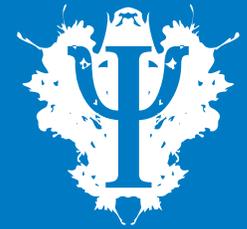
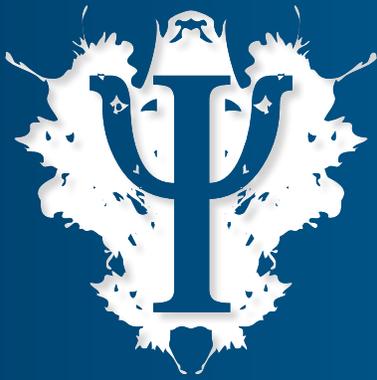


Psychology Student Research Journal



The Salience of Weight Discrimination: Perceived Weight Stigma Predicts Decreased Inhibitory Control and Increased Calorie Selection in Overweight Individuals ■ *Measuring Metacognition: A Comparative Validity Study of the Learning Strategies and Self-Awareness Assessment* ■ *Effects of Repeated Paroxetine Exposure on Acoustic Startle in Adolescent Rats* ■ *Religiosity, Depression, Anxiety, and Stress in European- and Hispanic-Americans* ■ *The Relationship Between the Willingness to Work Hard and Career Intentions Among College Students* ■ *Alignability and Distinctive Features in Free Categorization* ■ *The College of Social and Behavioral Sciences Writing Lab* ■ *The Effects of Shame and Self-Blame on Disclosure in Survivors of Sexual Assault*



Psychology Student Research Journal

Volume 4, 2016

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From the Editorial Board

It is with great pride that the members of the Editorial Board introduce the Psychology Student Research Journal (PSRJ) at California State University, San Bernardino. As we continue to grow, we hope to continue to include useful information for our readers and showcase the abilities and successes of psychology students at our university. The PSRJ provides an outlet for students who wish to enter graduate programs, pursue research-based careers, showcase their research, and prepare for the publication process. We hope you appreciate the value of our journal and support our on-going efforts to present student research in future volumes!

If you wish to obtain a copy of the newest volume, are enthusiastic about joining the staff at PSRJ, want to submit a manuscript for review (i.e. potential publication), or wish to obtain alternate formats of the information in this publication, please contact the Psychology Department at CSUSB. For more information about our organization, email us at csusbPSRJ@gmail.com, go to OrgSync.com, the CSUSB Psychology Department website, and look for us on [Facebook.com](https://www.facebook.com)!

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Letter from the Journal President

I have been honored and privileged to serve as the President of the Psychology Student Research Journal (PSRJ) since the inception of the project, which has been ongoing for a total of four years. Although these years were discontinuous, with a lapse in production for two academic years between the first and second pair of editions, the diverse committees that I have worked with have been dedicated to seeing this project through and have made immense advancements each year. This fact is a testament to the hard work and dedication of the faculty and students of the Psychology Department who are committed to this project. I am grateful to have had the honor of working with such dedicated individuals throughout my time as President and since the start of the PSRJ.

Throughout my time working on this project with the talented faculty and students of the Psychology Department, I have watched the PSRJ grow into what it is today. I am proud to say that, with every passing year, the quality and process of the journal has advanced. The first two editions were void of internal color, the peer review committee and process, and contained substantially less content than the third and fourth editions. Ultimately, these advances have contributed to the knowledge and skill of the committee and authors of our featured research projects, as well as the dissemination of research to our readers. Subsequently, the fourth edition of this project simulates a professional publication, giving students both the opportunity to submit and review scientific research while showcasing the amazing research projects of psychology students and faculty at California State University, San Bernardino (CSUSB). It is truly amazing to have witnessed the capabilities of the committee and the scholarship that has been promoted through this project.

As I am in the finishing stages of my Master's degree, my time as a student at CSUSB is coming to an end. I wish nothing more than for this project to continue in the direction it has gone since we started it; steadfastly forward. I encourage students to submit their work and join the PSRJ committee in future years. In doing so, the research performed by our department will continue to be showcased to students at our university. I have no doubt that the excellence of this journal will prevail on our campus and among the individuals that make up the Psychology Department for years to come.

I want to thank all the dedicated staff, faculty, and students that have contributed to this year's project. The committee would not have been able to complete this project without the backing of the Psychology Department and the amazing people who call this department theirs. As in years past, Dr. Robert Ricco has generously supported this project. I would also like to personally thank Dr. Ricco for the support he has provided me in completing this project for the last several years. I want to thank Dr. Donna Garcia, whose mentorship has been invaluable in the completion of each and every edition of the journal. I would be remiss if I did not thank each and every faculty and staff member in the Psychology Department for their contributions over the years. The interviews, book reviews and additional content that has been featured has been a product of their dedication to this project. It is also important to note that the journal could not have been completed without the hard work and dedication of each and every member who has served on the journal committee. These talented individuals have contributed immensely to my understanding of both research and teamwork. It has been my pleasure to work with such a dedicated and intelligent group of students. Finally, I would like to thank our readers who dedicate their time to understanding and producing research. It is you who truly drive our field, and without you, we would not have material or individuals for whom to publish. I will be forever in debt to everyone that has allowed me to and aided in my ability to lead this project. Thank you. I would like to dedicate this edition of the journal to you.

Ryan L. Radmall

President, Psychology Student Research Journal

About the Journal President

Ryan is a second year graduate student in the Industrial/Organizational Psychology program. He will be completing his Master's of Science in I/O Psychology in the Summer of 2016 and then plans pursue a Ph.D. in Criminology. He hopes to one day obtain a Ph.D. and apply quantitative psychology to corrections and police agencies.



Letter from the Editor-in-Chief

It was a pleasure to serve as this year's Editor-in-Chief for the fourth edition of the Psychology Student Research Journal.

The Department of Psychology, at California State University, San Bernardino has a strong heritage of research in many different aspects of psychology. One of the goals of research is to add to knowledge, and this journal provides an opportunity for students to share their research, as well as undergo a peer review process similar to that of professional journals.

This has been a collaborative effort between an incredibly talented and dedicated group of individuals. The journal officers and members made content recommendations and promoted earnest discussion about what this journal should represent. The reviewers spent hours reading, commenting on, and editing submissions. Without the authors, their mentors' willingness to share their research, and review suggested revisions, the journal would have been a far poorer publication. Despite working under a time crunch, everyone showed impressive diligence, and were willing to work hard to meet short deadlines. I wish to thank you all for your commitment and contribution towards creating this year's journal.

Sincerely,

A handwritten signature in black ink that reads "Erin Alderson". The signature is fluid and cursive.

Erin M. Alderson

Editor-in-Chief, Psychology Student Research Journal

About the Editor-in-Chief

Erin is a first year graduate student in the General Experimental Psychology program. She works with Dr. Cynthia A. Crawford in developmental neuropsychopharmacology, as well as with Dr. Hideya Koshino in working memory and attention. Erin plans to enroll in a Ph.D. program for behavioral neuroscience, and hopes to become a university professor with her own research lab.



Dr. Jeffrey Thompson

Official Titles:

- Dean of Graduate Studies; Appointed in 2012 (4 years)
- Associate Provost for Research; Appointed in 2005 (11 years)

Other Administrative Positions:

- Chair of the CSU Council of Chief Research Officers
- Chair of the Biology Department at CSUSB
- Developer of the CSU Biology Council

Noteworthy Recognitions:

- CSUSB Golden Apple teaching award in 2003

Leaving a Legacy of Research: A Brief Biography and Interview with Dean Jeffrey Thompson

Where did you go to school and what did you study?

I received my Bachelor's degree in Physics from Michigan State University and my Ph.D. in Molecular Biophysics from Florida State University. For my post-doc I worked at the National Institute of Health (NIH) for five and a half years. The first two years I worked with Marshall Nirenberg who received the Nobel Prize for discovering the genetic code who later switched his research to neuroscience, and that is where I got my start in neuroscience in his laboratory. For the next three and a half years I went on to the National Institute of Aging to help start the laboratory of neuroscience. Both of those positions were doing full-time research.

What did you do after you finished your schooling?

After I completed my post-doc work I moved to the University of Illinois at Urbana-Champaign and was on faculty in the College of Medicine and Department of Anatomical Sciences where I taught neuroscience to first-year medical students.

How many years have you been at CSUSB?

I have been here for 28 years as a Biology Department faculty member and was the chair of the Biology Department for seven years before becoming the Associate Provost for Research.

What do you consider your greatest accomplishment at CSUSB?

Creating an infrastructure to support research on-campus. I was the first Associate Provost for Research on-campus and had to create the entire office. That meant making sure that the infrastructure was in place to support research for faculty and then over the last five years starting the Office of Student Research (OSR) to support research for students.



What was the most difficult aspect of your jobs at CSUSB?

As the Associate Provost for Research, initially it was creating the new structure and processes. As the Dean of Graduate Studies, changing some of the processes to make them more efficient. In both of the areas, as far as faculty and student research and Graduate Studies, the most difficult thing has always been communication to make sure people are aware of programs that they can take advantage of; workshops and so forth.

How did you get to where you are? What has helped you to come to this position?

The skills that I obtained by being involved in research, like critical thinking and lifelong learning, have helped me get to where I am at today. When I got into my Ph.D. program at Florida State University, my faculty there told me that one of the reasons that I was accepted was because I had done undergraduate research.

What message would you like to impart to students that are interested in research?

Research is certainly extremely important for someone's career. Even in finishing a degree, the involvement in research has been shown to ensure that students stay in a program and graduate, and in going on to graduate programs or a career, it helps the individual to use their knowledge. Before I go into more detail about research, let me note that when I refer to research in this sense, research is not just basic research but really is the full gamut of research, scholarly activities, and creative activities. All of these can be considered someone's research in their specific area. When I learned information best, I was either in the laboratory or teaching the information to someone else, as opposed to the lectures I had listened to. The important aspects of research, in this sense, are twofold: the ability to connect the information that someone uses in the classroom to real life by being involved in the experience, and gaining skills, like data collection, data analysis, presentation skills, critical thinking skills, and lifelong learning skills, to get into graduate school or obtain a job.

What are your future plans?

I will be returning to faculty so I will be teaching a biology course in the Fall and will continue to teach the interdisciplinary studies 400 Research Ethics course in the Spring. I will also be involved in at least two grants, one with the U.S. Department of Agriculture (USDA) that is a student internship grant and another one with the California Institute for Regenerative Medicine (CIRM) stem cell research internship program that we have on-campus.

Is there anything else you would like to include in this interview?

Being on this campus has been a great experience. Obviously staying 28 years means that it was the right place for me, and I think it has been a combination of working with the faculty that we have and the students. We have a unique population here and faculty have always worked very well with students to bring them up to a level that they can compete with students across the entire country. Much of the interaction that students have here that they do not get elsewhere is that relationship with faculty members. So, in addition to the research skills that individuals receive by being involved in a research activity, the mentorship from faculty turns out to be a very critical piece because it helps the students see a role model, have discussions about career activities, and discussions about how to become a good researcher. At other institutions, you do not get that direct experience.

After eleven years as the Associate Provost for Research and four years as the Dean of Graduate Studies here at CSUSB, Dr. Jeffrey Thompson will be retiring from these positions in July and returning to the classroom as part of the Faculty Early Retirement Program (FERP). Many students, faculty members, and staff across the university will be forever grateful for the contributions to research and the campus community as a whole that Dr. Thompson has made. The Psychology Student Research Journal thanks Dr. Thompson for his many contributions to research on-campus, for participating in this interview, and wish him the best in his future endeavors.



The Saliency of Weight Discrimination: Perceived Weight Stigma Predicts Decreased Inhibitory Control and Increased Calorie Selection in Overweight Individuals

Author

Ashley M. Araiza and Joseph D. Wellman, Ph.D.

Abstract

Fear and stigmatization are often used to motivate overweight individuals to engage in healthy behaviors, however this strategy is often counterproductive and can lead to undesirable outcomes. In the present study, we examined the impact of weight-based stigma on cognitive ability and food selection in individuals who consider themselves overweight. We expected that the saliency of weight-based discrimination would moderate the relationships between perceived weight stigma and both inhibitory control and food selection. Specifically, we predicted that participants who were higher in perceived weight stigma would perform more poorly on an inhibitory control task and order more calories on a menu task when they read about discrimination against individuals who are overweight versus discrimination against a self-irrelevant out-group. Participants completed online prescreen measures assessing whether or not they considered themselves to be overweight and their perceptions of weight stigma. Participants who considered themselves overweight were then invited into the laboratory to complete various tasks designed to (1) manipulate weight-based discrimination, (2) measure inhibitory control, and (3) measure food selection. As predicted, results showed that participants higher in perceived weight stigma performed more poorly on the inhibitory control task and ordered more calories on the food selection task when they read about discrimination against individuals who are overweight, but not when they read about discrimination against an out-group. These findings provide evidence that perceptions of weight stigma are critical in our understanding of the impact of weight discrimination, as well as have important implications for addressing the obesity epidemic.



