Psi Chi
Journal of Undergraduate Research

Editor
Christopher Koch, PhD
Psi Chi Journal of Undergraduate Research
Department of Psychology
George Fox University
414 North Meridian Street
Newberg, OR 97132-2697
Telephone: (503) 554-2744
Fax: (503) 537-3834
Email: journal@psichi.org

Publication and Subscription Office
Susan Iles
Managing Editor
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: susan@psichi.org
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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 (ACHS) 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.

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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.

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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 (member ID number) 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. A Microsoft® Word electronic copy of the complete manuscript with figures, tables, and charts generated in either Word or Excel. Any scanned images or illustrations must be at least 600 dpi resolution. 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 authors. Footnotes that identify the author(s) should appear on a separate page. You must request masked review.
   b. An email address so that receipt of your manuscript can be acknowledged.
   c. A sponsoring statement from the faculty supervisor who attests:
      (1) that the research adhered to APA ethical standards;
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Dr. Christopher Koch, Editor
journ al@psichi.org

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An Interview With Diane F. Halpern

CHRISTOPHER KOCH

George Fox University

Diane F. Halpern is professor of psychology and director of the Berger Institute for Work, Family, and Children at Claremont McKenna College. She has won many awards for her teaching and research, including the Psi Chi Distinguished Member Award in 2005, the 2002 Outstanding Professor Award from the Western Psychological Association, the 1999 American Psychological Foundation Award for Distinguished Teaching, the 1996 Distinguished Career Award for Contributions to Education given by the American Psychological Association, the California State University’s State-Wide Outstanding Professor Award, the Outstanding Alumna Award from the University of Cincinnati, the Silver Medal Award from the Council for the Advancement and Support of Education, the Wang Family Excellence Award, and the G. Stanley Hall Lecture Award from the American Psychological Association. Halpern is the author of over 350 journal articles and book chapters. She has authored many books including *Thought and Knowledge: An Introduction to Critical Thinking* (4th ed., 2003), and *Sex Differences in Cognitive Abilities* (3rd ed., 2000). She coedited *States of Mind: American and Post-Soviet Perspectives on Contemporary Issues in Psychology* (1997) with Alexander Voiskounsky, *From Work-Family Balance to Work-Family Interaction: Changing the Metaphor* (2004) with Susan Murphy and a special double issue of *American Behavioral Scientist* on Current Issues at the Intersection of Work & Family (2006) with Heidi Riggio. Her most recent books are *Women at the Top: Powerful Leaders Tell Us How to Combine Work and Family*, which she coauthored with Fanny Cheung (2009), and an introduction to psychology textbook, *Psychological Science*, (3rd edition) which is she coauthoring with Michael Gazzaniga and Todd Heatherton. Dr. Halpern has served as president of the American Psychological Association, the Western Psychological Association, the Society for the Teaching of Psychology, and the Division of General Psychology of the American Psychological Association. She participated in the panel discussion “Women in Science: Are They Being Held Back?” sponsored by the EST/Sloan project in partnership with the Women Investigators Network at the New York Academy of Sciences and provided testimony to the U.S. Senate about the under-representation of women in some areas of science.
How did you become interested in psychology?
I was a mechanical engineering major during my freshman year at University of Pennsylvania. My boyfriend at that time (who later became my husband) was taking Intro Psych with the legendary Henry Gleitman. He told me I would love it and invited me to class. I fell in love with psychology and with the person who told me I would love it.

Who was your mentor?
In graduate school at University of Cincinnati, Bill Dember, who is now deceased, and Joel Warm, who is retiring this year after 42 years and 8,777 students (I calculated this number) were my dear mentors.

What did they do that was particularly meaningful for your development as a psychologist?
They told me that I could be a successful psychologist, and over time I came to believe them. They held me to the highest standards.

How much of your academic lineage or “family tree” do you know?
As a class project, a student once plotted this for me. According to this student, I can trace my lineage back to Wundt!

Do you have any advice for maximizing one’s graduate school experience?
Work hard, find a mentor, and keep your eye on your personal goal. If you want to go into academia, for example, read the job advertisements and see what requirements are needed. If academia is your goal, you will need to build a vitae with empirical publications. If you have a different goal, perhaps applied work, you will need to prepare by finding out what you need to know to enter that field.

What is your source or inspiration for research ideas?
This is a tough question. Research ideas come from everywhere, especially from my students. But many studies are the next step in a line of research or stem from something in the news.

Do you have any tips for developing a successful research program?
You have to love the research process, which includes writing. Too many people have great ideas and get discouraged when the results are not exactly what they had predicted (they almost never are) and then they fail to follow through with writing up the results to share with your fellow professionals. Persistence is probably the best answer.

What is psychology’s biggest problem today?
Can I make that plural? There is a lot of wasted effort as various subdisciplines fight with each other. Research and practice need each other, but far too often the relationship is more like a war than a marriage. Psychology also suffers from low self-esteem. We have not done a good job in convincing others that all of the BIG problems are behavioral in nature and we are the discipline that best knows about behavior.

Where is psychology as field headed? What will be the most important area(s) of psychological research in the future?
There is an undeniable biological revolution in psychology. If you are a student, study neuroscience along with psychology because the fields are coming together.

What is the biggest area(s) of application for the psychology?
There are many—health in general, education, industry and organizations, and in the military.

Are there any social issues that psychology should address?
Too many to list—We can help to reduce prejudice; we can help students succeed in school; we can help reduce international conflicts; and we can even help with mental illness. We can do all this and more, but will we choose to? I hope that some of the students reading this interview will pick a social issue and diligently apply the knowledge and methods of psychology to improve it.
Many studies have been conducted, and numerous theories have been formulated regarding causes of obesity (Faith, Johnson, & Allison, 1997; Gable & Lutz, 2000; Hewitt, 1997; Wadden, Brownell, & Foster, 2002), an epidemic plaguing people across the country. National surveys support these findings (Liebman et al., 2003). In general, Americans enjoy the abundance and variety of foods available, the automation of tasks both personally and professionally, and leisure activities are for the large part, effortless (Centers for Disease Control and Prevention [CDCP], 2006a).

The food pyramid is one way for people to manage their dietary intake, yet diet must be defined for each individual according to gender, age, and activity level in order to maintain a successful health plan (United States Department of Agriculture, n.d.). Mistakenly, some people tend to focus on certain foods and do not diversify their intake to create a healthy balance of nutrients. For example, people may consume vegetables by way of French fries and potato chips and grains may be consumed via pasta, tortillas, and hot dog buns. To complicate food consumption further, mindless eating patterns cause disruption in both intake and selection of foods. When food choices are coupled with mindless eating behaviors, such as eating while watching television or when bored, patterns of inconsistent eating and lack of control over the amount of food consumed become prevalent (Foster, Gore, & West, 2006).

Physical activity is a necessary and useful weight management tool (CDCP, 2007). However, people often opt not to participate in even the simplest activities. For example, people can take deliberate actions to park a longer distance from their destination for the purpose of exercising. The number of individuals who incorporate this activity into their daily routine is small. Similarly, exercise can be incorporated into many other routine activities, but this approach to exercise has not been widely used.

Obesity

It is estimated that 60 million American adults, age 20 and over, are classified as obese; a body mass index (BMI) greater than or equal to 30. This represents an increase of nine percent from previous calculations (CDCP, 2006d). Obesity is being defined as an epidemic as it increases a multitude of health issues including heart disease, strokes, and Type II diabetes (CDCP, 2006c). The CDCP is working to bring down...
these high percentages to a more reasonable level of approximately 15 percent by the year 2010 (CDCP, 2006a). To meet this goal, it is important that physicians and psychologists focus attention on further analysis, to discover the root of obesity.

Children, as well as adults, are fighting the weight battle. The current figures indicate children are increasingly being classified as either overweight or obese (CDCP, 2006a). Children experiencing excessive weight issues are at greater risk of experiencing obesity as adults, resulting in severe implications for both their quality and quantity of life (CDCP, 2006a). An example of these implications is the CDCP’s (2006b) prediction that one-third of all children born in the year 2000 will become diabetic.

The CDCP (2006a) places great emphasis on children learning appropriate eating and physical activity behaviors that will assist in a healthy lifestyle through adulthood, thus avoidance of severe negative health consequences. To further emphasize appropriate learning behaviors for children, one study determined that when children are not guided in their food preference and activity choices, the children might develop poor habits and attitudes regarding these important aspects of their overall wellness (Johnson, Brownell, St. Jeor, Brunner, & Worby, 1996). This information exemplifies the importance of family origin as a direct reflection of potential obesity.

Researchers posit that environment has a more prominent effect than genetic factors on obesity (Faith, Johnson, & Allison, 1997). If people choose to be more sedentary and do not reduce their food intake, this type of behavior will cause an overall increase in the person’s BMI (Hewitt, 1997). Therefore, it is important to address the significance of how family behaviors dictate available food choices, how these food choices are consumed, and the type of physical activities promoted within the family unit (Gable & Lutz, 2000). To better understand the complexities of adults’ struggle with being either overweight or obese, it is important to investigate whether family of origin plays a role. Analyzing what children struggle with, relevant to weight issues, may hold clues to similar struggles with weight in adulthood.

Eating Behaviors

In a recent study, Steinberg et al. (2004) investigated whether parents and children, both normal and overweight, responded the same when questioned about various eating behaviors and patterns relating to the children. Two separate and validated self-report questionnaires (i.e., Questionnaire on Eating and Weight Patterns-Parent and Questionnaire on Eating and Weight Patterns-Adolescent) were used and resulted in non-agreement between the two groups. Consistent with previous results, Steinberg et al. (2004) found that parents had underestimated the eating habits of their children. Because of the lack of concurrence among what children and their parents report for eating behaviors, it is important to recognize the necessity of parents gaining a greater awareness of their children’s eating patterns.

Field, Gillman, Rosner, Rockett, and Colditz (2003) investigated the intake of fruits and vegetables among preadolescent and adolescent Americans. They discovered that 75 percent of these adolescents fall into a pattern of inadequacies relative to healthy food selections. Adolescents were eating less than the daily fruit and vegetable intake established by nutritional standards (United States Department of Agriculture, n.d.). These results compound the necessity for parents to have a clear understanding of both their adolescent’s daily caloric intake and what foods constitute their overall caloric consumption. Socioeconomic status further complicates food choices, as research has demonstrated that foods high in fat content cost less than a healthier diet consisting of fruits and vegetables (Caballero, 2004). Because of the difference in food costs, families that are of low-income fall short of attaining appropriate food choices and ultimately suffer from higher rates of obesity.

Bruss et al. (2005) addressed factors such as a lack of understanding by parents as they attempt to determine what their children should eat as well as how much they should be eating. Cultural factors are particularly important because parents of various ethnicities often mistakenly compare their children to other children in terms of size and weight (Bruss et al., 2005). Further, from a culturally based socialized perspective, food is utilized as a message of hospitality, therefore it is a custom difficult to ignore. Parents seemed to lack an understanding of what constitutes sweet versus non-sweet foods, along with the same confusion for fat versus low-fat or non-fat foods (Bruss et al., 2005). They further noted that if a parent felt their child looked thin and of a relatively normal weight, then there was no reason why the child could not consume fatty foods. This type of attitude can have grave implications for a child’s health risks.

Mindless Eating Behaviors

An important consideration of eating patterns is an examination of activities and behaviors being performed by an individual while consuming food. For instance, a mindless eating pattern may involve a person eating because of being bored or eating while watching television. When these behaviors simultaneously exist, it is possible for a person to have...
less focus on food choices and the amount of food consumed.

Liebman et al. (2003) studied people who were engaged in an activity while consuming food, and results indicated increased weight when people ate mindlessly. The researchers focused on how much food was consumed and concluded that attention to the television allowed for a lack of control over the amount of food eaten. People appeared to be focused on the activity and essentially lost focus on the quantity of food intake. However, they did not specifically indicate whether there was a control present for the nutritional aspects of foods consumed. Another indication of a connection between BMI and eating patterns was noted with respect to eating meals together as a family. While higher BMI participants were less likely to eat breakfast meals with their families, these same findings were not found with respect to eating dinner together.

Carolli, Argentieri, Cardone, and Masi (2004) discussed the implication of food advertisements influencing food choices. Unhealthy food selections, including a variety of snack foods and junk foods, are splashed across the television in a manner that seems to increase these types of foods being selected for consumption. Because of this, it is plausible to consider the implications of foods being consumed while watching television. If a person watches a great deal of television and is continually overwhelmed by unhealthy food advertisements, they may be inclined to eat these foods during television viewing. Although eating while watching television has its implications for the control of satiety factors, it appears that defining exactly what foods are being consumed during a mindless behavior is as important.

**Activity Behaviors**

Coupled with the necessity to appropriately manage food behaviors is the importance of physical activity. Children and adolescents are continually growing and they require active and positive attention in these areas, as they are key to productive development. Epstein and Wing (1987) discussed the need for children to have a stable exercise plan, consisting of caloric intake balanced with caloric expenditure. Children require a certain amount of food for effective growth and development. If the amount of food is exceeded, then appropriate physical activity must compensate for the excess food intake. Further, children and adolescents must maintain adherence to keeping their caloric and physical activities in equilibrium. A plan that exceeds what the child can realistically achieve may result in an ineffective lifestyle both nutritionally and physically.

Physical activity has been widely recognized as an important component in deterring obesity (Caballero, 2004). Parents play a key role in assisting their children with the adherence of a healthy lifestyle. Parents must be educated on techniques to influence their child’s health and be actively involved in their child’s overall eating and exercise behaviors (Epstein & Wing, 1987). Controlling these behaviors in childhood is critical to minimizing obesity in adulthood (Magnusson, Hulthen, & Kjellgren, 2005).

Long-term considerations of physical activity throughout the lifespan have greater potential for maintaining healthy weight, than activity designed to lose weight during a designated period. Sharpe, Granner, Hutto, Ainsworth, and Cook (2004) investigated the connection between BMI and recommendations for physical activity. They found that people classified as either overweight or obese were not participating in adequate daily physical activities when compared to persons of normal BMI levels. Recommendations for physical activity were based on energy expenditure offsetting caloric intake. Sharpe et al. noted the importance of moderate activities spanning a person’s life, with the necessity to make continued activity attainable. If people have a plan they believe is achievable on a continued basis, they will be more inclined to maintain a beneficial healthy lifestyle. Jequier (2002) emphasized behavior modification over genetic factors, noting that people do not become obese by food consumption alone, but rather via a combination of unhealthy food choices of high calories mixed with a lack of energy output to establish a proportionate balance. In addition, environmental aspects seem to promote an increase in unhealthy choices, therefore countering a person’s path to a healthy balance of food and fitness.

