participate in both the online survey and videotaped conversation portions of the study. IRB approval was obtained prior to recruitment.

### Measures

As a part of a larger study investigating the link between young adults' psychopathology and social relationships, four measures pertinent to the current study's objectives were administered.

**Demographic questionnaire.** Participants completed a demographic questionnaire that asked about their sex, age, and race.

**Social anxiety.** The Social Anxiety Scale for

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Adolescents (SAS-A; La Greca & Lopez, 1998) was used to evaluate self-reported social anxiety. Participants rated 22 statements (e.g., “I get nervous when I meet new people”) on a 5-point Likert-type scale, ranging from 1 (*not at all*) to 5 (*all the time*). Scores range from 18 to 90, with higher scores indicating higher social anxiety. In addition to an overall social anxiety score, the SAS-A provides three subscores: Fear of Negative Evaluation (FNE), Social Anxiety and Distress in New Situations (SAD-New), and Social Anxiety and Distress in General (General SAD).

The scale’s title reveals that it was intended to be used with adolescent populations. Our student participants, averaging 18.65 years, can be classified as late adolescents (La Greca & Lopez, 1998). Although the psychometric properties of the SAS-A have not been studied extensively in college populations, normative data have been found for high school populations with age ranges overlapping that of the current study (Inderbitzen-Nolan & Walters, 2000). Factor analyses support the SAS-A’s three-factor structure (Inderbitzen-Nolan & Walters, 2000; La Greca & Lopez, 1998), and several studies (e.g., Glickman & La Greca, 2004; Inderbitzen-Nolan & Walters, 2000) have reported finding subscale internal consistencies similar to those found by La Greca and Lopez (1998): .91 (FNE), .83 (SAD-New), .76 (General SAD). La Greca and Harrison (2005) reported an adequate internal consistency of .87 for the total SAS-A score. For the current study, we found internal consistencies of .93 (FNE), .90 (SAD-New), .86 (General SAD), and .95 (SAS-A Total). The SAS-A correlates with other indicators of anxiety, such as measures of social functioning (La Greca & Harrison, 2005; La Greca & Lopez, 1998), general anxiety (Inderbitzen & Walters, 2000), and dating anxiety (Glickman & La Greca, 2004), providing support for construct validity.

**Social performance.** The Social Performance Rating Scale (SPRS; Fydrich et al., 1998) is a rating system for the behavioral evaluation of social skills modified from earlier rating systems (Trower, Bryant, & Argyle, 1978; Turner, Beidel, Dancu, & Keys, 1986) to be used specifically in socially anxious populations. Evidence for good convergent, divergent, and criterion-related validity, as well as acceptable internal consistencies, have been found for the SPRS (Fydrich et al., 1998). Five behavioral indicators of anxiety are rated on independent, 5-point Likert-type scales: gaze, discomfort, vocal quality, length of contributions, and conversation

flow. In the study at hand, the dimension of gaze was not rated due to visibility concerns, with some videotaped conversations lacking sufficient lighting to detect gaze. For the dimension of comfort, high ratings are given to those exhibiting natural body movements, appropriate laughing and smiling, effective gesturing, focused attention, and a relaxed posture. Ratings of good vocal quality are given to those who speak clearly in appropriate volumes, have nonintrusive and nonsarcastic tones, and are “warm and enthusiastic in verbal expression without sounding condescending or gushy” (Fydrich et al., 1998, p. 1007). Those who acknowledge their partners’ remarks without monopolizing the conversation nor speaking in very short statements receive ratings of good length, and those who eloquently initiate conversation topics, easily maintain the conversation, and fluidly respond to conversations breaks receive ratings of good conversation flow.

The raters were two undergraduate students who trained on the rating scale in the manner outlined by Fydrich et al. (1998) by viewing, rating, and discussing videotaped conversations until independent ratings consecutively varied by no more than one point on one dimension. All tapes were rated by one researcher, and 20% of the tapes were rated by the second to allow for inter-rater reliability analyses to be conducted. Excellent inter-rater reliability, in the form of intraclass correlations, were found for the rating scale, ranging from .94 (discomfort) to .95 (length) to 1.00 (vocal quality; conversation flow). Raters were blind to participants’ demographic information and performance on all other study measures.

**Interpersonal competence.** The Interpersonal Competence Questionnaire (ICQ; Buhrmester et al., 1988) includes 40 items that evaluate the following five domains of competence integral to close relationships: initiating relationships, self-disclosure, providing emotional support, negative assertion (i.e., asserting displeasure with others), and conflict management. Buhrmester et al. (1988) developed the ICQ to assess specifically the competence of college students in close friendships and romantic relationships. Following each of the questionnaire’s items (e.g., “Introducing yourself to someone you might like to get to know or date,” “Turning down a request by a companion that is unreasonable”) is a set of lines upon which participants rate their perceptions of their own competencies and comfort levels in the company of, respectively, a same-sex friend and different-sex

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friend/romantic partner. The current study incorporated perceptions of competencies with regards to close same-sex friendships. Ratings range from 1 (*Poor at this; would be so uncomfortable and unable to handle this situation that it would be avoided if possible*) to 5 (*Extremely good at this; would feel very comfortable and could handle this situation very well*). Individual competency scores are found by summing subscale items, and overall ICQ scores are achieved by summing all 40 items. Analyses of the ICQ have demonstrated the reliability and good fit of the measure's 5-scale structure as well as its correlation with theoretically related variables (Buhrmester, 1990; Buhrmester et al., 1988). For the study at hand, the following internal consistencies were found for the ICQ and its subscales: .95 (ICQ Total), .88 (initiating relationships), .85 (self-disclosure), .88 (emotional support), .87 (negative assertion), and .84 (conflict management).

### Procedure

Participants engaged in a videotaped conversation with a friend of their choice after being led to a room with two armchairs. They were instructed to discuss something that they would like to change about themselves with their friends for 10 min. The friends were told to respond to the conversation as they would typically respond. Friend pairs were left alone in the room with the video camera, and a research assistant returned to the room after 10 min to dismiss them. At a time of their choosing, participants later completed a survey that included the demographic questionnaire, SAS-A, and ICQ, in that order, on an online survey program. Both the participant and the friend gave informed consent to participate, and were debriefed and thanked for their time.

### Results

Means for the three subscales of the SAS-A, as well as those for social performance ratings and reported social competencies, are presented in Table 1. Analysis of the SAS-A indicated that 48.1% ( $n = 26$ ) of the 54 participants were classified as having significant social anxiety, using an SAS-A total score of 44 as a cut-off (La Greca & Lopez, 1998). Although observed performance ratings ranged from either 1 (*length, conversation flow*) or 2 (*discomfort, vocal quality*) to 5 for each dimension, average ratings for each dimension ranged between 4 and 5, indicating that most comfort levels were either high or very high, and that most vocal qualities, lengths, and conversation flows were either

good or very good. Average competency scores ranged from 28.35 (negative assertion) to 32.96 (emotional support), with standard deviations similar to those of nonclinical samples found in initial investigations of the ICQ's friend scale (e.g., Buhrmester et al., 1988) as well as in more recent reviews of the measure (e.g., Davila et al., 2009).

Pearson correlations were computed to determine if social anxiety related to ratings of observed performance and perceptions of social competencies in college students (Table 2). General social anxiety (Total SAS-A) scores were significantly negatively correlated with two of the four observed social performance behaviors: comfort ( $r = -.27, p = .05$ ) and length ( $r = -.34, p = .01$ ), such that those with higher social anxiety displayed less comfort and either very short or very long talking turns. Additionally, SAS-A subscale scores were found to have significant relationships with these observed nonverbal behaviors. Higher SAD-New scores were associated with lower ratings of comfort ( $r = -.31, p = .03$ ), length ( $r = -.34, p = .01$ ), and conversation flow ( $r = -.27, p = .05$ ). Higher FNE scores related to lower length ratings as well ( $r = -.29, p = .03$ ).

SAS-A scores were also related to perceptions of social competencies. Total SAS-A scores were significantly negatively correlated with perceived general interpersonal competencies ( $r = -.51, p$

TABLE 1

#### Descriptive Statistics for Social Anxiety, Observed Performance, and Perceived Social Competencies

	<i>M (SD)</i>	Range
Social Anxiety Scale for Adolescents (SAS-A), Total	45.17 (14.12)	19–80
Fear of Negative Evaluation	20.94 (7.54)	8–40
Social Avoidance and Distress in New Situations	16.52 (5.09)	5–28
General Social Avoidance and Distress	7.78 (3.14)	4–19
Social Performance Rating Scale (SPRS)		
Comfort	4.06 (1.09)	2–5
Vocal Quality	4.45 (0.91)	2–5
Length	4.48 (0.89)	1–5
Conversation Flow	4.43 (0.85)	1–5
Interpersonal Competence Questionnaire (ICQ)	150.64 (21.25)	85–195
Initiating Relationships	30.71 (5.32)	10–40
Self-Disclosure	29.23 (5.28)	16–40
Emotional Support	32.96 (4.12)	26–40
Negative Assertion	28.35 (5.01)	14–39
Conflict Management	30.22 (4.53)	19–40

Note. *Ns* range from 50 to 54 due to occasional missing data.

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< .001), as well as perceived competencies of initiating relationships ( $r = -.60, p < .001$ ), emotional support ( $r = -.30, p = .04$ ), and negative assertion ( $r = -.52, p < .001$ ). Both FNE scores and General SAD scores were negatively correlated with perceived general interpersonal competencies ( $r = -.37, p = .02$ ;  $r = -.46, p = .002$ ) and those of initiating relationships ( $r = -.45, p = .002$ ;  $r = -.54, p < .001$ ) and negative assertion ( $r = -.44, p = .002$ ;  $r = -.46, p = .001$ ). SAD-New scores were significantly associated with perceived general interpersonal competencies ( $r = -.57, p < .001$ ) and those of initiating relationships ( $r = -.63, p < .001$ ), emotional support ( $r = -.32, p = .03$ ), negative assertion ( $r = -.51, p < .001$ ), and conflict management ( $r = -.30, p = .04$ ).

Relationships between perceptions of social competencies and observed performance ratings were examined next, and lower perceptions of competencies were found to relate to lower observed performance ratings. Participants perceiving themselves as having greater general interpersonal competencies also had higher ratings of comfort ( $r = .33, p = .03$ ) and vocal quality ( $r = .34, p = .03$ ). Perceptions of greater initiating relationships competencies were associated with higher ratings of comfort ( $r = .40, p = .01$ ), vocal quality ( $r = .38, p = .01$ ), and conversation flow ( $r = .33, p = .03$ ). Perceptions of greater emotional support competencies were likewise correlated with higher ratings of comfort ( $r = .33, p = .03$ ), vocal quality ( $r = .32, p = .03$ ), and conversation flow ( $r = .34, p = .02$ ), and those of greater negative assertion competencies were associated with higher ratings of comfort ( $r = .32, p = .03$ ) and vocal quality ( $r = .33, p = .03$ ).

## Discussion

This study investigated the relationships among social anxiety, observed nonverbal behaviors in a conversation with a close friend, and perceived interpersonal competencies in late-adolescent college students. Three hypotheses were explored: that social anxiety would be negatively related to observed behaviors in conversations, that social anxiety would be negatively related to perceived social competencies, and that perceived social competencies would be positively related to observed behaviors in conversations with friends. In general, results supported the hypotheses.

### Social Anxiety and Observed Performance

Overall, higher social anxiety related to lower performance ratings of observed behavior in conversations with friends, supporting the findings

of previous studies that socially anxious persons perform worse in social interactions compared to nonanxious participants (Baker & Edelmann, 2002; Fydrich et al., 1998; Thompson & Rapee, 2002; Voncken & Bogels, 2008). Additionally, analyses demonstrated high intercorrelations among the different behaviors of the SPRS, maintaining Fydrich et al.'s (1998) proposition that socially anxious individuals consistently exhibit overall poor social performance rather than "discrete skills deficits" (p. 1005). It should not be overlooked that a halo effect influencing the observers' ratings could explain these intercorrelations (e.g., an observer noticing a participant's displayed nonverbal behavior and giving high ratings on the other measures). Yet the significant relationships between certain social behaviors and certain perceived competencies demonstrate that participants receiving low performance ratings also perceive themselves as having lower social competencies, suggesting an interplay between cognitive and behavioral variables as hypothesized in cognitive models of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997) and found in previous studies of social performance correlates (Halford & Foddy, 1982).

TABLE 2

#### Correlations: Social Anxiety, Observed Performance, and Perceived Competencies

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. SAS-A Total													
2. FNE	.94**												
3. SAD-New	.91**	.76**											
4. General SAD	.77**	.60**	.62**										
5. Comfort	-.27*	-.22	-.31*	-.21									
6. Vocal Quality	-.10	-.07	-.13	-.05	.62**								
7. Length	-.34*	-.29*	-.34*	-.25	.66**	.37**							
8. Conversation Flow	-.24	-.23	-.27*	-.11	.76**	.56**	.84**						
9. General IC	-.51**	-.37*	-.57**	-.46**	.33*	.34*	.09	.23					
10. Initiating Rel.	-.60**	-.45**	-.63**	-.54**	.40**	.38*	.19	.33*	.88**				
11. Self-Disclosure	-.05	.01	.04	-.28	.21	.18	.08	.13	.91**	.74**			
12. Emotional Support	-.30*	-.22	-.32*	-.32	.33*	.32*	.21	.34*	.84**	.64**	.71**		
13. Negative Assertion	-.52**	-.44**	-.51**	-.46**	.32*	.33*	.20	.25	.87**	.76**	.70**	.54**	
14. Conflict Man.	-.20	-.07	-.30*	-.23	.11	.18	-.08	.02	.83**	.63**	.69**	.67**	.61**

Note. *Ns* range from 50 to 54 due to occasional missing data. SAS-A = Social Anxiety Scale for Adolescents. FNE = Fear of Negative Evaluation. SAD-New = Social Avoidance and Distress in New Situations. General SAD = Social Avoidance and Distress in General. General IC = General Interpersonal Competence. Initiating Rel. = Initiating Relationships. Conflict Man. = Conflict Management.

\*  $p < 0.05$ . \*\*  $p < 0.01$ .