Author Interview

Ashley M. Araiza

What are you majoring in?

Master of Arts in Experimental Psychology.

What year are you in school?

I am a second-year graduate student.

Which professors (if any) have helped you in your research?

In my research, Drs. Joseph Wellman, Michael Lewin, and Donna Garcia have been invaluable resources.

What are your research interests?

I have several social- and health-related research interests in psychology. I am particularly interested in weight stigma, self-regulation of health behaviors, and motivations and interventions for health-related behavior change.

What are your plans after earning your degree?

After earning my Master's degree in June, I will begin a Ph.D. program in Social and Health Psychology at Stony Brook University in New York.

What is your ultimate career goal?

Ultimately, I aspire to be a dedicated scientist. I would like to obtain a university faculty position and have an active research program that works to address practical social and health issues through research.



Approximately two thirds of adults in the United States are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Obesity is a problem that can lead to a variety of health consequences including heart disease, stroke, Type 2 diabetes, some forms of cancer, and premature death (Nixon, 2010). Increased prevalence of obesity has led to discussion and framing of the issue as a threat to the health care system and as a societal burden to others (Tomiyama, 2014). Viewing the problem in this manner has resulted in greater stigmatization of the overweight, which could contribute to poor health factors that underlie some forms of obesity (Tomiyama et al., 2014). Stigmatization against this population can also result in increased discrimination and bias toward these individuals, rendering them vulnerable to negative physical and psychological consequences (e.g., depression, poor body image, harmful eating behaviors) (Tomiyama, 2014; Puhl & Heuer, 2009). Because the health consequences of weight stigma are relatively understudied, it is crucial to examine weight-based stigma and its outcomes in an effort to improve the health and lives of overweight individuals, as well as their social interactions and experiences.

One potential consequence of weight stigma is decreased inhibitory control, which is a component of executive function. Executive function is a general term used to describe higher order cognitive processes that control and regulate lower order processes and behaviors directed toward future goals (Alvarez & Emory, 2006). Research has shown that weight stigma can impact other forms of executive functioning (e.g., cognitive depletion). Major, Eliezer, and Rieck (2012) found that when an individual's weight was made salient, they performed more poorly on a cognitive task that measured cognitive depletion, suggesting a link between the experience of weight stigma and cognitive functioning. A second consequence of weight stigma is unhealthy eating behavior. Weight stigma has been associated with both binge eating and increased caloric intake (Wott & Carels, 2010; Major, Hunger, Bunyan, & Miller, 2014). Wott and Carels (2010) found that increased overt weight stigma was positively associated with binge eating, and Major et al. (2014) found that women who perceived themselves to be overweight consumed more calories after being exposed to stigmatizing literature compared to those who were exposed to non-stigmatizing literature. These findings support the notion that weight stigma can impact eating behavior. Finally, one's perceptions of stigmatization also influence various outcomes, and perceptions of stigma have

been associated with several negative psychological and physiological consequences (e.g., depression, stress) in numerous stigmatized groups (e.g., women, African Americans) (Schmitt & Branscombe, 2002).

The present study was conducted to facilitate understanding of the cognitive and behavioral consequences of weight stigma, and of the implications of these consequences for overall health. The impact of weight stigma on cognitive functioning and eating behavior has been observed in previous studies; however, few studies have examined how one's perceptions of the experience of weight stigma impacts these outcomes, or how perceived weight stigma and the salience of weight discrimination interact to impact cognitive ability or eating. Thus, the present study examined the relationships between perceived weight stigma and both cognitive functioning and eating behavior when weight-based stigmatization was made salient.

Weight Stigma and Inhibitory Control

Evidence suggests decreased executive control is a consequence of weight stigma. Major, Eliezer, and Rieck (2012) investigated whether overweight individuals would experience increased stress and reduced self-control when in situations that trigger concerns about being stereotyped and feeling rejected or devalued based on weight. Participants were videotaped (weight salience condition) or audiotaped (control condition) while delivering a speech. After the speech, they completed a cognitive task designed to measure executive control and had physiological measures recorded. Results showed that when weight was made salient, individuals exhibited a greater stress response and performed more poorly on the cognitive task, suggesting that stigma leads to increased stress and cognitive depletion in women who are overweight (Major et al., 2012). Because these findings suggest self-control can be impacted by weight stigma under conditions of stereotype threat, it is possible the specific executive control function of inhibitory control will be impacted by weight stigma under conditions when weight stigma is made salient. To our knowledge, no studies have examined the impact of weight stigma on inhibitory control, suggesting a need for research into the effects of weight stigma on this particular component of executive functioning.

Weight Stigma and Eating Behavior

Weight stigma has been associated with problematic eating behaviors. Wott and Carels (2010) investigated the relationship among weight stigma, weight loss, depression, and binge eating in adults who were



overweight or obese during a 14-week weight loss intervention. Results showed that weight stigma was significantly associated with depression, poorer weight loss outcomes, and most relevant to the present study, binge eating (Wott & Carels, 2010). The authors concluded that overt weight stigma could negatively influence overweight and obese individuals in a variety of ways, including serving as a trigger for problematic eating behaviors.

Weight stigma has also been associated with increased caloric intake in women. Major, Hunger, Bunyan, and Miller (2014) examined whether weight stigmatization depleted self-perceived cognitive resources, leading to increased intake of high calorie foods. Results showed that women who perceived themselves as overweight, reported feeling less capable of self-control over their eating behavior and reported eating more calories when exposed to stigmatizing articles compared to women who were exposed to non-stigmatizing articles. Additionally, women who perceived themselves to be overweight and were in the weight-stigma condition consumed more actual calories as measured by total grams of food eaten during the experiment. There were no associations between perceived weight stigma and eating behavior among women whose weight was not made salient. These results suggest weight-based stigma might lead to a decreased ability to self-regulate eating behavior; however, this has yet to be fully examined using cognitive measures of inhibitory control.

Other forms of stigmatization have also been associated with unhealthy eating. Inzlicht and Kang (2010) investigated whether coping with gender-based stereotype threat would influence eating behavior. Results showed that experiencing stereotype threat produced by a math test led women to eat significantly more ice cream when they had no coping strategy to buffer the stereotype threat. When women engaged in a coping task (i.e., cognitive reappraisal of the threatening situation), they ate less indicating they were more able to engage in restraint regarding the ice cream following the stereotype threat situation. Inzlicht and Kang (2010) concluded that coping with stereotype threat, which might consume cognitive resources could lead people to eat more unhealthy food. These findings might also generalize to other types of stigmatization. In particular, if individuals perceive themselves to be stigmatized based on their weight, coping with the experience of weight-based discrimination might consume cognitive resources, leading to increased eating.

Perceptions of Stigmatization

One important aspect of understanding stigma involves understanding how an individual's subjective experience of stigma influences outcomes. Research suggests that expecting stereotyping from others (i.e., stigma consciousness) can amplify cognitions that lead individuals to feel more stigmatization (Pinel, 1999). Pinel (1999) proposed that individuals do not always adopt the same outlook regarding their stigmatized status, suggesting that stigma consciousness is a critical way that stereotyped persons interpret events differently from non-stereotype individuals. Across multiple groups (e.g., women, gay men, lesbians, Whites, Blacks, Hispanics, Asians), Pinel (1999) found that high stigma conscious individuals were more likely to perceive discrimination against themselves and their in-group, compared to low stigma conscious individuals. Additionally, individuals high in stigma consciousness were more likely to avoid situations in which their stereotyped status could be relevant, thus thwarting efforts to negate the stereotype. These findings support the ideas that the subjective experience of stigma can vary among individuals, lead to different perceptions of stigma and different responses to stigmatizing situations, and result in a greater likelihood of experiencing stigma.

The subjective experience of discrimination is different across individuals. Thus, the objective experience of weight discrimination is unlikely to influence every person in the same way. Research suggests that discrimination as a subjective experience can influence outcomes to a greater extent than the objective experience of discrimination itself (Pinel, 1999; Major, Quinton, & McCoy, 2002). As described by Crocker and Major (1989), if a person with a disability does not consider themselves to have a disability, they might not consider the outcomes of other individuals with disabilities relevant to their own. With regard to weight stigma, if individuals do not perceive themselves to be stigmatized based on their weight, suggesting that overweight individuals in general are often the targets of weight-based discrimination might not have an impact on their cognitive abilities or their behavior. However, the more individuals perceive discrimination because they believe themselves to be a member of a stigmatized group, the more likely discrimination against their group will influence them (Crocker & Major, 1989).

Finally, this is particularly important because perceptions of discrimination can affect health and well-being. Schmitt and Branscombe (2002) reviewed literature on the consequences of discrimination



among disadvantaged groups and concluded that the experience of prejudice is negatively associated with psychological well-being. For example, women who perceive discrimination against their group often experience psychological and physical health problems. Additionally, African Americans who perceive racism against their group have shown increased psychological and physiological stress responses that have negative consequences for their overall health (Schmitt & Branscombe, 2002). A large body of research suggests that perceptions of discrimination negatively affect psychological well-being (e.g., anxiety, psychological distress, general life satisfaction) and that the degree of pervasiveness of such discrimination is an integral part of its overall impact on well-being (Schmitt, Branscombe, Postmes, & Garcia, 2014). Together, these findings suggest that the more individuals perceive themselves to be the target of discrimination, the greater the impact of discrimination. Additionally, this body of literature highlights the importance of understanding the role of perceptions of stigma in weight stigma's impact on cognitive and behavioral outcomes.

The Present Study

Previous research has suggested that weight stigmatization should be associated with both executive function (Major et al., 2012) and unhealthy eating behavior (e.g., Wott & Carels, 2010; Major et al., 2014), and that the subjective experience of stigma (e.g., perceived stigma) should moderate individuals' responses to discrimination (e.g., Crocker & Major 1989; Schmitt & Branscombe, 2002). However, little research has examined perceived weight stigma as a predictor of inhibitory control and eating behavior, or the interaction of perceived weight stigma and the saliency of weight stigma as a predictor of these outcomes. To address this gap in the literature, we examined weight-based discrimination as a moderator of the relationships between perceived weight stigma and inhibitory control and eating behavior (i.e., food selection). We predicted that the salience of weight-based discrimination would moderate these relationships, such that perceived weight stigma would lead to decreased inhibitory control and to increased calories selected when participants were reminded about discrimination against individuals who are overweight (experimental condition), but not when they were reminded about discrimination against a self-irrelevant out-group (control condition).

Methods

Participants

A total of 101 participants were recruited from social sciences classes at California State University, San Bernardino. For their involvement in the study, participants received their choice of either a \$10.00 Amazon gift card or 4 units of credit to be applied toward their courses. Nine participants were excluded from the final analysis for not completing all three tasks (four participants due to technical issues linking from one task to the next and five participants for failure to manually continue to the final task). An additional eight participants were removed as outliers on the calorie task for ordering more than 10,000 calories, indicating a lack of attention or lack of understanding of the task instructions.

The final sample consisted of 84 participants (Gender: 76 female; Age: $M = 21.42$, $SD = 5.38$, Range = 18 to 52; Race/Ethnicity: 67.9% Hispanic/Latino American, 11.9% Mixed, 8.3% White, 6.0% African American, 2.4% Native American, 2.4% Other, 1.2% Asian American). The average weight of participants was 192.41 pounds ($SD = 51.09$) and the average body mass index (BMI) of participants was 32.26 ($SD = 7.26$). Participants' BMI was calculated using weight and height measurements collected in the laboratory.

Procedure

Participants completed an online prescreen assessment. As part of the prescreen assessment participants completed a measure of perceived weight stigma. Additionally, participants indicated on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which they considered themselves overweight. Participants who indicated a score of 5 or greater on this question, which indicated that they considered themselves to be overweight, were given the opportunity to sign up for a time slot to come into the laboratory. Participants were unaware of selection criteria for the experimental study session.

Participants arrived at the laboratory where an experimenter greeted them and explained that they would participate in three separate tasks designed to assess cognitive processing. After providing informed consent, participants completed the study tasks.