**Family Behaviors**

Prior to Jequier’s (2002) investigation of obesity, Gable and Lutz (2000) discussed implications of obesity and noted that people do not immediately become obese, but rather develop this over time through unhealthy behaviors. How parents generally discipline their children was correlated with discipline relating to their children’s food selections and overall intake. The more permissive the parents were in general, the more lenient they were with respect to their children’s diets. Parents that were more strict in their discipline were more restrictive with sweets and junk food, and more focused on their child’s health. The same pattern was revealed when physical activity was examined. In other words, the more controlled the discipline, the greater the level of physical engagement in healthy activity.
In addition to the previous findings, Gable and Lutz (2002) separately examined the amount of television viewed by children and the amount of snack foods they consume. Their results indicated an increase in BMI of children that watched a greater amount of television. A correlation between unhealthy snacks and an increase in BMI was also revealed. Both of these correlations indicate that food choices and sedentary behavior have an effect on children’s weight.

Like children, adults struggle with the same lifestyle complexities of obesity. Goss and Grubbs (2005) conducted a study that compared food consumption and physical activity to the body mass of both lean and obese individuals. They compared Florida counties with the highest BMI rates to Florida counties with the lowest BMI rates via a state health survey. Their results revealed a positive correlation of a lower BMI to a higher consumption of fruits and vegetables and increased physical activity with the reverse occurring among the obese counties (Goss & Grubbs). Goss and Grubbs further emphasized the importance of educating adults in essential food and activity behavior modification that could result in a healthier lifestyle.

If adults obtain the appropriate tools and techniques necessary to counter weight gain, then it is plausible to consider that adults should have an influence on children having the ability to offset weight gain. Golan, Weizman, Apter, and Fainaru (1998) researched this influence by examining parents as a unit of change as opposed to allowing the child to be the exclusive agent of change. Participants were divided into a control group consisting of the child being responsible for their own behavior and the experimental group with the parents being responsible for the child’s behavior. What the researchers discovered was that although both groups of obese children lost weight, the experimental group lost more, formulating a conclusion that parent decisions assisted in the child’s food intake and activity level (Golan et al.). They noted that there were disagreements between parents, with one parent adhering to certain guidelines for change, while the other parent lacked consistency. This appeared to cause confusion for the child as he or she attempted to adhere to the program, which suggests the importance of the family working together in all aspects of food consumption and dedication to adequate physical activity. Furthermore, if an obese child or adult strives to lose weight with unhealthy snacks and lack of exercise prevalent in their home, the difficulty for a person to sustain any type of program is significantly deterred.

**Limitations of Previous Research**

A limitation of previous research is that studies tend to focus on very specific potential causes of obesity. For instance, fast foods, snack foods, and television have been investigated separately as potential factors of weight gain. Although there is evidence for these factors, typically more than one variable influences weight gain. Furthermore, additional investigation is needed when comparing and contrasting these variables such as examination of eating while watching television. With increased automation and family lifestyles more fast-paced, it is necessary to formulate an understanding of how eating, mindless eating patterns, and physical activity are extending from childhood to adulthood. This is especially true because an abundance of research clearly states that a child suffering from obesity is highly susceptible to suffering from obesity as an adult (CDCP, 2006a). There appears to be considerable literature on childhood obesity and adult obesity but they remain separated into distinct categories. Family behaviors appear to have a significant influence on healthy and unhealthy food choices as well as living active or sedentary lifestyles. Although there is some research on family influence, there is a need for further clarity defining a connection between childhood behaviors and the extent that they are carried over into adulthood.

**Current Study**

This study examines the effects of mindless eating as a predictor of a person’s BMI. For the purposes of this study, we examined physical activity, eating behaviors, and mindless eating. Our interest was to compare the behaviors of participants from their childhood to their behaviors today. This is important because many learned behaviors occur in a person’s childhood and tend to transfer into adulthood (Wardle, Guthrie, Sanderson, Birch, & Plomin, 2001). We further examined how each of these areas compares to their current BMI. Specifically, it was hypothesized that behaviors from childhood, (i.e., physical activity, eating, or mindless eating), would be positively correlated with behaviors in adulthood. Furthermore, it was hypothesized that these behaviors would positively correlate with current BMI, therefore, the greater the frequency of behavior, the higher the participants BMI.

An analysis of the influence of family was measured by a questionnaire. Questions pertained to physical activity, eating, and mindless eating behaviors during childhood and adulthood. Responses were calculated by a frequency scale of behavior ranging from 1 to 5. A score of 1 indicated that the participant never engaged in the behavior, while a score of 5 indicated that they always engaged in the behavior. Participant’s
BMI was calculated with standards published by the Centers for Disease Control and Prevention (2006b).

Method

Participants

Participants volunteered from the general population of undergraduate students (N = 49) and data collection took place in a psychology department classroom. Of the 49 participants, 43 were women and 6 were men with an age range between 18 and 59 (M = 23.93, SD = 9.50). Participant’s ethnic origin consisted of 37 Caucasians, 7 African-Americans, 1 Hispanic, and 4 people that indicated another race. Body Mass Index (BMI) ranged from 17 to 47. For adults, a BMI below 18.5 is considered underweight and a BMI above 30.0 is considered obese.

Because all participants were derived from one campus, data collection was a convenience sample. Students were instructed that participation in this research was not required and they were free to withdraw from the study at any time without penalty. Each participant received one extra credit slip to be utilized towards coursework, at the discretion of his or her instructor.

Instrumentation

Forms. Participants were issued a consent form (see Appendix A) prior to administration of the questionnaire. Participant demographics collected (see Appendix B) included age, gender, and ethnicity. The participants were also asked to record their height and weight whereby the information was used to calculate their BMI (BMI = weight/height^2 x 703), as well as their highest weight known (the highest weight they remember being in their lifetime).

Questionnaire. I developed a 22-item Family Behavior Questionnaire (see Appendix C) adapted from the Family Eating and Activity Habits Questionnaire (Golan & Weizman, 1998) to collect data on physical activity, eating, and mindless eating habits. Specifically, questions were derived from the validated measure but formulated to address the participants in this study. The questionnaire was divided into two separate sections. The first 11 questions referenced behaviors while the participant was growing up (e.g., Growing-up, how often did you watch television) and the second 11 questions referenced similar behaviors in their current state (e.g., Currently, how often do you watch television). Questions pertained to behavioral characteristics concerning levels of and exposure to various physical activities as well as eating practices relevant to exposure and styles of eating. Additional questions involved mindless eating behaviors such as eating while viewing television and when feeling bored. Responses to behavioral statements were scored using a frequency ranking scale. Possible scores for individual statements range from 1 (never) to 5 (always) occurring. Lower scores indicated positive behaviors and higher scores correspond to negative behaviors. The questionnaires took approximately ten minutes to complete.

Items reflecting different aspects of physical activity (i.e., 3a, 3b, 3c, 3d, 4, 5) were summed and comprised a physical activity subscale with reverse scoring for item 5. Items reflecting different aspects of eating (i.e., 6, 7, 8, 9, 10) were summed and comprised an eating subscale. Items reflecting different aspects of mindless eating practices (i.e., 11a, 11b, 11c, 11d, 11f, 11h, 11j) while growing-up and (i.e., 11a, 11c, 11d, 11e, 11g, 11h, 11i) currently were summed and comprised a mindless subscale with reverse scoring for item 11a.

Procedure

Sign-up. A research flyer and sign-up sheet were posted on a bulletin board outside the psychology departments main office located in the Social Science building. Participants voluntarily signed up for a designated time and day for data collection. Specified time slots allowed the researchers to dedicate ample time to work with each participant individually and avoid potential disruption while collecting data.

Forms and questionnaire. Upon arrival, each participant sat in one of the classroom chairs and was handed a packet of documents consisting of two copies of the informed consent, the demographic data sheet, and the questionnaire. After reading the informed consent, the participant signed one copy, returned it to the researcher, and retained the second copy for their personal records. Next, the participant completed the demographic data sheet and then the questionnaire. Once the participant completed the demographic information and questionnaire, all documentation was returned to the researcher. The participant was thanked for their time, instructed to retain their copy of the informed consent that provided information about the study, and issued an extra credit slip.

Results

The first hypothesis for this study was that behaviors in childhood and adulthood would be correlated. Specifically, we examined physical activity and found that childhood and adult behaviors were not significantly correlated, r = .21, p = .138. We also examined eating behaviors, specifically snacking and fast food behaviors to determine if childhood and adulthood habits were correlated. In this case, a strong positive
correlation, $r = .50$, $p = .005$ between eating behaviors in childhood and adulthood was present. A measure of effect size, or magnitude of relationships between childhood and adulthood, was large ($r^2 = .25$) indicating that 25% of the relationship between these values is explained. Similarly, engaging in eating while distracted was highly correlated between childhood and adulthood, $r = .49$, $p = .005$. The effect size associated with mindless eating in childhood and adulthood was also large, $r^2 = .24$.

The second hypothesis for this study was that physical activity, eating, and mindless eating behaviors would correlate to BMI. Specifically, we examined physical activity with BMI in adults and found that the data approached significance ($r = .27$, $p = .059$). An effect size of 7% indicated a moderate relationship between adult activity and BMI. We also examined eating behaviors, specifically snacking and fast food, to determine if adulthood habits were correlated to BMI. In this case, no significant correlation ($r = .04$, $p = .758$) was present. Similarly, engaging in eating while distracted was not correlated with BMI ($r = .10$, $p = .463$).

One finding that did not fall within either hypothesis was a strong positive correlation between current mindless eating behaviors and current eating habits, $r = .32$, $p = .024$.

**Discussion**

**Behaviors**

In our first hypothesis, we predicted that correlations between childhood activities and adult behaviors regarding physical activity, eating, and mindless eating behaviors would be present. The analysis did not indicate a connection between physical activity from childhood to adulthood. Because children must adhere to some form(s) of physical activity in school, it makes sense that a discrepancy with current activity exists. Although children are required to participate in educational physical activity, as adults, they are not required to perform these same tasks. Therefore, the decision to be physically active is left to individual willingness.

A connection was found between eating habits and mindless eating patterns from childhood to adulthood. This confirms the prediction that behaviors developed during childhood carry-over to adult years, suggesting that environment has a direct influence on both food choices and behaviors performed while eating. These findings concur with previous studies regarding environmental factors on behavior (Johnson et al., 1996; Faith, et al., 1997; Gable & Lutz, 2000; Field, Gillman et al., 2003). Implications of this finding suggest that because children are not responsible for food selections in the home, it is important for parents to consider what they introduce as food choices to their children. Children will eat what is put in the refrigerator and cabinets or placed on the table at mealtime. If more unhealthy foods are available, (e.g., snacks and fast food), children are inclined to grow up with a lack of understanding of these unhealthy selections. Further, they will be more inclined to eat these same unhealthy selections when they are adults.

Not only are healthy food choices important but patterns of eating must be considered. If children exhibit poor discipline in their eating behaviors, they have the potential of overeating. Children that eat because they are bored, do not eat at regular meal times, or eat while watching television are more likely to lose focus on the amount of food consumed, as suggested by previous research (Liebman et al., 2003). As noted by findings in this study, these mindless eating patterns hold significant potential of being performed as an adult. Familial treatment of these behaviors play an important role in how choices are made and patterns are formed (Golan et al., 1998). Specifically, if a family takes on the task of better managing these behaviors and eating patterns, the entire family will have an opportunity to reap the benefits (Golan et al., 1998).

**Body Mass Index**

In our second hypothesis, we predicted that participants’ adult behaviors, based on family origin, would positively correlate to their current BMI. Results indicate that current adult physical activity habits are not positively correlated with BMI, however, the correlation approached significance and additional data are likely to move it to a level of significance. As previously noted, children are required to perform physical activity in school and adults have the ability to make their own decision of participating in physical activity. How much physical activity, or lack of, appears to have an influence on a person’s weight, which has also been noted in an abundance of previous research (Epstein & Wing, 1987; Magnusson et al., 2005; Sharpe et al., 2004).

Although adult physical activity approached a positive correlate with current BMI, no relationship was found between adult eating habits and mindless eating patterns and BMI. One possibility for a lack of connection between these variables may be that participants in this study compensate for their eating choices and mindless eating habits with physical activity. Further, although snacks, sweets, and fast food were included as specific foods on the questionnaire, many other foods may be consumed. Excessive caloric intake must be offset by physical activity to avoid exces-
sive weight gain. Participants may consume an excess of calories but not related to the foods referenced in this study. Exactly which foods constitute caloric intake has a connection to weight as noted in previous research (Jequier, 2002; Epstein & Wing, 1987).

**Limitations of Study**

There are potential implications to the findings in this study. First, the questionnaire utilized consisted of questions adapted from a validated measure (Golan & Weizman, 1998). Specifically, questions were derived from the validated measure but formulated to address the participants in this study. The second implication of the final data may be a reflection of participation being voluntary and of convenience, which may ultimately result in the sample not being representative of the entire population. Finally, measures (i.e. questionnaire, height, weight) were self-reported causing a potential threat to accuracy in the data.

**Future Research**

There are several ways in which obesity may be addressed, (e.g., medication, diet plans, and surgery). Because these approaches may not be reasonable for all obese people, it is important to examine other approaches to prevention, mainly involving a preventative treatment that focuses on lifestyle changes and redirection of habits (Wadden et al., 2002). As family units become more affected by technological advances and fast-paced schedules, it is necessary to educate people on the importance of healthy eating and active behaviors. Many people fall short of taking care of their bodies because of convenience and lack of discipline, resulting in a lessen quality and quantity of life. This research merely scratched the surface of bridging the obesity gap between childhood and adulthood. These preliminary findings suggest a need for expanded research in this area.

With the correlation found between current mindless eating behaviors and current eating habits, the findings suggest that adults are choosing unhealthy foods while involved in mindless eating behaviors. Along with these results, further research should be conducted by obtaining a more detailed account of specific behaviors occurring within the family unit and the direct effects on obesity. This may ultimately help thousands of families to curb the obesity epidemic, and therefore live longer, healthier lives with the assistance of overall lifestyle plans (Bacon et al., 2002).

**References**


Goss, J., & Grubbs, L. (2005). Comparative analysis of body mass index, consumption of fruits and vegetables, smoking, and physical activity among Florida residents. *Journal of Community Health*

APPENDIX A

CONSENT FORM

I, ______________________________________ agree to participate in the research entitled Mindless Eating as a Predictor of Body Mass Index, which is being conducted by an undergraduate of the Psychology department. I understand that this participation is entirely voluntary; I can withdraw my consent at any time and have the results of the participation removed the experimental records, or destroyed.

The following points have been explained to me:

1. We are investigating mindless eating and eating behaviors. There are no direct benefits associated with this study, but a general contribution to research will aid in understanding of eating behavior. I will receive an extra credit form that may be accepted by one of my instructors.
2. The procedures are as follows: I will be asked to complete a demographic data sheet and information about my family behaviors. This study should be completed within 30 minutes.
3. There are no known discomforts or stresses that may be faced during this research.
4. Participation should not entail any type of risk.
5. The results of this participation will be confidential and will not be released in any individually identifiable form without the prior consent of the participant unless required by law.

____________________________________________        ____________________________________________
Signature of Investigator                           Signature of Participant

_________________________        ____________________________
Signature of Investigator                           Signature of Participant

Date

PLEASE SIGN BOTH COPIES. KEEP ONE AND RETURN THE OTHER TO THE INVESTIGATOR.

