 Psi Chi
Journal of Undergraduate Research

Editor
Warren H. Jones, PhD
Editor, Psi Chi Journal of Undergraduate Research
Department of Psychology
University of Tennessee
307 Austin Peay Building
Knoxville, TN 37996-0900
Telephone: (865) 974-0514 • Fax: (865) 974-0518
Email: psichijournal@utk.edu

Consulting Editors

Pamela I. Ansburg, PhD
Metropolitan State College of Denver

Debora R. Baldwin, PhD
University of Tennessee, Knoxville

John, P. Broida, PhD
University of Southern Maine

Sheila Brownlow, PhD
Catawba College

Susan R. Burns, PhD
Morningside College

Bradley J. Caskey, PhD
University of Wisconsin–River Falls

Andrew Christopher, PhD
Albion College

M. Diane Clark, PhD
Gallaudet University

Daniel P. Corts, PhD
Augustana College

Laurie L. Couch, PhD
Morehead State University

Anita A. Davis, PhD
Rhodes College

Florence L. Denmark, PhD
Pace University

Joy R. Drinmon, PhD
Milligan College

Julie E. Evey, PhD
University of Southern Indiana

F. Richard Ferraro, PhD
University of North Dakota

Alexis Grososky, PhD
Beloit College

Jennifer L. Hughes, PhD
Agnes Scott College

Jane A. Jegerski, PhD
Elmhurst College

William Kelemen, PhD
California State University, Long Beach

John W. Kulig, PhD
Plymouth State University

William J. Lammers, PhD
University of Central Arkansas

Janet D. Larsen, PhD
John Carroll University

Adrienne Y. Lee, PhD
New Mexico State University

Laura N. May, PhD
University of South Carolina Aiken

Elizabeth McGhee Nelson, PhD
Christian Brothers University

Lauren F. V. Scharff, PhD
Stephen F. Austin State University

Pamela Schuetze, PhD
Buffalo State College, SUNY

Paul C. Smith, PhD
Alverno College

Robert J. Sternberg, PhD
Yale University

Mary E. Utley, PhD
Drury College

George I. Whitehead, PhD
Salisbury University

Crystal L. Wright, PhD
Maryville College

Philip G. Zimbardo, PhD
Stanford University

Publication and Subscription Office

Susan Iles
Director of Publishing
Psi Chi National Office
P.O. Box 709
Chattanooga, Tennessee 37401-0709
Telephone: (423) 756-2044
Fax (toll-free): 1-877-PsiChi3 (1-877-774-2443)
Email: journal@psi chi.org
3  Associations Between Obsessive-Compulsive Symptoms and Academic Self-Concept
Matthew Brent Findley and Renee V. Galliher, Utah State University

9  Understanding Students’ University Educational Image and Its Role in College Choice
Jennifer Ellen Yugo, Bowling Green State University
Charlie L. Reeve, University of North Carolina, Charlotte

18  Hardiness, Stress, and Health-Promoting Behaviors Among College Students
Virginia C. Cress and Claudia Lampman, University of Alaska Anchorage

24  The Relationship Between Gender, BMI, Self-Esteem, and Body Esteem in College Students
Adriana Pilafova, George Mason University
D.J. Angelone, Rowan University
Katrina Bledsoe, College of New Jersey

31  Psychophysiological Responses to Visual Fear Stimuli
Courtney M. Roberts, Bowling Green State University
Katherine M. Hoetzl, Medical University of Ohio

Published quarterly by Psi Chi, The National Honor Society in Psychology
About Psi Chi

Psi Chi is the national 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 and is an affiliate of the American Psychological Association (APA) and the American Psychological Society (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 1,000 senior colleges and universities in the U.S. and Canada. The Psi Chi National Office is located in Chattanooga, Tennessee. A National Council, composed of psychologists 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 national organization provides programs to help achieve these goals, including national and regional conventions held annually in conjunction with the psychological associations, research award and grant competitions, certificate recognition programs, national and regional chapter awards, and national service projects.

For more information about Psi Chi, contact the Psi Chi National Office, P.O. Box 709, Chattanooga, TN 37401-0709; telephone (423) 756-2044; www.psichi.org.

Journal Purpose Statement

The twofold purpose of the Psi Chi Journal of Undergraduate Research is to foster and reward the scholarly efforts of undergraduate psychology students as well as to provide them with a valuable learning experience. The articles published in this journal represent primarily the work of the undergraduate student(s). Faculty supervisors, who deserve recognition, are identified by an asterisk next to their name or on a separate byline.

Since the articles in this journal are primarily the work of undergraduate students, the reader should bear in mind that: (1) the studies are possibly less complex in design, scope, or sampling than professional publications and (2) the studies are not limited to significant findings. The basis for accepting papers for publication is the agreement among three professional reviewers that the project, hypothesis, and design are well researched and conceived for someone with an undergraduate level of competence and experience.

Instructions for Contributors

The Psi Chi Journal of Undergraduate Research encourages undergraduate students to submit manuscripts for consideration. 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. The primary author of a submitted manuscript must be an undergraduate student who is a member of Psi Chi. Manuscripts from graduate students will be accepted only if the work was completed as an undergraduate student. Additional authors other than the primary author may include non-Psi Chi students as well as the faculty mentor or supervisor. Membership verification information for the primary author must be included.

2. Only original manuscripts (not published or accepted for publication elsewhere) will be accepted.

3. All manuscripts must be prepared according to the Publication Manual of the American Psychological Association (5th ed.).

4. What to submit:
   a. Four copies of the complete manuscript. Near-letter-quality print is required on all copies. Should you desire a masked review, make sure that identifying names, affiliations, etc., appear only on the title page and nowhere else on the manuscript; i.e., manuscripts should be reasonably free of clues to the identity of the author. Footnotes that identify the author(s) should appear on a separate page. You must request masked review.
   b. An e-mail address so that receipt of your manuscript can be acknowledged.
   c. A self-addressed stamped envelope (if metered, do not include date) with sufficient postage for the return of your manuscript when an editorial decision has been reached.
   d. A sponsoring statement from the faculty supervisor who attests: (1) that the research adhered to APA ethical standards; (2) that the supervisor has read and critiqued the manuscript on content, method, APA style, grammar, and overall presentation; and (3) that the planning, execution, and writing of the manuscript represent primarily the work of the undergraduate student.

Submit all manuscripts to:
Dr. Warren H. Jones, Editor
Psi Chi Journal of Undergraduate Research
Dept. of Psychology, Univ. of Tennessee
907 Austin Peay Building
Knoxville, TN 37996-0900

The Psi Chi Journal of Undergraduate Research (ISSN 1089-4136) is published quarterly in one volume per year by Psi Chi, Inc., The National Honor Society in Psychology, P.O. Box 709, Chattanooga, TN 37401-0709.

Subscriptions are available on a calendar-year basis only (Spring–Winter). U.S. rates are as follows (four issues): Individual $20; Institution $40. For international rates or other information contact: Psi Chi National Office, P.O. Box 709, Chattanooga, TN 37401-0709; telephone (423) 756-2044; fax (toll-free) 1-877-774-2443; e-mail journal@psichi.org. Printed in the USA. Periodicals postage paid at Chattanooga, TN, and additional mailing offices.

Statements of fact or opinion are the responsibility of the authors alone and do not imply an opinion on the part of the officers or members of Psi Chi. Psi Chi does not accept paid advertising for its publications Eye on Psi Chi or Psi Chi Journal of Undergraduate Research. The society does not wish to appear to endorse any particular products or services. Copyright 2006 by Psi Chi, The National Honor Society in Psychology. Postmaster: Send address changes to Psi Chi Journal of Undergraduate Research, P.O. Box 709, Chattanooga, TN 37401-0709.
Associations Between Obsessive-Compulsive Symptoms and Academic Self-Concept

The current study assessed associations among 4 obsessive-compulsive symptom clusters and academic performance in a sample of 147 college undergraduate students. Obsessive-compulsive symptoms were assessed using the Leyton Obsessional Inventory short form (LOIS; Cooper, 1970). Academic performance was assessed using the Academic Self-Concept Scale (ASCS; Reynolds, Ramirez, Magrina, & Allen, 1980). Negative, linear associations were observed between the obsessive-compulsive characteristics of doubting/repeating behaviors and academic self-concept, as well as between fears of contamination and academic self-concept. However, a curvilinear association suggested that the symptom cluster of checking behavior and attention to detail, when exhibited at a moderate level, was found to be associated with higher academic self-concept. The results may challenge previously held assumptions that obsessive-compulsive symptoms, regardless of type or severity, are negatively associated with psychosocial functioning.

Much of the research performed on the symptoms of OCD has consistently demonstrated that they can be divided into four or five different categories and has suggested that the symptoms of OCD may exist on a continuum of severity. For example, a study examining the relationship between obsessive beliefs and obsessive-compulsive symptoms categorized symptoms into the following groups: contamination/washing, harm obsessions/checking, hoarding, symmetry, and ordering/unacceptable thoughts (Tolin, Woods, & Abramowitz, 2003). Mathews, Jang, Hami, and Stein (2004) examined the structure of obsessive symptoms in a nonclinical population. Four symptom clusters emerged including concerns about contamination (contamination factor); repeating behaviors or uncomfortable thoughts and doubts (doubts/repeating factor); checking behaviors, excessive attention to detail, honesty concerns, strict conscience, and strict routine (checking/detail factor); and taking a long time to

Author Note. Portions of this manuscript were presented at the annual meeting of the Rocky Mountain Psychological Association, Park City, UT.
Address correspondence to Renee V. Galliher, PhD, Department of Psychology, 2810 Old Main Hill, Logan, UT 84322.
* Faculty supervisor

Matthew Brent Findley
Renee V. Galliher*
Utah State University
dressed and to hang up and put away clothing, and belief in unlucky numbers (worries/just right factor). Certain symptoms originally thought to be exclusive to OCD were found to exist frequently in the nonclinical sample because they did not clearly discriminate between participants scoring in the upper quartile and the lower quartile. Together with the similarity-in-factor structure between clinical and nonclinical participants, the results suggested that obsessive-compulsive symptoms exist on a continuum and can be exhibited in a nonclinical population (Mathews et al., 2004). Thus, although some consistency has emerged in the literature examining clusters of symptoms, no standard formula for conceptualizing symptoms has been developed and widely accepted. Checking, contamination fears, doubts/repeating, and worries/just right feelings—the symptoms discussed by Mathews et al.—are four different categories of obsessive-compulsive symptoms that were of interest in this study.

The current study examined associations between obsessive-compulsive symptoms, measured as continuous variables in a nonclinical population, and academic self-concept. It was hypothesized that certain obsessive-compulsive symptoms may actually be associated with enhanced academic self-concept when shown at moderate levels. For example, attention to detail, checking behavior, and a sense of responsibility, shown at moderate levels, would be expected to enhance academic motivation, accuracy, and precision. Very low levels of these characteristics would theoretically be associated with lower academic motivation and carelessness, thus decreasing academic functioning. At very high levels, however, these characteristics become debilitating. Conversely, a linear association is predicted between other obsessive-compulsive characteristics and academic performance. Contamination fears, doubts/repeating, and worries/just right feelings are predicted to be associated with increasingly poor academic performance as they become more intense.

Very little research has examined associations between obsessive-compulsive symptoms, to any degree, and academic performance. Mrdjenovich and Bischof (2003) assessed this relationship in college-aged students and found a negative correlation between course grades and a global index of obsessive-compulsive symptoms. As the overall severity of obsessive-compulsive symptoms increased, academic performance decreased. This study only examined the linear relationship between academic performance and obsessive-compulsive symptoms. Other relationships, including a quadratic relationship, were not considered. It can be argued that those exhibiting the highest levels of symptoms were in the range of possible diagnosis of OCD. Also, the global measure used by Mrdjenovich and Bischof did not allow for the examination of associations between particular obsessive-compulsive symptom clusters and academic functioning; the linear relationship observed in their study may be true of certain obsessive-compulsive symptoms, but may not accurately reflect the association with other symptoms.

To demonstrate how the obsessive-compulsive symptom of checking might be positively associated with academic performance, two belief systems were examined. Responsibility and perfectionism are two constructs that have consistently demonstrated significant relationships with obsessive-compulsive symptoms. Wilson and Chambless (1999) used three measures of responsibility including the Pervasive Responsibility Measure, the Responsibility Questionnaire, and the Obsessional Beliefs Questionnaire–Responsibility Subscale and compared their results to an obsessive-compulsive measure, the Padua Inventory. They found that for all three measures, responsibility significantly contributed to the prediction of obsessive-compulsive symptoms, especially to the obsessive-compulsive symptom of checking. Lopata and Rachman (1995) also demonstrated the relationship between perceived responsibility and compulsive checking, observing that when the level of perceived responsibility is decreased, the likelihood of compulsive checking also decreases.

Bouchard, Rheume, and Ladouceur (1999) performed research in which responsibility and perfectionism were shown to be highly correlated with OCD and also showed that perfectionism can predict responsibility. Their study included moderately perfectionistic participants and highly perfectionistic participants. Participants were submitted to high and low responsibility situations and then tested for checking behaviors. Results demonstrated that both levels of perfectionistic participants increased checking behaviors in the high responsibility situation. However, checking behaviors were significantly increased only for those in the highly perfectionistic group, thus suggesting that perfectionism and responsibility interact to predict checking behaviors (Bouchard et al., 1999).

Perfectionism has also been found to be positively correlated with academic performance (Brown et al., 1999). Two dimensions of perfectionism, high personal standards and maladaptive concern over mistakes, were assessed. Results showed that an increase in personal standards was positively associated with more frequent study behavior, evaluation of the course as more important, and better grades across the semester. Maladaptive concern over mistakes was not related with better grades, but was associated with more frequent study behavior.
As shown by the aforementioned study, certain types of perfectionism can be related to better study habits and eventually to better grades. Perfectionism has been demonstrated to be a predictor of responsibility, which in turn, has been a good predictor of checking behaviors. The established associations among perfectionism, responsibility, and checking behaviors lead to the hypothesis that moderate levels of the obsessive-compulsive symptom of checking will be associated with higher academic performance. Whereas responsibility and perfectionism, when excessive, may be very debilitating, moderate levels of both constructs have been conceptualized as positive personality characteristics. Excessive responsibility and perfectionism lead to excessive obsessive-compulsive symptoms such as checking. Responsibility and perfectionism exhibited in moderate amounts should lead to moderate amounts of checking and beneficial results in certain areas of functioning, including academic performance.