First, participants were randomly assigned to read either an article describing workplace discrimination against individuals who are overweight or workplace discrimination against a self-irrelevant out-group (i.e., Inuit Canadians). The articles were written for



this study and discussed experiences of workplace discrimination against the overweight (overweight condition) or against Inuit Canadians (control condition). Examples of excerpts from each article include: "Compared to average [weight individuals/White Canadians] doing the same job, [overweight individuals/Inuit Canadians] often earn less" and "According to research findings from Stanford University, [overweight individuals/Inuit Canadians] are 71% more likely to remain in a job without any promotion for five years or more compared to their [White Canadian/average weight counterparts]." Similar procedures have been used in previous research to experimentally manipulate perceived stigma (e.g., Eliezer, Major, & Mendes, 2010; Major et al., 2014; McCoy & Major, 2007).

Following the article manipulation, participants completed an adaptation of the Parametric Go/NoGo task as described by Langenecker, Zubieta, Young, Akil, and Nielson (2007) to assess inhibitory control. This task involved viewing letters on a screen and either pressing the spacebar or inhibiting pressing the spacebar in response to particular target letters. The task included two sets of three different levels assessing attention, set-shifting, and processing speed, with the last two more difficult levels assessing inhibitory control (Langenecker et al., 2007). In the first set, participants kept track of two letters. In the second set, participants kept track of three letters. Participants viewed a stream of letters presented quickly on a white background and were instructed to press the spacebar with either thumb to respond to certain target letters or not press the spacebar to inhibit their responses to the target letters. In the first set, participants pressed the spacebar to respond to the letters "r" and "s" (Level 1), to inhibit their response to "r" and "s" when either letter appeared consecutively (Level 2), and to inhibit their response to "r" and "s" when they were immediately followed by a red stop sign (Level 3). In the second set, participants respond to the letters "r," "s," and "t" using the same rules as each level in the first set.

After completing the inhibitory control task, participants completed a food choice task to measure behavioral intent with regard to eating. This task required participants to choose from a menu any food items that they would like to eat in an imagined scenario. Participants were instructed to imagine that they were going to dinner with a friend at an American-style sit down restaurant. They read instructions to choose items that they personally would like to eat in the imagined scenario and click those items on the interactive menu (Brochu & Dovidio, 2013; adapted from Liu, Roberto, Liu, & Brownell, 2012). Participants could se-

lect anything they would want to eat at dinner, including appetizers, main courses, desserts, and beverages.

Finally, the experimenter took various physiological measurements of each participant and then provided them with a gift card or granted them course credit. Before leaving the laboratory, participants were probed for suspicion, thanked, and debriefed.

Measures

Prescreen Measures

Perceived Stigma of the Overweight (McCoy, Wellman, Cosley, Saslow, & Epel, 2016). A 5-item composite drawn from the perceived stigma of the overweight scale was used to measure experiences with weight-based discrimination. Participants indicated on a scale of 1 (strongly disagree) to 7 (strongly agree) their level of agreement with statements regarding their experiences with weight-based stigmatization (e.g., "I experience discrimination because of my weight" and "I feel like I am personally a victim of society because of my weight"), $\alpha = .89$, $M = 3.47$, $SD = 1.62$.

Experimental Measures

Inhibitory Control. Response inhibition was measured as a percentage of correct trials by dividing the correct number of inhibitory trials by the total number of potential inhibitory trials for each level (Langenecker et al., 2007). The final score used as the dependent variable for each participant was an average of the third level (i.e., stop sign level) of both the first and second sets ($M = 20.48$; $SD = 7.68$), as the third level is thought to more clearly distinguish inhibitory control and to reflect sensitivity in detecting differences in young, healthy populations (Langenecker et al., 2007).

Food Selection. The total number of calories ordered on the food selection task was used as the measure of food selection. The total number of calories chosen by each participant was summed and the average number of calories ordered was calculated for the sample ($M = 2,361.96$; $SD = 1,333.84$) (Brochu & Dovidio, 2013).

Physiological Measures. Height and weight for each participant was measured by the experimenter using a scale and wall-mounted height meter, respectively. The average weight of the sample ($M = 192.41$; $SD = 51.09$) and BMI of the sample ($M = 32.26$; $SD = 7.26$) were calculated.



Results

Analysis Strategy

To test our interaction hypotheses, we conducted a hierarchical linear regression on each dependent variable (i.e., inhibitory control and food selection). The main effects of perceived weight stigma (mean-centered) and article condition (0 = weight discrimination) were entered in Step 1 and their two-way interactions were entered in Step 2. Correlations among all variables are presented in Table 1. Below, we focus on the highest order effect for each analysis. The full regression output is included in Table 2.

Inhibitory Control. As predicted, there was a significant two-way interaction between perceived weight stigma and article condition in predicting percentage of correct trials on the inhibitory control

task, Step 2: $F(3, 80) = 3.19, p = .03, \Delta R^2 = .08$; Model: $R^2 = .11, F(1, 80) = 6.71, p = .01$ (see Figure 1).

Specifically, in the overweight article condition, greater perceived weight stigma was associated with decreased performance on the inhibitory control task: $b = -2.43, SE = .82, t(80) = -2.96, p = .004$. In the control article condition, perceived weight stigma was not associated with inhibitory control: $b = .33, SE = .68, t(80) = .49, p = .63$.

Food Selection. As predicted, there was a significant two-way interaction between perceived weight stigma and article condition in predicting food selection (i.e., number of calories ordered), Step 2: $F(3, 80) = 2.91, p = .04, \otimes R^2 = .05$; Model: $R^2 = .10, F(1, 80) = 4.24, p = .043$ (see Figure 2).

Specifically, in the overweight article condition, perceived weight stigma was associated with increased number of calories ordered: $b = 419.85, SE = 143.10, t(80) = 2.93, p = .004$. In the control article condition, perceived weight stigma was not associated with the number of calories ordered on the food selection task: $b = 37.37, SE = 118.46, t(80) = .32, p = .75$.

Table 1. Correlations among variables by article condition.

	1	2	3	4
1. PWS		-.30*	.43**	.45**
2. Inhibitory Control	.09		-.19	-.06
3. Food Selection	.03	.12		.23
4. BMI	.35*	-.01	-.05	

Note: PWS = Perceived Weight Stigma, BMI = Body Mass Index; Correlations appearing above the diagonal represent the overweight article condition, Correlations appearing below the diagonal represent the control article condition; * $p < .05$, ** $p < .01$

Table 2. Regression output for dependent variables.

Dependent Variable:	Inhibitory Control		Food Selection	
	b	ΔR^2	b	ΔR^2
Step 1:		.03		.05
PWS	-.79		192.89*	
Article (0 = Overweight)	1.88		-193.13	
Step 2:		.08*		.05*
PWS X Article	2.76**		-382.48*	

Note: PWS = Perceived Weight Stigma; * $p < .05$, ** $p < .01$

Discussion

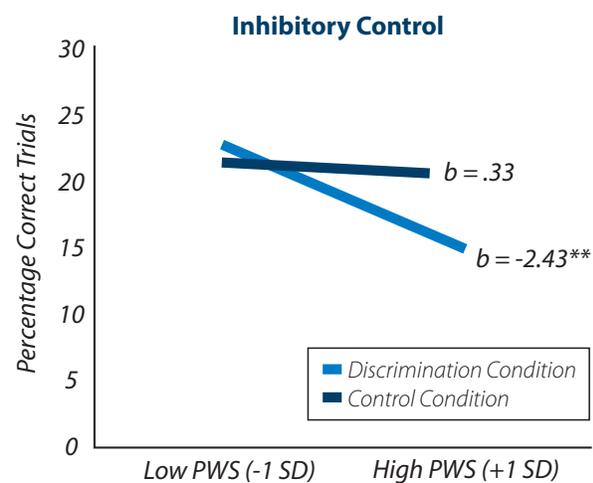
Although an extremely large number of Americans are overweight or obese and weight stigma is prevalent in our culture, there is a shortage of literature examining the cognitive, behavioral, and physiological consequences of this phenomenon (Major et al., 2012). The overarching goal of the present study was to identify some of the negative consequences of weight stigma and to provide insight into how these consequences affect our cognitive and behavioral functioning. We found that participants in the overweight article condition who scored higher on perceived weight stigma performed more poorly on the inhibitory control task and ordered more calories, whereas there were no differences for participants in the control condition. The findings that article condition moderated the relationships between perceived weight stigma and both inhibitory control and number of calories ordered provide important insight into how weight stigma may work to deplete cognitive abilities and impact eating.

The present findings suggest that participants in the overweight condition may have been cognitively depleted following the article task, subsequently leading to poorer performance on the measure of inhibitory control and a greater number of calories ordered on the food selection task. This is consistent with previous literature showing stigmatization and stereotype threat



The salience of weight discrimination: Perceived weight stigma predicts decreased inhibitory control and increased calorie selection in overweight individuals

Figure 1. Perceived weight stigma predicts inhibitory control by condition.

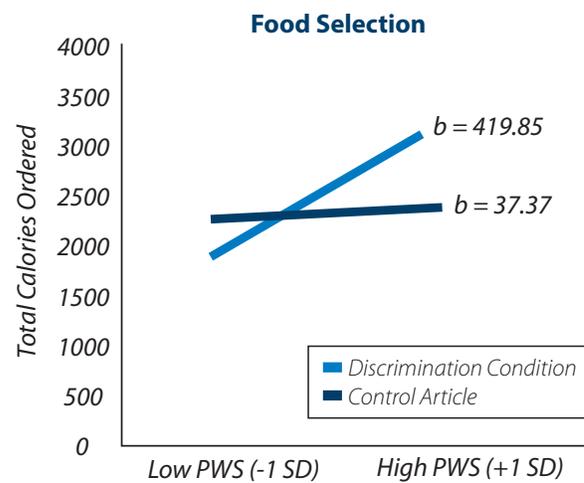


Note: PWS = Perceived Weight Stigma; * $p < .05$, ** $p < .01$

are associated with a reduction in cognitive abilities (Major et al., 2012; Brochu & Dovidio, 2013). Additionally, the present findings are consistent with previous research showing an increase in calories ordered due to weight-based discrimination (Inzlicht, McKay, & Aronson, 2006). Vohs and Heatherton (2000) suggest that coping with weight-based stereotype threats is exhausting and thus might deplete the cognitive resources necessary to exert self-control. The present findings provide an explanation for the increase in eating behaviors seen in previous studies (e.g., Inzlicht & Kang, 2010, Major et al., 2014); reduced inhibitory control.

The finding that perceived weight stigma and the saliency of weight-based discrimination interact to predict increased number of calories ordered illuminate a possible reason why weight stigma may actually lead to increased weight gain. Specifically, because perceived weight stigma seems to lead to increased number of calories ordered when individuals are reminded about discrimination against their in-group, it is possible that this might be one way in which weight stigma might lead to subsequent weight gain. This is consistent with the cyclic obesity/weight-based stigma (COB-WEBS) model proposed by Tomiyama (2014). The COB-WEBS model suggests that weight stigma is a positive feedback loop in which stigma leads to weight gain. In the event that individuals who are overweight or obese experience weight stigma, they may become stressed leading to increased eating, which in turn leads to more weight gain followed by an increased likelihood

Figure 2. Perceived weight stigma predicts food selection by condition.



Note: PWS = Perceived Weight Stigma; * $p < .05$, ** $p < .01$

of more stigmatization (Tomiyama, 2014). Demonstrating that perceived weight stigma and weight saliency interact to predict decreased inhibitory control offers further nuance and support for this model.

Importantly, these findings suggest that it is not necessarily one's perception of weight stigma alone that matters, but rather how it interacts with the saliency of discrimination against one's group. Both are important factors in determining the impact of weight stigma on cognitive functioning and eating behavior. In other words, whether a person is high or low in perceived weight stigma will not necessarily influence cognition or behavior unless weight-based discrimination is made salient. This is consistent with previous literature suggesting perceived stigma (e.g., Crocker & Major, 1989; Pinel, 1999; Major, Quinton, & McCoy, 2002) is a key factor in determining the consequences of weight stigma for various psychological and physiological outcomes.

Limitations and Future Directions

One opportunity for expansion of the present findings is to investigate the role of other cognitive processes in the relationship between weight stigma and eating behavior. In the present study, we examined inhibitory control, but decreased executive control in general can also result from weight stigma (Major et al., 2012). Future studies should examine a longer list of relevant executive functions (e.g., goal-directed persistence, attention) to determine if they have any role in self-



The salience of weight discrimination: Perceived weight stigma predicts decreased inhibitory control and increased calorie selection in overweight individuals

regulating eating behavior following weight-based discrimination. Additionally, weight-based discrimination is stressful (Tomiya, 2014). Stress can deplete cognitive resources needed for self-regulation in overweight women (Major et al., 2012) and can lead to unhealthy eating (Grosz et al., 2012). Because we did not assess stress in this study, future studies should examine the role of stress in the relationship between weight stigma, inhibitory control, and eating behavior.