Research that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to Chairperson of the Institutional Review Board.
APPENDIX B

Demographic Data Sheet

Date: ________________________

Age: ________________________

Gender: Male _______ Female _______

Race: African American _______
     Asian _______
     Hispanic _______
     Native American _______
     White _______
     Other _______

Height: __________

Weight: __________

Considering that one’s weight is a sensitive topic to reveal, we, the researchers, would like to assure you that
the utmost confidentiality will be upheld and no personal identification will be linked with the information you
provide. We cannot stress enough the importance of recording your weight AS ACCURATELY AS POSSIBLE in
order to ensure the validity of our study. Thank you for your cooperation.

Highest Adult Body weight: __________
# APPENDIX C

## Family Behavior Questionnaire

**Instructions**

The following questions refer to your family behaviors **while GROWING-UP**. Check the appropriate answer to each question with a scale of frequency from 1 to 5; 1 represents “Never” occurring and 5 represents “Always” occurring.

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<td>1. Growing-up, how often did you watch television?</td>
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<td>2. Growing-up, how often did you play video games on your television?</td>
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<td>3. Growing-up, how often did you engage in the following physical activities:</td>
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<td>a. Bicycle riding</td>
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<td>b. Taking a walk</td>
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<td>c. Sports</td>
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<td>d. Other</td>
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<td>4. Growing-up, how often did you engage in participation in constructive exercise classes? (you may include physical education in school)</td>
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<td>5. Growing-up, when you were not busy, did you get bored and revert to a relaxed state as opposed to performing a physical activity?</td>
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<td>6. Growing-up, how often were snacks available in your house, such as potato chips, popcorn, nuts, corn chips, etc.?</td>
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<td>7. Growing-up, how often were you allowed to eat these same snacks?</td>
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<td>8. Growing-up, how often were sweets available in your house, such as cookies, candy, chocolate, ice cream, etc.?</td>
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<td>9. Growing-up, how often were you allowed to eat these same sweets?</td>
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<td>10. Growing-up, how often did you eat fast food?</td>
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<td>11. Growing-up, how often did you participate in the following behaviors:</td>
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<td>a. Eat during regular meal times, at the table with family?</td>
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<td>b. Eat from the pans or pans the food was cooked in?</td>
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<td>c. Eat while watching television?</td>
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<td>d. Eat while playing video games?</td>
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<td>e. Eat while doing your homework?</td>
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<td>f. Eat if you were bored?</td>
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<td>g. Eat after school, prior to dinner?</td>
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<td>h. Eat late, prior to going to bed?</td>
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<td>i. Eat at your leisure and without permission?</td>
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<td>j. Take a second helping of food because it tasted good, even though you were feeling somewhat full?</td>
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**Instructions**

The following questions refer to your **CURRENT** family behaviors. Check the appropriate answer to each question with a scale of frequency from 1 to 5; 1 represents “Never” occurring and 5 represents “Always” occurring.

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<tr>
<td>1. Currently, how often do you watch television?</td>
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<td>2. Currently, how often do you work on your computer, either personally or professionally?</td>
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<td>3. Currently, how often do you engage in the following physical activities:</td>
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<td>a. Bicycle riding</td>
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<td>b. Taking a walk</td>
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<td>c. Sports</td>
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<td>d. Other</td>
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<td>4. Currently, how often do you engage in participation in a constructive exercise class?</td>
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<td>5. Currently, if you get bored, do you revert to a relaxed state as opposed to performing a physical activity?</td>
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<td>6. Currently, how often are snacks available in your house, such as potato chips, popcorn, nuts, corn chips, etc.?</td>
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<td>7. Currently, how often do you eat these types of snacks?</td>
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<td>8. Currently, how often are sweets available in your house, such as cookies, candy, chocolate, ice cream, etc.?</td>
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<td>9. Currently, how often do you eat these types of sweets?</td>
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<td>10. Currently, how often do you eat fast food?</td>
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<td>11. Currently, how often do you eat regarding the following behaviors:</td>
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<td>a. Eat during regular meal times, at the table?</td>
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<td>b. Eat by convention, as opposed to eating during regular times intervals?</td>
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<td>c. Eat from the pans or pans the food was cooked in?</td>
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<td>d. Eat while watching television?</td>
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<td>e. Eat while working on your home computer?</td>
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<td>f. Eat throughout your work day?</td>
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<td>g. Eat if you are feeling bored?</td>
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<td>h. Eat late, prior to going to bed?</td>
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<td>i. Take a second helping of food because it tasted good, even though you are feeling somewhat full?</td>
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Drug Use Exposure Among Seattle University Students

KORIANN E. BROUSSEAU
MICHELLE C. BARON
Seattle University

Drug use on college campuses is a large problem. Because people tend to associate with others who engage in similar behaviors as they themselves do, measuring exposure to drugs can give a picture of what drug use on a college campus is like. This study examines the drug use exposure of 218 undergraduate students at Seattle University, and measures demographic factors and lifetime, last month, and last week exposure to drugs. It was found that class standing is related to recent exposure and current living arrangements influences total exposure overall (lifetime and recent.)

For most students, going to college is a chance to experiment with new things and experiences and an opportunity to enjoy the freedoms that come with being an adult. For many, freedom allows access to new experiences. In most cases, this can include parties and exposure to drugs and alcohol. Drug use among college students is not a new phenomenon and has been studied by a variety of different researchers. It is important, however, to make an effort to understand these behaviors and what motivates them in an effort to better understand what draws students to these practices which can be potentially detrimental to their academic performance and, more importantly, their health.

Alcohol and Drug Use

It is well known that adolescents seem to be familiar with drugs. Much research has been done between adolescents and the use of alcohol, as in Getz and Bray’s (2005) study of alcohol use among adolescents in relation to quantity of drinking as a predicting factor for future drinking habits. Furthermore, research of alcohol use in college students is also widespread. Grekin and Sher (2006) looked at prevalence levels of alcohol dependence among college freshmen in terms of how prevalent it is in a college sample as well as students’ membership in Greek systems as a determinant for alcohol dependence. Another study, conducted by Caudill, Crosse, Campbell, Howard, Luckey and Blaine and colleagues (2006) also looked at alcohol in college students and the Greek systems. Wechsler and Kuo’s 2003 study on the moderating effects that female, minority and older students have on binge drinking also shows evidence that alcohol in relation to college adolescents is a popular topic among researchers.

When looking at drug use, above and beyond alcohol, the research on college students dwindles significantly. The majority of studies have been conducted on alcohol and its link to marijuana. Simons, Correia, Carey and Borsari’s (1998) have found that the motives for alcohol use and marijuana use are different when looking at different types of measures. Simons, Gaher, Correia, Hansen, and Christopher (2005) have also found, in a similar alcohol and marijuana study that the motives were different for the use of alcohol and marijuana. Interestingly, they also found that 99% of participants who used marijuana had also used alcohol.

Motivations

There are various factors that have an effect on drug use such as parenting styles (Patock-Peckham &
Drug Use Exposure at Seattle University

Morgan-Lopez, 2006), availability of drugs (McCabe, Teter, & Boyd, 2006), athletic involvement (Rockafellow & Saules, 2006), participation in the Greek system (Grekin & Sher, 2006), location of event for drug use (Quintero, Peterson, & Young, 2006; Clapp, Reed, Holmes, Lange & Voas 2006) and emotional reasons (Simons et al, 2005). Because each student uses drugs (including alcohol) for different reasons, it is necessary to study what has an effect on drug use in order to understand the motivations behind it. When a variety of factors relating to drug use are examined, a better understanding of what motivates drug use can be obtained, both on an individual and a more general scale.

Theoretical Basis

When taking into account previous research concerning young adults and drug use, this study attempts to expand the work of others concerning drug use among college students. This study focuses on drug exposure of college students in relation to their demographic and academic categories (class standing, major, etc). Because there seems to be no research to date conducted on students’ exposure to drug use, this is the main focus of the current study. There is little focus on the impact of demographic variables of college students on exposure to drugs and it is important to take these factors into account when looking at this kind of data. With the exception of the Greek system, academics and academic life is occasionally mentioned in previous studies (Getz et al., 2005; Flory, Brown, Lynam, Leukefeld & Clayton, 2006; Caudill et al., 2006; Rockafellow & Saules, 2006). With the exception of Caudill and colleagues’ study on alcohol and fraternity members (2006), academic performance is not prevalent in these previous studies.

The current study seeks to describe the drug use behaviors among Seattle University students. Seattle University is a private Jesuit college located in the heart of Seattle, Washington. With a campus population of under 7,500 (including staff, faculty, and undergraduate/graduate/law students), this university is a small community. The drug culture differs at private universities as opposed to public universities, and it is the small community that makes the drug use different at private universities. (Mohamed & Fritsvold, 2006). Campuses that are smaller and more tightly knit (as private universities often are) and have different social mores that allow for different behaviors. While on public campuses with well known Greek systems, alcohol might be a far more acceptable drug of choice, on private campuses, where discipline is generally handled on campus and the students generally come from higher income families, other drugs might be more available and more widely used. In light of this, we wanted to examine the drug culture among the Seattle University students. There are several goals to the current study. First, to determine if above and beyond other demographic variables, class standing has an effect on drug exposure (lower class standing predicts greater recent exposure while upper class standing predicts greater lifetime exposure). Second, we are seeking to determine if gender has a predictive effect on drug exposure. Third, determine if marital status predicts drug exposure. Fourth, determine if academic major makes a difference on drug exposure. Fifth, determine if living arrangements have an effect on drug exposure. Finally, determine if students who transferred to Seattle University had more or less exposure prior to their transfer.

Drug use is affected by many different variables. This study seeks to describe the different variables that have an effect on the drug use exposure among Seattle University’s student body. Previous studies have not sought to describe the exposure to drug use in the same way that this study does. This study examines lifetime exposure, last month exposure, and last week exposure and then seeks to gain an estimate into the average student’s drug use patterns (how often they use, and how recently they’ve used). In addition, this study tries to determine if there has been any excessive behavior associated with drug use (arrests due to drug use or treatment for drug use). With a better insight into the types of drugs students are being exposed to and how often, steps can be taken to minimize the effects of this harmful behavior on the lives of those who choose to participate in it.

Method

Participants

A total of 233 people were approached for participation in the study. From that number, 223 people agreed to take the survey. Five participants were dropped from analysis, four because they reported recent exposure but had not indicated what drugs they had been exposed to and one because they were a graduate student. The final sample included 218 participants (93% of those approached).

Measure

The investigators wrote a 21-question descriptive survey for the purposes of assessing demographic variables, drug exposure, and prior experience with drug exposure. (See Appendix)

Demographic information. The survey assessed the following demographic variables: age, gender, ethnicity, class standing (freshman, sophomore, junior, and senior); these variables were further broken down
Drug use exposure. In an effort to account for the errors in self-report brought on by asking about illegal behaviors, this study sought to examine the drug use behaviors that students had been exposed to, rather than personally participated in. The idea behind this is that people tend to associate with people who have similar behavior patterns (Wolfson, 2000). Though there are potential problems with assuming direct behaviors from indirect sources (McRae, Beebe, & Harrison, 2001) this method of assessment allows for a variety of information on drug use behaviors even when taken from a respondent who is not themselves a drug user. There has been, however, some validation of self-reporting of drug use (Stacy, Widaman, Hays, & DiMatteo, 1985) so this method can be used with reservations. Therefore, the survey asked several questions about drug exposure. It began by asking if students had ever been in a social situation with alcohol and/or a social situation with drugs. The survey then asked what drugs (including alcohol) students had been exposed to at three different time points: lifetime at Seattle University, last month, and last week. The drug exposure questions for each timeframe were in a check box format, with the choices being: alcohol, marijuana, cocaine, heroin, amphetamines, ecstasy, hallucinogens, prescription drugs, inhalants, morphine, IV drugs, PCP, and other (with lines for providing the drug name), with the hope that the participant would check all that they had been exposed to.

The next section on drug exposure asked participants to estimate the average usage of a Seattle University student, with options ‘abstinent more than 12 months’ to ‘current use more often than weekly (high quantity).’ The participants had seven average usage options, with several options broken down by ‘low quantity’ and ‘high quantity’ usage. Low quantity was defined as 1-2 drinks, 1 joint or 1 drug use and high quantity was defined as 3 or more drinks and/or multiple drug use (including binging).

The next question in this section asked the participants how long it had been since they had witnessed or directly participated in a social situation with alcohol and/or a social situation with drugs. The survey then asked what drugs (including alcohol) students had been exposed to at four different time points: lifetime at Seattle University, last month, last week, and within the last 12 months. The participants had eight options, starting with ‘within the last day’ up to ‘more than one year ago’. Due to an overwhelming write-in response, when the investigators were entering the survey data into SPSS for later analysis, they added a ninth option of ‘none’ for those participants who had never witnessed drug use during their time at Seattle University.

The final questions in the drug exposure section were about consequences of drug use. The questions asked if the participant knew of any Seattle University students that had been arrested for their drug use and if they knew of any Seattle University students that had received treatment for their drug use.

Prior experience with drug exposure. This section was used to assess if students who transferred to Seattle University had more or less exposure prior to their transfer. The question that the investigators used as a filter was whether or not the participant was a transfer student. If the participant answered in the affirmative, they were asked if they had transferred from a public or private university and if they had witnessed drug use more frequently prior to their transfer. The final question asked them to explain their perceptions of the difference.
Drugs Use Exposure and Class Standing

An independent samples t-test was conducted to compare the total number of lifetime, last month, and last week exposure by class standing (upper classmen versus lower classmen). There was no significant difference between drug exposure and class standing for lifetime exposure, \(t(216) = 1.32, p = .19\), despite upper-classmen (M=2.68, SD=1.97) being slightly more exposed to drug use than lower classmen (M=3.11, SD=1.97). However, there was a significant difference between upper classmen (M=2.15, SD=1.47) and lower classmen (M=1.30, SD=1.16) for last month exposure, \(t(216) = 4.16, p < .01\), for last month exposure. There was a significant difference, as well, between upper classmen (M=0.79, SD=0.86) and lower classmen (M=1.34, SD=1.03), \(t(215) = 3.34, p = .001\), for last week exposure.

Drugs Use Exposure and Gender

An independent samples t-test was conducted to compare the differences in total number of lifetime, last month, and last week exposure by gender. For lifetime, there was no significant difference between males (M=2.77, SD=1.78) and females, (M=2.75, SD=2.03), \(t(215) = .05, p = .96\). The difference between males (M=1.53, SD=1.28) and females (M=1.46, SD=1.28), \(t(215) = .39, p = .70\), for last month exposure was not significant. Finally, the last week exposure for males (M=0.97, SD=0.99) and females (M=0.88, SD=0.90), \(t(214) = .58, p = .56\), was not significant.
Drug Use Exposure and Marital Status

An independent samples t-test was done to compare the differences of lifetime, last month and last week drug exposure in relationship to marital status. The marital status was divided into “single” or “not single”. There was no significance in lifetime exposure, \( t(46.33) = 1.75, p = .087 \). Mean lifetime exposure for singles was 2.87 (SD=1.96) and 2.24 (SD=1.94) for those not single. However, there was a significant difference at the last month exposure, \( t(216) = 2.72, p = .009 \), and last week exposure, \( t(49.8) = 2.89, p = .006 \). The mean exposure within the last month for singles was 1.59 (SD=1.26) and .94 (SD=1.28) for those not single. Similarly, the mean exposure within the last week for singles was .98 (SD=.93) and .53 (SD=.83) for those not single.