In summary, obsessive-compulsive symptoms can be thought of as existing on a continuum with formal psychological diagnosis at the far extreme. Very little research has been done on obsessive-compulsive symptoms and their relationship with academic performance, but the research that has been performed has shown that severe symptoms do lead to academic impairment. However the hypothesis that obsessive-compulsive symptoms shown at a lesser degree of severity might enhance academic performance has not been tested. Further, different types of obsessive-compulsive symptoms have been identified (i.e., checking, contamination fears, doubts/repeating, and worries/just right) and previous research has not addressed the possibility that different types of symptoms are differentially related to psychosocial functioning. Specifically, in the current study, it was proposed that when exhibited at a moderate level, the obsessive-compulsive symptom of checking would predict better academic functioning.

### Methods

**Design**

The current study used a correlational design with self-report data to assess the relationship between the different types of obsessive-compulsive symptoms and academic self-concept.

**Participants**

Participants were 147 undergraduate students who completed an anonymous survey in exchange for credit in their psychology courses. All participants were over 18-years of age and provided verbal consent at testing time. Approximately half of the students were recruited from introductory psychology courses that fulfill general university requirements and ensure a broad sampling of university students. Additionally, students were recruited from advanced psychology courses and distance education courses in order to provide greater diversity with regard to age, geographic location, and other demographic variables. Participants were 89% White, 2% African American, 1.4% Native American, 4.1% Hispanic, and 3.4% Asian. Of the students, 42.2% were between 18- and 21-years old, 23.8% were between 22 and 24, 11.6% were between 25 and 29, 14.3% were between 30 and 39, and 8.2% were over 40-years-old. Freshmen participants comprised 27.9% of the students, 21.1% were sophomores, 21.1% were juniors, and 28.6% were seniors; 2 students did not report their grade.

**Materials**

**Demographic form.** The demographic form consists of standard demographic information, such as gender, age, grade, ethnicity, and educational status. Participants were assured that this information was to be used for the purpose of the present study only.

**Leyton Obsessional Inventory short form (LOI-SF; Cooper, 1970).** The Leyton Obsessional Inventory short form is a 30-item measure designed to assess obsessive-compulsive symptom severity in four categories. The scale yields four subscales: contamination, repeating/doubts, checking/details, and worries/just right. Ten items assess contamination fears (e.g., “I avoid using the public telephone because of possible contamination”), eight items assess repeating/doubts (e.g., “I usually have serious doubts about the simple, everyday things I do”), seven items assess checking/details (e.g., “I spend a lot of time every day checking things over and over again”), and three items comprise the worries/just right subscale (e.g., “Even when I do something very carefully, I often feel that it is not quite right”). Item 20 (e.g., “My major problem is repeated checking”) loads on both the repeating doubts factor and the checking/details factor. These questions assess the presence or absence of a symptom using a “true/false” format and scale scores represent the number of items endorsed. Approximately 50% of the items are reverse scored. Convergent, divergent, discriminative validity, and internal consistency of the original version have been shown to be strong (Stanley, Prather, Beck, & Brown, 1993). Three of the subscales demonstrated adequate internal consistency with the current sample (contamination: \( \alpha = .69 \), repeating/doubts: \( \alpha = .73 \), checking/details: \( \alpha = .68 \)), while the worries/just right subscale yielded an unacceptably low alpha (\( \alpha = .22 \)). Because of the poor internal consistency of the worries subscale it was dropped from analyses.
The Academic Self-Concept Scale (ASCS; Reynolds, Ramirez, Magrino, & Allen, 1980). The ASCS is a 40-item measure designed to assess participant self-concept regarding academic ability. The scale uses a 4-point Likert-type format ranging from strongly disagree to strongly agree. Negatively worded items are reverse scored so that higher scores represent stronger academic self-concept. A single score is obtained by summing the scores for all items. Sample items include “If I try hard enough, I will be able to get good grades” and “All in all, I feel I am a capable student”. Reynolds and colleagues reported good reliability (α = .91) and moderate correlation with grade point average (r = .40). Cronbach’s alpha for the current sample demonstrated good internal consistency (α = .95).

Procedure
A description of participation was provided during class time and posted on class websites. In order to recruit a wider range of students, participants were also recruited from a university distance education course delivered to off-campus sites via satellite (Psychological Statistics—a course which satisfies the requirements for several majors in the social sciences). Approximately 50 participants were recruited from the distance education course; many of these participants were nontraditional students and many resided in rural and remote communities. Distance education students requested a copy of the survey by e-mail from the first author and returned it via mail to the second author. Interested students recruited from the on-campus courses came to one of two scheduled survey administration sessions in large auditoriums. Survey completion took approximately 30-45 min and on-campus participants dropped their completed surveys in to a box before leaving. Following completion of the survey, on-campus participants signed a list, which was given to their instructor to verify participation. Off-campus students were given course credit when their surveys were received in the mail.

Results
Descriptive statistics. Table 1 contains means, standard deviations, and correlations among all study variables. Moderate to strong correlations emerged among all three obsessive-compulsive symptom clusters and all were significantly correlated with academic self-concept. In general, self-reported levels of contamination fears and repeating/doubting behaviors were lower than reports of checking behaviors/attention to detail. Subjective reports of academic self-concept were roughly normally distributed.

Primary analyses. Regression analyses with curve estimation were used to test both the linear and quadratic associations between the symptom clusters and academic self-concept. Results are summarized in Table 2. The linear model was highly statistically significant for the relationship between contamination fears and academic motivation (p < .01), while the quadratic model was non-significant (p = .59). The linear model for the relationship between the repeating/doubts cluster and academic motivation was also found to be significant (p < .01), while the quadratic model was again found to be non-significant (p = .86). The linear relationship between the checking/attention to detail cluster and academic motivation was also significant (p < .05). However, the quadratic model was observed to capture the association between checking/attention to detail and academic self-concept more powerfully (p < .01).

Discussion
The question of interest in this study was whether or not certain obsessive-compulsive symptom clusters, when exhibited at a moderate level, would be associ-
ated with higher academic performance. Among the four symptom clusters examined in the study, only the relationship between the checking/details symptom cluster and academic self-concept was found to be best explained by a curvilinear model. The relationships between the other symptom clusters and academic self-concept were best explained by a linear model.

The negative, linear relationship between both contamination fears and repeating/doubts and academic self-concept suggests that with increasing severity in either of these two symptom clusters, academic self-concept suffers. This is consistent with previous research, which reported negative linear associations between a global measure of obsessive-compulsive symptoms and academic performance (Mrdjenovich & Bischof, 2003). This may also suggest that the global scale of the Maudsley Obsessional-Compulsive Inventory (Hodgson & Rachman, 1977), used by Mrdjenovich and Bischof, may capture aspects of obsessive-compulsive symptomatology that are more closely aligned with the contamination fears and repeating/doubts factors measured in the current study.

The finding that preoccupation with germs and fears of contamination, at any level of intensity, are associated with poorer academic confidence is intuitive. For example, worry that one’s homework assignment has germs on it will not help complete the assignment. In addition, self-doubt and repetition compulsions make no theoretically defensible contribution to academic performance and self-confidence.

The curvilinear relationship between checking and academic motivation represents a new contribution to the literature. Findings suggest that when symptom severity is either very low or very high, academic self-concept is not optimal. However, the highest levels of academic self-concept were observed when symptom severity was moderately high. This finding is also intuitive in that some engagement in checking behaviors, attention to detail, conscientiousness, and adherence to routine seem necessary when performing any kind of academic task well. Conversely, very low levels of checking or attention to detail may constitute rushed or careless academic performance and very high levels of checking behaviors become debilitating and may actually prevent students from completing assignments or tests. Although there is considerable controversy surrounding the construct, this result is consistent with predictions made by the widely cited Yerkes-Dodson Law (Hancock, 2003; Hancock, 2004; Mendel, 1999). Although it has been described as overly simplistic, the Yerkes-Dodson Law posits that arousal triggers important attention and memory processes, but that very high levels of arousal result in restriction in the ability attend and incorporate information.

High achieving students in academic settings commonly reference their OCD characteristics in jest. These findings, however, suggest that this familiar joke may have some basis in fact. Students, advisors, and educators may benefit from consideration of the potentially beneficial outcomes associated with moderate levels of these behaviors. With this information, students would be able to monitor their own habits while studying, doing homework, or taking tests. Knowing that it is helpful to make a few checks on their progress, and then performing those checks, students may greatly enhance their academic confidence and possibly even their performance. Of course, it is important to remember that these findings are correlational and any reference to causal pathways is speculative. Further,

---

**TABLE 2**

*Summary of Regression Analyses Predicting Academic Self-Concept From Obsessive-Compulsive Symptom Clusters*

<table>
<thead>
<tr>
<th>Symptom cluster</th>
<th>Model</th>
<th>Adj. $R^2$</th>
<th>$F$</th>
<th>df</th>
<th>$p$-value</th>
<th>beta</th>
<th>$t$-statistic</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contamination</td>
<td>Linear</td>
<td>.09</td>
<td>14.80</td>
<td>1,145</td>
<td>&lt;.01</td>
<td>-30</td>
<td>-3.85</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>Quadratic*</td>
<td>.08</td>
<td>7.51</td>
<td>2,144</td>
<td>&lt;.01</td>
<td>-12</td>
<td>-0.54</td>
<td>.59</td>
</tr>
<tr>
<td>Repeating/doubts</td>
<td>Linear</td>
<td>.18</td>
<td>33.86</td>
<td>1,145</td>
<td>&lt;.01</td>
<td>-44</td>
<td>-5.82</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>Quadratic*</td>
<td>.18</td>
<td>16.83</td>
<td>2,144</td>
<td>&lt;.01</td>
<td>0.04</td>
<td>0.18</td>
<td>.86</td>
</tr>
<tr>
<td>Checking/details</td>
<td>Linear</td>
<td>.02</td>
<td>4.05</td>
<td>1,145</td>
<td>&lt;.05</td>
<td>-16</td>
<td>-2.01</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Quadratic*</td>
<td>.06</td>
<td>6.08</td>
<td>2,144</td>
<td>&lt;.01</td>
<td>-68</td>
<td>-2.81</td>
<td>.01</td>
</tr>
</tbody>
</table>

*Quadratic term added to linear model*
our analyses emphasized prediction of students’ subjective experience of academic success, motivation, and ability. This measure of academic self-concept has been found to correlate moderately with grade point average (Reynolds et al., 1980), but it will be important in future research to examine associations with various measures of actual academic performance.

The sample for this study was drawn from both traditional campus based classes and distance education courses, and participants represented the range of undergraduate grades roughly equally. This feature is both a strength and a challenge. The recruitment strategy maximized diversity in terms of age, socioeconomic status, and other demographic factors. However, it is unclear to what extent the patterns of association among the variables may be different for traditional campus-based students versus nontraditional students; data were not collected in such a way as to facilitate comparison of students recruited via the two strategies. Examination of specific pathways between obsessive-compulsive symptoms and academic performance separately for distance education students and on-campus students, men and women, and for other demographic groups will clarify associations in the general college student population.

In summary, these findings are significant for several reasons. Conventional wisdom has regarded anything defined as obsessive-compulsive as problematic. However, because certain obsessive-compulsive symptoms are strongly associated with perfectionism and responsibility, two constructs that when exhibited at moderate levels have been shown to be associated with higher academic functioning, they can also be associated with higher academic functioning. It is important to better understand the personality types associated with better academic functioning so more of the population can strive for desired academic outcomes.

References


Cooper, J. (1970). The Leyton Obsessional Inventory. Psychological Medicine, 1, 48-64.


Although educational researchers and college admissions specialists have long understood the importance of developing admissions systems that accurately and fairly select viable students, the actual utility of any such selection system depends heavily on the ability to attract a large pool of qualified applicants (Boudreau & Rynes, 1985; Murphy, 1986). As with other organizations, for universities to remain competitive, they must screen applicants to ensure that those accepted are likely to succeed, and those who are likely to succeed choose them. Given the evidence showing that perceptions of an institution’s reputation as a high quality or “prestigious” school is one of the most important factors in students’ college choices (Litten & Hall, 1989; Manski & Wise, 1983; McDonough, Antonio, Walpole, & Perez, 1998; Sax, Astin, Korn, & Mahoney, 1995), the effectiveness of university recruitment systems hinges on an understanding of the factors used by students’ and influential others to discern the comparative quality of schools.

Marketing and consumer research clearly shows that brand image (i.e., perceived quality of the brand) is a critical determinant of consumer decisions (Crable & Vibbert, 1986; Goldhaber, 1993; Marken, 1990). Organizational image, a person’s beliefs about the quality of a company as a potential employer, is also a primary determinant of applicant attraction and job pursuit intentions (Highhouse & Hoffman, 2001; Highhouse, Zickar, Thorsteinson, Stierwalt, & Slaughter, 1999; Rynes, 1991). To effectively influence application and enrollment decisions, educational recruiters need to understand what beliefs constitute such an image so that they can effectively influence students’ perceptions of university educational image (UEI; Astin, 1985; Braxton, 1993; Karabel & Astin, 1975; Nordvall & Braxton, 1996).