Finally, in the current study we examined prospective food intake with a menu-ordering task; however, we did not measure actual calorie intake. It is possible that in a different context or using a different measure of eating, the impact of inhibitory control on eating behavior would be different. Inhibitory control might be more predictive when food is present than when an individual is thinking about eating food. Future studies should measure other cognitive abilities as mediators using different measures.

Implications and Conclusions

Previous literature suggests that weight stigma has implications for both cognitive function and eating behavior, and the present findings build upon this to identify particular instances in which these relationships might be observed. Thus, offering critical information about how and in what ways the perception and experiences of weight stigma interact to impact cognitive and behavioral outcomes. One critical implication of these findings is that perceptions or experiences independent of one another are not necessarily problematic, but when individuals are high in perceived weight stigma and weight discrimination is made salient, there may be cognitive and behavioral consequences for the individual. Accordingly, it might benefit researchers, clinicians, and individuals to address the consequences of weight stigma directly with individuals by trying to reduce their perceptions of stigmatization.

Broader implications of this research include a greater understanding of both the cognitive and behavioral consequences that stem from weight-based discrimination. Little research has examined the consequences of weight discrimination for health. This is particularly important to examine as many campaigns designed to foster weight loss use stigmatizing language about being overweight to motivate individuals to lose weight or eat healthfully (e.g., Strong4Life campaign; Callahan, 2012), but psychological theory and research suggest this is a counterproductive strategy (Tomiya, 2014). Our findings contribute to a greater awareness of the consequences of societal bias against individuals who

are overweight, as well as advance our theoretical understanding of weight stigma and provide meaningful practical insights for addressing the obesity epidemic. Moreover, these and other related findings provide further support for the notion that the use of stigmatization as a motivator is not conducive to changing behavior, and can actually be harmful to the psychological and physical health outcomes of individuals.

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"One of the most damaging aspects of obesity is the weight bias and stigma that is so pervasive in our thin-obsessed society."

— Scott Kahan, M.D.

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Measuring Metacognition: A Comparative Validity Study of the Learning Strategies and Self-Awareness Assessment

Author

Ryan L. Radmall

Abstract

The conceptualization of metacognition has undergone important changes in the last 45 years as more precise measurement methods have emerged and research has expanded understanding of this construct. As a result of previous research, metacognition has been considered mainly in terms of cognitive processes. However, one noteworthy aspect of metacognition that has yet to be explored are the behavioral indicators of metacognition. The current study attempted to provide convergent validity to a recently developed metacognition measure that focuses on behaviors rather than cognition. In doing so, three scales, two of which have been psychometrically established, were utilized to measure metacognition in terms of cognitive processes, behavioral indicators, and the relationship between the need for cognition and metacognition. Findings support that metacognition consists of both behavioral and cognitive processes, and metacognition is negatively related to cognition. Implications of these findings, directions for future research, and limitations of the present study are discussed herein.



Author Interview

Ryan Radmall

What are you majoring in?

I am working on a Master's of Science in Industrial/Organizational Psychology.

What year are you in school?

I am a second-year and will be graduating in June.

Which professors (if any) have helped you in your research?

I have worked with Dr. Ken Shultz, Dr. Janelle Gilbert, Dr. Donna Garcia, Dr. Michael Lewin, Dr. Matt Riggs, Dr. Jan Kottke, and Dr. Janine Kremling on various projects throughout my academic career here at CSUSB.

What are your research interests?

My areas of interest are metacognition, predictors of law enforcement use of force and turnover, Early Maladaptive Schemas, Flow, and student resistance to change/learning.

What are your plans after earning your degree? My plans after graduation are to continue to teach statistics for the Student Assistance in Learning (SAIL) program, teach PSYC 210 or 311 for the Psychology Department next Fall, continue to work for the Criminal Justice Department as a statistics tutor, and apply to PhD programs next Fall.

What is your ultimate career goal?

My ultimate career goal is to gain acceptance to a PhD program in Criminology and to gain a full-time tenure track position at a major university while doing independent consulting for private or public organizations.



Metacognition first appeared in developmental psychology research as early as the 1970's, although the path for this research was paved in the 1960's during the cognitive revolution (Hacker, Dunlosky, & Graesser, 1998). It was not until the 1980's and 1990's that metacognition become more specifically measured and defined when cognitive psychologists joined the research of learning and developmental psychologists and produced more sophisticated methodologies to measure metacognition (Hacker, Dunlosky, & Graesser, 1998). Consequently, metacognition has been greatly reconceptualized since it first appeared in scientific literature.

Recently, metacognition has been defined as, "higher order thinking that involves active control over the cognitive processes engaged in learning" (Livingston, 2003, p. 2). Metacognition is "thinking about thinking" and consists of general knowledge of how human beings learn and process information. Typically, individuals of normal intelligence engage in metacognitive strategies when engaging in tasks that require effort, such as completing higher education coursework, without explicitly thinking about these processes. Metacognition is important for learning because metacognition plays an important role in successful learning, and for this reason it is important to understand the underlying mechanisms of metacognition in order to teach students how to more effectively learn and design instructional interventions.

Most of the definitions of metacognition include knowledge and strategy components (Livingston, 2003). John Flavell (1979) proposed that metacognition consists of metacognitive knowledge, experiences, and regulation. Metacognitive knowledge can be subdivided into knowledge of person variables, task variables, and strategy variables. The most effective approaches utilized in metacognitive instruction provide the learner with knowledge of the cognitive processes involved in learning and strategies to use, and experience or practice in cognitive and behavioral strategies. Hence, a four factor model of metacognition is proposed in the current study as cognitive, behavioral, strategies, and experience.

O'Neil & Abedi, (1996) developed a measure for analyzing how students think about learning tasks systematically. In understanding this phenomenon, researchers created a useful indicator for identifying educational goals that emphasize work habits or metacognitive strategies. This measure was titled the State Metacognitive Inventory (SMI) and has been validated with a factor analysis and demonstrated reliability.

Cohen et al. (1955) first characterized the need for cognition as "a need to structure relevant information in meaningful, integrated ways" so as to characterize the experiential world (p. 291). Other characterizations of the need for cognition describe this phenomenon as a tendency to think for enjoyment (Murphy, 1947) and a need to understand (Katz, 1960). Based on what we know about metacognition, it would make sense that the need for cognition would relate to metacognition. In order to provide convergent validity of metacognition containing a cognitive component, the NFC Scale is a good measure to be used in the current study.

The Learning Strategies and Self-Awareness Assessment (LSSA) was developed by Dr. Anton Tolman, to enhance student learning by identifying tasks that individuals engage in that demonstrate metacognition. This assessment is broken into three subscales of metacognition: strategies, a cognitive component of metacognition, and behaviors indicating metacognition. In the present study, the researcher will attempt to provide validity and reliability evidence for this scale by conducting a factor analysis and correlating this scale with other proposed measures of aspects of metacognition.

We hypothesize that LSSA will indicate convergent validity with the other measure of metacognition and cognition and that the total scale will measure metacognition based on a four-factor structure with each of the subscales measuring different aspects of metacognition including cognitive aspects of metacognition, behavioral aspects of metacognition, the need for metacognition, and strategies of metacognition.

Method

Data Collection and Screening

Data was collected through Qualtrics via the SONA Research Management System where California State University, San Bernardino (CSUSB) students could obtain extra credit points, for participation in research. Students were awarded one unit of extra credit for participating in the current study. Information about the current study indicated that 20 minutes was required to complete the survey.

Of the 503 participants, 14 students failed to complete a large portion of the survey and were removed from the analysis. Before distributing the survey, the primary investigator and a colleague completed the survey to determine the minimal time required for completion. As the result, SMEs took a minimum of three minutes to complete the survey. Therefore, seven participants were removed from the analysis for completing the



survey less than three minutes, which was noted by the researcher as careless responding. Finally, univariate outliers were assessed based on z-scores above the threshold of 3.5 or below the threshold of negative 3.50. Based on this criterion, 19 participants were removed. Multivariate outliers were assessed based on discontinuity in Mahalanobis distance coefficients and no outliers were identified. A total of 463 participants were assessed in the final analysis.

Participants

Among the 463 participants, approximately 72% were Psychology majors, 1% were Criminal Justice majors, and the rest of the participants indicated other majors. The age of participants ranged from 17 to 53 years old with an average of 23 years. Approximately 87% of the sample was female, with the remaining 13% being male. Hispanic/Latino students comprised the majority of the population (62%), followed by Caucasians (19%), African-Americans (7%), and Asian (5%). The sample was composed of approximately 11% Freshmen, 11% Sophomores, 32% Juniors, 47% Seniors, and less than 1% Graduate students. The average self-reported grade-point average was 3.01 on a 4.00 scale.

Measures

Three measures were used for the current study. Both the SMI and NFC scales had good psychometric properties, while the LSSA has not been tested psychometrically in the literature. The survey in its entirety, including the three following measures and their adaptations, can be found in Table 1.

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.907
Bartlett's Test of Sphericity	Approx. Chi-Square	10627.439
	df	1770
	Sig.	.000

State Metacognitive Inventory

(SMI; O'Neil, & Abedi, 1996)

The SMI measures metacognition as a state and is typically administered directly after the performance of a task. This measure has been validated using factor analysis methods and demonstrates good reliability ($\alpha = 0.70$). For the purpose of the present study, the SMI was adapted to target participants' current experience of

the items instead of retrospectively assess participants' performance on a task. In this way, the SMI reflects more of a trait measure in the dimension of metacognition.

Need For Cognition

(NFC; Cacioppo, & Petty, 1982)

The NFC scale measures an individual's tendency to engage in and enjoy thinking. This measure has been validated using factor analysis methods and demonstrates reliability ($\alpha = .91$) (Sadowski & Gulgoz, 1992). This measure was already developed as a trait measure and was used in the present study to provide convergent validity of metacognition with the assumption that individuals who have a need for cognition will generally demonstrate higher levels of metacognition.

Results

A principal axis factor extraction method with oblique (direct oblimin) rotation was performed using SPSS 23 on the 60 items related to metacognition as part of an Exploratory Factor Analysis (EFA). Preliminary evidence suggested adequate covariance in the matrix to support a factor analysis of the 60 items. To determine if the data matrix was suitable for factor analysis, the Kaiser-Meyer-Olkin's (KMO) was examined using a cut-off of 0.60. The KMO measure of sampling adequacy was noted at 0.91, which was well above the cut-off of required 0.600 for a meaningful solution (Tabachnik et al., 2006). Additionally, the Bartlett Test of Sphericity (BTS) yielded strong statistical significance indicating that there was a meaningful factor solution, $\chi^2 (1770) = 10,627.44, p < .001$. Both KMO and BTS statistics are noted in Table 1.

Guttman's (1954) rule requires that researchers retain all factors with eigenvalues greater than 1.0, while the scree test uses eigenvalues plotted on a graph at which all the factors before the elbow are to be retained (Cattell, 1966). The current analysis yielded 13 factors with eigenvalues greater than 1.0. To further reduce the number of the factors, the scree plot was examined. Visual inspection of the scree plot indicated that either one or three factors could be retained based on the positioning of the elbow (see Figure 1). Exploratory analysis forcing both a one and three factor structure was conducted and the researcher concluded that the three factor structure was more appropriate for the present analysis. Altogether, the three factors accounted for 36.25% of the variance among the 60 items used in the analysis, a fairly low amount considering the standard threshold typically requires 50% of variance to be accounted for in factor extractions (see Table 2).