Drug Use Exposure by Academic Major

A one-way ANOVA was conducted to compare the difference of lifetime, last month and last week exposure in relationship to academic major. There were 31 majors listed, which the investigators divided into six overarching categories including Social Science, Science, Liberal Studies, Business, Art, and Pre-Major. No significant difference for drug exposure by major was found for lifetime exposure, \( F(5, 209) = .55, p = .74 \), last month exposure, \( F(5, 209) = 1.54, p = .18 \), or last week exposure, \( F(5, 208) = .61, p = .693 \).

Drug Use Exposure and Living Arrangements

An independent samples t-test was conducted to compare lifetime, last month, and last week drug exposure by living arrangements (defined as living with parents or not living with parents). For lifetime exposure, there was a significant difference between those who lived with their parents (M=1.48, SD=1.56) and those who do not (M=2.92, SD=1.96), \( t(216) = 3.42, p = .001 \). The difference between people who lived with their parents (M=.83, SD=1.02) and those who do not (M=1.56, SD=1.28) is significant for last month exposure, \( t(216) = 2.66, p = .009 \). For last week exposure, the difference between people who live with their parents (M=.36, SD=.66) and those who do not (M=.97, SD=.93) was significant, \( t(215) = 2.99, p = .003 \).

Drug Use Exposure Prior to Transfer From a Public University

A chi square was done to test for a significant difference between drug use exposure prior to transferring to Seattle University from a public university. An assumption was violated during this test, as one cell had an expected count of less than five; however, the test was run anyway because the expected count was 4.90. There was no significant difference between drug use exposure prior to transfer and current drug use exposure at Seattle University, \( \chi^2 (1, N=84) = .22, p > .05 \).

Other Interesting Results

Participants were asked to provide their estimate as to how often the average Seattle University student uses drugs. There was a tie for the most common estimate: less than weekly but more than monthly, low quantity (low quantity = 1 drink, 1 joint, or 1 drug use) and more than weekly, low quantity. (The frequency for both was 48 occurrences, with 200 responses.) Seventy-six participants (34.9% of the sample who responded to this particular question) had witnessed drug use within the last week.

Forty-nine participants (22.5% of the sample) have known a Seattle University student that had been arrested as a result of their drug use. Fifty-two participants (23.9%) have known a Seattle University student that has received treatment for their drug use.

Across all three time period assessments (lifetime, last month, last week) alcohol was the most common drug followed by marijuana and then prescription drugs. For lifetime, the fourth most common drug was ecstasy followed by hallucinogens. For last month, the fourth most common drug was cocaine followed by ecstasy (n=10, 4.6%). For last week, the fourth most common drug was ecstasy followed by cocaine. (See Figures 1-3).

Discussion

There are many things that have an effect on drug use and with a larger sample it is possible that the cur-
rent study would have found more significant relationships between variables. As it was, there was a significant relationship between class standing and recent exposure, a significant relationship between marital status and recent exposure, and a significant relationship between living arrangements and overall exposure.

Class standing is related recent exposure. For lifetime exposure, there was no significant relationship between class standings, however for recent exposure there was a difference. Lower classmen had higher recent exposure at both the last month and last week exposure assessment points. It is possible that this is because upper classmen have more academic responsibilities than lower classmen do and/or lower classmen have more recent exposure as they are entranced with their new found freedom of experiences.

There was no relationship between drug use exposure at any assessment point and gender. It is possible that there would be a significant difference had the sample been larger and contained more male participants (as it was, the sample was only 27.5% male, though in the autumn quarter of 2006 the total male population of undergraduate students at Seattle University was only 39%).

Though there was no significant relationship between marital status and lifetime drug exposure, there was a relationship between marital status and recent drug exposure. People who were single (those who were single, divorced, or widowed) had higher exposure at the last month and last week assessment periods. This makes sense as those people who are not single (those who were married or partnered) generally have more responsibilities and attend fewer parties than their single counterparts.

There was no significant relationship between academic major and drug use exposure at any assessment period. It is possible that, were a larger sample obtained, a significant relationship could be found. This sample contained a larger percentage of psychology and criminal justice majors than other academic majors and it’s possible that this had an effect on the outcomes.

A significant relationship was found for living arrangements and drug use exposure across all three assessment points. Participants were given three choices (with parents, on campus, and off campus) which were further broken down into with parents and not with parents. Participants who did not live with their parents had higher instances of drug use exposure. This is not surprising, as students who live with their parents while attending college often do not have the same freedoms that students who live away from their parents do.

There was not a significant difference between drug use exposure prior and after transfer to Seattle University for lifetime and recent exposure. It is possible that with a larger sample of transfer students, a significant relationship could be found. Mohamed & Fritsvold (2006) commented on the differences in drug use at private universities and because Seattle University is a private university it was hoped that there would be a significant difference in drug exposure between public (transferred from) universities and Seattle University.

To date, there is no research on drug use exposure so this study is groundbreaking in that area. However, with self-reporting of drug use or, in this case, drug use exposure, it is hard to judge the accuracy of

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**FIGURE 2**

Drugs students have been exposed to during the last month at Seattle University ordered by the number of “yes” to exposure responses

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**FIGURE 3**

Drugs students have been exposed to during the last week at Seattle University ordered by the number of “yes” to exposure responses
the responses. It is the hope of the researchers that because the participants were reporting drug use they had witnessed rather than their own personal drug use they would be more accurate in reporting because they would not have to deal with any stigmas attached to drug use. The accuracy of the self-report was one of the major limitations of the study; however when it comes to drug use self-report is the only measure of drug use short of giving every student a drug test.

Another limitation of the current study was the large percentage of criminal justice and psychology major and the higher number of upper classmen in the sample. The investigators of this study are both double majors in criminal justice and psychology and both upper classmen. This led to an access bias, as both investigators had easier access to students who were of those majors and upper classmen. It would more beneficial and the results would be more applicable if an even number of upper and lower classmen were obtained and an equal number of different academic majors.

This research was conducted at a single university in the Northwest region of the United States so it is unclear as to the generalizability of the results to other universities. If this or a similar study was conducted at several universities across the country (both public and private) the results would be more applicable across a wider variety of universities.

Further research into this area would help to better understand the relationship between college students and drug use. With an increase of information, it is possible that a plan could be developed to eradicate drug use on campus or, at the very least, decrease drug use on campus. It would be beneficial for further research to assess personal drug use as well as drug use exposure in an effort to compare the differences in order to gain a clearer picture of drug use among Seattle University students. Perhaps with further development of this current study at Seattle University, this study could also be conducted at other universities, public and private, to better understand drug use among college students in general (as opposed to specifically at Seattle University).

Though this study has limitations, it does provide an interesting look into the drug culture among Seattle University students. Though very little of the previous research supports the findings of this study, it does form a helpful theoretical basis for understanding the results. Drug use is not unexpected on college campuses and this study helps to better understand what drugs are being used by Seattle University students. With further research, students and administrators could work together to increase awareness and decrease drug use.

References


APPENDIX

Survey Number:

**PLEASE READ BEFORE BEGINNING**

This survey is completely anonymous. As such, we request that you provide honest answers. Your answers will help us track drug use patterns within the student population at Seattle University. For our intent, we include alcohol in our definition of drugs.

1. Age: _____  
2. Gender:  
   □ Male  □ Female

3. Ethnicity:  
   □ Asian  □ Native American  
   □ African-American  □ Caucasian (non-Hispanic)  
   □ Hispanic  □ Other: _______________

4. Class standing:  
   □ Freshman  □ Sophomore  
   □ Junior  □ Senior

5. Major: ____________________________________________

6. Martial status:  
   □ Single  □ Married  
   □ Divorced  □ Partnered  
   □ Widowed

7. Average yearly income:  
   □ Under $20,000  □ 20,000-29,999  □ 30,000-39,999  □ 40,000-49,999  
   □ 50,000-59,999  □ 60,000-69,999  □ 70,000-79,999  □ 80,000-89,999  
   □ 90,000-99,999  □ 100,000+

8. What are your current living arrangements?:  
   □ With parents  □ On-campus  □ Off-campus

9. Have you ever been in a social situation with Seattle University students where the people around you were drinking alcohol?  
   □ Yes  □ No

10. Have you ever been in a social situation with Seattle University students where the people around you were doing illegal drugs (prescription or otherwise)?  
    □ Yes  □ No

11. Please check all that you have witnessed other SU students doing in your lifetime:  
    □ Alcohol  □ Hallucinogens  □ PCP  
    □ Marijuana  □ Prescription drugs  □ Other (please specify):  
    □ Cocaine  (other than specified use)  
    □ Heroin  □ Inhalants  
    □ Amphetamines  □ Morphine  
    □ Ecstasy  □ IV Drugs  □ None

12. Please check all that you have witnessed other SU students doing within the last month:  
    □ Alcohol  □ Hallucinogens  □ PCP  
    □ Marijuana  □ Prescription drugs  □ Other (please specify):  
    □ Cocaine  (other than specified use)
13. Please check all that you have witnessed other SU students using more than once a week:
   □ Alcohol
   □ Marijuana
   □ Cocaine
   □ Heroin
   □ Amphetamines
   □ Morphine
   □ Ecstasy
   □ IV Drugs
   □ None

14. By your estimate how often does an average SU student use drugs?
   Low quantity = 1-2 drinks, 1 joint or 1 drug use.
   High quantity = 3 or more drinks, multiple drug use (including binging)
   □ Abstinent more than 12 months
   □ Abstinent 1 to 12 months
   □ Current use less than monthly
   □ Current use less than weekly but more than monthly (low quantity)
   □ Current use less than weekly but more than monthly (high quantity)
   □ Current use more often than weekly (low quantity)
   □ Current use more often than weekly (high quantity)

15. How long has it been since you’ve witnessed drugs being used by SU students?
   □ Within the last day
   □ Within the last two days
   □ Within the last week
   □ Within the last two weeks
   □ Within the last month
   □ Within the last six months
   □ More than six months ago
   □ More than one year ago

16. Do you know of any SU students who have been arrested for their drug use? □ Yes □ No

17. Do you know of any SU students who have received treatment for their drug use? □ Yes □ No

18. Are you a transfer student? (If no, skip following questions) □ Yes □ No

19. Did you transfer from a public university or college? □ Yes □ No

20. Did you transfer from a private university or college? □ Yes □ No

21. Did you witness drug use more frequently before you transferred to Seattle University?
   □ Yes □ No

Please explain: ____________________________________________________________
________________________________________________________________________
________________________________________________________________________
Charlotte L. Powers
Clemson University

Academic Achievement and Social Involvement as Predictors of Life Satisfaction Among College Students

The present study examined academic achievement and social involvement as predictors of undergraduates’ life satisfaction. 103 participants completed a survey that assessed life satisfaction, academic achievement, and different types of social involvement. The results of a multiple regression indicated that both social involvement and academic achievement accounted for unique variance ($R^2 = .29$) in the outcome variable of life satisfaction. In addition, the distinction between structured and unstructured social involvement was examined, and I found that unstructured involvement had a much stronger relationship with life satisfaction. These results indicate that both social involvement and academic achievement are important predictors of undergraduate life satisfaction.

Just as the “keys” to happiness have been sought after from the beginning of intellectual and enlightened thought, the determinants of life satisfaction have been equally pursued. Among those who strive for this invaluable information are academic institutions. Because graduation rates have been found to be correlated with student life satisfaction (Graunke & Shelly, 2005), the topic is important to universities throughout the United States and abroad. With better knowledge of how these factors contribute to life satisfaction in college, education systems may theoretically be altered to improve the likelihood of high satisfaction levels and subsequent degree attainment of students.

Academic Achievement and Satisfaction

Previous research has found that academic achievement is positively correlated with overall life satisfaction. Chow (2004) recently asked undergraduates about their satisfaction with life and assessed nine possible predictors, including grade point average, self-image, self-esteem, sex, and living conditions. He established that grade point average was a predictor of life satisfaction, along with socio-economic status, self-esteem, and relationships with a significant other. Chow concluded that the students with higher GPAs tended to demonstrate a higher level of life satisfaction.

Individual grades received on a given day, in addition to cumulative GPA, have also been shown to predict satisfaction. By examining the relationship between academic achievement as indicated by grades, self-worth, and self-esteem, Crocker, Karpinski, Quinn and Chase (2003) found that self-esteem was contingent on the reception of good and bad grades. On days in which students received poor grades, they had much lower self-esteem than on a baseline day. Accordingly, a day during which a good grade was received had a significant change in satisfaction. The authors concluded that students’ self-esteem was related to grades (Crocker, et al. 2005). Diener and Diener (1995) found that across many countries, college students’ life satisfaction was closely related to self-esteem. From this research, one can assume that through self-

Author’s Note. The data presented in the current study were collected at Clemson University, Clemson, South Carolina, in March of 2007. The researcher would like to thank the professors in whose classes surveys were distributed: Professor Ashley Cowden, Professor Sarah Winslow-Bowe, and Professor Laurie Brown-Pressly. For their assistance in the planning and analysis of this study, the author would like to thank Dr. Thomas Britt and Eric McKibben. Correspondence may be addressed to Charlop@Clemson.edu.
esteem, perceived academic achievement is related to life-satisfaction.

To further emphasize the relationship between achievement and satisfaction, House (1992) performed a study in which he compared self-perception of academic ability, drive to achieve, and self confidence to withdrawal rates in college. Using a sample of 2,544 participants from a large American university, he found that the self-concept of academic ability was the “single most significant predictor” (House, p. 127) of withdrawal from the university, particularly for men (House, 1992). Crocker et al. (2003) also found that grades affected academic self-concept, making House’s findings applicable to the study of the influence of academic achievement. Therefore, grades could have a relationship with retention rates through affecting a student’s academic self-concept, indicating the importance of academic achievement.

These findings indicate that academic achievement, as demonstrated through grades, GPA, and academic self-concept, is a consistent predictor of life satisfaction. However, it seems improbable that a student who is “wholly consumed in academic performance” will attain the highest levels of life satisfaction, despite his or her level of success (Rode, Mooney, Near, Baldwin, Bommer & Robert, 2005). Rode et al. (2005) found that other factors, such as family relations, are important to life satisfaction, indicating that isolating oneself to focus solely on academics is actually detrimental. Instead, one should become involved in other activities as well.

Social Involvement and Satisfaction

To determine what other variables contribute to satisfaction, other factors have been examined, including socioeconomic status, perceived health, race, age, and social participation. Clemente and Sauer (2001) examined life satisfaction as a result of multiple factors, focusing on the independent effects of each contributor while controlling for the others. They found that social participation, as indicated by involvement with political and religious activities, was directly and positively related to life satisfaction, as were health and SES. However, neither GPA nor perceived academic achievement were assessed.