The purpose of the current study is to apply inductive methods used in organizational image research (e.g., Highhouse et al., 1999; Treadwell & Harrison, 1994), to better understand the nature of students’ UEI. This research methodology adds to current knowledge on university choice in several ways. First, it uses a sample of young adults to determine the factors that are most important to college choice and develop a
measure that universities can employ to assess and benchmark the perceptions applicants have of their own universities. Second, the method uses an inductive approach, which has not been used in previous studies of college choice. Similar to Highhouse and colleagues (1999), instead of assessing the effects of specific factors on attraction and image, this study found what factors were important to students inductively. This is accomplished through a series of studies that isolate the dimensions of image and determine their relationship to general image perceptions and intent to apply (ItA). Although the purpose for identifying the dimensions of UEI are clear, it is likely that most universities know little of the impressions potential students have of their university as a place to obtain an education. Literature in the popular press will often publish lists of the most prestigious, cost-effective or highest quality universities, but these lists do not tell universities how they are perceived by applicants in relation to other schools. Specifically, the goals of this study were to (a) elicit and identify perceived education-related characteristics that distinguish universities in terms of their “educational image” (i.e., to understand what dimensions underlie differences in students’ UEIs as it is perceived by them), (b) develop a psychometrically sound measure of those dimensions, so that we can (c) empirically investigate the relative influence of those dimensions on students’ ItA and how well those dimensions discriminate among schools.

Possible Factors Underlying Students’ UEI

Despite almost a half a century of research (Holland, 1958), little evidence exists regarding what exactly constitutes students’ images of a university (rather than an administrators’ or researchers’ images), and no research has focused on overall image or ItA (Grunig, 1997; Litten & Hall, 1989; Schmitz, 1993). Nonetheless, the existing research literature does provide promising suggestions regarding what factors we might find. For example, several studies suggest hearsay or indirect experiences, the reputation of a specific academic program, cost and prestige affect image and vary depending on the ability or achievement level of the student (Bowers & Pugh, 1973; Welki & Navratil, 1987).

Additionally, recent research has begun to confirm that students may base their educational decisions on nonacademic variables related to college life. These variables can include such things as high profile athletic programs (Toma & Cross, 1998), the aesthetics of the campus, social opportunities, location, and number of friends attending the same school (Bowers & Pugh, 1973; Douglas et al., 1983; Huddleston & Karr, 1982; Welki & Navratil, 1987). Although a wealth of education related and nonacademic dimensions have been investigated in the extant literature, no research has employed an inductive research strategy to assess how these nonacademic factors influence UEI and ItA.

Study 1

Following the methods established by Highhouse et al. (1999), we first sought to elicit factors that would distinguish one university from another. In this step, an attempt was made to allow participants to freely give their opinions of the universities, while getting at the elements that differentiate universities in attractiveness to students. The forced choice method of the study focuses participants on the differences between the two universities rather than the similarities.

Method

Participants. Undergraduate students (n = 43) at a large Midwestern university participated in this study for course credit. The sample is mostly White (74.4%), 56.4% women, and most were between the ages of 20 and 23 (64.1%).

Materials. Prior to this study, a pilot study was conducted to determine what schools were well-known by students attending the university where all the research was conducted. In the pilot study, students were asked to list all universities they were very familiar with. Participant responses were compiled in a database and the frequency that each was listed was determined. The 12 most frequently listed schools were used for this study. They were: Rose-Hulman Institute of Technology, University of California – Los Angeles, Indiana State University, Indiana University, Notre Dame, Ivy Tech, Yale, University of Illinois, Ball State, Michigan State, University of Michigan and Northwestern. These 12 schools were paired randomly across surveys, with each survey having six comparisons. The survey also asked for demographic information and asked the participant to list the schools he or she applied to.

Procedure. Participants were able to complete the survey at the end of a class period for course credit. They were told the survey intended to assess the perceptions of popular universities among current college students. For each of the six comparisons, participants were asked to indicate which school they would prefer to attend. The participants were then asked to describe the rationale for the preference. The survey (choosing a school for all six pairs and listing rationale) took approximately 10 min to complete. Following survey administration, the first author and a research assistant blind to the study’s purpose independently content coded the free-response items.
The authors identified dimensions that appeared to capture parsimoniously the content of the open-ended responses, yielding 13 potential dimensions. The content coding of the research assistant and the first author matched 94.6% of the time (i.e., interrater reliability was 94.6%). Thus, the 13 dimensions were accepted potential dimensions of UEI, and are given in the left-hand column of Table 1.

Study 2

The purpose of Study 2 was to develop a psychometrically sound measure of the dimensions identified in Study 1. One of the main goals of the present research was to develop a measure that can be used to assess UEI for future research and application by universities. In this step, an initial measure of UEI was developed and assessed.

Method

Participants. Participants were 135 introductory psychology students. The mean age was 19.83 years ($SD = 1.85$), 66% were men, and most (63.8%) were in their first or second year of college.

Materials. Using the results from the first study, four to five items were generated for each of the 13 initial dimensions of UEI. The items corresponding to each dimension were based on popular responses from Study 1, reflecting key aspects of each dimension. Example items are shown in Table 1. Items assessing general university image (GUEI) and ItA were added to the questionnaire. These criterion items were adapted from those originally used by Turban and Keon (1993) and Highhouse et al. (1999) to assess general company employment image and intent to apply. An example GUEI item is, “This would be a great place to obtain an education.” An example ItA item is “If this school admitted me, I would attend.”

Procedure. The 54-item questionnaire assessing the dimensions of UEI, general university educational image (GUEI), and ItA was administered to a large introductory psychology course. Participants indicated their agreement or disagreement with each item on a 5-point response scale. Students were asked to list any university with which they were generally familiar and respond to the items based on that university.

Results

Analysis of items’ descriptive statistics, corrected-item total correlations, and item-deleted alpha estimates indicated 11 items from 11 scales warranted
removal. Items with low or negative corrected-item total correlations, and/or improved item-deleted alpha estimates were removed. Exploratory factor analyses (EFA) using maximum likelihood estimation determined which items loaded most saliently on each factor (excluding the nominal scale based “size” and “type” items). Following an initial EFA using a principal components extraction, eight factors were selected on the basis of the scree plot and lambda matrix. A second EFA using those eight factors suggested five dimensions coming from the previous eight factors ($\chi^2 = 196.38, df = 166, p > .05$). Using EFA results and alpha analyses, the salient three items that loaded most heavily for each of the eight salient dimensions

<table>
<thead>
<tr>
<th>Items</th>
<th>$M$</th>
<th>$SD$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q28</td>
<td>3.94</td>
<td>.84</td>
<td>.65</td>
<td>.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q29</td>
<td>3.87</td>
<td>.92</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q30</td>
<td>4.04</td>
<td>1.00</td>
<td>.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q40</td>
<td>3.98</td>
<td>1.07</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q41</td>
<td>3.72</td>
<td>1.14</td>
<td>.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q42</td>
<td>3.51</td>
<td>1.28</td>
<td>.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q19</td>
<td>4.11</td>
<td>.81</td>
<td>.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20</td>
<td>4.15</td>
<td>.72</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q21</td>
<td>3.53</td>
<td>1.00</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q36</td>
<td>4.28</td>
<td>.62</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q37</td>
<td>4.21</td>
<td>.72</td>
<td>.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q39</td>
<td>3.81</td>
<td>.88</td>
<td>.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q16</td>
<td>3.80</td>
<td>1.45</td>
<td>.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17</td>
<td>4.00</td>
<td>1.26</td>
<td>.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q18</td>
<td>4.26</td>
<td>.98</td>
<td>.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q23</td>
<td>3.80</td>
<td>.72</td>
<td>.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q24</td>
<td>3.83</td>
<td>.74</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q25</td>
<td>3.87</td>
<td>.78</td>
<td>.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q31</td>
<td>3.15</td>
<td>1.16</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q32</td>
<td>2.87</td>
<td>1.03</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q33</td>
<td>2.81</td>
<td>1.17</td>
<td>- .36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>4.26</td>
<td>.82</td>
<td>.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>3.74</td>
<td>.94</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>4.13</td>
<td>.77</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$\alpha$ = .90 .83 .79 .77 .83

$M$ = 3.84 4.01 3.95 2.94 4.04

$SD$ = .86 .58 .70 .93 .73

Note: Maximum Likelihood estimation with Quartimax rotation. Only salient factor loadings (i.e., $\lambda > .35$) shown.
were chosen. A partial-confirmatory factor analysis of those 24 items is shown in Table 2. The five factors are as follows: (a) Extracurricular Opportunities (comprised of specific dimensions Spectator Sport Opportunities and Social Activities); (b) Degree Valuation (comprised of Postgraduation Opportunities and Name Recognition/Prestige); (c) Familiarity (comprised of Prior Personal Visits and Family Legacy); (d) Appeal of Location; and (e) Reputation of Specific Program. Descriptive statistics for the composite scales based on these five factors are shown in Table 2; only salient factor loadings are shown. The scales for each of these five dimensions demonstrate sufficient reliability, with all factors having Chronbach’s alpha coefficients above .75.

To assess the relationship between the five dimensions and the criterion perceptions of General UEI and ItA, correlational analyses were conducted. The two nominal scales (cost and size) were included in the analyses. Results showed that the five scales and the size and cost items were correlated with the outcome variables. However, these relations should be interpreted cautiously as the sample size is small ($N = 135$) and that most participants (87.5%) responded with the university they were currently attending as the target, resulting in a restriction of variance. Because of the major limitations of Study 2, we conducted another study using the measure developed in this study to assess the impact of each of the five dimensions on UEI and ItA.

**Study 3**

The purpose of Study 3 was to replicate the correlation analyses of Study 2 and to determine how well the isolated dimensions of UEI differentiate actual universities. This time, we selected five well-known universities (determined through the pilot study) which were thought to differ on the five dimensions. The schools were: Yale, Notre Dame, Ivy Tech, Indiana State and The University of Illinois.

Further, we were interested in determining if differences in ability, measured by self-reported SAT score, affect the importance given to the dimensions of UEI.

**Method**

**Participants.** Undergraduate students participated for course credit ($N = 114$). A majority were male (58.0%) and in their freshman year (51.8%). The average age was $M = 19.82$ years ($SD = 1.93$). The average self-reported SAT score was $M = 1207.20$ ($SD = 158.59$).

**Materials.** The refined survey from Study 2, consisting of 43 items assessing the five factors of UEI, was administered to participants.

**Procedure.** Each participant was asked to complete the questionnaire developed in Study 2 five times—once for each of the five schools (with the order randomized). To make the image of each school salient, the school’s logo was provided at the top of each page.

**Results.**

Mean differences between schools were given in Table 3 and demonstrated expected differences. For example, Yale was seen as a more costly and prestigious institution ($M = 3.32$ and 2.24, respectively) than the community college (Ivy Tech) or a smaller state school (Indiana State).

Next, we assessed the degree to which differences on the key dimensions were related to students’ general UEI and ItA. Overall correlations are shown in Table 4. Most of the correlations were of higher magnitude than observed in Study 2. However, contrary to Study 2, cost correlates negatively with both intent and image ($r = -.39$ and -.22, respectively) meaning

<table>
<thead>
<tr>
<th>TABLE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zero-Order Correlations Among Primary Dimensions and Criterion Perceptions From Study 3</strong></td>
</tr>
<tr>
<td>Factors/Items</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Extracurricular Opportunities</td>
</tr>
<tr>
<td>Degree Valuation</td>
</tr>
<tr>
<td>Familiarity</td>
</tr>
<tr>
<td>Appeal of Location</td>
</tr>
<tr>
<td>Reputation of Specific Program</td>
</tr>
<tr>
<td>The tuition at this university is reasonably priced.</td>
</tr>
</tbody>
</table>

*Note. Because each participant responded to all five school-specific surveys, correlations based on $N = 564$. All correlations significant at $p < .01$. 

**Spring 2007 □ Psi Chi Journal of Undergraduate Research**

Copyright 2007 by Psi Chi, The National Honor Society in Psychology (Vol. 12, No. 1, 9–17 / ISSN 1089-4136).
that participants who felt a college’s cost was more reasonable had less desirable images of that institution. However, because the overall correlations were sensitive to mean differences between the schools, we replicated this analysis using responses to only one school at a time. These results are shown in Table 4.

As expected, with one exception (Notre Dame), we found that reasonableness of cost was either significantly positively related to both outcomes when evaluating each school individually, or not significantly different from zero. The two private universities, Yale and Notre Dame, had higher base rates of UEI and ItA (likely driven by the Name Prestige factor), but students also appeared to recognize that tuitions were substantially higher in cost. On the other hand, these results also suggested that perceptions of cost were related to the criterion perceptions for some schools, but not for others. There were some differences in other factors as well. For example, Familiarity was related to ratings of UEI for the four regional schools, but not for Yale; meaning that the degree to which any specific factor affected GUEI may vary across schools.

To better understand which factors were the important predictors of UEI and ItA, regression analyses were conducted using the data from the five schools combined (given the issue with the cost item, it was not included in this analysis). UEI and ItA were each regressed on the set of five factors, which were entered simultaneously as a single block. The results, shown in the upper portion of Table 5, indicated that the overall set of factors account for significant amounts of variance in both GUEI and ItA ($R^2$ for GUEI = .81; $R^2$ for ItA = .65). Evaluation of the beta weights showed that most of the variance in GUEI was accounted for by Degree Valuation ($b = .8$), though Extracurricular Opportunities and Reputation of Specific Program were also significant with beta weights of .09 and .08. For ItA, Degree Valuation again uniquely accounted for the most variance ($b = .41$). Unlike ratings of GUEI, all four of the other factors were also significant predictors of ItA.