Table 2. Total Variance Explained by Three-Factor Structure

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent	Total
1	12.803	21.338	21.338	12.162	20.270	20.270	10.046
2	4.695	7.824	29.163	4.057	6.762	27.032	8.235
3	4.251	7.086	36.248	3.604	6.007	33.039	6.478
4	2.141	3.568	39.817				
5	1.968	3.280	43.097				
6	1.489	2.482	45.579				
7	1.456	2.426	48.005				
8	1.312	2.187	50.193				
9	1.277	2.129	52.322				
10	1.189	1.981	54.303				
11	1.132	1.887	56.190				
12	1.099	1.831	58.021				
13	1.026	1.711	59.732				
14	.984	1.640	61.371				
15	.950	1.583	62.954				
16	.917	1.529	64.483				
17	.888	1.480	65.963				
18	.860	1.433	67.396				
19	.826	1.377	68.773				
20	.787	1.312	70.085				
21	.758	1.263	71.348				
22	.736	1.226	72.574				
23	.724	1.207	73.781				
24	.688	1.146	74.927				
25	.682	1.136	76.063				
26	.670	1.116	77.179				
27	.628	1.046	78.225				
28	.602	1.003	79.228				
29	.583	.972	80.200				
30	.574	.957	81.158				
31	.548	.914	82.071				
32	.543	.905	82.976				
33	.538	.896	83.873				
34	.513	.855	84.728				
35	.502	.837	85.565				
36	.490	.817	86.382				

— Continued on Page 19 —



Table 2. Total Variance Explained by Three-Factor Structure

— Continued from Page 18 —

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent	Total
37	.482	.804	87.186				
38	.479	.798	87.984				
39	.457	.761	88.745				
40	.431	.718	89.463				
41	.421	.701	90.164				
42	.399	.665	90.828				
43	.392	.653	91.481				
44	.385	.642	92.123				
45	.380	.633	92.756				
46	.367	.612	93.368				
47	.361	.602	93.970				
48	.355	.592	94.562				
49	.332	.553	95.115				
50	.323	.538	95.653				
51	.317	.528	96.181				
52	.302	.503	96.684				
53	.300	.500	97.184				
54	.281	.468	97.652				
55	.257	.428	98.079				
56	.253	.421	98.501				
57	.243	.405	98.905				
58	.230	.384	99.289				
59	.221	.368	99.657				
60	.206	.343	100.000				

The Pattern Matrix of the factor extraction provided support for a three-factor structure because the items were highly correlated with one another and did not cross-load between factors (see Table 3). Factor loadings ranged from .32 to .72 for the first factor, from -.22 to -.77 for the second factor, and from .31 to .60 for the third factor. The first factor contained items from the SMI, with an additional three items from the LSSA that were language related loading on this factor. This factor was labeled as Cognitive Aspects of Metacognition. The second factor contained items related to the NFC Scale and actually consisted of only NFC Scale items. This factor was labeled as Need for

Cognition. The third factor consisted of items solely from the LSSA and was labeled as Behavioral Indicators of Metacognition. Cronbach alpha reliability was computed for each subscale and was found to range from .88 to .92, which indicated good reliability (see Table 4). Based on all of the evidence presented herein, the retention of a three-factor structure is warranted and these subscales are reliable. Finally, a correlation matrix was computed between the factors and it was found that factor one and three had positive moderate correlations, while factor two had a moderate negative correlation to factor one and factor three (see Table 5).



Table 3. Pattern Matrix of Three-Factor Structure

	Factor		
	1	2	3
<i>I try to think through and understand coursework before I attempt to complete it.</i>	.718	.056	-.039
<i>I select and organize relevant information to complete coursework.</i>	.718	.051	.048
<i>I am aware of my trying to understand questions before I attempt to solve them.</i>	.712	-.032	-.101
<i>I check my accuracy as I progress through the course.</i>	.653	.037	.097
<i>I think through the meaning of questions before I answer them.</i>	.647	.003	-.024
<i>I am aware of the need to plan my course of action.</i>	.627	.026	.006
<i>I keep track of my progress and, if necessary, I change my techniques or strategies.</i>	.620	-.047	.031
<i>I am aware of my ongoing thinking processes.</i>	.619	-.117	-.096
<i>I try to determine what the course requires.</i>	.616	.061	.009
<i>I make sure I understand just what needs to be done and how to do it.</i>	.608	.030	.011
<i>I almost always know how much work I have left to complete for the course.</i>	.607	.087	-.035
<i>I use multiple thinking techniques or strategies to solve problems.</i>	.600	-.097	.036
<i>I determine how to solve problems.</i>	.585	-.166	.009
<i>I correct my errors.</i>	.530	-.118	-.047
<i>I check my work while I do it.</i>	.504	-.033	.014
<i>I try to understand the goals of test questions before I attempt to answer.</i>	.490	.042	-.010
<i>I am aware of which thinking technique or strategy to use and when to use it.</i>	.463	-.088	.015
<i>I am aware of my own thinking.</i>	.445	-.124	-.108
<i>I attempt to discover the main ideas of the question.</i>	.430	-.213	.035
<i>I ask myself how what I was learning relates to what I already knew.</i>	.406	-.147	.047
<i>I review any criteria posted or handed out by the professor on how to write papers effectively an...</i>	.383	.067	.151
<i>I review and carefully consider feedback I received from the professor or others in order to unde...</i>	.377	-.064	.144
<i>I make use of online materials to help me better understand grammar, how to use the appropriate f...</i>	.317	.086	.279
Q40_r	-.043	-.771	-.093
Q41_r	-.012	-.707	-.159
Q39_r	-.037	-.666	-.012
<i>The notion of thinking abstractly is appealing to me.</i>	-.026	-.642	.069
<i>I like to have the responsibility of handling a situation that requires a lot of thinking.</i>	.064	-.633	.150
Q45_r	-.109	-.624	.026
<i>I prefer my life to be filled with puzzles that I must solve.</i>	-.077	-.623	.086
Q43_r	-.053	-.614	-.005
<i>I prefer complex to simple problems.</i>	.016	-.590	.045
<i>I find satisfaction in deliberating hard and for long hours.</i>	.011	-.576	.148
<i>I really enjoy a task that involves coming up with new solutions to problems.</i>	.105	-.537	.071
Q53_r	.076	-.530	-.050
Q48_r	.103	-.513	-.156
<i>I prefer a task that is intellectual, difficult, and important to one that is somewhat important...</i>	.010	-.469	.094

— Continued on Page 21 —



Table 3. Pattern Matrix of Three-Factor Structure

— Continued from Page 20 —

	Factor		
	1	2	3
Q44_r	.010	-.424	.026
Q52_r	.038	-.412	-.046
<i>The idea of relying on thought to make my way to the top appeals to me.</i>	.137	-.411	-.007
<i>I usually end up deliberating about issues even when they do not affect me personally.</i>	.081	-.216	.042
<i>I participate in a student study group to discuss/review class concepts and lectures.</i>	-.166	-.004	.599
<i>I come to class prepared with questions about things I needed clarification on or want examples of.</i>	.182	-.021	.595
<i>I review (not just re-read) material from each chapter assigned at least two additional times, co...</i>	.130	.021	.593
<i>I review notes from class or the textbook within four hours of the end of class.</i>	-.021	-.034	.591
<i>I prepare for exams by studying with another student or group of students.</i>	-.202	.024	.580
<i>I write multiple drafts of papers that are due for a class before I turn in my paper.</i>	.144	.054	.545
<i>I ask a friend or peer to read my paper drafts out loud to me while I evaluate areas I need to im...</i>	-.110	.081	.540
<i>I ask for help on papers or other assignments from my professor or other professionals.</i>	.065	-.016	.539
<i>I share my ideas or what I learn with others either in class discussion or outside of class.</i>	-.079	-.240	.533
<i>I read my assigned readings prior to the first day of class on the assigned topic.</i>	.066	-.045	.488
<i>I go to the Writing Center for help with papers.</i>	-.050	.063	.471
<i>I use SQ4R (Survey, Question, Read, Recite, Relate, Review) or another specific strategy (e.g. mu...</i>	.045	-.185	.463
<i>I make use of concept maps or some other graphical way of recording information from lecture or t...</i>	.063	-.031	.450
<i>I set up a study schedule, adapt it as necessary, and stick with it.</i>	.232	.051	.445
<i>I take time to help or explain concepts to other students who are struggling in class.</i>	.080	-.203	.407
<i>I use underlining (sparingly) or write personal notes in the margins or on sticky notes/in my not...</i>	.127	-.055	.355
<i>I identify unfamiliar vocabulary or terminology from text or lecture; I ask in class about it or...</i>	.235	-.139	.331
<i>I review any materials available for the course on Blackboard or other sites; regularly keep up w...</i>	.309	-.011	.325
<i>I come up with examples of how the concepts I read about or are discussed in class link or apply...</i>	.195	-.169	.308

Discussion

Based on the findings of the EFA, our original hypothesis was partially supported. The researcher believed that a four-factor structure would emerge and that all of these factors would indicate moderate significant correlations. However, results of the EFA indicated a three-factor structure with a negative association between the NFC Scale and the other two subscales of metacognition. These findings will be discussed further in the following section. Support was provided for the LSSA measuring behavioral aspects of metacognition, as indicated by the moderate significant correlation between the SMI and the LSSA items, and the nature of these items. Although the researcher

anticipated that the items of the LSSA would separate from their original scale and load with either the NFC Scale of the SMI, this was not discovered. This finding makes sense in light of the items of the LSSA being based more on behavior than cognition. In retrospect, this finding provides support for the original hypothesis that metacognition is comprised of behavioral indicators and cognitive aspects.

As far as recommendations for these scales, as indicated by the EFA, some of the factor loadings were low on the various factors. Typically, we would want to reword or rework the items with factor loadings lower than 0.4. For factor one, we would want to rework the last three items that were related to the cognitive

Table 4. Reliability of Three-Factor Structure

Factor	Number of items	Cronbach's Alpha
1	23	.917
2	18	.891
3	19	.880

Table 5. Correlation Matrix of the Three-Factor Structure

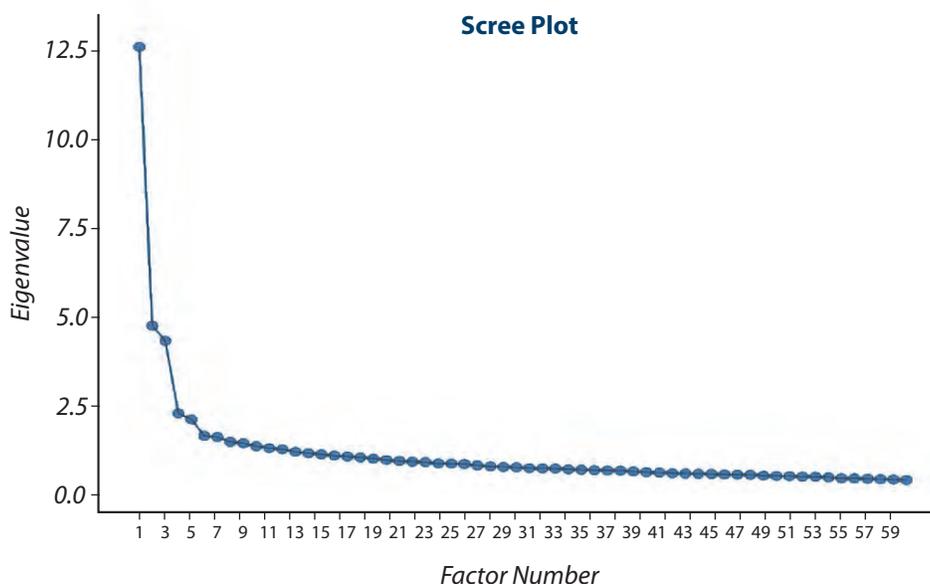
Factor	1	2	3
1			
2	-.390		
3	.306	-.205	

aspect of metacognition. As can be noted by the LSSA items in Table 1, many of these items combine multiple components and this may influence how well they load on specific factors. For example, one LSSA item that loaded on factor one reads, "I review any criteria posted or handed out by the professor on how to write papers effectively and how to avoid common mistakes." This item is comprised of at least four components. The first two components are "review criteria" either "posted

or handed out." The third and fourth components are "on how to write papers effectively" and "how to avoid common mistakes." Beyond the vagueness of the final component of this item (what are common mistakes?), this item is loaded. To obtain better factor loadings it might be a good idea to tease these items apart so that we create multiple items from this one. Examples of the new items might be, "I review criteria posted by the professor on how to write papers effectively," "I review criteria handed out by the professor on how to write papers effectively," "I review criteria posted by the professor on how to avoid common mistakes," and "I review criteria handed out by the professor on how to avoid common mistakes." By breaking this item down, we can see that there can actually be four items derived from this single loaded item. By separating the items of the LSSA in this manner, we are focusing on a more narrow range of behavior and would likely obtain better factor loadings. It is the researcher's proposal that this be done for all of the LSSA items in order to obtain better factor loadings. By doing this, the low loading items at the end of the third scale would likely show improvement. In regards to the low loading of the final item noted in the NFC Scale, I would recommend deleting this item. All of the other items of this scale demonstrate good loadings, and that is why I suggest this item to be deleted.