The current study seeks to investigate the relationship between social participation and life satisfaction further, with the expansion hypothesis of life involvement as a theoretical context. According to this theory (Kessler & McRae, 1981), the more involved in life activities a person is, the more he or she is satisfied with his or her life overall.

Bailey and Christy (1998) surveyed 243 undergraduates to assess involvement and life satisfaction. After grouping the students into low, medium, and high life satisfaction groups, the authors addressed the students’ levels of involvement, including time pressures, stress, responsibilities, and life roles. As they proposed, college students’ life satisfaction rating was related to their levels of involvement. Despite having more time constraints and more demanding lifestyles as a result of heightened social involvement, their research showed that students within the high-involvement category did not suffer increased stress or anxiety.

Social participation can be divided into two components: structured extracurricular activities (SEAs) and unstructured social interaction. Defined as activities that are “physically or mentally stimulating…and contain some structural parameters” (Gilman, Meyers & Perez, 2004, p. 31), SEAs include, but are not limited to, clubs, sports, volunteer organizations, and structured Greek life activities on college campuses.

Gilman (2001) found that SEA involvement had a significant relationship with overall life satisfaction. Even when controlling for social interest, high school students in the “high SEA” group (those participating in at least seven SEAs) had higher ratings of life satisfaction than those of the medium and low SEA involvement categories. Maton (1990) also reported a significant positive relationship between life satisfaction and SEA involvement. Whether a result of identification with the school, more structured role modeling, or another factor, SEAs have shown consistent relationships with life and school satisfaction.

However, the study of SEAs does not address social involvement at an unstructured level. Interpersonal interaction and activity should also be included in social participation, as not all socialization is involved with organized activity within associations. Social involvement through casual participation has been shown to be related to life satisfaction as well. For example, Bailey and Miller (1998) found that interaction in personal relationships was related to high levels of life satisfaction.

Similarly, research focused upon social involvement through social networking (i.e. participating in a group drawn together by interest, relation, or ideals) has demonstrated that uninvolved adolescents had a greater chance of negative outcomes, including heightened levels of depression and increased likelihood of dropping out (Mazza & Eggert, 2001). Therefore, it can be concluded that social involvement within and outside of SEAs is related to life satisfaction among college students.

It seems then that both academic achievement and social involvement are important predictors of life satisfaction. However, it has yet to be examined whether both are independently related to levels of
satisfaction. Therefore, in addition to examining the main effects of academic achievement and social participation as predictors, the current study also considers the possibility that both factors may be necessary for the highest levels of satisfaction. A student may score highly in academic achievement but lack any meaningful social activity, just as another may enjoy much social participation and perform poorly in classes; in both of these situations, the student may not score highly in life satisfaction.

Method

Participants

The current study sampled 103 undergraduate students from Clemson University, a mid-sized southeastern university. The sample was fairly equal in terms of gender (42.7% male, 53.4% female) and enrollment year (11.7% freshmen, 23.7% sophomores, 35% junior, and 25.3% senior). Just under 4% of the sample did not complete the demographics section. Ethnicities were not as evenly distributed, with 85.4% of the sample reporting themselves as white, 7.8% as African American, and 1% as “other”. 5.8% of the sample did not select an ethnicity.

Materials

Life Satisfaction. The Diener Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen & Griffin, 1985) was used to measure life satisfaction while in college. This highly popular five item measure is based on a seven point Likert scale (1= strongly disagree to 7= strongly disagree). Thus, a participant can score as low as five and as high as 35. Sample items include “in most ways my life is close to my ideal” and “I am satisfied with my life.” Although none of the items are negatively worded, the Diener scale maintains very high reliability and validity. The test-retest reliability yielded a correlation coefficient of .87 after two months, and each scale had good internal consistency, from .61 to .81 (Diener et al., 1985). For this study, I obtained in a Cronbach alpha score of .84.

Academic Achievement. The academic achievement scale (Appendix A) used in this study was created by the researcher to ascertain the level of success attained by each student. Also on a seven-point Likert Scale, the items measured academic success in general as well as in relation to other students. For example, a sample item “I typically get better than average grades in class” was included. An open-ended request for GPA was also included. Internal consistency for the self-report measure of academic achievement was .91. GPA and the academic achievement items were standardized and then combined into a single measure.

Social Involvement. The measure for social involvement was also generated by the researcher based on past research and the Chapin Social Participation Scale (Chapin, 1939). The Chapin Social Participation scale assesses participation through number of organization memberships, attendance, financial contributions, membership on committees, and offices held. Each of these aspects was assigned a specific weight, from one to five, in the order given above. Although the scale reflects a reliability coefficient of .89 (Bach, 1961), it may not be fully applicable to college students, based on the financial constraints of many students that prevent them from participating at certain levels within an organization (e.g., cannot attend business meetings). Consistent with previous research discussed above, the items reflect both SEA involvement (e.g. “I actively participate in clubs, teams, or other structured organizations) and casual social participation (e.g. “I actively participate in clubs or teams” and “I don’t devote much time to social activities”). Thus, the scale consisted of both positively and negatively worded items (Appendix B). Negatively worded statements were reverse scored.

Items were rated using a seven point Likert scale. Higher total scores indicate high social involvement, whereas lower scores represent low involvement. In addition, the measure included two questions addressing the number of hours of structured (teams, etc) versus unstructured social involvement, which were standardized along with the rated items to create measures for structured and unstructured involvement within total social involvement. The items comprising the unstructured and structured social involvement were measured using different response formats (i.e. hours versus a 1-7 Likert scale). Therefore, each item was standardized prior to the formation of separate sub-scales. Overall total social involvement had an internal consistency of .77.

Procedure

Participants were approached in several ways. One method was through classes that mandate attendance, so that the convenience sample is not simply composed of those students who actively go to class and are therefore more likely to have higher academic achievement. The classes used for participant selection were business writing classes; a class that is mandatory for every student to graduate Clemson. Students were also contacted at random locations (e.g. the dining hall).

To avoid the question order effect of academic achievement and social involvement priming life satisfaction, Diener’s Satisfaction with Life Scale was placed first among the three constructs to assess each
participant’s overall satisfaction with life in college. The scale for academic achievement, which requested information on GPA and perceived academic success, was second. The social involvement scale was placed third, which evaluated each student’s social participation, including statements about both structured and unstructured activities. A demographics section was included at the end of the survey, which included enrollment year, age, gender, and ethnicity. Once they completed the survey, which took approximately ten minutes, the participants were debriefed.

Results

Descriptive Statistics and Correlations

The average mean for life satisfaction among the Clemson undergraduate participants was 5.29 out of a seven point scale. As presented in Table 1, the means for academic achievement and social interaction were 5.52 and 5.34 respectively, also out of a seven point scale. These means indicate that Clemson students in general seem to be satisfied with their lives, with high academic achievement and social involvement. Each mean was above a score of 5 in a 1-7 scale. The correlations among the measured variable are presented in Table 2. Both academic achievement ($r = .37$, $p < .001$) and social interaction ($r = .34$, $p < .001$) were positively correlated with life satisfaction, as shown in Table 2.

Academic Achievement and Social Interaction as Predictors of Life Satisfaction

Analysis by multiple regression indicated strong main effects for both academic achievement and social involvement. As Table 3 indicates, both were highly significant ($p = .003$ academic achievement, $p < .001$ social involvement); they accounted for unique variance in life satisfaction. The multiple correlation of both predictors with the outcome was .45 ($p < .001$). The variables combined accounted for 23.9% of the variance in life satisfaction. However, there was no evidence of an interaction between academic achievement and social involvement with life satisfaction ($p = .43$).

Structured versus Unstructured Social Activities as Predictors of Life Satisfaction

In order to assess whether involvement in unstructured or structured activities was a more important predictor of life satisfaction, I created two new variables. After standardizing the measures of hours and ratings, separate indexes of unstructured and structured social involvement were created. Participants were asked to rate how many hours they participated in structured and unstructured activities, separately (2 hours, 2-4 hours, 4-6 hours, more than 6 hours). To assess the difference between these aspects of social involvement, I created two new variables. After standardizing the measures of hours and ratings, separate indexes of unstructured and structured social involvement were created. Participants were asked to rate how many hours they participated in structured and unstructured activities, separately (2 hours, 2-4 hours, 4-6 hours, more than 6 hours). To assess the difference between these aspects of social involvement, I created two new variables.

<table>
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<th>Variable</th>
<th>Social Total</th>
<th>Unstructured SI</th>
<th>Structured SI</th>
<th>Academic Achievement</th>
<th>Life Satisfaction</th>
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<td>.338**</td>
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</table>

* significant at the .05 level (2-tailed)
** significant at the .01 level (2-tailed)
involvement, two new variables were created: unstructured hours were combined with items that assessed unstructured activity involvement, and structured hours were combined with items that addressed clubs, teams, and other structured social activities. Sample items include “I actively participate in clubs, teams, or other structured organizations”. By standardizing the items, the hours and the Likert items could be combined into the two variables of structured and unstructured involvement, both of which had acceptable Cronbach’s Alphas (.79 unstructured, .94 structured). GPA was also standardized with perceived academic achievement, as assessed by the Likert scale items.

Unstructured social involvement was also significantly positively correlated with life satisfaction, at .41 (p < .001). The correlation of structured social involvement and life satisfaction was not significant, at .109 (p = .271).

Discussion

Consistent with previous research, perceived academic achievement had a strong, positive correlation with life satisfaction. The results support Chow’s 2004 study that academic success is strongly correlated with life satisfaction. The data are also consistent with House (1992), who found that self-perception of academic ability, instead of letter grades or GPA, was the best predictor of college dropout rates. Overall, the current study lends additional support to the existing studies that academic achievement has a strong relationship with life satisfaction among students, both by GPA and perceived achievement.

The results for social involvement were also in agreement with past research. As Clemente and Sauer (2001) found, social participation was positively correlated with life satisfaction as well (r = .34). This supports Kessler and McRae’s expansion hypothesis of life involvement that the more socially involved a person is, the more satisfied he or she is with life overall.

Interestingly, however, the current study found that unstructured social activity had a stronger relationship with life satisfaction than structured social activity. This is especially intriguing because in previous studies of SEA involvement and life satisfaction, unstructured activity involvement was not assessed for comparison with SEA involvement (Gilman, 2001). Instead, SEA involvement was thought to be the main link to life satisfaction in students.

Unlike past research that examined social involvement and academic achievement in isolation, the present study found that both academic achievement and social involvement were significant unique predictors of life satisfaction. It seems that both are important predictors of satisfaction among college undergraduates, as together they accounted for 20.1% of variance in life satisfaction.

The lack of evidence of an interaction indicates that the hypothesis of a synergetic effect was not supported. While both academic achievement and social involvement are correlated with life satisfaction, there was little support for the hypothesis that very high levels of both would be necessary for especially high levels of life satisfaction.

Limitations

Several limitations with the current study exist that should be acknowledged and kept in mind while interpreting its results. Although the sample was fairly representative of Clemson’s undergraduate population in terms of gender, it was not as equal in other aspects. The sample was composed of mainly juniors,
most likely as a result of the classes that were chosen to participate with the study. In addition, the mean for academic achievement was high (5.52); this may also be due to the classes chosen, rather than an actual representation of the student body.

Future studies should vary methods of participant selection, perhaps approaching students solely in open areas around campus instead of classrooms, which may yield a less accurate representation.

The current study found a much stronger relationship with unstructured social involvement with life satisfaction than structured (SEA) social involvement with life satisfaction. However, only two items were combined for the SEA involvement, whereas six were for unstructured, so there is a chance that some SEA involvement was included within the unstructured assessment. However, it is worth noting the alpha level was higher for the structured social activities. Future research could examine the relationship between these variables more closely.

In summary, these results support the previous research that examined either academic success or social interaction as predictors of life satisfaction. In addition, by assessing social involvement and academic achievement in the same study, there is support for the hypothesis that both variables are uniquely significant and important predictors of college students’ life satisfaction.

References


## APPENDIX A

### Academic Achievement

Cumulative GPA: __________

1. I typically get better than average grades in my classes.

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2. I often do not get high marks.

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3. On the whole, I am successful in class.

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4. I perform well in academics.

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5. I usually receive less than average grades on tests.

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### APPENDIX B

#### Social Involvement

1. Outside of class, I spend much of my time with friends.
   
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2. I often take part in group activities.
   
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3. I spend much of my time alone.
   
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4. I actively participate in clubs, teams or other structured organizations.
   
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5. I consider myself very socially active.
   
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6. I don’t devote much time to social activities.
   
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7. Estimated number of hours spent in structured organizations (clubs, teams, sports, Greek chapter meetings, committee meetings, et cetera) per week
   
   - Less than 2 hours
   - 2-4 hours
   - 4-6 hours
   - More than 6 hours

8. Estimated number of hours spent in casual social activities (going out with friends, actively socializing, et cetera) per week:
   
   - Less than 2 hours
   - 2-4 hours
   - 4-6 hours
   - More than 6 hours
LAUREN A. MCDERMOTT
TERRY F. PETTIJOHN II
Mercyhurst College

The Effect of Skin-Tone and Racism on Perceptions of Attractiveness

Caucasian college student participants (N=70) viewed and rated the attractiveness of facial photographs of male and female Caucasians and African-Americans with lightened, darkened, or original skin-tone. Participants also completed a measure of racism. Although African-American models with lightened skin-tone and Caucasian models with darkened skin-tone were predicted to be rated the most attractive, results revealed the manipulated skin-tone of the photographs did not significantly alter their attractiveness ratings. As predicted, the Caucasian models overall were rated as significantly more attractive than the African-American models and a significant negative relationship was found between racism scores and attractiveness ratings of the African-American photographs. Implications for skin-tone discrimination are discussed.

Physical appearance plays an important role in determining how interpersonal attributions are constructed and how individuals are evaluated. Even though laws exist in the United States to maintain equal treatment of all individuals, people are still prone to judging others simply based on external characteristics. Individuals of other races are judged because of the color of their skin, and as time goes on, more and more research is being conducted to understand the relationships between race and perceptions of that race (Keith & Herring, 1991; Bruce, Beard, Tedford, Harman, & Tedford 1997; Ashikari, 2005; Gullickson, 2005). Particularly, it is useful to study how the visual characteristics, such as skin-tone, influence person perceptions. The current research was designed to investigate the influence of skin-tone on person perceptions of attractiveness in Caucasians and African-Americans.

Several research studies (Ashikari, 2005; Gullickson, 2005; Keith & Herring, 1991; Levin & Banaji, 2006; Lerner & Buehrig, 1975) maintain that the pigment of an individual’s skin-tone aids in determining attitudes and behaviors expressed toward that individual. For example, Keith and Herring (1991) used data from the National Survey of Black Americans to investigate the effects of skin-tone on educational attainment, occupation, and income. According to the findings, African-Americans with lighter pigmented skin-tones lead a more privileged life than those African-Americans with darker pigmented skin-tones. These findings were consistent with the research of Frazier (1957), who suggested African-Americans with darker pigmented skin-tones are disadvantaged due to persisting discrimination. In fact, African-Americans actually show a bias for lighter skin-tone over darker-skin tone when judging other African-Americans (Bond & Cash, 1992; Porter, 1991). However, African-Americans are more accepting of other races than Caucasians overall (Bruce, Beard, Tedford, Harman, & Tedford 1997).