Specifically, participants who reported higher levels of social anxiety were observed to appear less comfortable (e.g., fidgeting), speak either more excessively or briefly, and maintain the conversation flow less effectively in a conversation with a friend. Previous findings of discomfort levels distinguishing socially anxious individuals from both anxious and nonanxious controls (Baker & Edelmann, 2002; Fydrich et al., 1998) lend support that those with social anxiety often behave differently in social situations through their use of body movements perceived as nervous, excessive, or contextually inappropriate by others. Socially anxious persons demonstrated conversation turns either so long as to prevent discourse or incredibly short with very long pauses, coinciding with findings that socially anxious individuals speak more excessively (Dow, 1985), pause more frequently (Dow, 1985; Hofmann, Gerlach, Wender, & Roth, 1997) and wait longer until their first utterance in conversations (Thompson & Rapee, 2002). Individuals may adopt pausing as a safety behavior to contemplate what is appropriate to say and reduce the risk of making statements judged to be inadequate (Thompson & Rapee, 2002). Stevens et al. (2010) indeed found shorter talking time to significantly correlate with observers' ratings of safety behaviors. The tendency for participants with high SAD-New scores to less effectively respond to conversational cues and relate with partners may be explained by their cognitive load: if they were significantly distressed by a new situation, they might have had less attention available to focus on the demands of the social situation and interact successfully with their friends (Rapee & Heimberg, 1997). Surprisingly, vocal quality was not found to be related to any anxiety score, suggesting that tone and volume may be less affected by social anxiety levels than other nonverbal factors. Nonetheless, these distinct nonverbal behaviors often exhibited by socially anxious late adolescents in conversations may interfere with their abilities to effectively communicate with their friends and, thus, build intimacy and gain support.

### **Social Anxiety and Perceived Social Competencies**

Participants reporting high social anxiety generally perceived themselves as being less socially competent than those reporting low social anxiety. Regardless of the successfulness of their social performances, those with social anxiety often think that their anxiety can be seen by others and believe

that this causes others to perceive them more negatively (Jones & Briggs, 1984). Social anxiety's significant relationships with perceptions of interpersonal competence underscore the possibility of a broad cognitive component interfering with social performance and affecting social relationships. Specifically, perceptions of general interpersonal competence and of competencies for initiating relationships and negative assertion correlated with all four social anxiety scores (Total SAS-A, FNE, SAD-New, General SAD). These findings indicate that two of the greatest perceived difficulties for socially anxious individuals, for which they experience the most discomfort and doubt their abilities the most, are initiating relationships and asserting displeasure with others, which are also two social situations often avoided by people (SAD-New) and in which people are quite susceptible to negative feedback (FNE). Being socially unskilled or perceiving one's self to be socially unskilled in the arena of initiating relationships is likely to negatively impact those entering the new social landscape of young adulthood, where the formation of new relationships relates to academic achievement (Hojat et al., 1988), greater self-esteem (Paul & Brier, 2001), and greater life satisfaction (Emmons & Diener, 1986). Late-adolescent college students who identify attractive and compatible peers but perceive themselves to not possess the competency to initiate relationships may miss out on rewarding friendships, just as those who perceive low competencies in asserting displeasure may be engaged in suboptimal friendships.

### **Perceived Social Competencies and Observed Performance**

As hypothesized, participants with perceptions of lower competencies were observed as performing less successfully in their conversations with friends than those perceiving high competencies. Those who perceived themselves as having low social competencies were rated by others as exhibiting lower levels of comfort, poorer conversation flow, and poorer vocal qualities, marked by inappropriate volumes and less pleasant tones. These findings indicate that socially anxious late adolescents may exhibit performance deficits rather than distorted perceptions of performance in conversations with friends, supporting Voncken and Bogels's (2008) theory of socially anxious individuals' behaviors being explained by performance deficits in situations requiring interpersonal skills (e.g., conversations) and by distorted perceptions of



performance in situations requiring performance skills (e.g., public speaking). Length ratings, however, were not found to significantly correlate with any competency, proposing that talking turn lengths are influenced more by anxiety or other factors separate from perceptions of competencies.

As the current study has shown, negative cognitions, particularly with relation to perceptions of low interpersonal competencies, are often paired with socially inadequate behaviors. A recent model of the maintaining factors of social anxiety disorder (Hofmann, 2007), drawing upon the theory of reciprocal determinism (Bandura, 1978), proposes those with social anxiety are nervous in social situations because they perceive the social standard to be too high for them to meet. Socially anxious persons want to impress others but doubt their ability to do so, effecting heightened self-focused attention that leads to negative self-perceptions, such as the appraisal of one's self possessing poor social skills. These negative cognitive processes exaggerate the likelihood of social failure and thus lead to avoidance and safety behaviors (e.g., pausing in conversation to consider what to say). Attempts to restructure cognitions to be more realistic may enable college students to behave more successfully in their friendships and thereby better enjoy friendships in both greater quantity and quality.

### Limitations

As with most research conducted at universities, a limitation of this study is the homogeneity of the sample, making it unclear if the current results can be generalized to other populations. In addition, such sample homogeneity may be associated with the obtained restriction of range of values for some study variables; for example, the different behaviors of the SPRS had standard deviations of less than one point on the rating scale. Nonetheless, it is encouraging that significant relations were obtained despite the somewhat restricted range on some variables. It is also possible that the self-report measures (i.e., the SASA and ICQ) were affected by social desirability, which can distort the manner by which participants respond to measures such that they may underreport their anxiety levels or bolster their competence levels in order to minimize their problems. However, results of the study at hand found correspondence between the ICQ and SPRS, which lends validity to using self-report measures of social competence with socially anxious samples.

### Future Directions

It is important to note that the SPRS was previously evaluated only by highly trained graduate students and mental health professionals, and for social performances with conversation partners with whom participants were not well acquainted. In response to Monti et al.'s (1984) advocacy for mid-level behavioral assessment, the measure was designed as a rating scale, which is less straightforward to utilize than a micro level assessment using frequency counts and duration of specified behaviors. Accordingly, Fydrich et al. (1998) questioned the ability of less highly trained raters to use the rating scale and to distinguish socially anxious participants from nonanxious ones in various situations, such as the conversation with friend scenario used in the present study. The significant results of this study demonstrate that raters with less experience are able to effectively use the SPRS, and that the SPRS can be useful in different contexts. A few suggestions can be made for avenues of future research. The relationships found in this study were correlational. Experimental research aiming to make cognitions more realistic and behaviors more successful could expound causal relationships, which would inform understanding of the maintaining factors of social anxiety and thereby facilitate the development of effective prevention and intervention models. Additionally, this study did not account for different levels of intimacy within friendships, which should be examined in future studies. Finally, this study's participants were primarily undergraduate students in their first and second semesters of college. A longitudinal study might assess the social anxiety, observed behaviors, and perceived competencies of students in their first year of college and later in their fourth, in order to examine whether adjustment to college life lowers social anxiety, and also whether students display more successful social performance behaviors and perceive themselves as having greater interpersonal competencies after becoming adjusted to college.

### Conclusions

Voncken and Bogels (2008) have proposed that those with social anxiety demonstrate more actual performance deficits in situations requiring more interpersonal skills, although they reveal more cognitive distortions in situations requiring more performance skills. Cognitive theorists describe this variance in social performance across situations as explained by either safety behaviors (Clark & Wells,

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1995) or subtle avoidance (Rapee & Heimberg, 1997) resulting from cognitive processes that seek to reduce anxiety. The study at hand provides evidence that socially anxious young adults do exhibit performance deficits in conversations with a friend, a situation requiring interpersonal skills. It also demonstrates that socially anxious college students have more negative perceptions of their social competencies in friendships than their nonanxious peers, which may explain their display of unsuccessful social behaviors that may serve to reduce their anxiety. Socially anxious individuals regularly experience unpleasant thoughts and emotions when placed in uncomfortable situations, which may reinforce their patterns of social withdrawal (Hofmann, 2007; Jones & Briggs, 1984). Even if they do not exhibit performance deficits, those who report having negative cognitions and inadequate competencies are likely to benefit from therapeutic techniques (such as the popular and empirically-supported cognitive behavioral group therapy; Heimberg et al., 1990; Heimberg & Becker, 2002) that seek to bolster their social performance behaviors and instill in them a social confidence (Herbert et al., 2005; Turner, Beidel, Cooley, Woody, & Messer, 1994). Observed behaviors associated with social anxiety and rated to be socially unsuccessful may be used to guide interventions for improved interpersonal processes. Clinicians may attempt to adjust certain behaviors (e.g., length) by identifying their performance, discussing the value of more successful behaviors, and introducing ways by which the client can work on adopting more successful behaviors. For instance, a clinician treating a socially anxious client who frequently responds to friends with brief utterances may reveal to the client how her shortness makes it difficult for her to build intimacy with her friend and does not communicate interest in the conversation and in her friend. The clinician might role-play conversation scenarios, encouraging the client to expand upon her ideas as necessary and modeling responses of adequate lengths. Future research is necessary to determine if altering these verbal and nonverbal behaviors predicts improvement in overall social competencies or friendship quality. Programs should be implemented and services offered in educational and mental health settings to bolster perceptions of interpersonal competencies and assuage levels of social anxiety. Such services would help adolescents hone their interpersonal behaviors and understand their new social landscapes facilitating

their experiences of more enjoyable and beneficial friendships.

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*Author Note.* Brittany N. Kuder, Department of Psychology, Loyola University Maryland; Rachel L. Grover, Department of Psychology, Loyola University Maryland.

Brittany N. Kuder is now at Department of Education and Human Services, Lehigh University.

Correspondence about this article should be addressed to Brittany Kuder, Department of Education and Human Services, Lehigh University, Bethlehem, PA 18015. Contact: brk213@lehigh.edu

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# The Effect of the Color Red on Hirability and Attractiveness

Julia F. Hammett, Emily J. Issler, and Holly E. Bashore  
San Diego State University

**ABSTRACT.** The present study investigated the effect of the color red on hirability and character attractiveness. Initial data were collected from 106 voluntary participants recruited from a Southwestern American university campus. Participants read a personality description, printed on either red or white paper, of either a male or female target, and completed a questionnaire rating the target's hirability and character attractiveness. The first hypothesis, that people would rate the target as less hireable if the personality description was printed on red paper rather than on white paper, was mostly supported. The second hypothesis, that people would rate the target as more attractive if the personality description was printed on red paper rather than on white paper, was partially supported. The third hypothesis, that this effect would only be true when rating opposite-sex targets, was not clearly supported. The results indicate that the effects of the color red depend on the context in which the color is viewed. A red stimulus may increase undesirable behaviors and attributes in performance-based contexts that foster competitiveness, such as contexts in which a person's hirability is evaluated, but may increase desirable behaviors and attributes in relational contexts, in which a person's attractiveness is evaluated.

Colors are present everywhere in our environment. Because symbolic and aesthetic meanings have been attached to certain colors throughout history and across cultures, colors influence our perception of the world around us (Smeesters & Liu, 2011). One color that has been shown to influence humans in various ways is the color red. Red has an impact on our affect (Elliott & Niesta, 2008), cognition (Tanaka & Tokuno, 2011), and behavior (Elliott & Aarts, 2011). Some studies have yielded results indicating a negative effect of red, in that red increases undesirable behaviors and attributes, such as aggression (e.g. Elliot, Moller, Friedman, Maier, & Meinhardt, 2007; Gnambs, Appel, & Batinic, 2010); however, other studies have yielded results indicating a positive effect of red, in that red increases desirable behaviors and attributes,

such as physical attractiveness (e.g., Elliot & Niesta, 2008; Elliot et al., 2010). Thus, it seems that the effect of a red stimulus depends on the context of the task and the socio-cultural meaning of the color red regarding this context. In the present study, we will examine the effect of the color red in two different contexts, namely evaluations of a person's hirability, which includes predictions of a person's overall qualifications and expected job performance (Dunn, Mount, Barrick, & Ones, 1995), and character attractiveness, which includes perceived desirability of a person based on this person's nonphysical attributes, such as character traits, attitudes, and behavior patterns (Kniffin & Wilson, 2004).

Several studies have yielded findings indicating

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a negative effect of red stimuli on performance, in which red increased undesirable behaviors and attributes. Elliot et al. (2007) found that having a number written in red ink, as opposed to green or black ink, in the corner of a test booklet impaired performance on anagram and numeric tests. Additionally, this color manipulation resulted in avoidance motivation as indicated by participants' tendency to choose easier rather than more difficult tasks. Similarly, Gnambs et al. (2010) found that a red (versus green) progress bar harmed performance in web-based tests of general knowledge. Other studies support the concept that the color red activates avoidance motivation (Tanaka & Tokuno, 2011) and that reading the word undermines intellectual performance (Lichtenfeld, Maier, Elliot, & Pekrun, 2009). Thus, the color red seems to enhance undesirable behaviors in situations in which performance is measured.

Different mechanisms have been proposed to account for these negative effects of the color red. Elliot et al. (2007) proposed that viewing the color red results in decreased performance on academic tasks and that avoidance of challenges is due to learned associations. Red is often used in the educational system to indicate failure, because teachers may use red ink to correct their students' mistakes (Rutchick, Slepian, & Ferris, 2010). The color red is further used as an indicator of danger and as a warning signal (e.g., red lights, fire alarms, warning signs). Given the repeated pairing of red with failure, danger, and avoidance, it is not surprising that seeing a red stimulus may impair performance. In conclusion, it seems that a red stimulus will have a negative impact on human behavior in performance contexts that foster competitiveness.

Perceptions of an individual's hirability occur in performance-based situations, such as the ones previously described, in that hirability is based on people's predictions of an applicant's future performance on the job. In addition, employment application settings, in which a person's hirability is assessed, may foster feelings of competition, because several applicants often compete for a single position (Duckett, 2000). This focus on performance and competition may increase negative emotions. Thus, the color red should have a negative effect on people's perceptions of a job applicant's hirability in that it should lead people to evaluate an applicant's overall qualifications and expected job performance more negatively.