Although a three-factor structure emerged, the relationship between metacognition and the need for cognition is spurious, at best. The fact that these factors

Figure 1. Scree Plot that indicates the retention of either one or three factors.





had negative associations indicate that cognition is different from metacognition. These results may indicate that metacognition operates subconsciously in individuals. In reviewing the literature, we find that one aspect of metacognition that appeared in the literature in the early 1990's is the self-monitoring of ones learning and knowledge. This is often described as "feeling of knowing" (Hacker, Dunlosky, & Graesser, 1998). Feeling of knowing pertains to people's predictions about what they know, even when they cannot explicitly recall this information from memory. One interesting application of this knowledge is how individuals determine what to study for an exam. In many instances, individuals self-monitor what to study and focus on areas where they may be substandard without explicitly identifying these factors. Reder (2014) notes that much of the control of cognitive processes utilized in metacognition are implicit. That is, individuals engage in these activities without knowing (Reder, 2014). This provides support for the findings of the present study. Perhaps individuals engage in metacognition as a function of implicit memory rather than explicit memory. When asked if they engage in explicit cognitive tasks or the desire to exercise more cognition, individuals that complete coursework throughout the quarter may be averse to explicitly endorsing these items. Hence the negative relationship between the need for cognition and metacognition. Future research should attempt to identify the relationship between cognition and metacognition.

One daunting finding of the study is that only 36.25 percent of the variance of metacognition was accounted for. Reviewing the literature, Flavell (1979), indicated that metacognition is comprised of person variables, task variables, and strategy variables. Although the researcher believed that all of these aspects of metacognition were surveyed by participants, perhaps there are additional person, task, or strategy variables that were not accounted for. Future research should be directed at identifying different variables that may be influencing metacognition.

Some limitations of the present study are that the sample was largely Latino, Psychology majors, female, and with generally high GPA's. Future research should examine cognition in a variety of samples as these particular demographic variables may influence the use of metacognition. ■

Editors

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"Simple shifts in points of view can open doors to expansions of consciousness as easily as rigid dispositions can close hearts and minds to such elevated awareness. It generally depends on whether you allow fear and violence to rule your actions or whether you give wisdom, courage, and compassion the authority to do so."

— Aberjhani

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Effects of Repeated Paroxetine Exposure on Acoustic Startle in Adolescent Rats

Authors

Erin Alderson and Cynthia A. Crawford Ph.D.

Abstract

Many of the medications that are effective at relieving the symptoms of depression in adults are ineffective in adolescent populations. In addition, the most popular class of antidepressants, the selective serotonin reuptake inhibitors (SSRIs), can induce suicidal ideation in adolescents. The mechanisms responsible for this paradoxical increase in suicidal ideation are unknown, but recent research in our laboratory suggests that paroxetine, an SSRI, may increase anxiety in adolescent rats. In an attempt to extend these findings, we assessed the effects of repeated paroxetine treatment on the acoustic startle response (ASR), which is a measure of anxiety. Male and female Sprague-Dawley rats (N = 262) were injected with paroxetine (1.25, 2.5, 5 or 10 mg/kg, IP) or vehicle for 10 consecutive days starting on postnatal day (PD) 35. Rats were then tested for ASR across 5 days starting 1, 7, or 28 days after the last drug treatment. Repeated paroxetine administration had a sex-dependent effect on the body weights of adolescent rats. Male rats treated with 10 mg/kg paroxetine showed decreased weight gain, whereas females given 1.25 mg/kg paroxetine exhibited a slight increase in body weight. Male rats were more sensitive to ASR than female rats, because the magnitude of the ASR was greater for males on all test days. Exposure to paroxetine (10 mg/kg) increased habituation of the ASR, on all test days, but only in male rats. Interestingly, male rats showed increased prepulse inhibition (PPI) relative to females, with the greatest sex difference occurring 28 days after the last drug treatment. Overall, adolescent male rats exhibited less anxiety-like behavior than females after repeated paroxetine treatment, and these paroxetine-induced effects were still apparent four weeks after the last drug treatment.



Author Interview

Erin Alderson

What are you majoring in?

I'm working on a Master's degree in Experimental Psychology.

What year are you in school?

I am a first year graduate student.

Which professors (if any) have helped you in your research?

I have been working with Dr. Crawford, Dr. Koshino, and Dr. Clapper for several years, and was on one project with Dr. Ricco. Additionally, classes and discussions with several of my professors, such as Dr. Riggs, Dr. Iñiguez and Dr. Campbell, have also impacted my research

What are your research interests?

My primary interests are neurobiology, cognition, behavior, development, and pharmacology.

What are your plans after earning your degree?

I hope to go on to a Ph.D. program.

What is your ultimate career goal?

I hope to become a university professor with a research lab.



Depression during adolescence is a growing problem in our society (Kessler, 2012). According to the National Institute of Mental Health (2014), approximately 3.3% of American adolescents have experienced severe bouts of depression, with rates of depression being higher for adolescents than adults, and higher for females than males. Depression strongly impacts quality of life, is usually recurrent, and may be comorbid with other mental disorders (Kessler & Walters, 1998). The most common treatment options for depression are medication and psychotherapy (National Institute of Mental Health, 2014).

Of the many antidepressant medications, selective serotonin reuptake inhibitors (SSRIs) are the most commonly prescribed, and are generally considered safe and effective in adult populations (Gordon & Melvin, 2013; Tiihonen et al., 2006). All SSRIs function by reducing the reuptake of serotonin, keeping it active in the synapse longer, but they may have different secondary effects (Gordon et al., 2013). Specifically, SSRIs differ in their ability to increase or decrease activity of other neurotransmitter systems, and these effects may vary with age (Schmitt, Kruizinga, & Riedel, 2001).

In contrast to adults, adolescent brains are still developing, and may display greater sensitivity to chemical agents, resulting in increased neurobiological changes following repeated exposure (Eiland, Ramroop, Hill, Manley, & McEwen, 2012). These changes may be relevant to the increased incidence of depression in adolescents. For instance, following chronic paroxetine treatment, several proteins that have been implicated in depression, such as protein kinase C, are elevated in the hippocampus of adolescents but reduced in adults (Karanges et al., 2013). Paradoxical effects of paroxetine are also seen in the dopaminergic system (Karanges et al., 2011). Further, SSRIs that are effective on adults are not uniformly efficacious in adolescents (Emslie et al., 2006; Whittington et al., 2004; Varley, 2003). In particular, some SSRIs have not been tested specifically for this population, as fluoxetine is the only SSRI currently approved by the FDA for use in adolescents (Gordon et al., 2013). Aside from reduced clinical efficacy, some SSRIs may increase the risk of suicidal behavior (Varley, 2003). Specifically, the SSRI paroxetine ranks as the highest for increasing the risk for suicidal behavior in adolescents (Tiihonen et al., 2006).

The reason for reduced antidepressant efficacy in adolescence is unknown, but may relate to adolescents differing in pharmacokinetics (drug processing) and pharmacodynamics (drug effects) compared to adults (Gordon et al., 2013; Oliver, Blom, Arentsen, &

Homberg, 2011). For instance, adolescents appear to metabolize paroxetine much faster than adults, yet show anxiogenic reactions (increased anxiety) with low concentrations of the drug present in the blood (West, Ritchie, & Weiss, 2010). Conversely, fluoxetine is anxiolytic (reduces anxiety) in adults (Oh, Zupan, Gross, & Toth, 2009; Iñiguez, Warren, & Bolaños-Guzmán, 2010).

Another possible mechanism for these paradoxical effects is the action of paroxetine on immature adolescent serotonergic and noradrenergic systems (Arrant, Coburn, Jacobsen, & Kuhn, 2013). In the locus coeruleus, a brainstem structure that produces most of the norepinephrine in the brain, paroxetine decreases noradrenergic activity in adult rats, but increases this activity in juveniles, resulting in anti-depressive and pro-depressive effects, respectively (West et al., 2010). This difference may increase sensitivity to certain behavioral measures. Specifically, serotonin and noradrenaline levels are both implicated in the strength of reflexive responses connected to depression and anxiety, such as the startle reflex (Quednow et al., 2004).

The acoustic startle response (ASR) is a reflexive response to sudden intense auditory stimuli, characterized by rapid muscle contractions that may be a protective reaction produced by the sympathetic nervous system (Koch, 1996). In other words, the introduction of a loud sound primes a “fight or flight” response, resulting in tensed muscles ready for immediate response. Overall, ASR is similar between rats and other mammals, including humans, indicating that acoustic startle is a useful model to study the integration of sensory stimuli and motor processing (Koch & Schnitzler, 1997).

The magnitude of ASR may differ between individuals due to factors such as genetics, emotional state, habituation, sensitization, prepulse tones, or the use of drugs (Koch, 1999). Due to startle being a reflex with a non-zero baseline, it is possible to measure differing degrees of startle by varying the intensity of the sound, allowing for more specific assessment after the application of a treatment condition (Davis, 1998). It is also possible to measure habituation, a facet of learning that results in reduction of sensitivity to the sound after repeated experience (Quednow et al., 2004). Moreover, using a warning tone prior to the intense sound allows for measurement of the inhibition or filtering of sensory information known as prepulse inhibition (PPI), a component of sensorimotor gating deficient in some mental disorders such as schizophrenia and autism (Quednow et al., 2004; Nusbaum & Contreras, 2004).

Conditioned fear studies have shown increased startle responses when exposed to adverse stimuli



(Brown, Kalish, & Farber, 1951). Conversely, pleasant mental states and reward attenuate startle magnitude (Schmid, Koch, & Schnitzler, 1995). Many anxiety disorders, especially posttraumatic stress disorder, demonstrate increased ASR, thus validating ASR as a measure of anxiety (Koch, 1999). Although PPI and habituation may be reduced in individuals with increased suicide risk, attempts to use these aspects of ASR as a measure of suicide risk have been unsuccessful (Quednow et al., 2006).

Preadolescent children diagnosed with anxiety disorders display hypersensitive ASR, while healthy controls show little ASR difference by sex or age, possibly indicating that sex and age differences for ASR in adulthood may begin during adolescence (Bakker, Tijssen, Koelman, & Boer, 2009). The amplitude of ASR and PPI both decrease with age in rodents, though the rate of decline is strain dependent (Rybalko et al., 2012). This decrease, along with the differing rates, is similar to that seen in humans (Rybalko et al., 2012).

Sex differences in rats mimic those in humans, with males being more sensitive to ASR and PPI than females (Lehmann, Pryce, & Feldon, 1999). However, the role of the estrous cycle in ASR is unclear and results on PPI are inconsistent, though males consistently show greater startle response than females (Plappert, Rodenbacher, & Pilz, 2005). Moreover, Kinkead, Yan, Owens, and Nemeroff (2008) found that PPI response in females fluctuates based on time of day, as well as stage of their estrous cycle.

In adult rodents, increased serotonin from SSRI treatment reduces sensitivity to ASR after exposure to chronic stress and fear conditioning (Clark, Vincow, Sexton, & Neumaier, 2004; Quednow et al., 2006; Raz & Berger, 2010). Conversely, decreasing serotonin levels does not affect basal ASR, but disrupts PPI (Fletcher, Selhi, Azampanah, & Sills, 2001). However, information from animal studies on adolescent ASR after exposure to SSRIs is limited.

In 2006, de Jong et al. tested adult male rats after adolescent exposure to fluoxetine or paroxetine and found no significant differences in PPI. Nonetheless, Vorhees, Morford, Graham, Skelton, and Williams (2011) replicated the previous study with a greater dose range and found significantly increased ASR without PPI in adolescent rodents while on drug, though no increase was found when tested off drug in adulthood. In an additional study using adolescent males and females, it was found that a low dose of chronic paroxetine enhanced anxiety-like behavior when measured by acoustic startle (unpublished data, 2014).

The mechanisms behind the paradoxical effects of SSRIs such as paroxetine on adolescents are unclear. It is possible that the increase in suicidal behaviors from paroxetine exposure may be due to anxiogenic effects on adolescent populations. Therefore, the goal of this study is to examine the effect of repeated paroxetine treatment using various doses during adolescence, on acoustic startle, both during adolescence and adulthood.

Materials and Methods

Subjects

Subjects were 262 male and female rats of Sprague-Dawley descent (Charles River Laboratories, Wilmington, MA), born and raised in the vivarium at California State University, San Bernardino (CSUSB). Only one rat per litter was placed into a group consisting of 8 subjects. Any animals from the same litter and group were averaged together. On postnatal day (PD) 3, litters were culled to a maximum of 10 rat pups. Pups were housed with the dam until PD 25, when they were weaned and moved to group cages with same-sex littermates (2-6 rats per cage). A temperature of 22-24 °C and a 12-hr light/dark cycle was maintained inside the colony room, with food and water provided ad libitum. All animals were treated according to the "Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research" (National Research Council, 2010), with the research protocol approved by the CSUSB Institutional Animal Care and Use Committee.