An additional goal of this study was to investigate whether the five factors were differentially related to UEI and ItA for students who differed in academic qualification. We created two groups based on a median split of SAT scores ($Mdn = 1120$) and reran the regression analyses on each group. The results are shown in the lower portion of Table 6. Looking at the results of the regression of GUEI first, the results showed that there were no significant differences between the any of the five pairs of beta weights. For both groups, Degree Valuation was the primary predictor. However, although not significantly different from each other, the beta weights for Reputation of Specific Program and Extracurricular Opportunities were significant for the higher ability group, but not the lower ability group. Looking at the regression of ItA, there again are no significant differences in any of the five pairs of beta weights. Overall, these results suggested that

<table>
<thead>
<tr>
<th>Factors/Items</th>
<th>GUEI</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>ItA</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ivy</td>
<td>Yale</td>
<td>ND</td>
<td>ISU</td>
<td>UoI</td>
<td>Ivy</td>
<td>Yale</td>
<td>ND</td>
<td>ISU</td>
</tr>
<tr>
<td>Extracurricular Opportunities</td>
<td>.51$^b$</td>
<td>.12</td>
<td>.61$^b$</td>
<td>.60$^b$</td>
<td>.66$^b$</td>
<td>.44$^b$</td>
<td>.44$^b$</td>
<td>.44$^b$</td>
<td>.57$^b$</td>
</tr>
<tr>
<td>Degree Valuation</td>
<td>.75$^b$</td>
<td>.62$^b$</td>
<td>.80$^b$</td>
<td>.70$^b$</td>
<td>.75$^b$</td>
<td>.44$^b$</td>
<td>.29$^b$</td>
<td>.55$^b$</td>
<td>.54$^b$</td>
</tr>
<tr>
<td>Familiarity</td>
<td>.22$^a$</td>
<td>.07</td>
<td>.45$^b$</td>
<td>.24$^a$</td>
<td>.51$^b$</td>
<td>.25$^b$</td>
<td>.39$^b$</td>
<td>.50$^b$</td>
<td>.36$^b$</td>
</tr>
<tr>
<td>Appeal of Location</td>
<td>.42$^b$</td>
<td>.25$^b$</td>
<td>.19$^a$</td>
<td>.42$^b$</td>
<td>.18$^a$</td>
<td>.44$^b$</td>
<td>.46$^b$</td>
<td>.37$^b$</td>
<td>.54$^b$</td>
</tr>
<tr>
<td>Reputation of Specific Program</td>
<td>.47$^b$</td>
<td>.24$^a$</td>
<td>.29$^b$</td>
<td>.38$^b$</td>
<td>.54$^b$</td>
<td>.37$^b$</td>
<td>.48$^b$</td>
<td>.43$^b$</td>
<td>.51$^b$</td>
</tr>
<tr>
<td>The tuition at this university is reasonably priced.</td>
<td>-0.07</td>
<td>-0.09</td>
<td>-0.19$^a$</td>
<td>0.13</td>
<td>0.26$^b$</td>
<td>0.05</td>
<td>0.19</td>
<td>0.02</td>
<td>0.13</td>
</tr>
</tbody>
</table>

*Note. N for each school = 113. GUEI = General UEI. Ivy = Ivy State Technical College; ND = Notre Dame; ISU = Indiana State University; UoI = University of Illinois.*

*$p < .05; ^{b} p < .01.$
the beliefs that students of different caliber had about universities influenced perceptions and intentions equally.

Looking at the differences in beta weights for each factor with regard to the two outcomes showed that for both groups, the impact of Degree Valuation was significantly smaller on attendance intentions than on perceptions of GUEI. On the other hand, Reputation of the Specific Program and Appeal of Location had a much larger impact on attendance intentions than they did on GUEI. These results clearly indicated students’ perceptions of GUEI and ItA were differentially influenced by these five factors.

**Discussion**

The central findings of the current study are complementary of prior research findings. Specifically, all five of the central factors found to underlie UEI have been identified in earlier work using different methods, such as familiarity with the university, perceived quality of specific academic programs (Huddleston & Karr, 1982), cost (Smith, 1994), postgraduation opportunities (Litten & Hall, 1989), and nonacademic factors such as Extracurricular Opportunities and Location (Bowers & Pugh, 1973). Our results confirm that these factors do form the foundation for students’ UEI. In this sense, the current findings confirm earlier indications of these factors’ influence by not only replicating them using a different methodology, but by also providing the long absent criterion-related validity evidence.

However, at the same time, a number of factors purported to be of import to student college choice were not found to be important in the current study.

<table>
<thead>
<tr>
<th>Groups</th>
<th>GUEI</th>
<th>ItA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.81</td>
<td>.65</td>
</tr>
<tr>
<td>Extracurricular Opportunities</td>
<td>.09</td>
<td>.13</td>
</tr>
<tr>
<td>Degree Valuation</td>
<td>.80</td>
<td>.41</td>
</tr>
<tr>
<td>Familiarity</td>
<td>-.04</td>
<td>.08</td>
</tr>
<tr>
<td>Appeal of Location</td>
<td>.00</td>
<td>.15</td>
</tr>
<tr>
<td>Reputation of Specific Program</td>
<td>.08</td>
<td>.25</td>
</tr>
<tr>
<td>Low Ability Students (n_{obv} = 190)</td>
<td>.76</td>
<td>.60</td>
</tr>
<tr>
<td>Extracurricular Opportunities</td>
<td>.09</td>
<td>.10</td>
</tr>
<tr>
<td>Degree Valuation</td>
<td>.80</td>
<td>.40</td>
</tr>
<tr>
<td>Familiarity</td>
<td>-.03</td>
<td>.09</td>
</tr>
<tr>
<td>Appeal of Location</td>
<td>-.02</td>
<td>.16</td>
</tr>
<tr>
<td>Reputation of Specific Program</td>
<td>.06</td>
<td>.22</td>
</tr>
<tr>
<td>High Ability Students (n_{obv} = 204)</td>
<td>.90</td>
<td>.71</td>
</tr>
<tr>
<td>Extracurricular Opportunities</td>
<td>.11</td>
<td>.06</td>
</tr>
<tr>
<td>Degree Valuation</td>
<td>.81</td>
<td>.50</td>
</tr>
<tr>
<td>Familiarity</td>
<td>-.06</td>
<td>.08</td>
</tr>
<tr>
<td>Appeal of Location</td>
<td>.02</td>
<td>.15</td>
</tr>
<tr>
<td>Reputation of Specific Program</td>
<td>.09</td>
<td>.26</td>
</tr>
</tbody>
</table>

*Note.* Predictor variables entered simultaneously for each regression. *b* reflects standardized beta weights. Gen UEI = General UEI.
For example, Grunig (1997) reported only two dimensions affecting choice, size, and selectivity. Although there was some mention of these factors in the initial stage of the current study, neither of these factors proved to yield an influence on UEI perceptions or choice intentions.

The current study also found that nonacademic factors affect image as well as ItA. Although prior research has also suggested that Extracurricular Opportunities and Appeal of Location may influence ItA, these factors have not been considered as potential influences on students’ perceptions of the quality of the institution as a place to receive an education. The current findings suggest that such nonacademic factors do in fact influence students’ UEI in addition to ItA, although they are not often considered by researchers or administrators as important.

The finding of Degree Valuation, which is partly comprised of Name Recognition and Familiarity as a key dimension, appears to connect to research from marketing and consumer psychology. Although Familiarity did not show as much influence as other factors in the latter studies, reviews of the qualitative data from Study 1 clearly shows its impact on choice. A number of students wrote that they preferred one of the two schools listed in the pairing because “I haven’t heard of the other school.” Even in cases when the student knew of both schools, many participants wrote phrases such as “I know more about this school” or “I have friends/family that went to this school.” This is consistent with research showing that a consumer’s confidence toward a brand may result from his/her familiarity or experience with the brand (e.g., Laroche, Kim, & Zhou, 1996). The factor of Name Recognition likely gains its impact from processes similar to the Familiarity concept, and is likely impacted by nonacademic influences as well such as sporting events (Tomo & Cross, 1998). An obvious implication of these findings is that, in order to increase students’ intention to apply to or enroll in a school, university marketers need to enhance the students’ familiarity with the school’s name.

Assessing the images of various universities can assist institutions in benchmarking their success in specific dimensions. Previous research has assessed the feelings and opinions of current students, applicants, and alumni to identify the strong and weak aspects of a specific university. However, as noted earlier, this information, although potentially useful for other reasons, may not provide the best basis for developing effective recruitment programs. Use of research methods, such as that used in the current study, are likely to identify dimensions of university image that will better enable a university to design recruitment materials that highlight the strengths of particular programs and those dimensions on which they excel, and may provide the needed evidence to encourage other university administrators to improve other aspects (e.g., national name exposure). Additionally, by benchmarking against other schools deemed to be a university’s primary competitors for top students, administrators will be equipped with the necessary information to make more strategic recruiting decisions.

Finally, the current study also found evidence indicating that different types of students may use information differently to form perceptions of UEI and ItA. Results from Study 3 show that high ability students’ ratings of UEI and ItA are more predictable than low ability students. Although the current analysis did not have enough statistical power to detect significant differences in the regression weights between these groups, these results suggest that the five factors capture most of the reliable variance in their perceptions, whereas this is less so for low ability students. That is, the identified set of five factors underlying UEI appear to be more applicable to high ability students (those students universities wish to target) than low ability students whose perceptions are apparently influenced by other factors.

Limitations and Assets

Although the current research successfully isolated dimensions of UEI, several limitations warrant consideration. First, although university recruitment and selection applies to high school seniors, we were unable to obtain access to a sample of high school students and used college students. Although the majority of participants had less than two years of college experience (79.3% for Study 1, 68.3% for Study 2, and 51.8% freshman for Study 3), they were current college students who had been through the choice process previously. Hindsight biases, maturation differences, cognitive dissonance, or other differences between our sample and high-school seniors could influence the decision-making process. Second, because our participants were already attending a university, they may not have considered the information as thoroughly as individuals who are actually making a decision that will have direct impact on them (cf. Brucks, 1985). Third, because all research was conducted at a large Midwestern public university, some of the results may be unique to the characteristics of the population that chooses to attend that school. Applying this methodology to a sample drawn from other types of universities (e.g., a small, private, liberal arts college, coastal) might elicit different dimensions of image, or find changes in the degree of importance placed on the isolated dimensions.
Despite these limitations, the current study provides a significant contribution to the research investigating students’ perceptions of universities and their college choice process by correcting for several of the methodological concerns noted by Grunig (1997), Litten and Hall (1989), and Schmitz (1993). This study looked at factors that discriminate between schools using a student, as opposed to an administrator, sample. Specifically, we isolated six factors (Extracurricular Opportunities, Reputation of Specific Program, Location, Cost, Familiarity, and Value of Degree) that significantly impact image and intent to attend. Furthermore, we found that Reputation of Specific Program and Extracurricular Opportunities were significant factors for higher ability students (based on SAT score) but not for lower ability students.

Future research stemming from the results of this study can employ larger and more diverse samples to more specifically assess how UEI dimensions affect general perceptions of universities and intent to apply. Using samples of high school students that are nearing the time of making decisions about colleges could provide more useful information about college choice. Further, longitudinal studies could be conducted to determine if and how the importance of the dimensions of UEI vary over time, perhaps assessing how perceived fairness of selection practices affects student perceptions. Finally, this study replicated a method developed by Highhouse and colleagues (1999) to assess image in a particular industry. The present study affirms this methodology as a useful tool for assessing image in many diverse areas.

References


Marken, G.A. (1990). Corporate image—we all have one, but few work to protect and project it. Public Relations Quarterly, 35, 21-23.


Most people know that too much stress isn’t good for you, but few really know the emotional, cognitive, and physical consequences of unmanaged stress (Lin & Ensel, 1989). According to a survey conducted by the American Psychological Association (2004), 45% of adults suffer adverse health effects from stress, and 75% to 90% of all physician office visits are for stress-related ailments and complaints. The way one responds to stress, however, is variable, and a stressor that makes one person sick can invigorate another (Selye, 1975). Based on a review of existing data, Kobasa (1979) suggested that some people do indeed have the ability to remain healthy under stressful circumstances and proposed that hardiness was the psychological variable which functioned as a stress-resistance resource. Individuals who are high in hardiness can interact with the world around them in a way that provides the motivation to turn stressful events in their lives from potential disasters into opportunities (Kobasa, Maddi, & Kahn, 1982; Maddi, 2002, 2004).

The major components of hardiness are known as the three Cs: commitment, control, and challenge (Kobasa, 1979; Kobasa, Maddi, Puccetti, & Zola, 1985; Maddi, 2002; 2004). Individuals who are strong in commitment have the desire to stay involved with the people and events going on around them. People who are strong in control want to struggle in order to have an influence on what is going on around them. Persons high in challenge learn from experiences, whether positive or negative, and find challenges developmentally satisfying (Kobasa et al., 1985; Maddi, 2004). Kobasa and Puccetti (1983) described hardiness as a “generalized ability to use all available personal and environmental resources to most effectively perceive, interpret, and cope with stress events” (p. 843). Therefore, hardy individuals may be better equipped to handle stressful periods in their lives.

One of those potentially stressful periods is the college years. For many young people, going off to college is likely a time when stress accumulates quickly. It is a time when many young adults are faced with learning to manage their own lives for the first time and being responsible for their own health habits, school, and finances, among other things. According to Sax (1997) depression and stress increase during the college years, and emotional and physical health tend to decline. Sax asked college students how frequently

---

**Hardiness, Stress, and Health-Promoting Behaviors Among College Students**

The purpose of this study was to examine the relationship between hardiness, stress, and health-promoting behaviors among college students. Each of these concepts was measured using self-report: Personal Views Survey III-R, Health Promoting Lifestyle Profile II, Perceived Stress Scale, and College Schedule of Recent Events-Modified. Multiple regression analysis was used to predict health-promoting behaviors from a composite of predictor variables including hardiness, perceived stress, recent stressful life events, and gender. The results showed that after controlling for perceived stress, recent stressful events, and gender, hardiness was the most significant predictor of health-promoting behaviors and negatively correlated with perceived stress. The discussion focuses on the potential benefits of hardiness training for a college student population.
they felt overwhelmed by all they had to do during the past year. One quarter (25.3%) of the freshman surveyed reported feeling frequently overwhelmed, however, there was a large gender difference: twice as many women (32.5%) as men (16.6%) said they felt overwhelmed with stress on a regular basis.