Other studies have shown that the effect of red

on human affect, behavior, and cognition may be positive in that red increased desirable behaviors and attributes. Elliot and Niesta (2008) found that seeing a woman's photograph placed on a red background increased men's physical attractiveness and sexual desirability ratings of the target. Similarly, women perceived men's physical attractiveness to be higher when men's pictures were placed on a red background and when they wore red clothing (Elliot et al., 2010). The color red did not have an effect on men's and women's physical attractiveness ratings when viewing photographs of their own sex. Further support for the effect of red on human physical attraction comes from Niesta Kayser, Elliot, and Feltman (2010), who showed that men chose to ask a conversation partner in a red shirt more intimate questions and also to sit closer to her. Thus, the color red seems to enhance desirable behaviors in situations in which partners of the other sex are being evaluated.

The impact of the color red on human physical attractiveness can be explained, at least partially, by evolutionary, biological, and socio-cultural factors. Throughout the animal kingdom, the red coloration of several species' body parts provides evidence for evolutionary ingrained preferences that may explain why humans are attracted to potential partners of the other sex who display the color red. For example, Hill (1990) found that female house finches preferred colorful mates, namely those with bright red plumage coloration. Zebra finches showed similar preferences regarding their mates' red bill color (Burley & Coopersmith, 1987). Waitt, Gerald, Little, and Kraiselburd (2006) found that rhesus macaques gazed significantly longer at reddened versions of female hindquarters. These behavior patterns suggest a connection between the color red and intersexual selection. Pink-to-red anogenital and facial coloration does not only occur in animals, but human female skin color also varies with reproductive state (Waitt et al., 2006). Increased reddening of a woman's face during ovulation serves as an indicator of fertility. It is evolutionarily adaptive for a man to be more attracted to a woman during this phase of her reproductive cycle.

Furthermore, the effect of red on human behavior may be due to socio-cultural experiences. The color red is frequently used as a symbol of love, romance, and fertility (e.g., red hearts on Valentine's Day cards). This symbolic meaning of the color red has existed throughout history in numerous cultures and has been used in folklore

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and rituals. For example, Japanese brides wear the colors white and red at their weddings (Hutchings, 2004). Thus, a red stimulus may have a positive effect on human affect in that it enhances desirable attributes, such as physical attractiveness, by functioning as a sexual symbol in contexts that include the evaluation of individuals of the other sex.

The concept of human attractiveness, however, is not limited to physical aspects, but can also include a person's character traits, attitudes, and behavior patterns. According to Kniffin and Wilson (2004), people are drawn to potential partners because of their overall fitness value, which consists of physical as well as nonphysical factors. These nonphysical factors may enhance the perceived physical attractiveness of a person and are therefore an important component of what makes a person appear attractive. The importance of nonphysical traits on perceived attractiveness is suggested by the careful manner with which people describe themselves in personal advertisements. Such descriptions typically address hobbies, preferences, interests, and other nonphysical characteristics. For example, when analyzing personal advertisements in local newspapers, Rajecki, Bledsoe, and Rasmussen (1991) found that while men often stipulated looks, women often stipulated status, a nonphysical characteristic. Red has been shown to enhance people's perceptions of a person's physical attractiveness, and physical and character attractiveness go hand in hand to determine a person's overall attractiveness, or fitness value. Thus, the color red should also have a positive effect on character attractiveness. In fact, red should lead people to evaluate a person's character traits, attitudes, and behavior patterns more positively.

As previous studies have shown, the effect of a red stimulus depends on the context of the task and the sociocultural meaning of the color red regarding this context. The present study adds to the literature by examining the negative and positive impacts of the color red in two different contexts. We will examine the effects of the color red on perceptions of a person's hirability during employment applications and on perceptions of a person's character attractiveness. In the present study, hirability and character attractiveness will be interpreted from reading a personality description.

First, we hypothesized that people would rate a person as less hireable if they read the personality description of a potential job applicant printed on red paper rather than on white paper. Second, we hypothesized that people would find a person to be

more attractive if they read the personality description of a potential partner printed on red paper rather than on white paper. Third, we hypothesized that red would only increase attractiveness ratings of men reading about women and of women reading about men.

## Method

### Overview

The present study used existing data initially collected for a class project, in which men and women had been asked to read a personality description of either a male or female target, printed on either red or white paper. In addition, participants were asked to rate the target's hirability and attractiveness. In the present study, the data were analyzed to test our hypotheses that (a) targets described on red paper would be perceived as less hireable, (b) targets described on red paper would be perceived as more attractive, and (c) red would increase attractiveness ratings of targets of the other sex.

### Experimental Design

The study used a 2 x 2 x 2 between-subjects design. The independent variables were comprised of two levels of paper color (white and red), two levels of sex of the participant, and two levels of sex of the target person. The dependent variables were perceived hirability and character attractiveness of the target person.

### Participants

One hundred six voluntary participants recruited from a Southwestern American university campus took part in the initial study. There were 39 (36.8%) men and 67 (63.2%) women ranging in age from 18 to 62 ( $M = 21.09$ ,  $SD = 5.61$ ). Seventy-three (68.9%) participants were single and 33 (31.1%) participants were in a committed monogamous relationship. Due to the small number of lesbians, gay men, and bisexual individuals ( $n = 2$ ), these participants were excluded from the analyses.

### Materials

**Personality description.** A brief personality description of either a male target ("John") or a female target ("Joan") was developed by the researchers of the initial study and was printed on either red or white paper, such that there were four different personality description versions. The description was the same for both target sex conditions, so the only thing different was the name of the target. The personality description consisted of one paragraph,

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in which the target's character traits ("Joan is nice and fun to be around"; "Some people describe her as impulsive"), attitudes ("She values relationships... but it is difficult for her to keep in touch") and behavior patterns ("Being active outside is one of Joan's favorite things to do") were outlined. The goal in developing the personality description was to obtain an even balance of the target person's positive and negative attributes.

**Hirability.** The hirability measure, printed on white paper, consisted of six items assessing the target's hirability. Examples included "I would hire this person" and "This person would bring good ideas to the company." All items were rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The six hirability items were preceded by a brief job description. Participants were instructed to imagine they were on a selection committee for a job that required moderate job demands and no previous experience. If the person described were hired, the participant would be working in close contact with this person. All six item scores were added up to yield a hirability summation with high scores indicating higher perceptions of hirability. In our sample, scores ranged from 14 to 30. Cronbach's alpha was .84.

**Attractiveness.** The attractiveness measure, printed on white paper, consisted of nine items assessing the target's character attractiveness. Examples included "This person and I would probably have a good connection" and "I find this person appealing." All items were rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). All nine item scores were added up to yield an attractiveness summation with high scores indicating higher perceptions of attractiveness. In our sample, scores ranged from 16 to 45. Cronbach's alpha was .83. Three of the items included in the attractiveness measure were adapted from Elliot et al. (2010). Instead of Elliot et al.'s (2010) question format ("How attractive do you think this person is?"), a statement format addressing the participant's perception ("I think this person is attractive") as well as the participant's estimate of other people's perceptions ("Others would find this person attractive") was used. The item "If I were to meet the person in this picture face to face, I would think he is attractive" (Elliot et al., 2010) was changed to "If I were to meet this person, I would think he/she is attractive." These three core attractiveness items as adapted from Elliot et al. (2010) were examined separately.

The order of the grouped hirability and

attractiveness items was counterbalanced. There were eight demographic items to assess participants' age, sex, ethnicity, sexual orientation, and relationship status. A full list of the hirability, attractiveness, and demographic items can be obtained by contacting the first author.

## Procedure

Individual participants were approached on campus and asked if they would like to participate in a short study on first impressions. If they agreed, they were handed one of the four versions of the personality description (of either a male or female target and printed on either red or white paper) and the test battery. Participants were instructed to first read the personality description, and then, based on what they had read, answer the questions in the questionnaire without consulting with others. All participants were informed that their answers would be anonymous and would be handled confidentially.

## Results

### Overview of Analyses

After computing the hirability and attractiveness summations, five separate  $2 \times 2 \times 2$  between-subjects analyses of variance were conducted. We examined the influence of color, sex of participant, and sex of target on (a) the hirability summation, (b) the attractiveness summation, (c) the dependent attractiveness item "I think this person is attractive", (d) the dependent attractiveness item "If I were to meet this person, I would think he/she is attractive," and (e) the dependent attractiveness item "Others would find this person attractive." For simplification purposes, the results of the last three analyses, which examined the influence of the independent variables on the three dependent core attractiveness items as adapted from Elliot et al. (2010) are reported in one combined section.

### Influence of Color, Sex of Participant, and Sex of Target on Hirability

A  $2 \times 2 \times 2$  between-subjects analysis of variance examining the influence of color, sex of participant, and sex of target on the hirability summation yielded the following results. A marginally significant main effect of color was found for the hirability summation,  $F(1, 98) = 3.77, p = .055$ . Participants rated targets as less hireable if their description was printed on red paper ( $M = 22.56, SD = 4.16$ ) than if their description was printed on white paper ( $M = 24.11, SD = 3.42; r = .20$ ). No significant

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differences were found when examining the effects of sex of participant,  $F(1, 98) = 3.44, p = .07$ , and sex of target,  $F(1, 98) = 0.54, p = .47$ , on hirability as measured by the hirability summation.

### **Influence of Color, Sex of Participant, and Sex of Target on Attractiveness**

A  $2 \times 2 \times 2$  between-subjects analysis of variance examining the influence of color, sex of participant, and sex of target on the attractiveness summation yielded no significant results. No significant differences were found when examining the effects of color,  $F(1, 98) = 0.14, p = .71$ , sex of participant,  $F(1, 98) = 0.02, p = .88$ , and sex of target,  $F(1, 98) = 1.55, p = .22$ , on attractiveness as measured by the attractiveness summation.

### **Influence of Color, Sex of Participant, and Sex of Target on Core Attractiveness Items**

Three  $2 \times 2 \times 2$  between-subjects analyses of variance examining the influence of color, sex of participant, and sex of target on the three core attractiveness items adapted from Elliot et al. (2010) yielded the following results:

A main effect was found for color for the dependent measure "I think this person is attractive,"  $F(1, 98) = 5.84, p = .02$ . Participants rated targets whose description was printed on red paper ( $M = 3.50, SD = 0.87$ ) as more attractive than targets whose description was printed on white paper ( $M = 3.22, SD = 0.89, r = .16$ ).

A color  $\times$  sex of participant  $\times$  sex of target interaction was found for the dependent measure "Others would find this person attractive,"  $F(1, 98) = 5.38, p = .02$ . As can be seen in Figure 1, women rated male targets on red paper ( $M = 3.53, SD = 0.74$ ) as less attractive than male targets on white paper ( $M = 4.21, SD = 0.80, r = .40$ ). Women rated female targets on red paper ( $M = 3.80, SD = 0.56$ ) as more attractive than female targets on white paper ( $M = 3.35, SD = 0.65, r = .35$ ). There were no significant differences for men rating male and female targets on red or white paper.

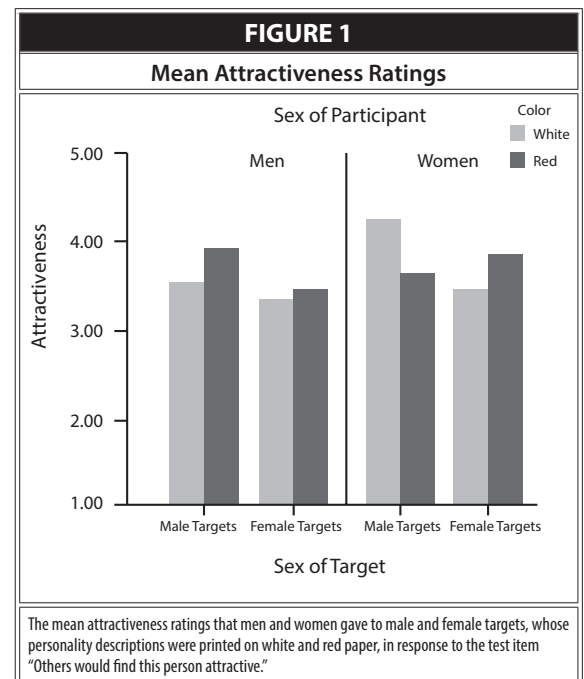
## **Discussion**

The present study examined the extent to which the color red would influence perceptions of hirability, defined as a person's capability of being hired (Dunn et al., 1995), and character attractiveness, defined as the power of irresistible attraction based on a person's character traits, attitudes, and behavior patterns (Kniffin & Wilson, 2004). We hypothesized that (a) people would rate a person to

be less hireable if they read the personality description of a potential job applicant printed on red paper rather than on white paper; (b) people would rate a person to be more attractive if they read the personality description of a potential partner printed on red paper rather than on white paper; and (c) the effect of the color red on character attractiveness would be consistent with the effect of the color red on physical attractiveness in that red would increase attractiveness ratings of opposite-sex partners but not of same-sex partners (Elliot & Niesta, 2008; Elliot et al., 2010).

The first hypothesis, that reading a personality description on red paper rather than on white paper decreases perceived hirability of the target, was mostly supported. The job description preceding the hirability items might have provided a competitiveness-fostering context in that it stated that if the person described were hired, participants would be working in close contact with this person on the same project. As a result, participants might have perceived the target to be their competitor in the work place. This would be consistent with previous literature, which indicates that red has a negative effect on human behavior in performance and competitiveness-based contexts (e.g., Rutchick et al., 2010). However, it should be noted that this finding was marginally significant ( $p = .055$ ) and its effect size was small to medium ( $r = .20$ ). Thus, conclusions should be drawn with caution.

The second hypothesis, that reading a



personality description printed on red paper rather than on white paper increases perceived character attractiveness of the target, is partially supported. For the dependent measure “I think this person is attractive,” which, compared to the other attractiveness items, assessed attractiveness in the most explicit way, participants rated targets whose description was printed on red paper as more attractive than targets whose description was printed on white paper. These findings replicate and extend previous work by Elliot and Niesta (2008) and Elliot et al. (2010), who found that viewing a photograph of a target person on red background increased perceived physical attractiveness of the target. Therefore, we can conclude that the positive effect of the color red on human affect may not be limited to visual stimuli, as perceived when seeing a target’s photograph, but may generalize to verbal information, as perceived when reading a target’s personality description.