Research findings concerning preferences for skin-tone in Caucasians are mixed. Fink, Grammer, and Thornhill (2001) found that darker skin-tone levels were preferred to lighter skin-tone levels in

Author Notes. Portions of this research were presented at the 35th annual Western Pennsylvania Undergraduate Research Conference at Grove City College, Grove City, Pennsylvania.

Terry F. Pettijohn II, Ph.D., now at Coastal Carolina University, served as faculty advisor of this research.

Send correspondence concerning this article to Lauren A. McDermott via email at lmcder39@mercyhurst.edu
Caucasians’ facial appearance. However, Zebrowitz (1997) suggests that lighter skin-tone is found to be most attractive in women, which demonstrates a relationship between gender and skin-tone level and how these variables may affect attractiveness perceptions. In time periods past, Caucasians that had lighter skin-tone levels were considered more attractive and had fewer diseases, such as melanoma, associated with being in the sun (Shoveller, Lovato, Young, & Moffat, 2003). Having a darker skin-tone level, or many skin defects, could indicate that an individual had to spend most of their time doing manual labor outdoors, which means they were not a member of royalty or high society (Shoveller, Lovato, Young, & Moffat, 2003). Times have changed and there is currently a preference for tan skin-tones in Caucasians (Shoveller, Lovato, Young, & Moffat, 2003).

Based on these previous research studies, the current study predicted an interaction between the variables of model race and skin-tone on attractiveness ratings. Specifically, African-American models with a lightened skin-tone and Caucasian models with a darkened skin-tone were predicted to be rated most attractive. Unfortunately, a race bias still exists in our society, so it was also hypothesized that Caucasian participants would rate African-American photographs as less attractive than Caucasian photographs overall. Also, participants’ level of racism was expected to negatively correlate with their African-American photograph attractiveness ratings.

Method

Participants

Seventy four undergraduate students (66.2% women) from a small, liberal arts college volunteered for participation in the study in exchange for partial fulfillment of Introductory Psychology course requirements. Participant mean age was 21.97 years (SD=4.79) and participants were predominately Caucasian (94.6%). No African-Americans completed the study, and only one Asian, one Hispanic, and two participants selecting “other” participated.

Materials and Procedure

The photographs used in the experiment included one Caucasian male, one Caucasian female, one African-American male, and one African-American female chosen from Getty Images (www.gettyimages.com), a free photo website. The four models were approximately college age (18-22 years old). These images were converted from color to grey-scale. Only the skin of each photograph was selected for change so that the clothes, hair, and eyes did not change. Using a color balance tool included in the software program Abode Photo Shop 7.0, the intensity of light was increased by an increment of 50 per pixel to lighten skin of the photographs and the intensity of light was decreased by an increment of 50 per pixel to darken the skin of the photographs.

Participants were asked demographic questions regarding their age, sex, and race in order to describe the sample of participants. For each of the photographs presented, participants were asked to respond to the question asking “This person is attractive” to be rated on a Likert scale on a 5-point Likert scale (strongly agree to strongly disagree) next to each photograph.

Participants were also asked to complete McConahay’s (1986) Old-Fashioned and Modern Racism Scale. These measures are commonly used in prejudice research with documented reliability and validity (McConahay, 1986). This scale consisted of 14 statements including “Black people are generally not as smart as whites” and “Blacks should not push themselves where they are not wanted”. Similar to the attraction statements, these statements were also rated on a 5-point Likert scale. The old-fashioned racism scale tapped the dimension of overt racism, whereas the modern racism scale measured the more subtle form of racism.

Procedure

Each session took approximately 30 minutes to complete. Participants were randomly assigned into one of three skin tone conditions: lightened, original, or darkened. All four pictures (An African-American male, an African-American female, a Caucasian male, and a Caucasian female) were presented in each condition. Participants in each condition also received a packet including the demographic questions, the pictures and attractiveness statements, and the racism measurement scales.

There was a “rigid instruction sheet” between the pictures and attractiveness statements and the racism measurement scales asking participants to stop and wait for further instruction. Participants were told that the next section was to be used for a different study and was not related to their facial photograph ratings. This was necessary because if the participants discovered the true nature of the experiment at the time of completing the racism measurement scale, they could have returned to their attractiveness ratings to change their answers to reflect a less racist attitude. Placing the rigid instruction sheet between the two sections allowed for easy observation of this action and allowed for the opportunity to eliminate faulty data. After completion of the experiment, participants were debriefed and thanked for their participation.
The Effect of Skin-Tone
McDermott and Pettijohn

Results
Since only four of the participants were non-Caucasian, participant race could not be analyzed and these four responses were removed from the data set. A 3 (skin-tone: light, original, and dark) x 4 (model: Caucasian male, Caucasian female, African-American male, and African-American female) mixed factors ANOVA was conducted to determine if there was a statistically significant difference in attractiveness ratings. There was a significant main effect for the within factor of model, F(3, 66)=9.05, p<.001, η²=.12, no main effect for the between factor of skin-tone, F(2, 67)=1.08, p=ns, and a significant interaction effect, F(6, 66)=3.05, p<.01, η²=.08 (see Figure).

Individual t-test comparisons revealed that the lightened and darkened versions of the Caucasian female models (M=4.0 and 4.21, SD=.63 and .66, respectively), the Caucasian male models (M=3.50 and 3.63, SD=.98 and .97, respectively), the African-American female models (M=3.46 and .91 and .98, respectively), and the African-American male models (M=2.92 and 3.38, SD=.98 and .92, respectively) were not statistically different, all ps>.10. However, the Caucasian models were rated as significantly more attractive than the African-American models overall, t(69)=4.64, p<.001, d=1.12, (M=3.78 and 3.37, SD=.59 and .78, respectively).

Old-fashioned and modern racism scores were calculated and correlated with attractiveness ratings. African-American model attractiveness ratings overall were negatively correlated with old-fashioned racism scores (r(68)=-.39, p=.001) as well as modern racism scores (r(68)=-.30, p=.01), indicating that lower racism scores were associated with higher attractiveness scores for the African-American models.

Discussion
Support for the hypotheses presented in the current study was mixed. The prediction that Caucasian models overall would be rated as significantly more attractive than the African-American models and the prediction of significant negative correlations between racism scores and attractiveness ratings of the African-American photographs was found. A same-race attractiveness bias still exists and Caucasian college students who are more prejudice are less likely to rate African-Americans as attractive. However, we did not find support for the prediction that African-American models with a lightened skin-tone and Caucasian models with a darkened skin-tone would be rated most attractive. However, when just looking at the pattern of the means, the African-American female with lightened skin-tone and the Caucasian female with darkened-skin tone were rated most attractive. Perhaps skin-tone differences are especially relevant when judging female attractiveness (Hill, 2002; Thompson & Keith, 2001). In addition, the various levels of skin-tone used may have appeared unnatural to the participants affecting their attractiveness toward certain photographs. We wanted the levels of skin-tone to be noticeably different but if smaller increments were used the pictures may seem more natural and attractive to participants.

Another possible explanation for findings is the topic of averageness. In previous studies on facial averageness (Jones, Little, Feinberg, Penton-Voak, Tiddeman, & Perrett, 2004; Valentine, Darling, & Donnelly, 2004) the symmetry and averageness of an individual’s face result in that face being considered more attractive than other, non-symmetrical faces. It is possible that this concept of averageness translates across different aspects of the human body and is not restricted to facial appearance. Perhaps this concept of averageness is also applicable to skin-tone in that people may be most attracted to average levels of everything on another person. This could explain our lack of significant skin-tone differences. In fact, the original skin-tone of the male models was rated as more attractive than the lightened or darkened versions.

Another topic of study that contributes to an understanding of visual perceptions and their affect on peoples’ opinions of one another is the topic of averageness. In these studies on facial averageness, (Jones, Little, Feinberg, Penton-Voak, Tiddeman, & Perrett, 2004; Valentine, Darling, & Donnelly, 2004) the symmetry and averageness of an individual’s face

Mean Model Attractiveness Ratings by Skin-Tone and Model Type. Attractiveness ratings were made using a 5-point Likert scale where larger values indicate greater agreement that the individual was attractive.
result in that face being considered more attractive than other, non-symmetrical faces. It is possible that this concept of averageness translates across different aspects of the human body and is not restricted to facial appearance. Perhaps this concept of averageness is also applicable to skin-tone in that people may be most attracted to average levels of everything on another person.

There are several aspects of this study that can be replicated and expanded in future investigations. The current sample was not diverse. As previously stated, there were no African-American participants in the study, so we were unable to examine how African-Americans viewed different skin-tones and whether their racial attitudes were related to attractiveness ratings. Future studies may also consider skin-tone variations in other races, such as Hispanics or Asians. It may also be beneficial to examine a similar relationship between attractiveness ratings, skin-tone levels, and prejudice levels when using facial composites and color pictures instead of individual pictures and grayscale pictures. Facial composites would provide the pictures with a base of attractiveness which would further implicate that any change in attractiveness rating must be due to skin-tone since, based on previous research, pictures of facial composites are often considered extremely attractive (Langlois & Roggman, 1990). It may also be advantageous to conduct this study using color pictures, or with live models, since these stimuli are more realistic.

The purpose of this research was to better understand the relationship between peoples’ perceptions of others and how they are affected by their perceptions. This experiment lays the groundwork for further experimentation methods that lead to an enhanced understanding of the relationship between personal perception and personal judgment of attractiveness. It also serves as a stepping stone to understanding prejudice. In order to fix a problem the source of that problem must be identified. Sadly, it is evident that discrimination is still prevalent in today’s society. People constantly judge each other in their first impressions of one another whether that judgment is based on gender, race, skin-tone level, or other visual factors. Once an initial judgment is made people blur the line between stereotypes and individual characteristics. Once prejudice is better understood, in terms of why it happens, what happens, when it happens, and how it happens, then it will become easier to stop peoples’ personal prejudices.

References

Preferred Music Genre: The Influence of Major Personality Factors

Personality traits and musical preferences were obtained and analyzed using the IPIP Five Factor Inventory from Buchanan (2001) and questions regarding preferred musical characteristics similar to those used in a study by Schwartz (2004). The goal was to see if certain types of people (in regard to personality) prefer certain types of music. In addition, Sensation Seeking as defined by Zuckerman (1979) was used as another facet of personality and as a second independent variable. There were 170 students surveyed. Significant main effects were found for Sensation Seeking and Openness to experience, meaning that participants higher in these characteristics tended to prefer harder forms of music.

Adolescents have spent over 10,000 hours listening to music by the time they finish middle and high school. Adults too can cause a 25,000-seat concert arena to sell out in a matter of minutes (Schwartz, 2004). Music is obviously an important part of the lives of human beings. Music helps people, especially adolescents, validate their feelings and comforts them with the affirmation that they are not emotionally alone (Schwartz, 2004). From this notion, much research has been done on psychological reactions to certain types of music-from changes in heart rate, facial expressions, and respiration to changes in emotional states and behavior (Nater, Krebs, & Ehlert, 2005; Weisskirch & Murphy, 2004; Schwartz, 2004; Ravaja & Kallinen, 2004). However, there is substantially less research on whether people with certain psychological traits tend to prefer certain types of music. This study used the five-factor model of personality to examine this concept.

The five-factor model was originally developed from the major themes that recur in personality descriptors in both natural languages and scientific theories. Costa & McCrae (1992) believed that personality should “begin at the top and work down”. They identified the broadest possible domains of traits from these recurring themes and then analyzed each to identify the most important/useful traits to measure which were later organized into 30 facets. This research led to the development of the NEO Personality Inventory (NEO-PI). The five domains, Neuroticism (N), Extraversion (E), Openness to experience (O), Conscientiousness (C), and Agreeableness (A), have shown consistent reliability and validity. In fact, it is one of the few instruments that has demonstrated that it does measure enduring dispositions (by self-report or ratings of spouses/peers). A longitudinal study lasting six years was conducted on the N, E, and O scales. This study showed stability coefficients ranging from .68 to .83 in both inventories that were filled out by the participant and inventories that were filled out by the spouse (about the participant). A similar longitudinal study lasting seven years assessed peer ratings and found stability coefficients ranging from .63 to .81 for the five domain scales, with the acceptable range being .30 - 1.00 (Costa & McCrae, 1992). Through extensive comparisons with other psychological tools such as the State-Trait Personality Inventory (STPI), the Personality Research Form (PRF), and the Minnesota Multiphasic Personality Inventory (MMPI), statistically significant correlations have been
found to demonstrate the convergent and discriminant validity of the NEO-PI with $r$ values for all 30 facets ranging from .45-.68 (STPI), .32-.71 (PRF), and .54-.66 (MMPI) (Costa & McCrae, 1992). In this way, it measures what it intends to measure by showing commonalities where there should be and differences where they actually occur. The NEO-PI with its reliable and valid five factors, or domains, will serve this experiment well when combined with questions about musical preference.

“Sensation Seeking” has also previously been found to correlate with some of these personality and music preference variables and was investigated in this study as well. Sensation Seeking was described by Zuckerman (1990, as cited in McNamara & Ballard, 1999) as a “trait characterized by the need for ‘varied, novel, and complex sensations and experiences, and the willingness to take physical and social risks for the sake of such experiences’” (p. 313). Sensation Seeking relates to both Extraversion (being assertive and excitement-seeking) and Openness to experience (being creative and enjoying change) in that high sensation seekers tend to display four sets of characteristics in their search for optimal arousal: thrill and adventure seeking, experience seeking, disinhibition, and susceptibility to boredom (Weisskirch & Murphy, 2004; McNamara & Ballard, 1999; Weiten, 2004; Loas, Verrier, & Flament, 2001). Expanding on this relationship, Kopacz and Malgorzata (2005) conducted a study that combined these three variables and found that Openness to experience, Extraversion, and Sensation Seeking are associated with stronger musical preferences. Rawlings’s findings (2003) suggested that this is due to the “emotion-inducing” qualities of music, further emphasizing that people use music for emotional validation and comfort. This explains why multiple studies have found “hard rock” music to be strongly correlated to Openness to experience and Sensation Seeking (Rawlings, Vidal, & Furnham, 2000; Weisskirch & Murphy, 2004). The qualities of this type of music (and more recently punk) most effectively validate the emotions that more open, extraverted people experience. Nater, Krebs, and Ehlert (2005) agree. They found that Sensation Seeking was indeed associated with the psychological experience of aggressive and arousing music. This psychological connection is the basis for making Sensation Seeking a second independent variable in the current study.

In another study by McManus and Furnham (2006), Openness to experience was also associated with enjoyment of and involvement in aesthetic activities such as reading, drawing, painting, and listening to music. This suggests that people who are more open to experience are likely to be more expressive in their music preference. For example, someone scoring high on the Openness (O) domain would more than likely prefer music that was highly emotional with very descriptive lyrics. Their study also suggested that people with Agreeableness and Conscientiousness traits were likely to choose less expressive music (less emotional, very concrete thoughts and ideas) and be less actively involved. This is supported by a positive correlation that exists between creative personality traits and musical experience, forming yet more foundation for the study at hand (Goncy & Waehler, 2006).