Drug Treatment

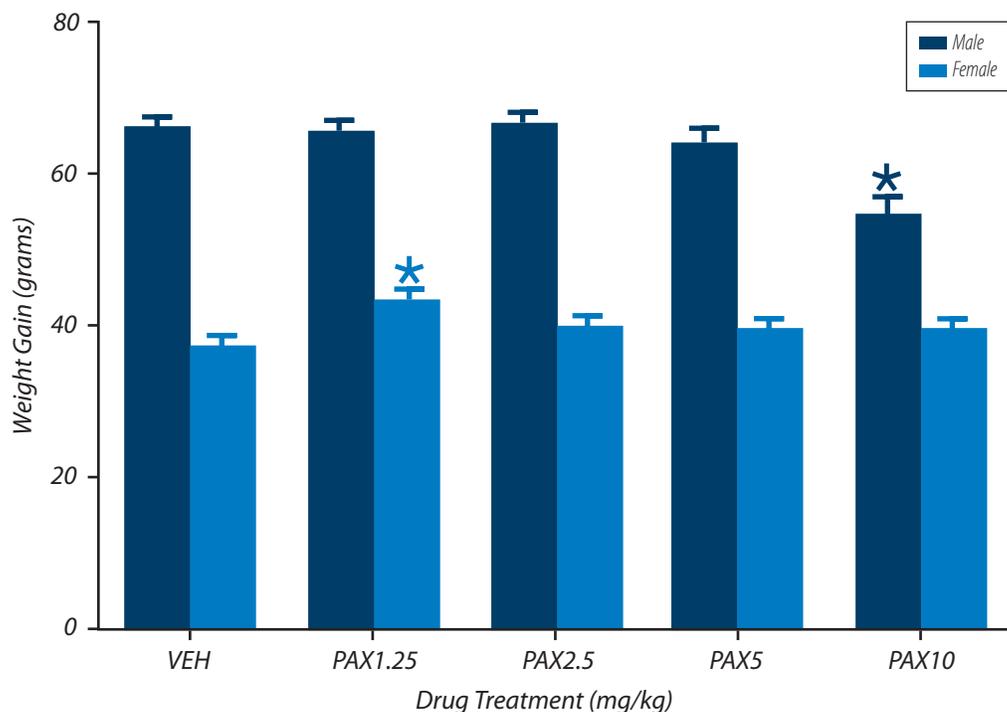
Paroxetine hydrochloride was obtained from Toronto Research Chemical, Toronto, ON, and dissolved in 50% DMSO/distilled water solution. Starting at PD 35, subjects were weighed and received intraperitoneal injection with paroxetine (1.25, 2.5, 5, or 10 mg/kg) or vehicle for 10 consecutive days. Procedure

Apparatus

Acoustic Startle. ASR testing was conducted using the Coulbourn Animal Acoustic Startle System (Coulbourn Instruments, Whitehall, PA), which consists of a weight-sensitive platform inside individual sound-attenuating chambers. A ventilating fan built into the chamber provides background noise. Group cages were transported to a quiet room adjacent to the testing room. In the adjacent room, each rat was individually placed in a ventilated holding cage, small enough to restrict extensive locomotion, and transported directly to the testing chamber.



Figure 1. Mean body weights for rats ($n = 30-35$) treated with vehicle or paroxetine (1.25, 2.5, 5, or 10 mg/kg) across PD 35–44. *Significantly different from same-sex vehicle treated rats.



Procedures

Acoustic startle/Prepulse inhibition: On one of three test days (PD 45, PD 52, or PD 73), rats were placed into a testing chamber for a 5 min acclimation period prior to the delivery of any stimulus. The session was conducted using a 70 dB white noise background. On the first 31 trials of the session, a startling stimulus (50 dB above background (or 120 dB), 40 ms) was presented alone. The remaining trials were presented in a pseudorandom order and included 12 trials (middle trials) with the startling stimulus alone (used to calculate % PPI and average startle amplitude), and 12 trials/prepulse stimulus intensity on which a prepulse stimulus (20 ms) precedes the startling stimulus by 100 ms. The prepulse stimuli was 6, 12 or 18 dB above background. Additionally, there were 8 trials on which no stimulus was presented, but activity within the chamber was still monitored. The inter-trial interval was 20 s.

Percent prepulse inhibition was calculated as $[100 \times (\text{average startle amplitude on the prepulse trials} / \text{average startle amplitude on the startle stimulus alone trials})]$. Rats were tested for four additional days but only received the 5 min acclimation and 31 habituation trials. Percent habituation was calculated as $[100 \times (\text{aver-$

age startle amplitude on the last four days startle alone trials / average startle amplitude on day one trials)].

Design and Analysis

This experiment required a total of 262 rats (2 sex x 3 test day x 8 subjects per group). Data (i.e., startle magnitude, habituation, and prepulse inhibition) were analyzed by separate three-way (sex x test day x drug condition) ANOVAs. Significant higher-order interactions were further analyzed using one- or two-way ANOVAs. Post hoc analysis of data was made using Tukey tests ($p < .05$). Data from body weight obtained during injections was analyzed using a $5 \times 2 \times 10$ (drug condition x sex x day) repeated measures ANOVA.

Results

Weight

There was a significant main effect of sex on body weight, such that adolescent male rats weighed more than their female counterparts, $F(1, 326) = 224.061$, $p < .001$. Further analysis showed a significant main effect of dose on body weight for males $F(4, 159) = 8.751$, $p < .001$ and females $F(4, 167) = 3.0$, $p =$



.020. Adolescent male rats given the 10 mg/kg dose weighed significantly less than all other drug conditions (Tukey, $p < .001$), while adolescent female rats given the 1.25 mg/kg dose weighed significantly more than vehicle controls (Tukey, $p = .007$) (see Figure 1).

Habituation

There was a significant main effect of sex on habituation of startle magnitude, $F(1,231) = 5.527$, $p = .020$. Further analysis showed no significant effect of dose for females, but a significant effect of

dose for males, $F(4,130) = 2.614$, $p = .039$, with males given the 10 mg/kg dose of paroxetine showing increased habituation on all test days (see Figure 2).

Prepulse Inhibition

There was a significant main effect of sex on PPI, $F(1,257) = 5.76$, $p = .017$. Specifically, males showed greater PPI than females for all conditions. There was a marginal interaction between sex and test day $F(2, 257) = 2.866$, $p = .059$, with the effect of sex being greatest on test day three (see Figure 3).

Figure 2. Mean habituation was determined by averaging the pulse alone trials from days 2-5 as a percentage of the first day pulse alone trials. Rats had been treated with paroxetine (1.25, 2.5, 5, or 10 mg/kg) or vehicle from PD 35 to PD 44 and tested for ASR starting on PD 45, PD 52, or PD 73. *Indicates a significant difference from same sex vehicle-treated rats.

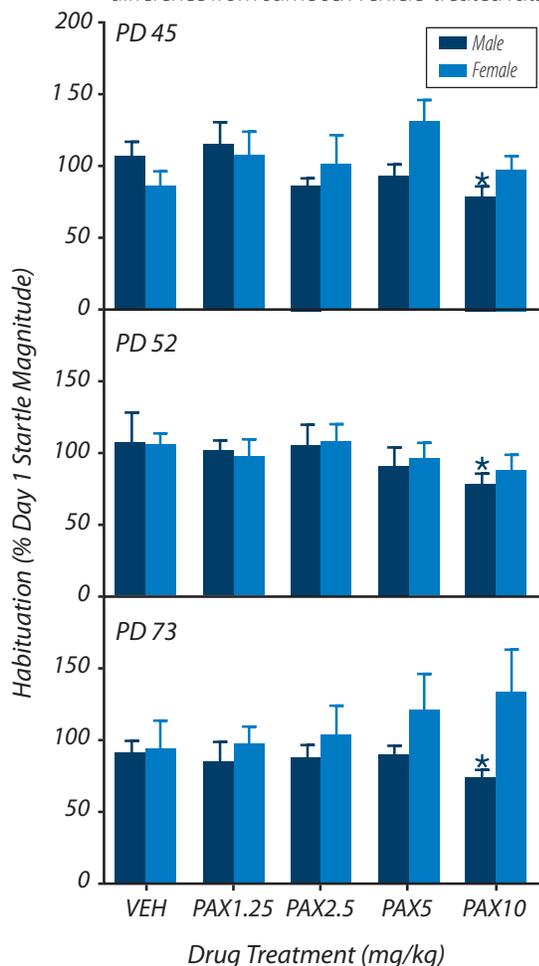
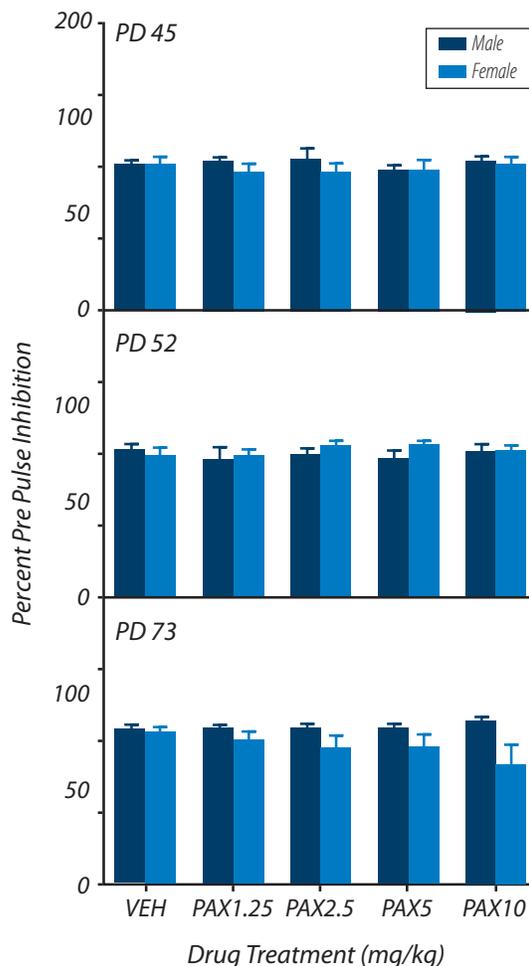


Figure 3. Pre Pulse Inhibition was determined by averaging pre pulse trials as a percentage of pulse alone trials. Rats had been treated with paroxetine (1.25, 2.5, 5, or 10 mg/kg) or vehicle from PD 35 to PD 44 and tested for ASR starting on PD 45, PD 52, or PD 73.





Discussion

It was expected that repeated exposure to paroxetine in adolescent rats would result in increased anxiety-like behaviors as measured by ASR. Instead, paroxetine resulted in decreased anxious behaviors in adolescent male rats, but no effect in adolescent female rats. Additionally, both a sex- and dose-dependent effect of paroxetine was found on body weight. Specifically, it was found that paroxetine decreased weight gain and increased habituation of the ASR in adolescent male rats, while causing a slight weight gain in adolescent female rats and no effect on habituation of the ASR.

As expected, male rats weighed more than female rats; however, repeated paroxetine administration had a sex-dependent effect on the body weights of adolescent rats. Distinctively, male rats treated with 10 mg/kg paroxetine weighed significantly less than their vehicle-treated counterparts, while females given 1.25 mg/kg paroxetine exhibited a slight but significant increase in body weight compared to their vehicle-treated counterparts. Pereira-Figueiredo et al. (2014) found a similar pattern in adolescent male and female Wistar rats following treatment with the SSRI sertraline, but the effect was not apparent until PD 90. Additionally, a recent study also found attenuated weight gain for males at 5 mg/kg of PAX from PD 30-59 (unpublished data, 2014). In our study, the weight decrease in males was substantial, as those treated with the high dose weighed 20% less than vehicle-treated controls. This paroxetine-induced reduction in weight in male rodents may have long lasting impacts on overall health (Gaukler et al., 2015). Yet, it is not clear if this weight loss in adolescent rodents is also apparent in adolescent humans.

Most human research on SSRI-induced weight changes is focused on adult subjects. Of the few studies in non-adult populations, one found no differences in weight change between children and adolescents treated with paroxetine, but did not compare sex (Findling et al., 2006). Conversely, Strobel, Warnke, Roth, and Schultze (2004) found weight gain in female adolescents treated with SSRIs, but no changes in male weight. Using primarily female subjects, Mansoor et al. (2013) also found that paroxetine caused adolescent weight gain, though some subjects lost weight, and no mention was made of sex differences. However, none of these studies had equal groups of males and females, therefore it remains unclear whether SSRI-induced weight changes in adolescents are sex-dependent.