The third hypothesis, that red increases attractiveness ratings of partners of the other sex but not of partners of the same sex, was not clearly supported. Women rated female targets whose description was printed on red paper as more attractive than female targets whose description was printed on white paper. However, women rated male targets whose description was printed on red paper to be less attractive than those whose description was printed on white paper. There were no significant differences for men rating male and female targets whose description was printed on red and white paper. These findings are inconsistent with Elliot and Niesta (2008) and Elliot et al. (2010). It may be that this inconsistency is due to the difference in stimuli used in the present study (a personality description) and the previous studies (a photograph). De Vries (2010) found that for men assessing the attractiveness of a potential female partner based on dating profiles, personality descriptions were only half as influential as photographs. However for women, expressed dating interest was equally affected by personality descriptions and photographs of male targets. Because personality descriptions were used in the present study, these findings might explain why there were no significant differences for men rating the attractiveness of male and female targets on red and white paper but why there were differences for women rating male and female targets.

It is also possible that the meaning of the color red may change when associated with different sexes. Because women only perceived female

targets described on red paper as more attractive than female targets described on white paper but perceived male targets described on red paper as less attractive than male targets described on white paper, it may be that the color red only enhances women’s attractiveness. The reason behind this effect might be that the biological force that causes women to appear more attractive to others during ovulation when their skin tones are reddened should not have an influence on men’s attractiveness, because men’s fertility is not indicated by a reddening of the skin (Waite et al., 2006).

### **Theoretical and Practical Implications**

The present study indicates that the valence of the effect of red is context-dependent. Red had a marginally significant negative effect on the dependent measure of hirability, but had a positive effect on the most explicit dependent items of character attractiveness. The dependency of the effect of the color red on the context in which red is viewed may be explained by the symbolic meaning of the color in the given situation. The job description preceding the hirability questions provided a performance-based context, which seemingly enhanced red’s symbolic meaning of competitiveness and danger. Ratings of attractiveness include a context that is based on the evaluation of partners of the other sex, in which red is thought to serve a symbol of sex, love, and romance. It is possible that this issue of context-dependency may extend beyond the simple context in which the color is presented to how red is used and also to how much red is used (e.g., purpose, channel, dominance in the visual field).

Our findings may be of interest to users of online dating services or other social media, whose goal it is to attract potential partners. By constructing their profiles to include a red background or red font they may increase the probability of successfully reaching that goal. However, individuals in online dating and other social media settings should be careful when using the color red in their profiles. Although red has been shown to increase positive feelings in relational contexts, it has also been shown to increase negative feelings in competitiveness-based contexts and to be related to perceptions of aggression and danger. People searching for the best suitable partner through the use of social media compete with a great number of other social media users. In fact, several users may be interested in a single person’s profile. In addition, a person using red in their profile may be

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perceived by others as dangerous or aggressive, two personality traits that are not helpful when trying to attract potential mates. Thus, red may not only have positive effects in these contexts but may also have negative effects in that red could appear attractive to potential mates but competitive to rivals.

In job application settings, it generally may be advisable to shy away from the use of the color red in either clothing or application materials because red may decrease one's chances of being hired. However, it is possible that there may be hiring benefits of the red 'power tie' for men and similar smaller accessories. Red suits/dresses may be bad, but red accents (tie, kerchief, lipstick) may be good. It is also interesting to note that it may be possible that, depending on the job, competitiveness and aggression could be job assets and, thus, the use of the color red may be advantageous.

### Limitations

The results of the present study and their implications should be viewed in light of several limitations. First, implications for the present study may be constrained by the relatively small size of the sample in terms of gender. Effects of the color red may be stronger if the study had been conducted using a larger sample.

Second, it is uncertain whether the results of the present study are due to the color red itself or to the novelty of the paper color. The color red is more unusual and novel than white, not only relative to general expectations (most books, tests, and letters are printed on white paper as opposed to red paper), but also within the packet of papers in the present study (the hirability, attractiveness, and demographic items were printed on white paper). For example, in an organizational setting, an application printed on red paper rather than white paper is untraditional and thus, may be viewed as unprofessional. This may decrease an applicant's chance of being hired.

Third, the use of an extended attractiveness measure, as opposed to the shorter measure used in previous studies (e.g., Elliot et al., 2010), might have impacted the results, as indicated by the finding that the 9-item attraction summation did not yield any significant findings although analyses of the individual core items as adapted from Elliot et al. (2010) did yield significant findings. Examining the three core attractiveness items separately may present a threat to statistical conclusion validity, particularly the effects of fishing on Type I error rates. It is possible that some of the additional items

included in the nine-item attractiveness measure might not have exclusively tapped attractiveness but might have tapped a related construct. For example, the item "This person and I would probably have a good connection" might have tapped compatibility rather than perceived attractiveness. However, although plausible, the present data do not support this possibility. When testing for inter-item reliability, the reliability of the overall scale was not increased through the removal of certain items. Nevertheless, it may be advisable to use a shorter, three-item measure of attractiveness, consistent with measures used in previous studies (e.g., Elliot et al., 2010), and consisting of the items "I think this person is attractive," "If I were to meet this person, I would think he/she is attractive," and "Others would find this person attractive" in future studies. However, it should be considered that scale reliability may be sacrificed through the use of a shorter scale.

Finally, it remains unclear whether the attractiveness questions used in the present study actually tapped character attractiveness. Although it is possible that participants evaluated the personality characteristics of the target person as outlined in the personality description to infer character attractiveness, it is also plausible that they evaluated physical attractiveness by inferring physical appearance based on the information from the description (e.g., they might have imagined the person described to be athletic because "being active outdoors is one of Joan's favorite things to do.") However, because no photograph was used, we may assume that participants were evaluating the target person's nonphysical rather than physical attractiveness.

### Future Directions

Future studies may address some of the previously described limitations. Given the small to medium effect sizes, researchers may consider increasing the size of the overall sample. Furthermore, researchers may use a nonred but novel (e.g., green or blue) color to control for the effect of novelty of the color red. Methods may be augmented by limiting the attractiveness measure to the three core items adapted from Elliot et al. (2010) if doing so does not decrease scale reliability. Finally, a subset of the participants may be interviewed after completion of the questionnaire to determine which strategies they used to evaluate the target's attractiveness. This would allow researchers to determine whether participants actually are evaluating the target's



character attractiveness or whether they are inferring physical information from the description provided. This follow-up interview also may shed light on the issue of whether participants were under the impression that the target chose to use the color red for their description. A target's intention of using an unusual background color for their description may have an impact on participants' impressions of the target.

In addition, it may be of interest to test the effect of the color red in online dating and other social media contexts. Will red have a positive effect by enhancing a user's attractiveness or will red have a negative effect by increasing feelings of competition with this user or by increasing perceptions of danger and aggressiveness? Similarly, it may be interesting to take a closer look at red's context-dependency. Does the effect of red simply depend on the context itself or also on the way in which red is used in this context and on the amount of red used? As mentioned earlier, it may be possible that although red suits and dresses decrease a job applicant's chances of being hired, red accessories may be advantageous in this context.

Finally, it would be useful to determine whether the effect of other colors, such as blue or black, is also context-dependent. Given the previous literature suggesting the importance of the color red in regards to human affect and behavior, we concentrated on this color in the present study. However, assumptions about the symbolism of other colors (such as "black symbolizes eroticism" versus "black symbolizes evil and death," Elliot & Maier, 2007) exist as well.

## Conclusion

Bearing the limitations previously discussed in mind, it can be concluded from the present findings that the effects of the color red are context-dependent. Red may increase undesirable behaviors and attributes in performance-based contexts that foster competitiveness, such as contexts in which job applicants' hirability is being evaluated, but may also increase desirable behaviors and attributes in more pleasant context, such as contexts in which people's attractiveness is being evaluated.

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*Author Note.* Julia F. Hammett, Department of Psychology, San Diego State University; Emily J. Issler, Department of Psychology, San Diego State University; Holly E. Bashore, Department of Psychology, San Diego State University.

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Correspondence concerning this article should be addressed to Julia F. Hammett, Department of Psychology, San Diego State University, San Diego, CA 92182. Email: juliabussberg@aol.com.

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# Blacks in the Red: Racial Discrimination in Funding Allocations

Donte L. Bernard, Jessica L. McManus, and Donald A. Saucier\*  
Kansas State University

**ABSTRACT.** In interracial helping situations, discrimination is likely to occur particularly when it cannot be justified by using other situational factors (e.g., the justification-suppression model of prejudice; Crandall & Eshleman, 2003). Through use of the justification-suppression model of prejudice as a theoretical foundation, we conducted a study to examine if individuals who were higher in racism would be less likely to allocate funds to organizations that help racial minority students. White participants completed a racism measure and later were asked to allocate a large sum of money across a variety of student organizations, one of which helped racial minority students. Results revealed that participants allocated less money to the organization that benefitted Black students. Participants' racism scores, however, were uncorrelated with the amount of money that was allocated to each group. These results add to the literature on discrimination in helping situations, suggesting that in interracial allocation situations, the race of those in need may significantly influence how much is ultimately given.

As American society continues to become more racially and ethnically diverse, various organizations, groups, and charities have formed in order to support and advocate for racial minority groups (e.g., National Black United Fund, National Association for the Advancement of Colored People). However, with the current state of the economy, many of these organizations lack the funds and resources needed to increase opportunities for minority group members (Fairlie & Robb, 2008). This raises the question: how much financial support do these organizations receive from nonminority individuals and groups? As an example, a study of the National Institute of Health's (NIH) research funding of Black and White applicants found that Blacks were 10% less likely than Whites to receive research funding (Ginther et al., 2011). Although we cannot say for certain, this disparity in the allocation of funds may be explained as a result of discrimination, prejudice, and negative perceptions of minorities,

as the rates of funding given to minority members is considerably less than the funding given to White nonminority group members. Although racism and subsequent discrimination may appear to be declining (Bonilla-Silva & Dietrich, 2011; Dovidio & Gaertner, 1991; Pearson, Dovidio, & Gaertner, 2009), examples such as these provide evidence that this may not truly be the case, as these unsettling differences suggest that the decision to help others may be significantly influenced by the race of those in need of help (McManus & Saucier, 2012).

Racism and discrimination are rarely expressed openly or as apparently as in the past, instead manifesting in more subtle forms that are harder to detect (Crosby, Bromley, & Saxe, 1980; Dovidio & Gaertner, 2000; Dutton & Lake, 1973; Gaertner & Dovidio, 1986). As a result, researchers have employed various methods ranging from the use of hypothetical to real-life behavioral situations in order to identify what moderates these expressions of prejudice and discrimination, specifically in the

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realm of helping situations (e.g., Bryan & Test, 1967; Dovidio, Gaertner, Kawakami, & Hodson, 2002; Plant & Devine, 2003; Rosenfeld, Greenberg, Folger, & Borys, 1982).

### **Discrimination in Helping Situations**

Previous research on helping and discrimination has found that various factors may aid in justifying discriminatory behavior, such as distance, time, effort, and investment, which may play a pivotal role in the ultimate decision to withhold aid from Blacks in helping situations (Crandall & Eshleman, 2003; Crosby et al., 1980; Kunstman & Plant, 2008).

A review of nonverbal behavior, aggression, and helping paradigms examined by Crosby et al. (1980) revealed that Whites offered less help to Blacks than to Whites in 40% of the studies they examined, suggesting that anti-Black discrimination occurs frequently in helping situations. This review predominantly examined discrimination from majority group members (Whites) toward minority group members (Blacks). Specifically, they found discrimination to occur in situations in which there was no direct face-to-face contact and when the White helper and the Black person in need of help were farther apart. It is important to note that the synthesis of past literature conducted by Crosby and colleagues focused primarily on between group design studies. Findings from Crosby et al. (1980) illustrated that although discrimination may not be as evident in our society, it still may play a significant role in the decision to help. These findings were again illustrated by Saucier, Miller, and Doucet (2005) in a meta-analysis inspired by the results of Crosby and colleagues' study. Results from Saucier et al. (2005) illustrated that when potential helpers had more opportunities to rationalize not helping with reasons having nothing to do with race (e.g., high risk, lack of time, scarcity of resources) Black targets were helped less than White targets. Similar findings can also be seen in Kunstman and Plant's (2008) study investigating the influences of the severity of emergencies on racial biases in helping situations. In line with the previous findings, Kunstman and Plant found that as the severity of an emergency increased, the speed and quality of help offered from White participants to Blacks compared to Whites decreased.

Together, Crosby et al. (1980), Kunstman and Plant (2008), and Saucier et al. (2005) illustrated that although discrimination may not be as evident in our society, it still may play a significant role in the decision to help. A more recent study by

Saucier, McManus, and Smith (2010) supported these findings, revealing that Whites higher in racism were more likely to support an expensive scholarship proposal only when the scholarship recipient was seemingly White, not Black. Helping paradigm studies such as those mentioned have shown that although it is socially unacceptable to act in a prejudiced manner (Plant & Devine, 2003), some Whites may subtly express discrimination by offering less help to Blacks than to Whites in some situations (Crosby et al., 1980; Saucier et al., 2005, 2010). As such, it is our belief that discrimination will occur in the allocation of funds between in-group and out-group members.

The hypothetical task of allocating resources (i.e., funds, time, effort) is often used within the social psychology field as a measure of helping (e.g., Chen & Li, 2009; Murphy-Berman, Berman, & Campbell, 1998). However, research investigating the allocation of funds, specifically in interracial helping situations, appears to be under-investigated. One such study conducted by Stepanikova, Triplett, and Simpson (2011) examined allocation tendencies between Whites with high and low implicit biases toward Blacks. This study asked participants to decide how to split up a monetary endowment between themselves and an imaginary White or Black partner. Through use of a one-shot dictator game (Eckel & Grossman, 1996), which is a common standard of behavioral measures of both altruism and generosity in several fields (e.g., Benenson, Pascoe, & Radmore, 2007; Eckel & Grossman, 1996; Simpson & Willer, 2008), it was illustrated that those with higher implicit biases toward Blacks allocated significantly more money to a White partner than a Black partner. These results suggest that a potential helper's decision to help may be greatly influenced by the race of the individual or group in need of help. The current study seeks to further examine discrimination in interracial helping situations by examining helping disparities between in-groups and out-groups through the relationship between racial attitudes and the allocation of student privilege fees between student organizations that do and do not support racial minority groups.