Whereas college can be a stressful time for many students, research also suggests that hardiness can play a positive role in college students’ lives. For example, Weibe and McCallum (1986) were the first researchers to study the relationship between hardiness, health practices, and illness among college students. Their sample included 86 (60 women and 26 men) undergraduate students enrolled in psychology courses at the University of Alabama at Birmingham. The findings suggest that harder students maintain better health practices while under stress than less hardy students. The stress-resistance effects of fitness and hardiness were also later examined at University of Alabama at Birmingham among a sample of 373 undergraduate students enrolled in introductory psychology classes (Roth, Wiebe, Fillingim, & Shay, 1989). Roth et al. (1989) found that when hardiness and fitness were examined together, the combination of these variables was associated with better health in general. When hardiness and fitness were assessed separately, however, only fitness remained clearly related to health. Banks and Gannon (1988) found that hardiness played an important role in mediating minor and major stressful events in college students. They also found hardiness acts as a stress buffer against the development and/or report of illness. Smocheck (1993) examined hardiness, health, and burnout among a population of 217 female senior baccalaureate nursing students. The results supported the theoretical link between hardiness and health and strengthened the notion that hardiness provides protection against burn out.

Whereas these studies clearly suggest hardiness may play an important role in college students’ lives, existing research is dated (15 to 20-years-old). It is important, therefore, to look at common health trends today among college students and examine the relationship between stress, health, and hardiness. Moreover, previous research on health, stress, and hardiness has focused mainly on symptoms of illness. Health-promoting behaviors are defined as “self-initiated actions on the part of individuals that enhance health status in the absence of a specific health threat” (Pender, 1982 as cited in Nikou, 1999, p.18). These behaviors concentrate on nutrition, exercise, self-responsibility, spirituality, environment, social relationships, thinking, physical health, emotional health, and stress management (Dana & Hoffman, 1987).

The present research, therefore, focused on predicting health-promoting behaviors rather than symptoms of illness. In addition, the current study also included multiple measures of stress among college students, including a measure of total recent stressful life events and perceptions of the amount of stress in one’s life. Finally, it seems important to include gender in any study exploring stress in college students, as previous research suggests that women report greater levels of stress than men (Sax, 1997).

The purpose of this study was to explore predictors of health-promoting behaviors among college students from a composite of variables including hardiness, perceived stress, recent stressful life events, and gender. We hypothesized that after controlling for the experience of stressful life events and perceptions of the amount of stress in one’s life, hardiness would be a significant predictor of positive health practices. We also expected that the experience and perception of stress in one’s life would be negatively correlated with positive health behaviors.

Method

Participants

One hundred and thirty seven participants were recruited primarily from psychology classes at the University of Alaska Anchorage. All participants were undergraduate students. Sixty-three percent of the students were women, and over three-fourths (78%) were White. The remaining participants were Asian (7%), Alaska Native or Native American (3%), Latino (5%), or Other (7%). Participants were offered extra credit for their voluntary participation in the study depending on the policy of each instructor. Participants were treated in accordance with the APA’s ethical principles for psychologists.

Materials

A demographic questionnaire was used to assess age, gender, race, college level, and relationship status of participants. Gender of participants was coded as man = 0 and woman = 1 and differences among variables was calculated using an independent sample t test. The criterion or dependent variable was measured using the Health Promoting Lifestyle Profile II (HPLP II; Walker, Sechrist, & Pender, 1995). Participants were asked to complete the HPLP II, which is a 52-item instrument designed to measure health-promoting behaviors. Test-retest reliability over a 2-week period found the HPLP II to have an alpha of .93 and a Cronbach’s alpha of .92 for the total scale (Walker, Sechrist, & Pender, 1987). A score for overall health-promoting lifestyle was obtained by calculating a mean for the individual’s responses to all
52 items. Statements such as “I discuss my problems and concerns with people close to me”, “I question health professionals in order to understand their instructions”, and “I am aware of what is important to me in life” were measured and scored as follows: never = 1; sometimes = 2; often = 3; and routinely = 4 (Walker, Sechrist, & Pender 1995).

The predictor variable of hardiness was measured using the Personal Views Survey III-R (PVS III-R; Hardiness Institute Inc., 2004). The PVS III-R is an 18-item self-report inventory designed to assess commitment, control, and challenge (the three Cs of hardiness), as well as overall hardiness. Participants were asked to what extent they agreed with each of 18 statements such as “by working hard, you can always achieve your goal”; “thinking of yourself as a free person just leads to frustration”; and “most days, life is really interesting and exciting for me” on a 4-point Likert-type scale (never = 0, almost never = 2, fairly often = 3, and very often = 4). The PSS was shown from previous research to have a Cronbach’s alpha reliability that ranged from .84 to .86 and a two-day test-retest reliability of .85 (Donnell, 2003; Cohen, Kamarck, & Merrelstein, 1983). PSS scores were obtained by reversing the scores on the seven positively-worded items then summing across all 14 items so that a higher number indicated greater perceived stress.

The other measure used to assess the predictor variable of stress was the College Schedule of Recent Events-Modified (CSRE-M; Marx, Garrity, & Bowers, 1975), a 47-item questionnaire designed to obtain information about the occurrence of specific recent life events. The CSRE-M has a 4-point response scale, and participants indicated the number of times (0-3) during the last year 47 different events occurred such as “entered college”, “had a major conflict in or change in values”, and “had trouble with school administration.” Scores were obtained by summing the total number of times all 47 events occurred for each participant; higher scores corresponded with higher levels of stress.

### Procedure

Participants were given packets in their classes that contained a consent form, demographic questionnaire, and the four questionnaires (in counter-balanced order) used to measure hardiness, stress, and health-promoting behaviors. The packets were passed out in the classrooms to students who wanted to participate and participants were asked to return their completed questionnaires when the class met next. Prospective participants were told the purpose

<table>
<thead>
<tr>
<th>Variables</th>
<th>CSRETotal</th>
<th>LPSTotal</th>
<th>PSSTotal</th>
<th>Hardiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSRETotal (Recent Stressful Life Events)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPSTotal (Health Promoting Behaviors)</td>
<td>-0.02</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSSTotal (Perceived Stress)</td>
<td>0.29*</td>
<td>-0.41*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Hardiness</td>
<td>-0.26*</td>
<td>0.48*</td>
<td>-0.60*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: *Correlation is significant at the 0.01 level (2-tailed).
of the study was to examine the relationship between personality characteristics, stress, and health-promoting behaviors among college students.

**Results**

A simultaneous multiple regression analysis was used to predict respondents’ total health-promoting behavior score from total hardiness, perceived stress, recent stressful life events, and gender. With the exception of gender, which was dummy coded as described above, the remaining variables in the regression (CSREM, PSS, PVS-III R, and HPLP II) were summed rating scales. Although such rating scale data may be considered ordinal by some researchers, the use of parametric statistics in such cases is common, safe, and recommended (Desselle, 2005; Kerlinger & Lee, 2000). Desselle (2005) indicated that “…scale scores can be subjected to tests such as student t tests, one-way analyses of variance (ANOVAs), multivariate ANOVAs, and multiple regression analysis procedures, as appropriate, to test research hypotheses” (p.11).

Prior to conducting the regression analysis, we examined bivariate relationships among the variables in the study. Table 1 presents correlations between hardiness, the two stress measures, and health-promoting behaviors. Health promoting behaviors (LPSTotal) was shown to be negatively correlated with perceived stress (PSSTotal) and positively correlated with hardiness. The correlation between health-promoting behaviors and total number of recent stressful life events (CSRETotal) was not statistically significant. Table 2 illustrates gender comparisons on all variables measured within the study. Although no gender differences were found for hardiness, recent stressful life events, or health-promoting behaviors in this sample, a gender difference was found that showed women had higher levels of perceived stress when compared to men. The decision was made, therefore, to keep gender in the regression model.

Results of the multiple regression analysis (Table 3) found that the composite of predictor variables accounted for a significant proportion of the variability in health-promoting behaviors (Adjusted $R^2=.26$, $p<.01$). After controlling for perceived stress, recent stressful life events, and gender, hardiness was the most significant predictor of health-promoting behaviors in this college student sample (Standardized Beta =$ .35$, $p<.01$). The only other significant predictor variable in the model was perceived stress (Standardized Beta =$ .24$, $p<.01$).

**Discussion**

The results of this study confirm that hardiness is an important characteristic to explore when studying the relationship between stress and health among college students. The results supported the hypothesis that hardiness would be a strong predictor of health-promoting behaviors after controlling for perceived stress, recent stressful life events, and gender. Perceived stress was also found to be a significant predictor of health-promoting behaviors while holding constant hardiness, recent stress, and gender. Nikou (1999) found similar results among female nursing students. Pollachek (2001) also found men and women who
possessed the personality characteristic of hardiness had higher levels of social support and participated in more health-promoting behaviors. Weibe and McCallum (1986) found that hardiness was related to health practices, but not directly related to stress.

Because hardiness was shown to be the greatest predictor of health-promoting behaviors, it would appear that hardiness training would be beneficial for college students. The “HardiTraining” program has been shown to be more effective among college students in improving their retention rates and grade-point-averages than standard student enrichment, and leadership training approaches” (Maddi & Khoshaba, 2001, p.30). Maddi, Kahn, and Maddi (1998) found participants who experienced hardiness training showed greater increases in personality hardiness, job satisfaction, and perceived social support levels and showed a decrease in subjective strain and illness severity, than did those experiencing relaxation/meditation or passive listening. The study also found that hardiness training can be learned and can be considered a serious tool for managing stress. Hardiness training includes the hardy skills of coping, social support, relaxation, nutrition, and physical activity which are known as the “five fingers of the hand” (Maddi, 2002, p.182). It was proposed by Maddi (2002) that young people who are in school need hardiness training and assessment in order to be readily prepared for adulthood. So in the future when disrupting changes occur, they are able to turn those changes into opportunities instead of allowing them to be devastating to their lives. Currently there are some colleges in the United States that offer hardiness training for regular credited hours (Maddi, 2002).

If college students had the opportunity to participate in the hardiness training, they could potentially benefit from having improved health and making better health choices as well as handling stress in a positive manner which may help them succeed in college.

One limitation of the current study was the population of college students assessed. Most students came primarily from psychology classes. According to the PVSIII-R percentile rank averages in 2003 (Hardiness Institute Inc., 2004), the average total hardiness score is 32, but the average score for this sample was 37.7. Psychology majors at the University of Alaska Anchorage, therefore, appear hardier than the average sample of participants who completed the measure in 2003. The specific reason for the difference in the means is unknown, but it would be interesting to extend the population to include students from different majors at the same university to see if the mean score remained the same or changed directions. Another limitation was the uneven balance of gender represented within the sample. Psychology majors at this particular university tend to be women and thus gender and major are confounded. Collecting data from more male students would help future research that examined gender difference when using these same predictor and criterion variables used in this study.

Finally, this and other studies in this area are correlational in design. It would be beneficial to explore the health benefits of a hardy personality using an experimental design. Future research should concentrate on comparing a group who received hardiness training to a control group to see if hardiness is a beneficial component for success among college students.
References


There are many factors that can affect self-esteem and the way people view their own physical appearance. For example, men and women are often bombarded with images of individuals exemplifying a perfect physique (Hewitt, Flett, & Ediger, 1995), especially by the media. This focus may increase self-imposed pressure to maintain youth and meet the unrealistic beauty standards fostered by the media and imposed by society. These constant pressures, along with the need to receive approval and acceptance from others, may lead to decreased self-esteem (Crocker, Luhtanen, Cooper, & Bovverette, 2003).

The evolutionary perspective presents one possible way of understanding the focus on physical appearance and attractiveness in society. This view suggests that reproductive potential is the most essential quality of a future female mate. Cues that signal this potential are seen as the most important determinants of attractiveness and may include good mothering ability, femininity, and resistance to diseases (Wade, Shanley, & Imm, 2004). Thus, men may be attracted to women who possess these characteristics, and women attempt to fit this “model” to attract men, further perpetuating the societal focus on appearance. According to the evolutionary view, women may attempt to maintain their attractiveness in order to fulfill those societal expectations (Wade, et al.). Evolutionary theory may also suggest that male species attempt to “spread their seed” to maximize dispersal of their genes through the next generation. One way to accomplish this is by being the alpha male. Thus, men may need to show dominance. Having a muscular physique will enable a man to exert this dominance. However, there are no other specific physical standards that men need to embrace in order to fulfill their evolutionary purpose. So, according to the evolutionary view, men may attempt to maintain a muscular appearance in order to fulfill their evolutionary purpose and perceived societal expectations.

Relatedly, appearance has been linked to self-esteem. Self-determination theory states that self-esteem is higher when it is based on more abstract variables, such as values and distinctive features of one’s personality, than when it is based on tangible attributes such as appearance (Crocker, et al., 2003). According to this theory, people who base their self-

The purpose of this study was to examine the relationship between body esteem, self-esteem, and Body Mass Index (BMI) for college students. It was hypothesized that men would have higher self-esteem and body esteem than women. It also was hypothesized that lower BMI would be associated with greater self-esteem and body esteem.

The sample consisted of 72 men and 81 women from a small northeastern college. In addition to several demographic questions, participants completed the Rosenberg Self-Esteem Scale and a Body-Esteem Scale for Adolescents and Adults. There were statistically significant relationships supporting both hypotheses. Compared to women, men had higher self-esteem and body esteem. For all participants, lower BMI scores were related to higher body esteem and higher self-esteem. Implications and limitations of this study are discussed.