These foundations led to the hypothesis for this study that participants higher on the E and O domains would be higher in Sensation Seeking and prefer harder forms of music such as heavy metal, hard rock, and rap. Extraverts have been associated with choosing music characterized by strong rhythms, dissonant harmonies, and fast tempo which not only correlates with harder forms of music but has correlations with the types of music sensation seekers prefer as well (Rawlings, Vidal, & Furnham, 2000). High sensation seekers tend to prefer music that is intense, emotional, complex, loud, and dissonant (Weisskirch & Murphy, 2004; Schwartz, 2004). People with higher scores on the E and O domains and Sensation Seeking scales have indeed been found to prefer music genres like heavy metal, punk, grunge, electronic jazz, techno, and hard rock presumably because these genres provide the arousal that they seek (Rawlings, Vidal, & Furnham, 2000; Weisskirch & Murphy, 2004; McNamara & Ballard, 1999). Similar results were expected in this study.

**Method**

**Participants**

Participants were 170 students from a liberal arts university in the southeastern United States participated. However, four participants had incomplete surveys so the total number of participants was 166. There were 97 females and 73 males ranging from 18 to 24 years old. The survey was given in five sections of a Basic Psychology class. This course is a general education requirement and therefore yielded the most diverse group of participants possible. They were also told a day or two in advance about the study in an attempt to obtain maximum attendance for the study.

**Materials**

A consent form, which was approved by the Ethics in Human Research Committee, was administered before the experiment. It informed the participants about the purpose of the study and let them know that they could refuse to participate at any time. The demographics portion of the survey asked participants
to record their age, gender, race, and academic major. Participants were also asked to rate their present mood on a scale from 1 = very bad to 7 = very good.

Personality was measured using a shortened version of the NEO Personality Inventory (NEO-PI) called the IPPI Five Factor Personality Inventory (Costa & McCrae, 1992; Murray, Rawlings, Allen, & Trinder, 2003; Buchanan, 2001). This is a 41-item inventory that measures the five factors N, E, O, C, and A. Each of these factors is defined in Appendix A (Formy-Duval, Williams, Patterson, & Fogle, 1995). The NEO-PI has shown good internal consistency (values for N, E, O, A, and C being .87, .80, .77, .75, and .85) as well as acceptable test-retest reliability (values ranging from .80 to .87 across all five domains at six months and .62 to .79 at 30 months) (Murray et al., 2003). The IPPI Inventory has shown similar reliability scores: .74, .84, .88, .76, and .83 for O, C, E, A, and N domains, respectively (Buchanan, 2001). This tool was created to assess the five domains of the Five-Factor Model based on the IPPI inventory developed by Goldberg (1999). The reasoning behind selecting this tool was that it addresses the same domain constructs as the NEO-PI, but is shorter and much more practical. The NEO-PI is a 240-item inventory and the IPPI is only 41-items. Length can become a confound if participants get bored or become apathetic with a survey that is too long. Time constraint is also an issue in a college classroom. This was taken into consideration when choosing the IPPI inventory.

Sensation Seeking (SS) was measured using the “Interest and Preference Questionnaire” developed by Zuckerman (1979). This is a 40-item inventory developed to measure individual differences in stimulation and arousal needs. The reliability and construct validity for this tool has been well established (Loas, et al., 2001). In a study by Roberti, Storch, and Bravata (2003), correlations with a similar Sensation Seeking scale (The Zuckerman-Kuhlman Personality Questionnaire - Impulsive Sensation Seeking Subscale) ranged from .43 to .61.

Musical preference was determined using a similar method to that used by Schwartz (2004). All of the previously mentioned studies defined music preference as genre when doing their research (i.e. Rock, Hip-Hop, Pop, etc.). However, this study focused on the characteristics of the music as the dependent variable in a similar manner as Schwartz. In her study, instead of simply asking the participants to list their favorite types of music, the questions asked about specific qualities of music that they preferred. The qualities used in this study are defined in Appendix B (Schwartz, 2004; Weisskirch & Murphy, 2004; Werner, Swope, & Heide, 2006). In addition to these questions, the current survey also asked which genres they liked the most for further clarification in data analysis. Using both the qualities of the music and the genres helped to minimize variance due to differences in participants’ definitions of specific music genres. The genres used in the questionnaire were Pop, Hard Rock, Easy-listening, Heavy Metal, Oldies, Punk, Gospel, Electronic/Dance, Jazz, Rap, Country, and Alternative. Rawlings, Vidal, and Furnham’s (2000) findings show that this portion of the survey should be reliable. In their study, the category participants said they preferred and then heard was strongly correlated. For example, if the student specified that they preferred Blues music, they were also more likely to be able to identify Blues music accurately when an excerpt was played for them.

**Design and Procedure**

The independent variables for this study were personality traits (Extraversion and Openness to experience) and Sensation Seeking. This study was a 3 X 3 factorial design. Personality had 3 levels (High, Medium, or Low overall scores). Sensation Seeking had 3 levels (High, Medium, and Low). The dependent variable was musical preference.

The consent form was administered first, followed by the surveys. The surveys began with the demographics portion. The order of the 3 sections of the survey (Personality, Sensation Seeking, and Music Preference) was counterbalanced using all possible orders to avoid any confounds that may have resulted from one consistent order. The participants were told to be honest because it was anonymous. They were assured that there were no right or wrong answers because the purpose was simply to observe different personality types and musical preferences. After completing the survey, the participants were allowed to ask any questions they might have had pertaining to the study and were thanked for their cooperation.

**Scoring**

Personality was scored using the IPPI Scoring Key (Buchanan, 2001). The survey used a five-point Likert scale ranging from very accurate (5) to very inaccurate (1). The scores for each of the questions associated with E and O factors were added together to form a score for an E/O (Extraversion/Openness to Experience) personality variable. There were seven Openness questions and nine Extraversion questions for a total of 16 E/O loaded items. E/O scores ranged from 28 to 72 and were labeled as High, Medium, or Low by adding or subtracting one standard deviation (SD=7.33) from the mean (M=54.33). These were the
three levels (High > 61; Medium = 60-48; Low < 47) used to compare to the musical preference scores.

Sensation Seeking was scored using the method developed by Zuckerman (1979). The total number of points possible then was 40. Once calculated, these scores were labeled Low (0-15), Medium (16-24), or High (25+). They were then able to be compared to the personality and musical preference scores.

For the musical preference part of the survey, the participants were asked to rate each quality and genre using a 5-point Likert scale, ranging from strongly like (5) to strongly dislike (1). The scores were obtained by adding up the numbers circled. However, the questions that correspond with the lighter forms of music were reversed-scored (where 1=5, 2=4, 3=3, 4=2, 5=1). These questions alternated with the heavier music questions and are bolded in Appendix C. Scores ranged from 48 to 102. Lower scores indicated a preference for lighter forms of music and higher scores indicated a preference for heavier forms of music.

Results

A Pearson product-moment correlation coefficient analysis revealed significant positive relationships between Music Preference and Sensation Seeking, \( r(168) = .44, p < .05 \), Music Preference and E/O \( r(168) = .23, p < .05 \), and between Sensation Seeking and E/O, \( r(168) = .39, p < .05 \). There were no significant correlations between any of the demographics and Music Preference (See Table 1). A 3 X 3 between-subjects ANOVA was conducted first with music preference as the dependent variable, and Sensation Seeking (high, medium, low) and E/O (high, medium, low) as the independent variables. The results indicated that there was a significant main effect for sensation seeking, \( F(2, 157) = 5.04, p < .05 \), partial eta-square = .07, with those High (\( M=78.70, SD=9.81 \)), Medium (\( M=73.58, SD=9.41 \)), and Low (\( M=67.92, SD=9.52 \)) sensation seekers all scoring significantly different from each other on their music preferences, as indicated by a Tukey’s post hoc test. There was no significant main effect for E/O, \( F(2, 157) = .57, p > .05 \). However, an interesting pattern was observed in the E/O variable data. For example, two participants with a similar E/O score could actually be very different. One could have had a high Extraversion (E) score and a low Openness to experience (O) score and the other could have had a high O score and a low E score, balancing out to similar EO scores. With the E/O scores alone, results could be inaccurately interpreted. A high E/O score would not necessarily mean the participant would have both a high E score and a high O score. In this study, two participants had an E/O score of 58. This would lead to an interpretation that they were similarly high in both Extraversion and Openness to Experience. Yet, one participant had an E score of 42 and an O score of 16, and the other participant had an E score of 28 and an O score of 30. Not only were the second participant’s E and O scores closer to each other, but they were also higher in Openness to Experience. The first participant, conversely, was much higher in Extraversion. Therefore, the E/O scores together may not reveal precise information about the participant’s personality. Because of this observed pattern, the scores were then separated for further analysis. After running another between-subjects ANOVA with the E/0 scores separated into and E variable and an O variable, there was a significant

| TABLE 1 |

<table>
<thead>
<tr>
<th>Correlations Between All Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Music</strong></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Music</td>
</tr>
<tr>
<td>Mood</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Race</td>
</tr>
<tr>
<td>Major</td>
</tr>
<tr>
<td>SS</td>
</tr>
<tr>
<td>E/O</td>
</tr>
<tr>
<td>O</td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level
* Correlation is significant at the .05 level
main effect for Openness to experience, $F(2, 157) = 5.04$, $p < .05$, partial eta-square = .06, with those scoring High ($M=77$, $SD=10.55$) in Openness scoring significantly higher in music preference than those in the Medium ($M=71.47$, $SD=9.39$) and Low ($M=70.99$, $SD=10.46$) groups. There was no significant main effect for Extraversion, $F(2, 157) = 1.18$, $p > .05$, unless the interval between the High, Medium, and Low groups is made significantly larger. However, this made the High and Low groups contain too few participants ($N=15$) and the Medium group contain too many ($N=138$). There were no significant interactions. Overall, those participants higher in Sensation Seeking and Openness to experience indicated a preference for harder forms of music.

**Discussion**

The purpose of this study was to see if there is a relationship between personality characteristics and the types of music people prefer. Previous research had shown a positive correlation between music preference and Sensation Seeking, which is one such personality characteristic (Rawlings, Vidal, & Furnham, 2000; Weisskirch & Murphy, 2004; McNamara & Ballard, 1999; Nater, Krebs, & Ehler, 2005; Kopacz and Malgorzata, 2005; Rawlings, et al., 2003). Similar results were expected and obtained here. Participants scoring higher on the Sensation Seeking Scale tended to also prefer harder forms of music, and lower sensation seekers tended to prefer softer forms of music. Moreover, this study also looked at the Big Five personality characteristics, more specifically Extraversion and Openness to experience. These characteristics were also expected to positively correlate with music preference, but the data only supported this hypothesis for Openness to experience.

To expand on these results, it is recommended that similar research be conducted with other personality characteristics. There are many facets to human personality and the Big Five (specifically E & O) is just one method of measuring them. In addition, the facets researched here were measured using a fairly new tool, the IPIP Five Factor Personality Inventory (Costa & McCrae, 1992; Murray, Rawlings, Allen, & Trinder, 2003; Buchanan, 2001). Perhaps, with a more reliable, well-established tool (i.e. the NEO-FFI), more generalizable results could be obtained. These tools, however, are very difficult and expensive to acquire. As with any survey, the honesty of participants should be taken into consideration when interpreting the results. The participants could have felt uncomfortable or insecure about answering some of the questions honestly. For example, some questions on the Sensation Seeking Inventory addressed relatively sensitive material such as drug use and sexual orientation. This can affect the results as well.

The effect size here suggests that the independent variable of Sensation Seeking only accounts for 7% of the total variance of the dependent variable (music preference) and the independent variable of Openness to Experience only accounts for 6% of the total variance of music preference. This could be improved in additional research by increasing the diversity and total number of participants. In this study, gender, age, race, and major could have varied more. There were more females ($N=97$) than males ($N=73$) and most participants were white ($N=148$) compared to all other races represented ($N=21$). The age range was also only from 18 to 24 with a mean of 18.75. The majority of participants were 18 or 19 years old (accounting for 83.5% of all participants). While this is applicable to Sensation Seeking because of Zuckerman’s claim that the 20’s are associated with highest Sensation Seeking, in order to better test the hypothesis, a more diverse age range would be necessary (Zuckerman, 1990). In addition, most participants were Education or Biology majors (28.8% and 12.4%, respectively). However, age, gender, race, major, and mood did not reach significant correlations with music preference or personality variables- not significantly impacting the results found here.

With further research, these results could be applicable in multiple areas. One potential application would be in helping very high sensation seekers. As previously stated, high Sensation Seeking is often associated with dangerous and irresponsible behaviors. They are willing to take physical and social risks to reach the optimal level of sensation they seek. The results here indicate that the qualities of harder forms of music do seem to validate the emotions higher sensation seekers feel. They prefer to listen to it. Music, then, could be very useful in helping high sensation seekers deal with these desires in more safe and prosocial ways by giving them a better outlet. This also can lead to a Music Therapy application. Knowing that there is a correlation between some personality characteristics and music preference could certainly benefit the music therapist. Again, more personality characteristics would need to be added to this research to have even more applicable pertinence. Adding more music genres could also be beneficial. Recent research has begun to include even more genres in music preference/response research (Lipscomb & Mazzola, 2007; Hegde & Rao, 2007). This can only increase the knowledge obtained about the types of music people prefer and why they prefer it. Recent research has also introduced a new area for music application, learning. Several of these studies suggest...
that music can help with increasing memory and improving cognitive performance (Rickard, Vasquez, Toukhssat, & Murphy, 2007; Jungers, 2007). If the type of music that emotionally validates the person could be identified, perhaps the desired effects could even be improved. Speculatively, trying to use music that the person does not prefer could hinder the cognitive effects. The last potential application could be aiding neuromuscular function. Chen, Penhue, and Zatorre (2007) have suggested that music can help physically (as well as emotionally). The rhythm or beat of the music has potential to help the brain reconnect to performing muscular functions (i.e. tapping the foot, clapping the hands, etc.). Again, knowing something about the type of music that helps the person emotionally could possibly help them physically as well. It is clear, more research needs to be done to get closer to determining whether certain types of people prefer certain types of music, and to be able to use this information effectively. The results obtained here provide a basis for more such research.