### **Justification-Suppression Model of the Expression of Prejudice**

The expressions of prejudice have changed from more overt to covert methods, creating the illusion that racism is declining (Dovidio & Gaertner, 1991). As a result of this shift, various paradigms

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have been created in order to aid researchers in studying the covert expression of contemporary prejudice. One such theory that may help to explain why discrimination is likely to occur in more subtle or ambiguous situations is the justification-suppression model of the expression of prejudice (Crandall & Eshleman, 2003). In short, this theory argues that people in general want to appear nonprejudiced to themselves and others. The conscious decision to suppress prejudice is often related to internal forces (e.g., egalitarian beliefs) or external forces (e.g., social norms condemning prejudice). As such, when behaviors may be perceived as prejudiced, people are more likely to suppress the expression of prejudice. However, prejudiced behavior is less likely to be suppressed when it is not easily perceived or when it can be justified by other factors having nothing to do with prejudice. However, prejudiced behavior is less likely to be suppressed when it is not easily perceived as being prejudice, or when it can be justified by other factors having nothing to do with prejudice. When this prejudice is expressed, it is done in a way that is justifiable to self and others as something other than discrimination in order to avoid contradicting one's own egalitarian beliefs and social norms (Devine, Monteith, Zuwerink, & Elliot, 1991; Plant & Devine, 1998). It is our contention that individuals higher in racism would be less likely to suppress their negative attitudes toward out-group members when compared to individuals lower in racism. As such, we believed individuals higher in racism would allocate significantly less money to organizations that support a racial minority group when compared to student organizations that do not support racial minority groups.

#### **Arousal: Cost-Reward Model of Helping**

The inconsistencies we expected to arise among participant allocation responses between student organizations that did and did not support racial minority groups may further be explained through the arousal: cost-reward model of helping. This model states that individuals experience feelings of arousal when witnessing others in need of help (Piliavin, Dovidio, Gaertner, & Clark, 1981). As a result, individuals will attempt to reduce this arousal, making decisions about how to do so based on their assessment of the comparative costs of helping (e.g., assumed risk, effort, or time) and the costs of not helping (e.g., guilt, level of target's suffering, or perception of the emergency). Interestingly, research suggests that Whites may provide

more quality help (e.g., additional time, additional resources, or extra effort) to Whites than they do to members of another race, which may be a result of Whites associating more costs with helping Blacks and more rewards with helping Whites (Saucier et al., 2005). These differences of perceptions between Whites and Blacks may be explained as a result of various perceived differences, such as the lack of similarity between the potential helper and person or group in need of help (Avdeyeva, Burgetova, & Welch, 2006; Marjanovic, Greenglass, Struthers, & Faye, 2009).

#### **The Current Economy in the United States**

The current American economy inspired us to create a study focusing on the allocation of resources to certain student groups, as our economy has forced organizations including federal and state governments, as well as universities, to make significant budget cuts. The recent economic and financial crisis in the United States and other countries is the worst it has been in 50 years (Aiginger, 2009), and it has forced many families, businesses, and organizations to make significant cuts in spending and has resulted in an increase in unemployment rates. Consequently, budget cuts are an unfortunate, but common occurrence as a result of the down economy. Frequently, these budget cuts force organizations to be pitted against each other, forcing a difficult decision to be made by the organizations of whom to fund. An example of this can be seen in California, as Governor Jerry Brown signed a state budget that cut \$195 million in college financial aid and state childcare programs. Often, these decisions of allocating resources are based on cost and reward analyses when decisions of who to help and who not to help must be made. However, the costs and rewards of helping Blacks and Whites may be seen differently (Piliavin et al., 1981; Saucier et al., 2005), and as a result, the race of the individual or group in need of help may influence the assessments of the cost and rewards in a helping situation. In college settings, different clubs, groups, and organizations compete for funding in order to support their endeavors. This leads one to question if the race of the group in need of support influences others' decisions to support them.

#### **Current Study**

Past studies have primarily examined the allocation of funds among differing groups (e.g., Ford, Boxer, Armstrong, & Edel, 2008; Stepanikova

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et al., 2011), however few have investigated the discrepancies in money allocation that may occur when allocating resources among groups that may or may not support a racial minority group. Utilizing predictions from the justification-suppression model of prejudice and the arousal: cost-reward model of helping, the purpose of this study was to examine the differences in money allocation of student privilege fees to a student organization that supports a racial minority group (i.e., Black Student Union or BSU), when placed among other student organizations that do not support a racial minority group. We hypothesized that a student organization that supported a racial minority group would be allocated significantly less money than student organizations that did not support a racial minority group. Further, we contended that individuals' levels of racism would be negatively correlated with how much money they allocated to the student organization that supported a racial minority group.

## Method

### Participants

This study was completed with approval from the institutional review board where the research was conducted. For the current study, the researchers were interested in examining racial discrimination from Whites towards Blacks. As a result, the current study included only White undergraduate participants ( $N = 207$ ) that attended Kansas State University, which is predominantly composed of White students. The university is located in a rural area of Kansas with a predominately White population. However, three participants failed to fully complete all parts of the study and their data were not included in further analyses. Of the 207 participants, 53.1% were men and .9% were women, with the average age being 19.24 years ( $SD = 3.06$ ). Participants received credit to partially fulfill their General Psychology course research participation requirement.

It is important to note that because we were specifically interested in the expression of racism by the majority (i.e., White) on minority (i.e., Black) group members, we did not look at a more diverse sample of participants. Additionally, because we were interested in the manifestations of racism and discrimination on a college campus, we wanted to examine the expression of prejudice within the college student population, specifically at a university with a predominantly White student body.

### Materials

**Racial Argument Scale (RAS).** The RAS (Saucier & Miller, 2003) was used to assess participants' level of racial prejudice against Blacks. The RAS is an indirect measure of racial attitudes that asks participants to rate how much an argument supports a conclusion about contemporary social issues involving the treatment of Blacks. The RAS consisted of a series of five short paragraphs arguing positions that represented various contemporary social issues that involve the treatment of Blacks. To complete the RAS, participants were asked to rate their agreement with the conclusion that followed each argument with a Likert-type scale from 1 (*not at all*) to 9 (*very much*). According to the RAS, participants with higher scores on this scale are higher in racism than those with lower scores. The scale has been found to have good internal consistency, convergent validity, test-retest reliability, predictive validity, and is not influenced by social desirability (Saucier & Miller, 2003). Participants completed the Racial Argument Scale as part of an online mass screening at the beginning of the semester. A sample argument and conclusion can be seen below.

**Argument:** It has been shown that White Americans score 15 points higher on IQ tests than African Americans. This difference in IQ scores has even been shown when other variables such as education levels and socioeconomic status are taken into account.

**Conclusion:** Whites are more intelligent than African Americans.

**Allocation task.** Participants completed an allocation task that would indirectly measure levels of discrimination toward Blacks. The task consisted of allocating \$300 in student privilege fees among 15 different student organizations; only one of these groups supports a racial minority groups (i.e., the Black Student Union). Students at Kansas State University are required to pay a student privilege fee as part of their tuition during their time spent attending the school. Students currently pay roughly \$365 per semester in privilege fees; however \$300 was used in our study to make the allocation task simpler for participants. This privilege fee allows students access to various commodities on campus, such as the recreation center, the campus health center, and various organizations around campus. As a result, emphasis was put on describing the \$300 as student privilege

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fees in order for participants to perceive the money as their own money being allocated.

Each student organization used was an actual student organization at Kansas State University, and each was followed by a short explanation describing the organization's purpose. Additionally, the organizations that we selected benefited different subsets of the student population. This was done in order for participants to have a random yet broad selection of organizations in which they could potentially allocate funds. The presentation order was randomized (with the exception of BSU), in order to convey that there were no biases toward any organizations. However, BSU was listed third, in order to ensure participants noticed this organization was on the list, thus not allowing the justification of saying they ran out of money to allocate to BSU. See the appendix for a full list of student organization names and descriptions along with the instructions provided to the participants.

### Procedure

The study was conducted in two phases, with the first being the completion of the RAS as a part of an online mass screening session via Sona Systems, at the beginning of the semester. The second phase of the study was conducted in the following months of the semester. For phase two of the study, participants signed up via Sona Systems. We were particularly interested in students who participated in phase one of the study in order to link racism scores from the RAS to allocation responses; however, any White undergraduate was eligible to participate. At the time of the study, participants were placed in a classroom setting and instructed to make decisions regarding the allocation of \$300 in student privilege fees among 15 different student organizations within the university. At this time participants were presented with the allocation measure and instructed that all \$300 had to be allocated; however, how the fees were allocated were entirely up to them. In order to make the allocation task more believable, emphasis was put on describing the \$300 as "student fees" so they would perceive it as their money being allocated. After their completion of the task, participants were debriefed and thanked for their time.

## Results

### Allocation Between Groups

Our first hypothesis was that the student organization that supported a racial minority group would have less money allocated to them than the student

organizations that did not support a racial minority group. To test this hypothesis, we conducted a repeated measures analysis of variance to examine mean differences in the amount of money allocated to each of the 15 organizations. The ANOVA revealed differences in the average amount of money allocated across the 15 student organizations,  $F(14, 2842) = 9.93, p < .001$ . This significant main effect was probed using Bonferroni-corrected multiple comparison procedures. Through these analyses, it was found that BSU was allocated less money ( $M = 11.70, SD = 12.47$ ) than each of the other student organizations. Specifically, BSU was allocated significantly less money than nine of the 14 other student organizations ( $M = 17.41$  to  $34.97, SD = 19.65$  to  $47.49$ ),  $M_{diffs} = 5.72$  to  $23.27, SEs = 1.52$  to  $3.53, ps < .022$ . BSU was allocated significantly less than: the Dairy Science Club, Kinesiology Student Association, Architecture Planning and Design, Engineering Student Council, College of Business Ambassadors, International Honor Society of Psychology, International Buddies, Arts and Sciences Council, Agriculture Student Council, and Union Program Council. Out of the 207 participants, 19 participants allocated money to two or less organizations and 110 participants allocated some portion of the money to all 15 organizations. Most importantly, we found that 79 participants donated \$0 to BSU but made donations to other groups. When participants allocated \$0 to BSU, on average they allocated \$20.24 to the remaining organizations. Ultimately, our primary hypothesis was supported; the BSU was allocated significantly less money than was allocated to of the majority of the other student organizations (see Figure 1).

Although we found significant differences in the average amount of money allocated across the 15 student organizations, it is not reasonable to conclude that BSU was allocated less money because it serves a smaller student population. In actuality, each organization serves only a minority of students on campus. As such, the number of students BSU serves is similar to that of every student organization listed.

### Racism Levels and Money Allocation

Our second hypothesis was that levels of racism would be negatively correlated with the amount of money allocated to the student organization that supported a racial minority group (i.e., BSU). To test this, we calculated correlation coefficients between participants' scores on the RAS and how much money they allocated to each student

organization. We were only able to connect 80 participants RAS scores to their allocation responses; therefore the following correlations only reflect those 80 participants<sup>1</sup>. Surprisingly, and contrary to our hypothesis, RAS scores were uncorrelated with the amount of money allocated to BSU ( $r = -.05$ ,  $p = .664$ ). Scores on the RAS were not significantly correlated to the amount of money allocated to any of the organizations, ( $r$ s =  $-.002$  to  $-.161$ ,  $p$ s =  $.155$  to  $.989$ ).

## Discussion

The current study examined the differences in the allocation of student privilege fees to a student organization that supports a racial minority group when placed among other student organizations that do not support a racial minority group. Consistent with our hypotheses, results revealed an overall main effect for money allocation such that the organization that supported a racial minority group was allocated significantly less money than nine of the 14 other student organizations that did not support a racial minority group. Moreover, results revealed RAS scores were uncorrelated with the amount of money allocated to BSU, suggesting that the allocation task may not have been strong enough to elicit significant discriminatory responses. Nonetheless, these results offer support to empirical research that has investigated the manifestation of prejudice in helping situations and the role that discrimination may play in allocating funds.

First, the finding that BSU was allocated significantly less money than nine of the student organizations could be explained through the justification-suppression model of prejudice (Crandall & Eshleman, 2003) because participants may have allocated more money to the student organizations that they most identified with. This may have allowed justifications to be made in defending the discrepancies in money allocation to the student organization that supported out-group members. As a result, BSU may have been seen as the least beneficial of the student organizations, thus, leading to the discrepancy in allocation of student privilege fees. There were many organizations in this study that only supported a specific group of interests (e.g., Dairy Science Club, Agricultural Student Council, Kinesiology Student Organization), however these organizations were all allocated significantly more money than BSU, suggesting that the race of the individuals belonging to the organization may have been a factor in the ultimate allocation decision. Secondly, these findings may

be explained by the arousal: cost reward model of helping (Piliavin et al., 1981) because by allocating even a small amount of money to BSU, participants may have been able to affirm their egalitarian beliefs and values, consequentially alleviating any arousal and conflict of their beliefs that may have arisen if they had allocated no money to a group that supported a racial minority group. Participants may have viewed the risks of allocating funds to BSU as higher than the risks of allocating funds to organizations that do not support a racial minority group. This could be because White individuals may see little personal benefit to donating to smaller minority organizations, and past research suggests that Whites have been found to associate more costs with helping Blacks and more rewards with helping Whites (Saucier et al., 2005).

It is logical to think that an individual's racism level would be inversely related to the amount of money they would allocate to a group that supported minorities. However, our results showed that no significant relationship was revealed between RAS scores and allocation tendencies. These unanticipated results may be explained through the aversive racism theory (Gaertner & Dovidio, 1986), which explains that although Whites believe they have egalitarian attitudes, they may experience anxiety and discomfort around Blacks. The current method did not place participants in a situation in which direct face-to-face contact was needed, which may have lessened the feelings of discomfort and anxiety felt by helpers in a face-to-face interaction. However, because BSU was allocated less money overall, this suggests that the race of the individuals receiving help may ultimately affect an individual's overall decision to provide help, despite their levels of racism. Overall, our results suggest that participants may be more likely to allocate significantly more amount of funds to organizations in which they may directly benefit, and significantly less to organizations that support a specific group of which they are not a member (i.e., racial minority groups).