AUTHOR NOTE. Address correspondence to Adriana Pilafova, 10108 Mosby Woods Dr., Fairfax, VA, 22030. E-mail: adipilafova@gmail.com

* Faculty supervisor
Self-esteem has been defined in different ways. Some researchers have defined self-esteem as an individual evaluation of personal attributes (Coopersmith, 1967). Other researchers have defined it as a combination of positive and negative self-evaluations across a variety of domains (Piers & Harris, 1969), as well as a global construct without any specific domains (Rosenberg, 1979). Because of its wide acceptance, the current study used this latter definition. In general, there appears to be a relationship between weight and self-esteem during adolescence. Overweight adolescents and adults tend to have lower self-esteem than individuals of normal weight (Felker, 1968). For men, the relationship between weight and self-esteem is strongest during middle adolescence, with overweight men displaying lower scores of self-esteem (Mendelson & White, 1985) compared to adult men. For women, the relationship between weight and self-esteem is strongest during late adolescence, with overweight women displaying lower scores of self-esteem compared to adult women (Mendelson & White). However, the relationship between weight and self-esteem is less clear during late adolescence/early adulthood. In fact, there are a variety of conflicting findings among studies using college student samples (Hyde, 2005); thus, self-esteem in undergraduate college students calls for further exploration.

Women are more likely than men to view themselves through the eyes of others and feel preoccupied with the tangible attributes of appearance (Crocker, et al., 2003). In line with the self-determination theory, this focus may then lead to decreased self-esteem. Moreover, women viewing themselves as overweight as a predictor of socially inappropriate behaviors that are counter to societal standards of attractiveness, and likewise would decrease mate desirability (Mendelson, White, & Mendelson, 1996). On the other hand, women who view their appearance more positively and in line with societal standards tend to have higher levels of self-esteem (Mendelson, Mendelson, & White, 2001).

Evolutionarily speaking, a man needs to show dominance in order to secure his place as the alpha male and be able to retain women’s attraction. In line with this theory, men could feel a pressure to have a muscular build (Olivardia, Pope, Borowiecki, & Cohane, 2004) in order to maintain their dominant status. Given that this may be an unattainable ideal, one’s self-esteem could be affected. Thus, men who do not fit the muscular lean body type may experience changes in their self-esteem. Whereas much research on self-esteem and appearance has concentrated on women, there is a paucity of research exploring these factors in men. Previous research has instead often combined self-esteem measures in men with measures of body mass and body esteem (Mendelson, Mendelson, & Andrews, 2000). Body esteem is a global construct that refers to people’s self-evaluation of their physical appearance (Mendelson, et al., 2000). Obese and overweight adults tend to have low body esteem (Hendry & Gillies, 1978). In addition, women tend to have lower body esteem than men (Gray, 1977). Regardless of weight, high body esteem is related to high self-esteem (Mendelson, et al., 2000).

Although researchers have reported gender differences in self-reports of self-esteem and body esteem, other researchers have noted minimal gender differences in these domains (Hyde, 2005). For example, one study reported a lack of gender differences in self-esteem for young adults (Greene, & Wheatley, 1992). However, analyses were performed on a combined sample of men and women both attending college and not attending college (Greene, & Wheatley, 1992). Whereas there are likely to be similarities in these two groups, it is possible that the combined data masked possible differences in self-esteem between these groups, as well as a potential interaction effect of gender and sample (college vs. noncollege). In addition, over the past 20 years, women have reported increasingly more dissatisfaction with their bodies compared to men (Feingold, & Mazzella, 1998). However, these studies have been criticized for low effect size (Hyde) and the use of participants from all age groups (Feingold, & Mazzella; Mendelson, et al., 2000). As stated, specific investigations of adolescents have provided preliminary support for gender differences in specific age groups.

Given findings derived from different age groups and various samples, it is important to compare gender differences across samples from different age groups. In particular, examining the college population is essential because of the specific pressures individuals may experience in college. For example, in college most young adults are surrounded by individuals their own age. Thus, college students are constantly bombarded with images of their peers that may make them feel inadequate about their appearance. Specifically, there are social events and organizations that may foster the emphasis on physical appearance, increasing the probability that college students may place more emphasis on their appearance. Inability to meet standards of perceived attractiveness may in turn decrease self-esteem and body esteem. Therefore, it is important to study how male and female college students may be affected by this phenomenon.
Another important aspect that could affect self-esteem is one’s development. According to one developmental theory, in late adolescence individuals are creating consistent self-concepts and self-presentation styles (Erikson, 1963). Thus, in college years there is a search for one’s identity. Variables such as self-esteem and body esteem have been shown to play a major role in this development (Lysell & Adamson, 1996). Moreover, it has been shown that eating disorders have a higher prevalence among college sophomore women (Hesse-Bider, 1992). Because eating pathology could affect self-esteem and body esteem, this further illustrates the need to study those variables in a college population.

In general, men and women experience great pressure to be physically appealing, although the rationale behind these pressures may differ by gender. For men, the ideal body consists of minimal body fat and muscular development (Olivardia, et al., 2004). Men tend to believe that their bodies were fatter and further from the ideal than actual measurements indicate, which is related to decreased self-esteem and body esteem (Olivardia, et al.). Interestingly, when women are asked to rate men’s appearance they favored a significantly less muscular and lean body type. The way men view themselves does not directly relate with the way women perceive them (Olivardia, et al.). This might be due to the over idealization of the lean figure and the emphasis on weight reduction that has affected men and women in general (Garner, Garfinkel, Schwartz, & Thompson, 1980). However, in spite of this thinness ideal, contradictory evidence has shown that men are conforming to different social norms. That is, some men may view being overweight more positively which in turn results in higher self-esteem. (Mendelson, et al., 1996).

Most research, though, provides evidence that both genders, under significant pressure to maintain perfect body image, experience negative effects on their self-esteem (Mendelson, et al., 2000). The societal pressure to maintain a slender physical appearance has turned body mass index (BMI) into a standard of achievement. BMI is defined as a person’s weight divided by a square of the person’s height. It serves as a measure of leanness; a high score represents a less lean body, and a low score represents a more lean body.

BMI is a strong predictor of self-esteem for adolescent boys and girls, and this relationship does not differ between genders. People with high BMI scores tend to have lower self-esteem scores regardless of their gender (Mendelson, et al., 2000). In addition, boys and girls tend to have different expectations for ideal BMI. Boys are more satisfied with slightly higher BMI scores than girls.

Given the contradictory findings for gender in self-esteem and body esteem, additional data are necessary. Most of the research in this domain has grouped individuals from varying age groups such as middle school, high school, and college (Mendelson & White, 1985; Mendelson, et al., 1996). The analyses from these studies often combine these data, thus it is unknown whether the conclusions drawn can be generalized to the specific age groups, such as college students. Moreover, some of the recent studies identifying gender differences in these domains have focused on samples outside of the United States (Mendelson, et al., 2000). Thus, there appears to be a lapse of data examining potential relationships and influences of self-esteem and body esteem in college students from the United States.

The purpose of the current study is to investigate the connection between self-esteem, body esteem and BMI in undergraduate college students from the United States. Previous research suggests a relationship between self-esteem and physical appearance satisfaction. The current study will further investigate this relationship, specifically addressing possible gender differences. Based on the notion that adolescent boys have higher self-esteem than adolescent girls, we would expect this pattern to continue into adulthood. This is further strengthened by the elevated pressure women could experience from the media regarding their appearance. Thus, the first hypothesis is that male college students will have higher self-esteem and body esteem than female college students. Based on the notion that adolescents with lower BMI have higher self-esteem and body esteem, we would expect this pattern to continue into adulthood. Thus, the second hypothesis is that higher scores on self-esteem and body esteem measures will relate to lower scores on the BMI.

Method

Participants

Participants were male \((n = 72)\) and female \((n = 81)\) undergraduate students from a small northeastern college. Participants were sampled through a convenience \((n = 18)\) and a cluster \((n = 135)\) methodology. For the convenience sample, students signed up for the study via an online program and received credit for psychology courses. Students participated in groups with a maximum size of 10 in a college classroom. For the cluster sample, all dorm names were placed in a hat, and five dorms were randomly selected. Next, one floor was randomly selected from each dorm. All residents of the selected floor were asked to participate. Those who agreed to participate were given candy as an incentive. Students participated in groups with a maximum size of two in their dorm rooms.
The mean age of the participants was 19.4 years old ($SD = 0.87$). Regarding grade level, 12.4% of the participants were freshmen, 64.1% were sophomores, 15% were juniors, 7.2% were seniors, and 0.7% were graduate students. Regarding ethnicity, 82.4% of the participants self-identified as Caucasian, 3.3% as African American, 7.2% as Asian, 3.3% as Hispanic, and 3.3% self-identified as “other”.

Measures

The participants were asked to complete three questionnaires in the following order: (a) the Rosenberg Self-Esteem Scale (Rosenberg, 1965), (b) the Body-Esteem Scale for Adolescents and Adults (Mendelson, Mendelson, & White, 1997), and (c) Demographic Questionnaire, in which participants also reported weight and height approximations.

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) was developed as a self-report measure of self-esteem. The scale has been shown to be highly reliable ($\alpha = 0.89$). Participants are asked to rate their level of agreement with 23 statements on a 4-point Likert scale (1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree). For this scale, lower scores signify higher self-esteem. Sample questions include, “As a whole I am satisfied with myself”; “I feel that I am a person of worth, at least on an equal plane with others”; and “All in all, I am inclined to feel that I am a failure”. Responses to the scale were averaged for all participants to provide a mean self-esteem score.

The Body-Esteem Scale for Adolescents and Adults (BESAA; Mendelson, White & Mendelson, 1997) is a measure of self-perceived appearance. Participants are asked to rate their level of agreement with 23 statements on a 5-point Likert Scale (0 = never, 1 = seldom, 2 = sometimes, 3 = often, and 4 = always). For this scale, higher scores represent a higher body-esteem score. The scale consists of three subscales: Body-Esteem Appearance (10 items; $\alpha = 0.92$), Body-Esteem Weight (eight items; $\alpha = 0.94$) and Body-Esteem Attribution (five items, $\alpha = .81$). BE-Appearance highlights participants’ general feelings about their physical appearance. Some examples include “There are lots of things I’d change about my looks if I could”, and “I’m pretty happy with the way I look”. BE-Weight targets weight satisfaction. Some examples include: “Weighing myself depresses me” and “I really like what I weigh”. BE-Attribution targets participants’ opinions on how others evaluate his or her body and appearance. Some examples include, “Other people consider me good looking” and “People my own age like my looks”. Responses to the scale were averaged for all participants to provide a mean body-esteem score.

The final measure was the Demographic Questionnaire. It consists of seven questions that were developed by the researchers. Participants are asked to disclose their age, gender, ethnicity, major, grade level, weight, and height. BMI was calculated using the formula, $(\text{Weight}/\text{Height}^2) \times 703$. BMI was examined as a continuous variable for all participants.

Procedure

Overall, participants responded to the measures within 20 to 45 min. For the convenience sample, participants were invited to complete the survey in a classroom. After all the individuals were seated, the informed consent form was distributed. Once the informed consent form was completed and collected, the participants were given the Rosenberg Self-Esteem Scale (Rosenberg, 1965). After participants completed the Self-Esteem Scale, they received the BESAA. Finally, participants were asked to complete the Demographics Questionnaire. Upon completion of all three questionnaires, all participants were fully debriefed. The names of the different questionnaires were only revealed to the participants in the debriefing form. Thus, unless participants recognized a certain scale, they were not aware of what the scale measured.

For the cluster sample, all participants completed the surveys in their dorm rooms. In order to ensure anonymous responding (given that their roommates may have also been completing the questionnaire), participants were instructed to sit at their desks. After they were settled in their desks, the informed consent was distributed and signed. Next, the three questionnaires were distributed in the order mentioned above, and the researcher waited outside the room for the students to finish. Once the participants had completed the questionnaire, they were asked to place it in a box to foster confidentiality. Next, participants were fully debriefed. Before leaving, the researcher provided candy to the participants as a reward for their participation.

Results

Two univariate analyses of variance and a sequential regression analysis were performed to determine any potential differences between the two samples. Analyses revealed a lack of statistically significant differences between the two samples; therefore all subsequent analyses include combined data from the convenience and cluster samples. The mean self-esteem score for all participants was 1.86, ($SD = 0.41$) and the mean body-esteem score was 2.33, ($SD = 0.61$). Most participants had a BMI score in the normal range ($M = 23.31$, $SD = 3.69$).
An exploratory analysis was performed to assess differences between men and women’s BMI scores. A one-way ANOVA revealed that the differences were not statistically significant, $F(1, 152) = 3.5, p > .05$, partial $\eta^2 = .02$. These results showed that there are no significant differences between men and women and their BMI scores.

The first hypothesis that self-esteem and body esteem would vary by gender was examined using two separate univariate analyses of variance. Men ($M = 1.79, SD = 0.38$) reported higher self-esteem than women ($M = 1.93, SD = 0.43$), $F(1, 151) = 6.80, p = .01$, partial $\eta^2 = .03$. Observed power was equal to .55. In addition, men ($M = 2.50, SD = 0.52$) reported higher body esteem than women ($M = 2.17, SD = 0.64$), $F(1, 151) = 23.55, p < .01$, partial $\eta^2 = .07$. Observed power was equal to .92.

The second hypothesis that higher self-esteem and body-estee scores would be associated with BMI scores was examined through a sequential multiple regression analysis. Given a significant difference self-esteem and body esteem between men and women, we decided to enter gender in the primary step of the analysis to reduce the variance attributed to gender. A sequential multiple regression was selected because it assesses how much variance was accounted for by each predictor above and beyond the variance accounted for by gender. An assessment of multicollinearity revealed that self-esteem and body esteem highly correlated, $r = .66, p < .01$. Thus, the predictor variables were not completely independent of each other, which could have decreased the power and effect size of the analyses.

The overall $R$ was significantly different from zero, $F(2, 149) = 18.68, p < .01$. $R^2$ was equal to .22. An adjusted $R^2$ of .20 indicates about 20% of the variability in BMI was predicted by self-esteem and body esteem after controlling for gender effects. Overall effect size was measured by Lambda and was equal to .02. When examining individual predictors, self-esteem ($\eta = .19, p = .05$) appeared to have a negative correlation with BMI but was not the strongest predictor of BMI, accounting for about 3% of the variance. Thus, high self-esteem is associated with lower BMI for both men and women. Body esteem ($\eta = .56, p < .01$) appeared to have a high negative correlation with BMI and was the strongest predictor BMI, accounting for about 31% of the variance. Thus, high body esteem is associated with lower BMI for both men and women.