References


### APPENDIX A

NEO Five Factor Inventory: Five Factors Defined

<table>
<thead>
<tr>
<th>Factor</th>
<th>Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion</td>
<td>gregariousness, assertiveness, activity, excitement-seeking, positive emotions, warmth</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>trust, altruism, compliance, modesty, straightforwardness</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>competence, order, dutifulness, achievement-striving, self-discipline</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>anxiety, angry hostility, depression, self-consciousness, impulsiveness</td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>imaginative, creative, artistic, original, non-traditional values, appreciation of knowledge</td>
</tr>
</tbody>
</table>

### APPENDIX B

Musical Questionnaire: Characteristics

<table>
<thead>
<tr>
<th>Genres</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softer</td>
<td></td>
</tr>
<tr>
<td>Pop, Easy-listening, Oldies,</td>
<td>romantic and dreamy, mild and quiet, sad and gloomy,</td>
</tr>
<tr>
<td>Gospel, Jazz, and Country</td>
<td>peaceful and relaxing, soft and tender, serious and thoughtful, good-natured and kind</td>
</tr>
<tr>
<td>Harder</td>
<td></td>
</tr>
<tr>
<td>Hard Rock, Heavy Metal, Punk,</td>
<td>wild and violent, upsetting and protesting, tough and hard,</td>
</tr>
<tr>
<td>Electronic/Dance, Rap, and Alternative</td>
<td>loud and played at a great volume, played with many guitars/drums, played at a fast tempo</td>
</tr>
</tbody>
</table>
## APPENDIX C

### Music Preference Questionnaire

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I like music that is romantic and dreamy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I like music that is wild and violent.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I like music that is mild and quiet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I like music that is upsetting and protesting.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I like music that is sad and gloomy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I like music that is tough and hard.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I like music that is peaceful and relaxing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>I like music that is loud and played at a great volume.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I like music that is soft and tender.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>I like music that is played with many guitars/drums.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>I like music that is serious and thoughtful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I like music that is played at a fast tempo.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>I like music that is good natured and kind.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>I like Hard Rock music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>I like Pop music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>I like Heavy Metal music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>I like Easy Listening music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>I like Punk music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>I like Oldies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>I like Electronic/Dance music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>I like Gospel music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>I like Rap music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>I like Jazz music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24</td>
<td>I like Alternative music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>I like Country music.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
The Effect of Odor Familiarity on Context-Dependent Memory

Howard C. Levin
Julia F. Heberle
Albright College

Does familiarity of an odor, controlling for appropriateness, have an effect on odor-based context-dependent memory (CDM). Context-dependent memory is the enhancement of memory due to matching contextual cues in encoding and recall situations. This study separates two aspects of the Cue Distinctiveness Principle, familiarity and context appropriateness. College students were asked to learn and recall a list of words in either matching or non-matching conditions under a novel or familiar odor. The results did not show a significant CDM effect. Therefore, the familiarity component of the cue distinctiveness principle is not an adequate explanation for the mixed results of prior odor-based CDM research and thus context appropriateness, not familiarity, may carry the entire explanatory weight of odor-based CDM effects.

One of the central questions in memory research is what effect the environmental context has on memory. Many studies have shown that contextual cues in the environment help people to recall information. The context-dependent memory (CDM) effect is a class of phenomenon best described as when information learned in a particular context better recalled when the context is the same as that in which it is learned. The prevailing theory behind context-dependent memory is the encoding specificity principle which states that the recollection of an event occurs if and only if properties of the event to be recalled are similar to the properties of the retrieval information (Tulving, 1983). Godden and Baddeley (1975) demonstrated the CDM effect in the natural environment when they had participants learn words on land and underwater. Their research showed that recall of information was better when the contexts of encoding and recall matched.

While Godden and Baddeley demonstrated that a change in overall environmental context leads to CDM effects, other researchers have examined more specific sensory modalities of information encoding that can contribute to CDM. Their experiment examined the differences in noise levels of study conditions compared to test conditions. Participants learned information in both noisy and silent conditions and recalled the information in matching and mismatching conditions. Results showed that the information was best recalled when the noise level was the same as when the information was learned.

While there have been many studies performed examining visual and auditory CDM effects, there has been limited research on the contributions of odor to CDM. Furthermore, the research that has been performed on odor-based CDM has shown mixed results. Smith, Standing and De Man (1992) showed support for odor as a contextual cue in the recall of information. Their study compared two odors, jasmine incense and ‘Lauren’ perfume by Ralph Lauren in a CDM matching/nonmatching design with undergraduates. Their results showed that recall was highest when

Author Note. This project was completed as a portion of the undergraduate honors thesis of the first author under the supervision of the second author.

Correspondence concerning this article should be addressed to Julia F. Heberle, P.O. Box 15254, Albright College, Reading, PA 19612.
learning and testing occurred in the same-odor environment compared to different-odor environments. Bjork and Richardson-Klavehn (1989) report two odor CDM studies with adults that failed to show an effect. Rubin, Fagen, and Carroll (1998), initially failed to find an odor-based context-dependent effect. They tested whether infants learning to kick to control the movement of an overhead mobile would show better retention of knowledge when learning and testing took place in the same or different odor environments. They concluded that context-dependent effects did not occur due to the infants’ detection of the novel odor at testing, which may have distracted the infants and therefore caused the lack of retention. Their later studies (Schoers, Prigot, & Fagen, 2007) using food related odors did show odor-based CDM effects. The difference in results could be due to the different populations tested (infants versus college students), differences in the type of task used to test for recall, or type of odors used. The mixed findings indicate that more research is justified to determine whether odor plays a role in CDM.

The mixed results of odor-based CDM research have led researchers to question why the effect appears in some studies while others have failed to find an effect. The explanations tend to focus on more theoretically based ideas rather than the specific details of experimental methodology and stimuli. One explanation for the mixed results is the idea of cue distinctiveness (Herz, 1997). Herz (1997) hypothesized that distinct odors will facilitate memory better than ordinary odors and therefore contribute more to CDM effects. Herz defined an odor as distinct if it is novel and/or if it is inappropriate to the environmental context. The study used three odors: osmanthus (an Asian, floral-fruity scent), peppermint, and fresh pine, as well as a no-odor control condition. The odors were dispersed throughout the laboratory. Osmanthus was considered a novel, inappropriate odor, peppermint was a familiar, appropriate odor, and clean fresh pine was a familiar, appropriate odor within a psychology laboratory. Therefore, the osmanthus odor was considered the most distinct while the pine odor was considered the least distinct. There was a significant CDM effect found for the osmanthus odor, a small effect found for the peppermint, and no effect found for the pine odor indicating that odors need to be distinct to contribute to CDM effects.

While Herz’s study shows a CDM effect, the odors used confound novelty and appropriateness which are two aspects of the cue distinctiveness principle. It is not clear from the results reported that the recall rates are a function of appropriateness or novelty or both. The current study attempts to disentangle these aspects by examining only one part of the cue distinctiveness principle, the novelty of an odor in relation to CDM. According to the cue distinctiveness principle, a novel odor should contribute more to CDM effects than a familiar odor. Separating novelty from appropriateness may help to explain the mixed results of odor-based CDM research, at least for adult participants. Therefore, a novel odor present during both the encoding and recall of newly learned information should allow for the greatest enhancement of encoding and recall, and therefore the largest CDM effect when encoding and recall odors match.

**Method**

**Participants**

The participants in this study were 48 undergraduate students enrolled in four different psychology lab courses at a small liberal arts college. Each lab session met in the same room at the same time on different days of the week (Monday-Thursday). The participants ranged from 18 to 23 years of age. They were offered extra credit in their psychology course for participation in the study. None of the participants reported any adverse reactions from being exposed to the odors used in the study.

**Materials**

A word list containing 25 common, concrete, semantically unrelated, and affectively neutral English words (19 nouns, 6 verbs) were selected from the Brown and Ure (1969) to-be-remembered items list (see Appendix). The two odors used in this experiment were pure essential oils from a commercial aromatherapy collection, Eucalyptus Globulus (novel) and Orange Citrus Sinensis (familiar). The odors were both considered inappropriate (that is, unusual or unexpected) in the context of a psychology laboratory. The odors were dispersed throughout the laboratory using a commercially available odorizer plug-in fan set on the highest level of intensity. The laboratory used was a standard computer lab (16’ x 32’) with two windows, carpeting, and adequate ventilation for odor clearing between conditions.

**Design**

All students in each of the four laboratory sections were randomly assigned to one of the following four conditions corresponding to the odor present during the learning and recall sessions: novel-novel (NN), novel-familiar (NF), familiar-familiar (FF), and familiar-novel (FN). The matching conditions were the NN and FF conditions, while the non-matching conditions were the NF and FN conditions. The odor present during the learning session and the matching/non-matching
condition were manipulated in a 2 x 2 between-subjects factorial design. The number of participants in each treatment condition was 13 (NN), 13 (NF), 14 (FF), and 8 (FN), differences resulting from actual enrollment in each laboratory section.

Procedure

The same procedure was used for each of the four treatment conditions. Thirty minutes before each lab session, the plug-in fan containing either the novel or familiar odor was inserted into the wall allowing the odor to diffuse throughout the classroom. The windows in the classroom were closed to ensure containment of the odor in the room. The learning or recall session began an hour after the start of the lab session to give sufficient time for the students to become acclimated to the environmental context. The experimenter introduced himself to the participants and asked them to read and sign an informed consent form. The participants were given the word list and instructed that they had 10 minutes to study the list. After 10 minutes, the word lists were removed and the participants were instructed to not discuss the list. They were told that the experiment would conclude the following week with a recall session.

The next week, the room was set-up with the familiar or novel odor and the recall session began an hour into the lab. The participants were re-introduced to the experimenter and given 10 minutes to recall and write down as many words from the list as possible. After 10 minutes, the experimenter asked participants to write down whether the room smelled the same during the recent session as in the prior session, and to rate the familiarity of the odors during both sessions on a 5 point scale. The experimenter collected the participants’ lists and debriefed the participants.

Results

A 2 (odor type: familiar, novel) x 2 (context: matching, nonmatching) factorial ANOVA was used to analyze the data and determine whether context-dependent effects were present and whether there was an effect of odor familiarity on context-dependent memory. The dependent variable was the number of words correctly recalled from the word list. We hypothesized that the participants in the matching conditions would do significantly better than those in the non-matching conditions and that there would be an interaction of familiarity of the odor with the matching/non-matching condition. The mean number of words recalled and standard deviation in each condition are presented in Table 1. The results of the 2 x 2 ANOVA showed no significant main effect for the context factor, $F(1,44) = .021$, $p = 0.884$ and no interaction between the context factor and odor present during the learning condition, $F(1,20) = .515$, $p = 0.477$. However, there was a main effect of odor type present during the learning condition approaching significance $F(1,44) = 2.654$, $p = 0.098$, indicating that the number of words recalled was higher for the novel odor conditions. These results indicate that while the familiarity of the odor during learning did have an effect on the number of words recalled, there was no context-dependent memory effect.

Discussion

The purpose of this study was to examine odor-based CDM and determine whether the familiarity of an odor (separate from the odor’s context appropriateness) contributes to this effect. If odor-based context-dependent memory is dependent on the familiarity of an odor, then the novel-novel odor condition should have showed the greatest recall of words, followed by the familiar-familiar condition, and the non-matching conditions.

The results of the study failed to show a significant CDM effect for both the novel and familiar odor, thereby adding to the mixed results of odor-based CDM research. While there was no significant effect found, the results indicated that memory was enhanced.

<table>
<thead>
<tr>
<th>TABLE 1</th>
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<tr>
<td><strong>Mean Number of Words Recalled by Context (Matching vs. Non-Matching) as a Function of Odor Type Present During Learning</strong></td>
</tr>
<tr>
<td>Mean</td>
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<tr>
<td>Learning Condition Odor</td>
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<tr>
<td>Novel Odor</td>
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<tr>
<td>Familiar Odor</td>
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When a novel odor was present during the encoding session. This result is supported by the Rescorla-Wagner model of learning which explains that the associative value of a stimulus is proportional to the surprisingness of the stimulus (Rescorla & Wagner, 1972; Domjan, 2003, p. 113). Therefore, a novel odor should lead to a greater number of words being recalled than a familiar odor.

While the novel odor enhanced the encoding of information, its reinstatement during the retrieval session did not lead to a CDM effect. Therefore, the cue distinctiveness principle failed to adequately explain the lack of a CDM effect in this study. It should be noted that Herz (1997) found that odor cue distinctiveness is determined more by the odor's contextual appropriateness than by its familiarity. Since both of these odors were considered inappropriate to the environmental context, Herz may have considered both of these odors to be relatively distinct. However, even if both odors were considered distinct we would still expect to find a CDM effect according to the cue distinctiveness principle.

Another suggestion proposed by Laird (1935) to explain the mixed results of odor-based CDM is that an odor works best as a retrieval cue if the related event is emotional (as cited in Smith et al., 1992). The current study used a word list containing 25 affectively neutral English words from the Brown and Ure (1969) to-be-remembered items list. Since no CDM effect was found, the current study supports the idea that words need to be emotion inducing for an odor-based CDM effect to exist.

While this study focused specifically on odor-based CDM, the general research on physical reinstatement CDM studies may help us to explain the mixed results in this area of research. A meta-analysis performed by Smith and Vela (2001) has found that while incidental environmental CDM exists, there are factors that might explain why the CDM effect has been difficult to produce in the laboratory. Their meta-analysis of 75 CDM studies has found support for two major hypotheses that have been proposed to explain the mixed results of CDM research, the mental reinstatement and outshining hypotheses. The mental reinstatement hypothesis suggests that mental reinstatement of an environmental context at the time of testing may evoke memories of events experienced in the original context (Smith & Vela, 2001). Therefore, participants in the mismatching odor conditions may have mentally reinstated the original environmental context helping them to recall just as many words as participants in the matching odor conditions. The outshining hypothesis proposes that environmental cues can be suppressed at test due to stronger associative cues outshining the cues provided by the environmental context. This hypothesis suggests that the odor cues in the environmental context may have been suppressed due to other associative cues that were present during both the learning and recall sessions. Unfortunately, the meta-analysis excluded studies on odor-based CDM due to the lack of published studies in this area of research. Further research needs to be performed to determine whether these hypotheses can truly explain the mixed results of odor-based CDM research.

While the results of this study should help researchers gain further insight into odor-based CDM, there are some limitations that must be taken into account. Some participants reported that they were not aware of the odors in the room where the learning and recall sessions took place. Surprisingly, 48% of the participants did not respond correctly when asked whether the odor present during the retrieval session was the same as the odor present during the learning session. For future studies, participants should be given a pre-test to make sure they have a minimal level of odor recognition. Another limitation of the study was the low level of retention of the learned information. Since there was a week between the learning and recall sessions, many of the participants were only able to recall few words from the word list. Many physical reinstatement studies examining CDM have shown that at least a week is needed between the learning and recall sessions to help reduce mental reinstatement effects. However, more learning trials may have been needed to ensure that the information was stored in memory at the end of the learning session.

The role of contextual cues in helping people to remember information has important practical implications in many fields. Reinstating the environmental context may enhance eyewitness memory, serve as an aid to people with memory problems, or help students to more effectively learn new information. Further research on context-dependent memory will hopefully help researchers to gain a deeper understanding of how people store and recall information. In conclusion, CDM research may have major implications in the optimal conditions for learning. Researchers must determine what factors contribute to and suppress the effects of the environmental context in helping people to recall information. It must also be determined which sensory modalities contribute to the CDM effect. If the research is to be of real practical importance, unraveling which environmental cues and sensory modalities impact CDM will be critical.
References


APPENDIX

Word List

context forbid option ratio tattoo stammer distribution menace phase nitrogen crutch hoist caught

sequel decade veneer kerosene quota socialism penalty levy zero barracks should qualm


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