## Limitations

One limitation of this study may have been the type

<sup>1</sup>During both phases of the study, participants were asked to indicate the last six digits of their school ID number. However, due to participants incorrectly reporting their school ID number, not reporting their school ID number, or only participating in one phase of the study, we were only able to match 80 participants' RAS scores and their allocation responses. Therefore, the following correlations only reflect those 80 participants.

of resources we asked participants to allocate. Many students are able to afford and attend college only as a result of loans, scholarships, and part-time jobs. As a result, many college students do not have a lot of money and may find the student privilege fees unnecessary. As such, student privilege fees may be a “sore issue” among students; therefore student’s resentment in paying these student fees may have emerged in their responses. This resentment may also have emerged from students who do not participate in any organizations because they too must pay these student fees, regardless of how involved they are on campus. As a result, the allocations may not have been a truthful representation of their beliefs. Moreover, students whose parents fund their college education would not be concerned about the student privilege fees because they are included in tuition. However, college students were examined because student organizations on campuses are constantly competing for money, and students are usually the ones who decide who receives the funding through student governing associations. Another possible limitation may have been that our study utilized self-report measures, and as a result have been affected by the common biases related to the self-report method. However, by including realistic information such as student privilege fees and actual student organizations on campus, this situation was made as plausible as possible, because organizations on university campuses are constantly searching for funding and support. Lastly, although there are many types of

prejudice and discrimination, we focused solely on White discrimination against Blacks. However, if this study were conducted with another minority organization, we contend the results would likely be similar, because aversive racism theory has been shown to apply to the treatment of other minority groups and does not apply exclusively to White against Blacks discrimination (Sue et al., 2007).

### Future Directions and Conclusions

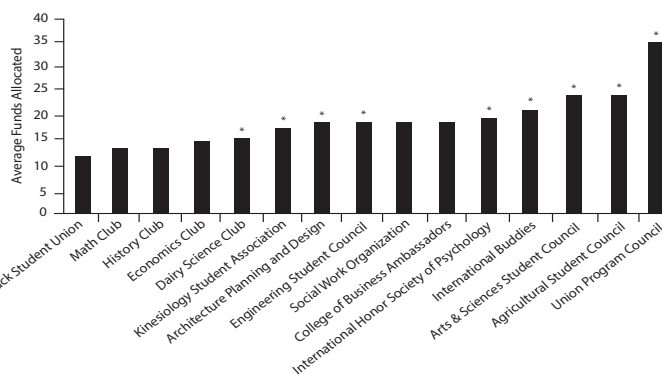
Unfortunately, decisions to offer aid and resources are often unfairly made (e.g., Ginther et al., 2011) and may be influenced by negative attitudes toward certain groups (e.g., Stepanikova et al., 2011). Our findings revealed that participants unfairly allocated money to BSU, illustrating that there are differences in allocation responses when allocating between organizations that do and do not specifically support racial minority groups. This may have a significant impact on the future growth and success of organizations that openly advocate for racial minorities groups (e.g., NAACP, National Black United Fund, National Latino Professional Organizations). As such, future research should continue to study the relationship between prosocial behavior and prejudice, specifically in hopes of identifying the decision-making factors that may influence the ultimate decision to help. Overall, these results offer insight into the role that racism and discrimination may play role in the ultimate decision of the allocation of resources to competing groups.

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**FIGURE 1**

#### Average Amount of Money Allocated to Student Organizations



\* Indicates that Black Student Union (BSU) was allocated significantly less money than the following: Dairy Science Club, Kinesiology Student Association, Architecture Planning and Design, Engineering Student Council, College of Business Ambassadors, International Honor Society of Psychology, International Buddies, Arts & Sciences Council, Agriculture Student Council, and Union Program Council.



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*Author Note.* Research conducted by Donte L. Bernard, now at University of North Carolina at Chapel Hill, Department of Clinical Psychology, Jessica L. McManus, now at Carroll College, Department of Psychology, and Donald A. Saucier, Kansas State University, Department of Psychology.

Correspondence concerning this paper should be addressed to Donte Bernard, 242 Davie Hall, University of Chapel Hill, Chapel Hill, NC 27599. Email: dlb36@unc.edu

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## APPENDIX

### Privilege Fee Allocation Among Student Organizations

Over the past couple of years, Kansas State University (KSU) has been trying to find a better way to allocate the money from the privilege fees that are included in every student's tuition. Currently a student's privilege fee is used to fund different organizations such as the Rec, the Student Union, the *Collegian*, etc. As of this year, each student pays roughly a total of \$600 per academic year to cover their privilege fee, about half of which will go to the Union and Lafene, leaving about \$300 to be allocated to remaining student organizations. Below are 15 KSU student organizations that are also the most common organizations across schools in the Big 12 Conference. Different students will get different lists of student organizations to ensure all student groups are represented.

Knowing this, please allocate the remaining amount of money (\$300) to KSU organizations by giving as much or as little to each group as you see fit. This is your money and the administration wants to know how you would like to spend it.

**Please do not exceed \$300 total across these 15 organizations.**

1. \$ \_\_\_\_\_ **Agricultural Student Council** (promotes the college of agriculture to students at KSU)
2. \$ \_\_\_\_\_ **Architecture Planning and Design** (raises awareness of architecture at KSU)
3. \$ \_\_\_\_\_ **Black Student Union** (brings together African American students at KSU)
4. \$ \_\_\_\_\_ **College of Business Ambassadors** (created by business majors who represent KSU at major events)
5. \$ \_\_\_\_\_ **Dairy Science Club** (promotes dairy science to students at KSU)
6. \$ \_\_\_\_\_ **Engineering Student Council** (promotes engineering to students at KSU)
7. \$ \_\_\_\_\_ **Arts & Sciences Student Council** (promotes the arts and sciences to students at KSU)
8. \$ \_\_\_\_\_ **History Club** (raises historical awareness about KSU to students)
9. \$ \_\_\_\_\_ **International Buddies** (pairs international students with students from the United States who also attend KSU)
10. \$ \_\_\_\_\_ **Kinesiology Student Association** (promotes and enhances knowledge of kinesiology at KSU)
11. \$ \_\_\_\_\_ **Economics Club** (promotes the importance of economics to students at KSU)
12. \$ \_\_\_\_\_ **Math Club** (created for students to promote the importance of math in the workplace)
13. \$ \_\_\_\_\_ **International Honor Society of Psychology** (promotes psychology to students at KSU)
14. \$ \_\_\_\_\_ **Social Work Organization** (educates the community about the role that social work plays in society and the lives of its members)
15. \$ \_\_\_\_\_ **Union Program Council** (provides entertainment to KSU community and an opportunity for students to gain leadership skills)

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# Response Bias Toward Fearful Stimuli Increases as Stimulus Noise Increases

Brian D. Stirling, Madeleine S. Greskovich, and Dan R. Johnson\*  
Washington and Lee University

**ABSTRACT.** Signal detection theory was applied to investigate the role of bias in snake perception. In Experiment 1 ( $N = 16$ ), participants viewed flashing images of snakes and salamanders and were instructed to identify which image appeared. Experiment 2 ( $N = 16$ ) used a similar design but also included blurred stimuli (noisy stimuli condition) in order to generate greater noise. We hypothesized that individuals would exhibit a response bias (i.e., where false alarms exceed misses) toward snakes and that this effect would increase in Experiment 2 due to greater uncertainty in the noise condition. In Experiment 1, participants recorded significantly more false alarms than misses ( $p = .002$ ,  $d = 0.97$ ). In Experiment 2, participants also recorded significantly more false alarms than misses ( $p = .001$ ), with a larger effect for noisy stimuli ( $p < .001$ ,  $d = 1.16$ ) than for standard stimuli ( $p = .002$ ,  $d = 0.97$ ). These results provide the first evidence of a response bias toward fear-relevant stimuli in a nonclinical population.

Evolutionary psychology seeks to explain human psychological constructs, such as memory, language, emotion, and perception, by tracing history and identifying the traits that served as beneficial adaptations for survival (Buss, 2005). The ability to rapidly detect and respond to a potential threat is one important survival mechanism. Fear typically signals danger and evokes awareness of a potential threat or hazardous situation (Buss, 2005).

A complex network of neural structures in the brain linked to the autonomic nervous system controls the rapid perception of potential danger and the detection of threat-relevant stimuli (Armony & LeDoux, 1999). One theoretical view proposed that, among these neural structures, the amygdala acts as a rapid response *fear* module by enabling both the perception of fear in others and the awareness of fear within the individual (Öhman & Mineka, 2001). Some theorize that the fear module has been shaped by evolutionary history such that evolutionary-relevant, threatening stimuli receive preferential access to this system

with little computational processing (Armony & LeDoux, 1999).

A number of studies provide evidence for the rapid detection of fear-relevant stimuli using visual search tasks. One study presented human participants with 3 x 3 matrices containing stimuli from both fear-relevant (snakes and spiders) and fear-irrelevant (flowers and mushrooms) categories (Öhman, Flykt, & Esteves, 2001). During each trial, participants were instructed to find the discrepant stimulus (e.g., one snake stimulus out of eight flower and mushroom stimuli) as quickly as possible. Participants detected the presence of fear-relevant stimuli among fear-irrelevant distractors significantly faster than detecting the presence of fear-irrelevant stimuli among fear-relevant distractors.

A number of recent studies also using visual search tasks offer further support for the rapid detection of fear-relevant stimuli. LoBue and DeLoache (2008) expanded upon the findings of Öhman et al. (2001) by investigating the response latencies to fearful stimuli in children. Children,

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ages 3- to 5-years-old, as well as adults, detected snake targets significantly faster than nonsnake targets (flowers, frogs, and caterpillars). Moreover, infants (8- to 14-month-olds) have been shown to direct their attention to fear-relevant stimuli faster than fear-irrelevant stimuli (LoBue & DeLoache, 2010). Although people of all ages have been shown to rapidly detect fear-relevant stimuli faster than fear-irrelevant stimuli, it remains unclear what process underlies this rapid detection. LoBue and DeLoache (2011) explored the explanatory mechanism by showing how a snake's coiled shape is responsible for participants' rapid detection as opposed to other visual features. However, a number of other explanations have yet to be investigated.

There are at least two competing hypotheses that could explain why participants exhibit a rapid detection of fear-relevant stimuli in visual search paradigms. One suggests that it is caused by a perceptual sensitivity, which could explain why participants are able to distinguish, for example, snake-like features from surroundings faster than flower-like features. The other proposes that it is induced by a bias to say one has seen a snake rather than a flower. One could detect a discrepant snake target faster than a flower target simply because he/she is biased to respond quickly when there is potential for a snake to be present. In addition, it seems likely that under conditions of uncertainty, the bias to respond in favor of the threatening stimulus would be advantageous. Due to the visual search paradigm's reliance on response time, it has not been possible to disentangle sensitivity from response bias explanatory mechanisms.

Signal Detection Theory (SDT; Macmillan & Creelman, 2005) offers a theoretical and computational framework that may help determine whether discrimination ability (i.e., perceptual sensitivity), response bias, or both underlie individuals' rapid detection of fearful stimuli. According to SDT, the task of detecting a stimulus involves two separate processes: discriminating the signal/target stimulus from other stimuli (sensitivity) and preference for responding "yes" or "no" when deciding if a hardly discernible stimulus was present (response criterion). An individual with a liberal response criterion will respond "yes," or signal present, when in doubt, and an individual with a conservative response criterion will yield many "no," or signal absent, responses. Sensitivity and response criterion are independent processes (Macmillan & Creelman, 2005). An individual with a liberal

response criterion could have an increased number of "yes" responses, but this will not affect his/her overall number of correct responses (sensitivity). Unlike the visual search paradigm, SDT relies on a type of accuracy and inaccuracy, including hits (saying "yes" when the signal is present) and false alarms (saying "yes" when a signal is absent) to assess sensitivity and response bias.

Becker and Rinck's (2004) study highlighted the utility of the SDT framework. They found that individuals fearful of spiders were not able to detect spider stimuli any faster than nonfearful individuals, but they applied a more liberal criterion during detection compared to nonfearful individuals. These results suggest that spider fearful individuals (spider phobics) exhibit a response bias rather than an enhanced detection of threats. However, it remains unknown whether a similar pattern would emerge in a nonclinical population.

### Present Study

The purpose of the present study was to examine sensitivity and response bias for evolutionary fear-relevant stimuli. During the experiment, participants were exposed to images of snakes and salamanders that represented fear-relevant and fear-irrelevant stimuli, respectively. The images flashed quickly on a computer screen in order to assess participants' immediate reactions to the images. The participants were instructed to identify each image as a snake or a salamander. SDT was used to measure the level of response bias. False alarms were counted when a participant thought a salamander appeared when a snake was presented instead. Misses were counted when a participant thought a salamander appeared when a snake was presented. According to Macmillan and Creelman (2005), a response bias is evident when the proportion of false alarms is greater than the proportion of misses.

Two experiments were conducted. For Experiment 1, which used the paradigm above, we hypothesized that individuals would show a response bias toward fear-relevant stimuli (snakes). Experiment 2 incorporated noisy stimuli and standard stimuli where noisy stimuli were meant to represent high environmental noise, like tall grass, and standard stimuli were the same unaltered images used in Experiment 1 (see Figure 1). For Experiment 2, we hypothesized that there would be greater response bias with noisy stimuli than standard stimuli due to higher uncertainty.

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## Experiment 1

### Method

**Participants.** Sixteen undergraduates (age range = 18–22, demographics of university = 49% women, 83% White) volunteered for this experiment<sup>1</sup>. Some participants may have received extra credit for an introductory psychology class. They were recruited from a sign-up sheet posted in the university's science building, and all participants gave informed consent before beginning the IRB approved experiment.

**Apparatus and stimuli.** Participants were individually tested in a private computer lab. The experiment was conducted on a Dell PC running E-prime software. All experiments trials, responses, and task-specific experimental instructions were presented using a computer, and all of the responses were recorded via a USB keyboard.