**Discussion**

Both hypotheses were supported by the findings of the study. For hypothesis one, men did demonstrate significantly higher self-esteem and body esteem than women. For hypothesis two, lower scores on body mass index (BMI) were associated with higher self-esteem and body esteem. The differences in regard to self-esteem may indicate that the lower people’s weights were in comparison with their heights, the better they feel about themselves.

This study is consistent with previous findings regarding self-esteem and physical appearance satisfaction. The evaluation of physical appearance is the strongest predictor of self-esteem (Crocker, et al., 2003). Furthermore, satisfaction levels of physical appearance are positively related with self-esteem (Mendelson, et al., 2001). The current study provided more insight into the relationship because it showed that college men had higher self-esteem than college women.

The current study found BMI to be a significant predictor for body esteem. This lends additional support to the findings of Mendelson, Mendelson, and Andrews (2000) who reported a relationship between BMI and body esteem. As shown in the current study, the lower people’s BMI was, the higher their score was on the BESAA. Because BMI depends on the weight of participants, the relationship shows that the less individuals weigh compared to their height, the better they would feel about their outward appearance.

The current study extended previous findings of gender differences. Mendelson, Mendelson, and Andrews (2000) stated that there were significant differences between men and women only in regard to body satisfaction. In the current study, there was a significant difference between men and women in regard to self-esteem. Men were found to have higher self-esteem and body esteem than women. Some of the differences may be attributed to the variations in images of appearance that men and women are bombarded with. For men, there seems to be a more uniform look that centers around having a muscular body build. Because in colleges body building equipment and gyms may be more accessible, it may enable men to meet this criteria easier. Thus, college men may have less muscle belittlement and muscle displeasure (Olivardia, et al., 2004) and therefore may be happier with themselves (Morrison, Morrison, Hopkins, & Rowan, 2004). For women, there seems to be no uniform image that they need to follow. The media, college organizations, and peers may all project different body types that are found attractive. Some may portray the lean body as attractive, but others may place emphasis on a more toned and muscular physique. Thus, it may be more difficult for women to conform to any particular ideal. This could increase their frustration with their bodies and could in turn lead to lower body esteem and self-esteem.
Some of the gender differences may be due to eating disorder problems in women. Hesse-Biber (1992) found that among a sample of college women, observed from their sophomore to their senior year, eating disorders were significantly more prevalent initially and decreased by senior year. Furthermore, Rosen and Ramirez (1998) found that people with eating disorders find it difficult to accept their bodies. Thus, they are very distressed and have low self-esteem. In one study, women with eating disorders scored much lower on both self-esteem and body-esteem measures than healthy women (Mendelson, McLaren, Gauvin & Steiger, 2002). As such, there may be a connection between the predominantly sophomore sample of this study and eating disorders acting as an extraneous variable. Future research should investigate the relationship between self-esteem, body esteem, and BMI, while accounting for the potential influence of eating disorder symptomology in a college population, especially among female sophomore college students.

There are some limitations in the design. The use of heterogeneous groups could have either increased or decreased our ability to detect differences. Another limitation is the use of the cluster and the convenience samples. Lastly, the cross-sectional nature of the study is another limitation. Because of the cross-sectional design, we are not able to determine directionality of the relationship of self-esteem, body esteem and BMI.

The strengths of the study appear to outweigh some of the potential limitations. For example, the use of both the Rosenberg Self-Esteem Scale and the Body-Esteem Scale for Adolescents and Adults, which have been frequently used in the literature and have high validity and good test-retest reliability (Mendelson, White, & Mendelson, 1997), may have reduced the amount of random error. There were also no differences found between the two clusters. The lack of statistically significant differences between the convenience sample and the cluster sample showed that any potential extraneous variables did not affect the data or skew the results. Finally, the experimenter ensured that the participants were aware of the anonymity of the measures. Emphasis on this aspect decreased self-promotion effects and may have fostered unbiased data.

Future research could consider ethnic differences. Some researchers have highlighted potential differences in ethnic values regarding physical appearance (Croll, et al., 2002). A more diverse sample should be examined in the future, both in a college and a community sample. Given the different values regarding physical characteristics, it is likely that there may be different pressures on different ethnic groups regarding BMI. As in the current study, these varying perceptions are also likely to influence self-esteem and body esteem.

The present study investigated the differences between men and women in their attitudes about their appearance and found that men generally have higher self-esteem and body esteem. It also showed that the lower a person’s BMI is, the higher self-esteem and body esteem one is expected to have. Such findings suggest that there may be a problem in our society and that sociocultural factors play a role in people’s perceptions (Smolak, Levine, & Thompson, 2001). Indeed, Mendelson, Mendelson, and Andrews’ (2000) findings suggest that if people do not base their self-esteem and feelings of self-worth on weight, they come to have higher self-esteem. All evidence suggests that society must strive to allow individuals to evaluate themselves based on more meaningful and less superficial criteria.

**References**


Mendelson, B. K., McLaren, L., Gauvin, L., & Steiger, H. (2002). The relationship of self-esteem and body esteem in women with


There has been much research conducted in the field of psychophysiology involving the effect of fear on the sympathetic nervous system. Specifically, heart rate and galvanic skin response (GSR) have been used to examine the various levels of the “fight or flight” reaction. It has been shown that when subjects view pictures depicting threat, violent death, or erotica, there are reports of strong emotional arousal, large skin conductance response, and pronounced cardiac changes (Bradley, Codispoti, Cuthbert, & Lang, 2001). These findings led the current research to examine similar effects when subjects viewed fear-inducing clips from popular movies.

The current research demonstrates that subjects can decipher between potentially threatening and non-threatening stimuli quickly, effortlessly, and without elaborate cognitive processing (Öhman, 1993). This process is highly advantageous and may be critical for survival (Azevedo, et al., 2005). There are individuals who experience high volumes of stress in their everyday lives (i.e., firefighters, police officers, physicians, etc.). Continuous activation of the autonomic nervous system can have long-lasting effects. According to Hans Seyle’s General Adaptation Syndrome, the body goes through three stages after the activation of the autonomic nervous system: alarm, resistance, and exhaustion. During the stage of exhaustion, the body’s ability to deal with stress runs out and its immune system suffers. Deciphering the cues and biological effects of the fear response will allow researchers to develop adaptive defense strategies for these individuals. Moreover, understanding the fear response will allow researchers to improve treatment for individuals with phobias and other fear-related illnesses. The findings from this research can be applied to other studies involving panic disorder, anxiety, phobias, and fear conditioning.

Prior research from Fredrikson and Öhman (1979) investigated the effect of fear-relevant stimuli on the sympathetic nervous system. Participants were shown a series of colored slides that were projected onto a screen. The slides consisted of various pictures of snakes, spiders, flowers, and mushrooms. The snake and spider pictures were considered fear-relevant, whereas the flower and mushroom pictures were considered fear-irrelevant. Skin conductance, heart rate, and galvanic skin response recordings. Undergraduate students (n = 10) were used in the study (7 women, 3 men). Of the 3 movies investigated, we proposed that both heart rate and galvanic skin response would be lowest while viewing gory stimuli and highest while viewing shocking stimuli. This trend was present, however the results were not statistically significant. Future research ideas are suggested.

Author Note. We gratefully acknowledge the assistance of Adrienne Malone and Arcola Whatley of Bowling Green State University in carrying out the experiment. We would also like to acknowledge the editorial assistance of Dr. William O’Brien and Haukur Sigurdsson.

* Faculty supervisor
and finger pulse volume were measured. The habituation, acquisition, and extinction of fear responses were observed. A relationship was found between fear-relevant stimuli, heart rate, and skin conductance during habituation trials. Unlike skin conductance and heart rate, finger pulse volume appeared to be unaffected. The fear-relevant stimuli were also associated with the activation of the sympathetic nervous system during acquisition and extinction trials. Finger pulse volume and skin conductance were the two measurements affected by the stimuli during these trials. Heart rate appeared to be unaffected by the fear-relevant stimuli. Nevertheless, heart rate reflected parasympathetic activity and, according to Fredrikson and Öhman, heart rate acceleration due to sympathetic activation might be masked by the increased vagal tone that decelerates the heart. In general though, Fredrikson and Öhman found that the heart rate responses were larger and longer lasting following fear-relevant stimuli as opposed to neutral stimuli. Furthermore, they found that the fear-related stimuli do not necessarily need to remain present in order for their effects to be felt.

Another study, conducted by Globisch, Hamm, Esteves, and Öhman (1999), examined the effect of fear on heart rate and skin conductance. Globisch et al. investigated the startle reflex modulation and autonomic response patterns in subjects with high and low levels of animal fear. Fear-relevant and fear-irrelevant pictures were shown to the participants. Similar to Fredrikson and Öhman (1979), subjects were shown pictures of both snakes/spiders and pictures of neutral/pleasant stimuli. Electrodermal activity, heart rate activity, and blood pressure were continuously recorded during the presentation of the stimuli. Globisch et al. found that the fear-relevant pictures initiated a sympathetically dominated autonomic response in participants assigned to the high-fear group. High-fear subjects had significantly larger skin conductance response magnitudes to the snake/spider slides relative to neutral stimuli. Low-fear subjects also showed larger skin conductance values to the snake/spider slides when compared to the neutral stimuli. Nevertheless, this increase was much smaller than that of the high-fear subjects. Globisch et al. also found that heart rate acceleration was present in high-fear subjects during the presentation of the snake/spider pictures, while heart rate deceleration was present in non-fearful subjects. Furthermore, the presentation of the snake/spider pictures evoked a significant increase in arterial pressure in fearful subjects. This was not the case for participants in the control group. Fear-potentiated startle appears to be associated with strong sympathetic activation (i.e., increased sweat gland activity and cardiac acceleration) during the presentation of fearful stimuli. Moreover, minimal stimulus input was needed to activate these fear responses. Globisch et al. demonstrated that fear-specific startle potentiation started very early during picture processing and persisted, regardless of whether the threat cue was present or absent. Globisch et al. further demonstrated that once the fear network is activated, autonomic emotional processing is engaged. As a result, the fear response cannot be terminated immediately after the extinction of the feared stimulus (Fredrikson & Öhman, 1979; Zajonc, 1980). In regards to the current study, some subjects may have previously viewed the particular movie clips used. Past studies suggest that the subjects should still demonstrate an autonomic response to the stimuli.

The “fight or flight” response was also investigated in a study conducted by Azevedo, et al. (2005). They explored the effects of adverse emotional stimuli on human subjects in hopes of inducing “freezing” behavior and heart rate deceleration. Freezing behavior is also known as “attentive immobility,” which is when an individual suddenly becomes motionless as a response to a source of danger; hence, it may be considered a precursor to the “fight or flight” response. Previous studies (Bradley et al., 2001, 2003; Hebb, 1946; Stevens & Gerzog-Thomas, 1977) have shown that when presented with pictures of injured and mutilated people, subjects reacted with fear to signs of another’s injuries. Participants were male undergraduate and graduate volunteers. Azevedo et al. recorded both postural sway and heart rate in their study. They found that the presentation of fearful pictures significantly reduced the subjects’ body sway and increased their muscle stiffness. Moreover, heart rate was shown to decelerate with the viewing of the fear-relevant pictures. Specifically, heart rate decelerated with the presentation of the gory stimuli.

The aim of the current research was to examine the effect of different types of fearful stimuli on heart rate and skin conductance. Our independent variable was the presentation of visual fear stimuli in the form of movie clips. The clips were composed of suspenseful, gory, and shocking stimuli. Our dependent variables were heart rate and GSR recordings. Of the three movies investigated, we proposed that both heart rate and GSR would be lowest while viewing gory stimuli and highest while viewing shocking stimuli.

Method

Participants

Undergraduate students (n = 10) from Bowling Green State University participated in this study. Seven of the students were women and three were men. The
mean age of the participants was 21.3 years. The students were randomly chosen from a volunteer database. Participants were informed that the experiment would last approximately 30 min. Participants were also told that the research was aimed at examining heart rate and skin conductance while they viewed a series of movie clips.

**Materials**

**Heart rate and GSR.** The primary pieces of equipment used for this study were the EKG/ECG and GSR transducer by BIOPAC Systems Inc. The BIOPAC Student Lab software Version 3.0 was also used. Additional BIOPAC materials include disposable electrodes (three per subject), three electrode leads, and a BIOPAC unit that was connected to a computer. A reclining chair was used for participants to sit in during the visual presentation. A television and VCR was also used for the presentation of the visual stimuli.

**Film stimuli.** Three film segments (containing gory, shocking, and suspenseful content) were obtained for this study. These film segments were selected by having a group of undergraduate students in a psychophysiology class rate nine film segments according to their level of gore, shock, and suspense. Gore was defined as covered or stained with blood, full of or characterized by bloodshed, mutilation, and violence. Shocking was defined as to strike with great surprise and emotional disturbance. Suspenseful was defined as something that causes anxiety or apprehension resulting from an uncertain, undecided, or mysterious situation. The definitions used were obtained from the American Heritage Dictionary (2000). The three movie segments that received the highest rating in each category were selected for the current study. The three movies used in the current study were Saw (gore), Fatal Attraction (shocking), and Silence of the Lambs (suspenseful). Each movie clip lasted for approximately 5 min.

**Procedure**

To begin the procedure, one of the experimenters placed three disposable electrodes on the participant. Using a lead II configuration, one electrode was placed on the participant’s right anterior forearm at the wrist. Another electrode was placed on the medial surface of the participant’s left leg, just above the anklebone. The last electrode was placed on the medial surface of the participant’s right leg, just above the anklebone. The galvanic skin resistance sensors were placed on the top of the forefinger and middle finger of the participant’s left hand. Following the placement of the electrodes and skin sensors, the participant was instructed to relax for 5 min prior to calibration.