The stimuli presented were images downloaded from various Internet websites. For the practice trials, two categories of images were collected (cats and dogs), and each category contained two different images. For the experimental trials, two categories of images were collected (snakes and salamanders), and each category contained 13 images. All of the images were changed to grayscale to reduce the possibility of color variations affecting visual search delays, and they were equated for luminance. When presented, all of the images were positioned in the center of the screen, and the size of each image was between 700 to 850 pixels wide and 400 to 600 pixels tall (screen resolution = 1280 x 1024, refresh rate = 60 Hz). No obvious distortion was evident after adjusting image size. The 13 images were classified as standard stimuli and an identical set of 13 images were classified as noisy stimuli; noisy stimuli were manipulated using the blurring tool of Adobe® Photoshop® (see Figure 1).

**Procedure.** Participants began with eight practice trials containing neutral stimuli (dogs and cats). Each trial began with a fixation cross presented at the center of the computer screen for 1000 ms followed immediately by the stimulus, which flashed quickly for 20 ms. A mask subsequently followed the stimulus and remained on the screen for 300 ms. The words "Please Respond" then appeared on the screen until the participants responded. If the participants did not respond within 5000 ms, the next trial began and no data were recorded for that trial. Participants were

instructed to respond by either pressing the "Z" or the "M" key to identify either a fear-relevant stimulus (snake) or a fear-irrelevant stimulus (salamander), and the key assignments were counter-balanced across all participants. Participants were exposed to one block of 52 trials (i.e., 26 stimuli repeated twice) using only standard stimuli. The noisy stimuli were included in the second experiment along with the standard stimuli. Critically, snakes and salamanders were presented with equal frequencies, so that the stimulus ratio would not induce a response bias. Thus, the participants instead caused any response bias observed.

**Data analysis.** For the SDT paradigm, a false alarm occurred if a participant chose a snake when a salamander image was presented, and a miss occurred if a participant chose a salamander when a snake image was presented. A response bias toward snakes (i.e., a liberal criterion) is present if the proportion of false alarms exceeds the proportion of misses (Macmillan & Creelman, 2005). Based on the definition of SDT, response bias is independent of perceptual sensitivity. Hits and correct rejections were not included in the analysis.

### Results and Discussion

A paired-samples *t* test was performed to test the hypothesis that the proportion of false alarms would exceed the proportion of misses, thereby indicating a response bias toward snakes. An outlier was identified and removed according to the Grubb's (1969) test for outliers with an alpha level of 0.01<sup>2</sup>. This method of outlier detection is commonly used with normally distributed populations, which was expected for the proportions in this study, and has been shown to be statistically valid (Beckman & Cook, 1983). The *t* test revealed that the proportion of false alarms ( $M = .259$ ,  $SD = .157$ ) were significantly greater than the proportion of misses ( $M = .069$ ,  $SD = .060$ ),  $t(14) = 3.76$ ,  $p = .002$ ,  $d = 0.97$ .

The results supported the hypothesis that a response bias exists for the fear-relevant stimuli. Specifically, it was evident that participants were biased to respond "snake" more than "salamander" independently of their ability to discriminate between the two stimuli. This finding expanded upon Becker and Rinck's (2004) study in two ways: It found a response bias toward snakes, not just spiders, and it also found a bias within a nonclinical population, not just individuals meeting clinical

<sup>1</sup>Individual demographic information was not collected.

<sup>2</sup>Outlier exclusion did not noticeably change the results.

criteria for phobias. Although the first experiment provides evidence of response bias for fearful stimuli, Experiment 2 replicated and expanded these findings by directly manipulating conditions under which response bias should increase.

## Experiment 2

### Method

A new sample of Washington and Lee University students ( $N = 16$ ) volunteered for Experiment 2. The design was identical to Experiment 1, except noisy stimuli were added. Experiment 2 contained two blocks of 52 trials, one using standard stimuli from Experiment 1 and the other using noisy stimuli (see Figure 1). The blocks were counterbalanced across all participants, so participants were exposed to all standard stimuli either before or after all of the noisy stimuli. The additional block likely did not affect subject fatigue as each block lasted about two to three minutes (entire session lasted about 10–15 minutes).

### Results and Discussion

A 2 (animal)  $\times$  2 (noise level) within-subjects ANOVA was performed to test the differences in false alarms and misses within the standard and noisy stimuli conditions. The Grubb's (1969) test identified another outlier at an alpha level of 0.01, and it was subsequently removed from further analysis<sup>3</sup>. The significant main effect of animal,  $F(1, 14) = 19.85$ ,  $p = .001$ ,  $\eta_p^2 = .586$ , indicated that the proportion of false alarms were significantly greater than the proportion of misses. A significant main effect of noise level,  $F(1, 14) = 19.63$ ,  $p = .001$ ,  $\eta_p^2 = .585$ , indicated that the proportion of false alarms and misses in the noisy stimuli condition were significantly greater than the proportion of false alarms and misses in the standard stimuli condition. This serves as a manipulation check and demonstrates that the noisy stimuli were significantly harder to discriminate. These main effects were qualified by a significant interaction between the animal and noise level,  $F(1, 14) = 8.61$ ,  $p = .011$ ,  $\eta_p^2 = .381$ .

Two dependent  $t$  tests were used to isolate the source of this interaction, and the alpha level for these tests was set at 0.05 using the Bonferroni procedure to correct for Type 1 error. A large effect was found within the standard stimuli condition where the proportion of false alarms ( $M = .300$ ,  $SD = .174$ ) were significantly higher than the

proportion of misses ( $M = .095$ ,  $SD = .052$ ),  $t(14) = 3.77$ ,  $p = .002$ ,  $d = 0.97$  (see Figure 2). An even larger effect was found with the noisy stimuli where the proportion of false alarms ( $M = .503$ ,  $SD = .263$ ) was significantly higher than the proportion of misses ( $M = .151$ ,  $SD = .090$ ),  $t(14) = 4.51$ ,  $p < .001$ ,  $d = 1.16$  (see Figure 2).

The results replicate the findings of Experiment 1 that there is a response bias toward fear-relevant stimuli. Furthermore, they support the hypothesis that there is a greater response bias for fear-relevant stimuli in situations of higher uncertainty. In other words, the participants had more snake than salamander responses when the situation made it harder to discern between the images despite the equal exposure ratio.

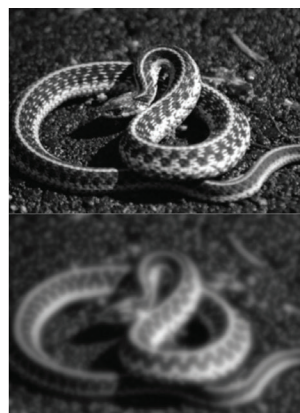
## Summary and Concluding Discussion

The results of the reported experiments provide the first evidence of a response bias in the detection of evolutionarily fear-relevant stimuli in a nonclinical population. The results of Experiment 1 demonstrate that individuals perceived more snake than salamander stimuli despite an equivalent presentation ratio. Experiment 2, which incorporated blurred images of snakes and salamanders, found that the magnitude of response bias increased as stimulus noise increased. As such, the bias effect was heightened in situations of elevated uncertainty.

Previous studies used visual search paradigms to assess whether individuals were able to more rapidly detect fear-relevant stimuli compared to fear-irrelevant stimuli. Although they have shown

**FIGURE 1**

**An Example of Fear-Relevant (Snake) Standard Stimulus (Top) and a Noisy Stimulus (Bottom)**



<sup>3</sup>Outlier exclusion did not noticeably change the results.

that humans detect fear-relevant stimuli faster than fear-irrelevant stimuli, (LoBue & DeLoache, 2008, 2010, 2011; Öhman et al., 2001), the results could not confirm if humans possessed a perceptual sensitivity toward fear-relevant stimuli as opposed to a bias. The present study incorporated an SDT framework to see if a bias existed toward fear-relevant stimuli completely separate of sensitivity, and the results revealed that this bias does exist. This did not fully answer the question, however. Humans could hold both a perceptual sensitivity and a bias toward detecting fear-relevant stimuli, making the threat-detection framework that much more robust.

Another approach the present study utilized was to decrease the sensitivity of Experiment 1's paradigm by making the stimuli harder to discern from one another. This method offered two advantages: it gave more substantial evidence for disentangling discrimination ability from response bias, and it more closely tied into situations where it would be harder to detect a fear-relevant threat (e.g., a snake moving in tall grass). It seems beneficial for survival if humans, even if incorrectly, predict that an imminent threat exists despite uncertainty. Experiment 2's results suggest this is the case.

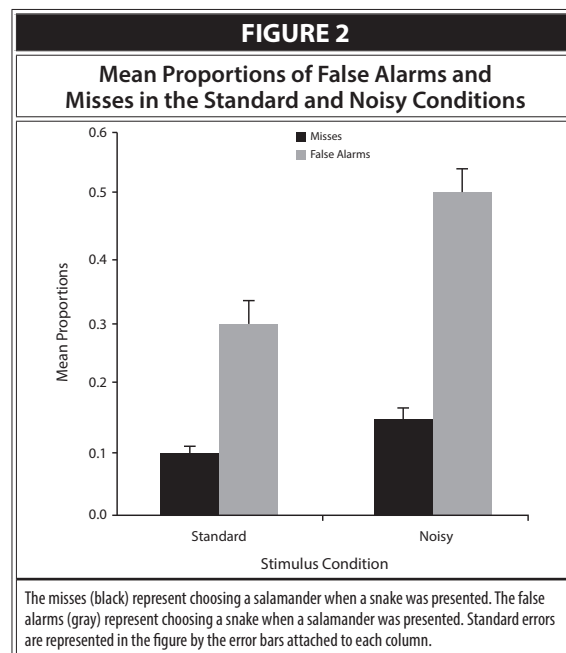
A notable strength of this study was the similarity between the fear- and fear-irrelevant stimuli. LoBue and DeLoache (2008), for example, were the authors to pair up the fear-relevant stimuli with closely matching controls, such as snakes with caterpillars. Caterpillars, besides the prominent coil shape, do not carry many visual similarities with snakes. The present study used salamanders, which are known for the following traits: limb reduction, body elongation, snake-like facial features, and partial coil-like features. The choice of salamanders made it harder for participants to disambiguate between the stimuli, which provided an especially convincing test for a response bias in detecting evolutionarily fear-relevant stimuli.

The results from this study expanded upon Becker and Rinck's (2004) study, which found that spider phobic individuals exhibited a response bias toward spiders, by revealing a response bias in a nonclinical population. The present study, however, did not investigate the possibility of a response bias toward spiders in a nonclinical population. A future study would be necessary to see if a response bias exists toward other fear-relevant stimuli, such as spiders, angry faces, and fearful faces, for a nonclinical population in order to see if this

response bias can be generalized to all evolutionarily relevant threatening stimuli.

It is important to acknowledge some limitations present in this study. Firstly, the computer monitors had a refresh rate of 60 Hz even though the stimuli were presented for 20 ms. This could have potentially had some stimuli flash in the range of 20–60 ms. However, the stimulus presentation range still made the task challenging, thereby creating conditions under which response bias is most likely to present itself. Secondly, one could argue that the present study did not properly represent a real-life animal encounter. There are a number of reasons for this argument: (a) animals do not usually appear in a 50:50 ratio, (b) a snake is generally much larger than a salamander, and (c) the experiments were conducted in a safe, comfortable environment. The first limitation could be addressed by implementing blocks containing ratios such as 30:70, 50:50, and 70:30 of snakes:salamanders. Although ethical principles make it difficult to assess response bias for real snakes, as suggested in reasons two and three, future studies could incorporate video footage to improve ecological validity.

Another extension to the current study would be to include phylogenetic and ontogenetic fear-relevant and fear-irrelevant stimuli. If the rapid visual detection of phylogenetic stimuli, such as snakes and spiders, is derived from an evolved bias, then the same bias should not exist for ontogenetic stimuli such as guns and knives; however,



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if this detection is based on experience rather than evolved bias, all fear-relevant stimuli should be detected more rapidly than fear-irrelevant stimuli (LoBue, 2010). Blanchette (2006) examined the visual detection of both phylogenetic and ontogenetic categories of fear-relevant and fear-irrelevant stimuli and found that all fear-relevant stimuli were detected more rapidly than fear-irrelevant stimuli, regardless of whether they were phylogenetic or ontogenetic. Blanchette (2006) proposed that multiple mechanisms exist in humans for the detection of fear-relevant stimuli, in that it is possible that humans possess an evolved bias for the detection of evolutionary-based fear stimuli, and that they can also learn to detect ontogenetic fear stimuli as a result of experience.

In conclusion, the current study demonstrated that individuals exhibit a response bias in detecting snakes, especially in situations that possess higher uncertainty. The noisier the environment, such as tall grass, could increase the chances of one initially believing that a snake may be present. This finding is important for not only disentangling discrimination ability from response bias based on past studies but also for opening up opportunities for future studies. The current study's results demonstrate the value of SDT in uncovering the processes underlying threat detection.

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*Author Note.* Brian D. Stirling, Department of Psychology, Washington and Lee University. Madeleine S. Greskovich, Department of Psychology, Washington and Lee University. Dan R. Johnson, Department of Psychology, Washington and Lee University.

Brian Stirling is now at Department of Psychological and Brain Sciences, Dartmouth College.