Calibration was necessary to check the accuracy of the EKG/ECG machine and GSR transducer. Equipment calibration took place while the participant was in a relaxed state.

The first 30 s of recording was used to collect each participant’s baseline values. The baseline values were obtained by averaging both the heart rate values and the galvanic skin response values across the 30 s interval.

After the baseline period concluded, participants viewed the three video segments, each lasting 5 min. In order to ensure that we were collecting valid data, the order of the video segments was counterbalanced for each participant. For each movie segment, we obtained the overall mean amplitude for both heart rate and GSR. We used these mean values to describe heart rate and GSR for each movie segment. Between each movie clip, the VCR was stopped and the EKG/ECG and GSR recordings were paused for 1 min. This time allowed participants to return to their baseline values before beginning the next video segment.

**Results**

The mean heart rate (HR) for the baseline condition was 78.51 BPM (beats per minute). The gory segment had the second lowest heart rate ($M = 86.74$ BPM). The shocking segment had the highest heart rate ($M = 90.18$ BPM) and the suspenseful segment had the second highest heart rate ($M = 89.70$ BPM).

A single factor ANOVA was conducted with heart rate as the dependent variable. An alpha level of .05 was used for all statistical tests. We used three difference scores (fear level minus baseline level) for each type of fear stimulus. The mean difference scores for both heart rate and GSR are shown in Table 1. As predicted, the lowest mean value for heart rate was found with the presentation of the gory stimuli, while the highest mean value for heart rate was found with the presentation of the shocking stimuli. Nevertheless, there was not a statistically significant difference between the heart rate scores and each of the fear levels, $F(2, 27) = 0.35, p > .05$. The mean heart rate and GSR values for

<table>
<thead>
<tr>
<th>Difference scores</th>
<th>Heart Rate (HR)</th>
<th>Galvanic Skin Response (GSR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gore – Baseline</td>
<td>8.24 BPM</td>
<td>0.05 Δ uMho</td>
</tr>
<tr>
<td>Shocking – Baseline</td>
<td>11.67 BPM</td>
<td>0.07 Δ uMho</td>
</tr>
<tr>
<td>Suspenseful – Baseline</td>
<td>11.19 BPM</td>
<td>-0.69 Δ uMho</td>
</tr>
</tbody>
</table>

TABLE 1

The Mean Difference Scores for Heart Rate and GSR

Copyright 2007 by Psi Chi, The National Honor Society in Psychology (Vol. 12, No. 1, 31–34 / ISSN 1089-4136).
baseline and the three video clips are shown in Table 2. A single factor ANOVA with GSR as the other dependent variable was not performed. Negative numbers were obtained for the GSR data and it is assumed that this was due to equipment malfunction.

**Discussion**

Of the three movies investigated, we hypothesized that both heart rate and GSR would be lowest (other than baseline) while viewing gory stimuli and highest while viewing shocking stimuli. After conducting a single factor ANOVA, we found that this trend was present, however our results were not statistically significant at an alpha level of .05. With the exception of the baseline value, heart rate was lowest during the gory segment and highest during the shocking segment. In accordance with Azevedo et al. (2005), the presentation of stimuli involving blood, injuries, or mutilation appeared to have a slowing effect on heart rate. Hamm, Cuthbert, Globisch, and Vaitl (1997) pointed out that subjects within their study demonstrated strong sympathetic activation as well. However, Hamm et al. found cardiac acceleration present during the observation of fearful pictures. These pictures did not involve any blood, injuries, or mutilation, but rather other fear-relevant stimuli. Also, similar to Globisch et al. (1999), we found that most fear-relevant stimuli initiated a sympathetically dominated autonomic response based on the increases in heart rate and skin conductance.

If this study were to be replicated in the future, a number of things should be taken into consideration. First and foremost, it would be beneficial to have more participants. With more participants, the reliability of the statistics would increase and could potentially lead to significant results. Also, with more participants it would be possible to examine gender differences in regards to fear responses. Moreover, skin conductance did not appear to be a very effective measurement. We believe that the GSR transducer was malfunctioning at the time of data collection. Heart rate seems to be a much better measurement to use when looking at autonomic nervous system activation. Therefore, it may be more efficient to use heart rate and another measure of sympathetic activity in the future. Information gathered by this research re-emphasizes that participants can decipher between potentially threatening and nonthreatening stimuli quickly, effortlessly, and without elaborative cognitive processing (Öhman, 1993). Understanding the fear response will allow researchers to develop defense strategies for individuals in high-stress environments. By understanding the fear response, researchers will also be able to develop new treatment options for individuals with a phobia, panic, or anxiety disorder.

**References**


Sincere appreciation is expressed for the hard work on the part of the following individuals who served as reviewers for articles processed July to September, 2006. Without the assistance of such dedicated professionals, the *Psi Chi Journal* would not be able to function.

—EDITOR

Deborah Baldwin, *University of Tennessee, Knoxville*
Carl Bartling, *McNesse State University*
Danny Benbassat, *Ohio Northern University*
Sheila Brownlow, *Catawba College*
Mei Mei Burr, *Northern Kentucky University*
David Carroll, *University of Wisconsin–Superior*
Bradley J. Caskey, *University of Wisconsin–River Falls*
Andrew Christopher, *Albion College*
M. Diane Clark, *Gallaudet University*
Perry Collins, *Wayland Baptist University*
Dan Corts, *Augustana College*
Laurie Couch, *Morehead State University*
Nancy Dess, *Occidental College*
Virginia Diehl, *Western Illinois University*
Jeff Elliott, *Tennessee Temple University*
Julie A. Evey, *University of Southern Indiana*
Juanita V. Field, *Plymouth State University*
Marion T. Gaines, *Presbyterian College*
Renee Galliher, *Utah State University*
Sheryl R. Ginn, *Wingate University*
Rick Grieve, *Western Kentucky University*
Steve Haase, *Shipensburg University*
Bruce Henderson, *Western Carolina University*
Jennifer L. Hughes, *Agnes Scott College*
Jane A. Jegerski, *Elmhurst College*
Jenny Katz, *State University of New York College at Geneseo*
Marcel Kerr, *Texas Wesleyan University*
Raymond Knee, *University of Houston*
Nancy Knous, *Northwestern Oklahoma State University*
Jason Kring, *Embry-Riddle Aeronautical University*
Janet Kuebli, *Saint Louis University*
John W. Kulig, *Plymouth State University*
Bill Lammers, *University of Central Arkansas*
Kira Leck, *University of Pittsburgh at Bradford*
Charles A. Lyons, *Eastern Oregon University*
Pam Marek, *Kennesaw State University*
Stephanie Muller, *Murray State University*
Walter Murphy, *Lenoir-Rhyne College*
Elizabeth McGhee Nelson, *Christian Brothers University*
Debra Oswald, *Marquette University*
Baron Perlman, *University of Wisconsin–Oshkosh*
Rose Perrines, *Eastern Kentucky University*
Rebecca A. Regeth, *California University of Pennsylvania*
Shannon Rich, *Texas Woman’s University*
Joan Riedle, *University of Wisconsin–Platteville*
Mark G. Rivardo, *Saint Vincent College*
Miguel Roig, *St. John’s University, New York*
Michael Russell, *Washburn University of Topeka*
Lauren F. V. Scharff, *Stephen F. Austin State University*
Royce G. Simpson, *Spring Hill College*
Paul Smith, *Alverno College*
Steven Specht, *Utica College of Syracuse University*
Alan Swinkels, *St. Edward’s University*
Phil Wann, *Missouri Western State University*
Gary Welton, *Grove City College*
George Whitehead, *Salisbury State University*
William Wozniak, *University of Nebraska at Kearney*
The Psi Chi Journal of Undergraduate Research is a national, fully reviewed, quarterly journal dedicated to the publication of undergraduate student research. All active Psi Chi chapters receive one complimentary subscription to the journal. We encourage each chapter to see that an additional subscription is obtained for the school library and that other organizations and interested individuals are made aware of its availability. Every effort has been made to provide a high-quality publication and yet offer the journal at affordable subscription rates to ensure its availability to all interested students, faculty members, and institutions. Back issues and bulk orders for classroom use are also available.

Journal Subscription and Back Issue Order Form

<table>
<thead>
<tr>
<th>SUBSCRIPTION RATES</th>
<th>SUBSCRIPTION ORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals: $20/year (4 issues)</td>
<td>Check one: [ ] New Subscription [ ] Renewal</td>
</tr>
<tr>
<td>Institutions: $40/year (4 issues)</td>
<td>Check all that apply: [ ] 2007 [ ] 2008 [ ] 2009 [ ] 2010</td>
</tr>
<tr>
<td>Subscription orders must be prepaid and are based on the calendar year. Make checks payable to PSI CHI or order online by credit card at <a href="http://www.psichi.org">www.psichi.org</a></td>
<td>________ @ $20 (individual) = ________________</td>
</tr>
<tr>
<td>Entire Volumes (Institutions): $40</td>
<td>________ @ $40 (institution) = ________________</td>
</tr>
<tr>
<td>Single issues (Individuals): $6 per copy</td>
<td>BACK ISSUE ORDER (see rates at left)</td>
</tr>
<tr>
<td>Single issues (Institutions): $12 per copy</td>
<td>Enter number you are ordering beside all that apply:</td>
</tr>
<tr>
<td>CLAS SROOM USE</td>
<td>2006 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Bulk orders for classroom use are available at a discount. Faculty members should contact the Psi Chi National Office (<a href="mailto:journal@psichi.org">journal@psichi.org</a>) for availability, rates, and shipping costs.</td>
<td>2005 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>INTERNATIONAL (OUTSIDE U.S.)</td>
<td>2004 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Canada: Add $10 for annual subscriptions; add $2.50 for single issues.</td>
<td>2003 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Other International: Contact Psi Chi National Office for rates.</td>
<td>2002 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Shipping Address (please type or print):</td>
<td>2001 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Name ____________________________</td>
<td>2000 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Address ____________________________</td>
<td>1999 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>____________________________</td>
<td>1998 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>City/State/Zip+4 __________________</td>
<td>1997 __ Entire vol. __ Spring __ Summer __ Fall __ Winter</td>
</tr>
<tr>
<td>Email ____________________________</td>
<td>1996 __ Entire vol. __ Spring/Summer __ Fall/Winter</td>
</tr>
</tbody>
</table>

Subscription total . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . = $ ________

Back Issue total . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . = $ ________

International total (see rates at left) . . . . . . . . . . . . . . . . = $ ________

Total amount enclosed . . . . . . . . . . . . . . . . . . . . . . . . . . = $ ________

MAIL TO: Psi Chi National Office | Subscriptions | P.O. Box 709 | Chattanooga, TN 37401-0709
Other Journals of Student Research in Psychology

**Journal of Psychology and the Behavioral Sciences**
- Founded 1966
- One issue per year
- Authors may be undergraduate or graduate students with faculty mentor.
- Contact: Dr. Daniel J. Calcagnetti
  JPBS Faculty Editor
  Department of Psychology M-AB1-01
  Fairleigh Dickinson University
  285 Madison Avenue
  Madison, NJ 07940
  Telephone: (973) 443-8974
  E-mail: daniel@fdlu.edu
  Web URL: view.fdu.edu/default.aspx?id=784

**Modern Psychological Studies**
- Founded 1992
- Two issues per year: September and March
- Primary author must be an undergraduate student.
- Preferred submission deadlines: April and October
- Publishes experimental research, but will also consider theoretical papers, literature reviews, and book reviews.
- Contact: Editor, MPS
  Department of Psychology
  University of Tennessee at Chattanooga
  615 McCallie Avenue
  Chattanooga, TN 37403-2598
  Telephone: (423) 785-2238, 755-4262
  E-mail: mpssub@utc.edu

**UCLA Undergraduate Psychology Journal**
- Founded 2002
- Two issues per year: Spring, Fall
- Online, refereed journal dedicated to undergraduate research in psychology
- Publishes empirical studies and literature reviews concerning any topical area in the psychological sciences.
- Contact: Lisa Kakinami, Editor-in-Chief
  Journal e-mail: UPJ@ucla.edu
  Web URL: www.studentgroups.ucla.edu/upj/upj/index.html

**Journal of Psychological Inquiry**
- Founded 1996 by the Great Plains Behavioral Research Association
- Authors must be undergraduate students.
- Publishes empirical studies, literature reviews, and historical articles concerning any topical area in the psychological sciences.
- Submissions must (a) come from students at institutions that sponsor the Great Plains Students’ Psychology Convention and the *Journal of Psychological Inquiry* or (b) have been accepted for or presented at the meeting of the Great Plains Students’ Psychology Convention, the Association for Psychological and Educational Research in Kansas, the Nebraska Psychological Society, or the Arkansas Symposium.
- Contact: Mark E. Ware, Managing Editor
  Department of Psychology
  Creighton University
  2500 California Plaza
  Omaha, NE 68178-0001
  Telephone: (402) 280-3193
  E-mail: meware@creighton.edu
  Web URL: puffin.creighton.edu/psy/journal/JPIhome.html

**Journal for Undergraduate Research in Psychology**
- Founded 1997
- Published quarterly (March, June, September, December)
- Online journal dedicated to undergraduate research presented at local, regional, or national conferences.
- Abstracts accepted from any conference.
- Award winners may have full text of paper published online.
- Contact: Dr. Chris Koch
  Director, Undergraduate Studies in Psychology
  Department of Psychology
  George Fox University
  Newberg, OR 97132
  Web URL: www.georgefox.edu/academics/undergrad/departments/psychology/index.html

The journals listed above all solicit and publish research in psychology conducted and written by students. Journals published internally (i.e., which only accept submissions from students within one institution or department) are not listed. If you know of other journals that meet these criteria, please inform the Psi Chi National Office, P.O. Box 709, Chattanooga, TN 37401-0709; Telephone: (423) 756-2044; Fax (toll-free): 1-877-774-2443; E-mail: journal@psichi.org.