Correspondence concerning this article should be addressed to Brian Stirling, Department of Psychological and Brain Sciences, Dartmouth College, Hanover, NH 03766. Contact: brian.d.stirling@dartmouth.edu





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Name of Award	Description of Award	Submission Deadline	Who Can Apply?	Award Amount/Prize
<b>Regional Chapter Awards</b>	Presented to one chapter in each of six regions that best achieve Psi Chi's purpose	January 17	• Chapter	• Six \$500 awards • Plaque
<b>Society Annual Convention Research Awards</b>	Up to 8 awards (4 grad, 4 undergrad) presented for the best research papers submitted for APA/APS conventions	January 31 February 28	• Graduate • Undergraduate	• \$500 graduate (number varies) • \$300 undergraduate (number varies)
<b>Bandura Graduate Research Award</b>	Awards the student submitting best overall empirical study; cosponsored by APS	February 1	• Graduate	• Travel to APS • Plaque • 3yr APS membership
<b>Newman Graduate Research Award</b>	Awards the student submitting best overall empirical study; cosponsored by APA	February 1	• Graduate	• Travel to APA • Plaque • 3yr journal subscription
<b>Denmark Faculty Advisor Award</b>	To one outstanding faculty advisor nominated by the chapter who best achieves Psi Chi's purposes	February 3	• Faculty Advisor (chapter nomination)	• Travel to APA • Plaque
<b>Cousins Chapter Award</b>	Presented to one chapter that best achieves Psi Chi's purpose	February 17	• Chapter	• One \$3,500 award • Travel to APA • Plaque
<b>Kay Wilson Officer Team Leadership Award</b>	Awards the best chapter officer team for exceptional leadership as a group	March 1	• Chapter	• \$2,000 award (\$1,000 for chapter + \$1,000 for officers)
<b>Kay Wilson Leadership Award</b>	Awards one chapter president who demonstrates excellence in the leadership of the local chapter	April 1	• Chapter President (chapter nomination)	• One \$500 award • Travel to APA • Plaque
<b>Psi Beta/Psi Chi Building Bonds Awards</b>	Awards to recognize collaborative activity by a Psi Chi and Psi Beta chapter	June 1	• Chapter	• \$100 award • Plaque
<b>Model Chapter Awards</b>	All chapters meeting the five criteria will receive \$100	June 30	• Chapters	• \$100 each chapter
<b>Diversity Article Awards</b>	Awards for best <i>Eye on Psi Chi</i> articles published by student authors on diversity issues	July 15	• Graduate • Undergraduate	• Four \$300 awards
<b>Regional Research Awards</b>	Up to 78 awards presented for the best research papers submitted as Psi Chi posters for the regional conventions	Deadlines Vary, Fall/Winter	• Graduate • Undergraduate	• \$300 each (number varies)
<b>Regional Faculty Advisor Awards</b>	To six outstanding faculty advisors (one per region) who best achieve Psi Chi's purpose	December 1	• Faculty Advisor (chapter nomination)	• Six \$500 awards • Plaque

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## RESEARCH AWARDS

### Society Annual Convention Research Awards | Jan 31 & Feb 28

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

### Bandura Graduate Research Award | February 1

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

### Newman Graduate Research Award | February 1

All psychology graduate students are eligible to submit their research for the Edwin B. Newman Graduate Research Award. The winner receives the following: (1) travel expenses to attend the APA/Psi Chi Society Convention to receive the award, (2) a three-year subscription to an APA journal of the winner's choice, and (3) two engraved plaques, one for the winner and one for the winner's psychology department as a permanent honor to the winner. This award is presented during the APA/APF Awards ceremony at the annual APA/Psi Chi Society Convention in August.

### Diversity Article Awards | July 15

Four awards of \$300 each are available for the best *Eye on Psi Chi* articles published by student authors on diversity issues, including but not limited to ethnic minority, GLBT, gender, and physical disability. The submission cannot contain faculty primary authors or coauthors. Both graduate and undergraduate Psi Chi members are eligible for the award.

### Regional Research Awards | Deadlines Vary (Fall/Winter)

All Psi Chi members (undergraduate and graduate) are eligible to submit their research for the Regional Research Awards. Up to 78 cash awards of \$300 each are presented to students submitting the best research papers to Psi Chi sessions at regional conventions. Award monies are distributed at the conventions following the presentations. Deadlines for submissions vary according to region and sometimes from year to year; check the Psi Chi website for details.

## CHAPTER AND ADVISOR AWARDS

### Regional Chapter Awards | January 17

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

### Denmark Faculty Advisor Award | February 3

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

### Cousins Chapter Award | February 17

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

### Kay Wilson Officer Team Leadership Award | March 1

The Kay Wilson Officer Team Leadership Award is presented annually to the best chapter officer team who demonstrates exceptional leadership as a group. The winning Psi Chi chapter and officers receive a \$2,000 cash award (\$1,000 for chapter and \$1,000 for officers).

### Kay Wilson Leadership Award | April 1

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

### Psi Beta/Psi Chi Building Bonds Awards | June 1

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

### Model Chapter Awards | June 30

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

### Regional Faculty Advisor Awards | December 1

This award is presented annually to one Psi Chi faculty advisor from each region who best achieves Psi Chi's purpose. The award is to recognize and reward actively involved chapter advisors. The winning faculty advisor from each region will receive \$500 and a plaque.

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## RESEARCH GRANTS

### Graduate Assistantship Grants | January 6

This grant provides funding for four graduate assistantships to teach and/or conduct research during any academic semester. Each grant recipient will receive \$3,000. Applicants must be a graduate student who has yet to graduate and a Psi Chi member to be eligible for the program.

### Collaboration Grants | January 20 & June 1

All Psi Chi and Psi Beta chapters are eligible for these collaboration grants that provide funding for a Psi Chi chapter and a Psi Beta chapter to collaborate on a shared activity. Psi Chi will award four \$500 grants.

### FBI NCAVC Internship Grants | February 3 & October 1

All undergraduate and graduate Psi Chi members who are accepted as FBI NCAVC interns are eligible to apply for this internship grant. Two grants up to \$7,000 will be awarded annually for the 14-week unpaid position that allows the intern to conduct research at the FBI NCAVC.

### APS Summer Research Grants | March 4

All undergraduate Psi Chi members are eligible to apply for these grants (research must be conducted while still an undergraduate, not after graduation). The purpose of the program is to allow students to conduct research during the summer with a faculty sponsor who is a member of APS. Psi Chi awards six \$5,000 grants (a stipend of \$3,500 to the student plus \$1,500 to the faculty sponsor).

### CUR Summer Research Grants | March 4

All undergraduate Psi Chi members are eligible to apply for these grants (research must be conducted while still an undergraduate, not after graduation). The purpose of the program is to allow students to conduct research during the summer with a faculty sponsor who is a member of CUR. Psi Chi awards two \$5,000 grants (a stipend of \$3,500 to the student plus \$1,500 to the faculty sponsor).

### SRCD Research Grants | March 4

All undergraduate Psi Chi members are eligible to apply for these grants (research must be conducted while still an undergraduate, not after graduation). The purpose of the program is to allow students to conduct research during the summer with a faculty sponsor who is a member of SRCD. Psi Chi awards two \$5,000 grants (a stipend of \$3,500 to the student plus \$1,500 to the faculty sponsor).

### Summer Research Grants | March 4

All undergraduate Psi Chi members are eligible to apply for these summer research grants (research must be conducted while still an undergraduate, not after graduation). The purpose of this program is to provide funds for members to conduct summer research at nationally recognized research institutions. Psi Chi will award 14 grants of \$5,000 (a stipend of \$3,500 to the Psi Chi student plus \$1,500 to the sponsoring faculty member at the research institution each year).

### Faculty Advisor Research Grants | June 1

All current faculty advisors and coadvisors who have served an active Psi Chi chapter for at least one year are eligible to apply for these faculty advisor research grants. The purpose of this program is to provide funds for advisors to defray the direct costs of conducting a research project (no stipends included). Twelve grants of up to \$2,000 are available annually.

## RESEARCH GRANTS

### STP Assessment Resource Grants | June 1

All Psi Chi faculty members are eligible for these grants, which support projects to develop assessment tests, instruments, and processes. Psi Chi will award three \$2,000 grants.

### APAGS/Psi Chi Junior Scientist Fellowships | June 30

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

### Thelma Hunt Research Grants | September 18

All Psi Chi student and faculty members are eligible to apply for a Thelma Hunt Research Grant. One \$3,000 grant is presented annually to enable members to complete empirical research that addresses a question directly related to Psi Chi.

### Mamie Phipps Clark Research Grant | September 27

All Psi Chi members (faculty, graduate and undergraduate students) are eligible for the Mamie Phipps Clark Research Grant. Each grant offers up to \$1,500 to defray the costs of conducting a research project focusing on ethnic minorities. Total funding available is \$10,000.

### SuperLab Research Grants | October 1

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

### Undergraduate Psychology Research Conference Grants | Oct 1

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

### Regional Travel Grants | Deadlines Vary (Winter/Spring)

All graduate and undergraduate Psi Chi members are eligible for these regional travel grants that provide funding to assist students with travel expenses to a regional convention. Each grant offers up to \$300 each.

### Graduate Research Grants | November 1 & February 3

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

### Undergraduate Research Grants | November 1 & February 3

The purpose of this program is to provide funds for undergraduate student members to defray the cost of conducting a research project. Applicants may request up to \$1,500 for each project. A total of \$35,000 has been allotted for this student grant program.

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## PSI CHI RESEARCH GRANTS

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

Name of Grant	Description of Grant	Submission Deadline	Who Can Apply?	Award Amount/Prize
<b>Graduate Assistantship Grants</b>	Provides funding for teaching and/or conducting research during any academic semester	January 6	• Graduate	• Eight assistantships of \$3,000
<b>Collaboration Grants</b>	Provides funds for a Psi Chi chapter and a Psi Beta chapter to collaborate on a shared activity	January 20 June 1	• Chapter	• Four \$500 grants
<b>FBI NCAVC Internship Grants</b>	Provides living expenses for a 14-week unpaid FBI NCAVC internship to conduct research	February 3 October 1	• Graduate • Undergraduate	• Two grants, up to \$7,000 each
<b>APS Summer Research Grants</b>	Provides opportunities to conduct research during the summer with APS sponsor members	March 4	• Undergraduate	• Six \$5,000 grants (\$3,500 student + \$1,500 sponsor)
<b>CUR Summer Research Grants</b>	Provides opportunities to conduct research during the summer with CUR sponsor members	March 4	• Undergraduate	• Two \$5,000 grants (\$3,500 student + \$1,500 sponsor)
<b>SRCD Summer Research Grants</b>	Provides opportunities to conduct research during the summer with SDRC sponsor members	March 4	• Undergraduate	• Two \$5,000 grants (\$3,500 student + \$1,500 sponsor)
<b>Psi Chi Summer Research Grants</b>	Provides opportunities to conduct research during the summer at nationally recognized research institutions	March 4	• Undergraduate	• Fourteen \$5,000 grants (\$3,500 student + \$1,500 sponsor)
<b>Faculty Advisor Research Grants</b>	Provides funding for up to 12 faculty advisors to conduct empirical research	June 1	• Faculty Advisor	• Twelve grants, up to \$2,000 each
<b>STP Assessment Resource Grants</b>	Supports projects to develop assessment tests, instruments, and processes	June 1	• Psi Chi Faculty Members	• Three \$2,000 grants
<b>APAGS/ Psi Chi Junior Scientist Fellowships</b>	Provides a fellowship to support 1st-year or 2nd-year graduate research projects	June 30	• Psi Chi Members • APAGS Members	• Four \$1,000 fellowships, (number varies)
<b>Thelma Hunt Research Grants</b>	Enables members to complete empirical research directly related to Psi Chi	September 18	• Faculty • Graduate • Undergraduate	• One \$3000 grant
<b>Mamie Phipps Clark Research Grants</b>	Enables members to conduct a research project focusing on ethnic minorities. Total grant money available is \$10,000	September 27	• Faculty • Graduate • Undergraduate	• Up to \$1,500 each (number varies)
<b>SuperLab Research Grants</b>	Two awards for conducting the best computer-based research	October 1	• Graduate • Undergraduate	• SuperLab software • Cedrus Response pad
<b>Undergraduate Psychology Research Conference Grants</b>	Funding to defray cost of sponsoring local/regional undergraduate psychology conferences. Total grant money available is \$15,000	October 1	• Sponsor(s) of local and regional conference	• Up to \$1,000 each (number varies)
<b>Regional Travel Grants</b>	\$3,000 available per region to assist students with travel expenses to a regional convention	Deadlines Vary, Winter/Spring	• Graduate • Undergraduate	• Up to \$300 each (number varies)
<b>Graduate Research Grants</b>	To provide funds for graduate students to conduct a research project. Total grant money available is \$20,000	November 1 February 3	• Graduate	• Up to \$1,500 each (number varies)
<b>Undergraduate Research Grants</b>	Funding to defray the cost of conducting a research project. Total grant money available is \$35,000	November 1 February 3	• Undergraduate	• Up to \$1,500 each (number varies)

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# 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](mailto: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
  - content,
  - method,
  - APA style,
  - grammar, and
  - overall presentation; and
  - the planning, execution, and writing of the manuscript represent primarily the work of the undergraduate student.
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.

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## 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.

### Author Checklist:


Prior to submission, check:

1. Is the primary author a Psi Chi member?
  - o The **first author** of a submitted manuscript must be a member of Psi Chi at the time of submission.
  - o Additional authors may include non-Psi Chi members.
2. Is the manuscript empirical?
  - o **Empirical** articles include original data collection, secondary data analysis, or meta-analysis.
3. Is the contribution original?
  - o Only **original manuscripts** (not published or accepted for publication elsewhere) will be accepted.
4. Is this paper ready to be judged by reviewers?
  - o Reviewers will be prompted to evaluate your paper based on the **level of work** expected of undergraduate students, graduate students, or faculty.
  - o 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?
  - o 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?
  - o 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**?
  - o All manuscripts must be prepared according to the Publication Manual of the American Psychological Association (6th ed.).
  - o 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!)




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[New Users: Please register here](#) <sup>?</sup>

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To ensure proper functionality of this site, both [JavaScript](#) and [Cookies](#) must be enabled in your browser.

## Online Journal Submission Process

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

Four items are required for all submissions:

- Cover Letter**  
Include primary author's education status, manuscript originality statement, IRB approval
- Sponsoring Statement**  
Undergraduate first authors only
- Cover Page**  
Author names, school affiliation, and any author note
- Masked Manuscript**  
MS Word with all personal information removed

Simply register an account, then click Submit Manuscript:

- Upload Files**  
Files can be removed, replaced, or reorganized
- Enter Manuscript Information**  
E.g., title, abstract, authors, keywords, etc.
- Review Manuscript Material**  
Summary of all information/ files submitted
- Submit Manuscript**  
Receive email confirmation

New software benefits:

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

\* Psi Chi member ID number required

**Register an account:** <http://pcj.msubmit.net/cgi-bin/main.plex>

**Tutorial videos:** <http://www.ejpress.com/demos>