Male rats were more sensitive to ASR than female rats in our study, as the magnitude of the ASR was

greater for males on all test days. These findings are consistent with previous research, which has shown greater ASR in males than females (Lehmann, Pryce, & Feldon, 1999; Plappert, Rodenbucher, & Pilz, 2005). Research also indicates that the amplitude of ASR decreases with age (Rybalko et al., 2012). We did not see a significant decline in ASR magnitude between test days, though our subjects may have been too young to display such differences. Additionally, the reduction of ASR magnitude with age may be strain-dependent (Rybalko et al., 2012).

Contrary to our expectations, exposure to paroxetine (10 mg/kg) increased habituation of the ASR (i.e., the magnitude of the ASR decreased from the first to the fifth test day) on all test days, but only in male rats. Some research indicates that SSRI treatment reduces habituation in adult human subjects of both sexes (Quednow et al., 2004). Other studies have found that SSRI treatment restores deficits in habituation in prenatally-stressed female rats (Pereira-Figueiredo et al., 2014). Interestingly, sex differences in ASR are not present until the onset of puberty, at which point females display increased fear-potentiated ASR compared to males (Schmitz, Grillon, Avenevoli, Cui, & Merikangas, 2014). However, there is very little research on SSRI effects on habituation and even less that includes sex as a factor, indicating a need for further research on this topic.

In human participants, studies on sex-based differences in response to SSRIs, yield inconsistent results (Baca, Garcia-Garcia, & Porras-Chavarino, 2004). Generally, women appear to respond better to SSRI treatment than men or older women, possibly due to modulatory effects of estrogen on serotonin (Baca, Garcia-Garcia, & Porras-Chavarino, 2004; Marazziti et al., 1998; Serretti, Gibiino, & Drago, 2011). High doses of estrogen alone have been shown to have anti-depressive properties, which suggests that estrogen may increase the efficacy of SSRI treatment (Keating, Tilbrook, & Kulkarni, 2011). Moreover, estrogen influences neurotrophic factors, which play a role in depression (Borrow & Cameron, 2014). For example, in males and females, there are basal and stress-induced differences in the rate of neurogenesis in the hippocampus, an area associated with depression (Hillner, Neumann, Couillard-Despres, Aigner & Slattery, 2013). Such differences warrant further investigation into this topic and into sex-based differences in the onset, duration and magnitude of depressive symptoms.

Paroxetine has a stronger binding affinity for serotonin transporters in young human females than in young



males, but the magnitude of this effect is negatively correlated with age in females and positively correlated with age in males (Marazziti et al., 1998). Nonetheless, in rats, we found a stronger anxiolytic response on all test days in males, but not females, treated during adolescence with the high dose of paroxetine. Interestingly, Tomita et al. (2014) appraised the response curve in human patients with major depressive disorder and found that males who showed high initial response to paroxetine continued to respond positively to paroxetine treatment, whereas females who showed high initial response did not. Additionally, Ordyan, Pivina, Fedotova, and Akulova (2013) found no reduction of anxious behavior in females, but an age-dependent effect on males following SSRI treatment. Specifically, younger males showed reduced anxiety with fluoxetine treatment, while older males showed increased anxiety (Ordyan, Pivina, Fedotova, & Akulova, 2013). This difference in efficacy for older and younger males may indicate that hormones other than estrogen play a role in SSRI effect, or that males and females may differ in SSRI binding affinity for serotonin, as well as other neurotransmitters.

There are few studies on the effects of adolescent SSRI treatment on ASR/PPI. De Jong et al. (2006) did not find significant differences in ASR or PPI when rats treated with SSRIs during adolescence were tested on ASR/PPI as adults. Conversely, Vorhees, Morford, Graham, Skelton, and Williams (2011) found increased ASR with no effect on PPI in adolescents on drug, but only after combining all paroxetine groups before comparing them to controls. As an additional consideration, both of these studies used oral gavage for drug administration. Rodents often struggle and show stress-induced behaviors following oral gavage (Hoggatt, Hoggatt, Honerlaw, & Pelus, 2010). Therefore, it is possible that stress from an oral gavage prior to testing may have influenced the paroxetine-induced effects on ASR reported by Vorhees et al. (2011).

Analysis of the PPI scores showed a marginal interaction between sex and test day. Specifically, male rats showed increased PPI relative to females, with the greatest sex difference occurring 28 days after the last drug treatment. Some studies have shown that males are more sensitive to PPI compared to females (Lehmann, Pryce, & Feldon, 1999), whereas other studies have shown that sex differences in PPI are inconsistent and may be related to age, time of day, or the female estrus cycle (Gebhardt, Schulz-Juergensen, & Eggert, 2012; Plappert, Rodenbacher, & Pilz, 2005; Kinkead, Yan, Owens, & Nemeroff, 2008). Additionally, estrogen appears to prevent disruptions in PPI (Gogos et al.,

2006). This may indicate that the differences we found in PPI are due to gender-based developmental differences, rather than an effect of paroxetine treatment.

It is surprising that an increased dose of paroxetine showed no effect on PPI in our study. Paroxetine has anticholinergic properties, which may influence PPI measurements (Riedel, Eikmans, Heldens, & Schmitt, 2005). For instance, Ukai, Okuda, and Mamiya (2004) found significantly reduced PPI in male mice following treatment with the muscarinic antagonist scopolamine without reduction of ASR amplitude. Additionally, these anticholinergic properties of paroxetine are associated with short-term memory deficits post-treatment, which may affect habituation (Riedel, Eikmans, Heldens, & Schmitt, 2005). It is possible that the anticholinergic actions of paroxetine occur only through specific muscarinic receptors, but further research would be required to determine if this is the case.

Overall, our results showed that adolescent male rats exhibited less anxious behavior than females after repeated paroxetine treatment, and these paroxetine-induced effects were still apparent four weeks after the last drug treatment. The role of estrogen and SSRIs is not clear, suggesting that measurement of estrogen levels might give additional insight into our results. Moreover, paroxetine treatment over a greater time-period, such as 30 days, may show different results.

One of the difficulties when looking at studies of the efficacy of SSRIs is a lack of uniformity between studies. For instance, groups divided by sex may include members that range from adolescence to old age (Keers & Aitchison, 2010), whereas some assess age differences within adult populations (Serretti, Gibiino, & Drago, 2011). As a further complication, SSRI effects on other neurotransmitter systems are poorly understood (Riedel, Eikmans, Heldens, & Schmitt, 2005). This lack of uniformity between studies makes direct comparison difficult, and highlights the need for additional research on sex and age differences in SSRI treatment. ■

“Never take the obvious for granted. Once upon a time, it was so obvious that a four-pound rock would plummet earthward twice as fast as a two-pound rock that no one ever bothered to test it. That is, until Galileo Galilei came along and took ten minutes to perform an elegantly simple experiment that yielded a counterintuitive result and changed the course of history.”

— V.S. Ramachandran



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Religiosity, Depression, Anxiety, and Stress in European and Hispanic Americans

Authors

Jennifer Marie Popoff

Abstract

The present study was conducted to assess whether religiosity serves as a protective buffer against depression, anxiety, and stress in European and Hispanic Americans. Few studies of European and Hispanic American college students have examined the effect of religiosity/spirituality on depression, anxiety, and stress levels. If religiosity serves as a protective factor against depression, anxiety, and stress, it may be one influence in the comparably lower rates of depression and anxiety among Hispanic Americans, who typically endorse greater religious beliefs and involvement than their European American peers. The present study hypothesized that Hispanic college students would endorse lower levels of depression, anxiety, and stress than European American college students, and that participants with greater religious beliefs and activity would report less depression, anxiety, and stress than their less religious counterparts. Analyses of variance were conducted and results indicated no significant differences across ethnic groups on levels of depression, anxiety, or stress. A significant finding in the predicted direction was observed for religiosity and reported depression. No other significant results were found for religiosity and anxiety or stress. Results are discussed within the context of religious/spiritual beliefs and their impact on psychological adjustment and well-being.



Author Interview

Jennifer Popoff

What are you majoring in?

Clinical/Counseling Psychology

What year are you in school?

First year graduate student

Which professors (if any) have helped you in your research?

Dr. Mori at California State University, Fullerton was a huge help in guiding me through my McNair Scholars undergraduate Research Project.

What are your research interests?

Mental health correlates, depression, anxiety, prevention of psychopathology, coping, religiosity, strengthening community well-being, underrepresented populations, and cross-cultural psychology

What are your plans after earning your degree?

Upon completion of my Master's Degree, I plan to continue my education by pursuing a Psy.D.

What is your ultimate career goal?

My ultimate career goals are to be a practicing Psychologist, contribute to psychological research, and serve as a mentor supervising trainees and research assistants.



Religion is a fundamental component of American life, as approximately 92% of all Americans believe in God (Pew Forum on Religion & Public Life, 2008). The vast majority of Americans declare an allegiance to God and the influence of religiosity varies across multiple aspects (e.g. psychological health, physical health, well-being, life satisfaction) (Masters, Lensegrav-Benson, Kercher, & Hill, 2005; Merrill, Steffen, and Hunter, 2012). There is a plethora of research assessing the relation between religiosity and mental health and investigators have demonstrated positive associations between religiosity and psychological health (Ellison, 1991; Garter, 1996; Koenig, 1994; Pargament, 1997). However, few studies have examined the impact of religiosity within a cultural context, and the studies that have primarily focused on Whites and African Americans (Cook, Pearson, & Thompson, 2002; Chatters, Taylor, Bullard, & Jackson, 2008; Neeleman, & Lewis, 1990). Furthermore, there have been few investigations of an empirical nature exploring the impact of religiosity on psychological distress (i.e., depression, anxiety, perceived stress) across ethnic groups (European, Hispanic Americans). The present study evaluated the effects of religious/ spiritual beliefs on depression, anxiety, and stress levels of European and Hispanic American college students. This study could shed new light on the protective effects of religiosity on psychological health across ethnically diverse groups.

Hispanics are the largest underrepresented ethnic group in the U.S., and are over-represented within the lower socio-economic groups (U. S. Census Bureau, 2004). Lower socio-economic status has been linked to higher prevalence of psychopathology (Kessler et al. 1994; Dohrenwend et al. 1992). In general, Hispanic Americans have greater financial hardships than non-ethnic minorities, less utilization of mental health resources, and overall receive poorer quality healthcare than European Americans (U.S. Department of Health & Human Services, 1999). Based on these observations, Hispanic Americans should demonstrate higher rates of mental health problems compared to European Americans due to their (generally) lower socio-economic status, limited resources, and underutilization of psychological treatment.

The Centers for Disease Control and Prevention (CDC, 2010) conducted a study and found European Americans to have greater rates of depression, anxiety, stress, and other psychological symptoms compared to their Hispanic American counterparts, but there is a lack of research to explain the proportionately higher rates of mental illness in European Americans. Researchers comparing European and Hispanic Americans have

examined mental illness by looking at social class, acculturation, and marital status, however the differential rates of psychological disorders are not fully explained by these factors. A review of the literature consistently demonstrates variation between the two ethnic groups in rates of psychopathology, but has not adequately identified factors that account for these differences. Mental illness is widespread in the United States (annual prevalence of psychiatric illness is 26% in the general population) (Kessler, Chiu, Demler & Walters, 2005), and rates of depression, anxiety, stress, and other psychological symptoms continue to rise (Substance Abuse & Mental Health Services Administration [SAMSA], 2010). Based on the aforementioned observations, it is important to be aware of factors that influence psychological health.

In a study conducted by Merrill, Steffen, and Hunter (2012), results indicated that non-religious European and Hispanic Americans experience lower life satisfaction and pro-religious individuals had higher life satisfaction. This shows religiosity plays a pivotal role in psychological well-being among Hispanic and European Americans. According to Rote and Starks (2010), Hispanic Americans endorse greater religious beliefs and involvement than their European American peers. Robinson, Bolton, Rasic and Sareen (2012) found that religiosity specific to particular ethnicities (Chinese, Vietnamese, and Japanese) provide a greater protective buffer against psychopathology in comparison to their less religious counterparts. If religiosity exerts a protective effect against depression, anxiety, and stress, it may be one factor in the comparably lower rates of depression and anxiety among Hispanic Americans.

Present Study

The current study explored the association between religiosity and depression, anxiety, and stress across ethnicity (e.g., European and Hispanic American). It was hypothesized that Hispanic college students would endorse lower levels of depression, anxiety, and stress than European American college students.

Hypothesis 1.

Hispanic American college students will endorse lower levels of depression than their European American peers.

Hypothesis 2.

Hispanic American college students will endorse lower levels of anxiety than their European American peers.



Hypothesis 3.

Hispanic American college students will endorse lower levels of stress than their European American peers.

It was further hypothesized that participants with greater religious beliefs and involvement would report less depression, anxiety, and stress than their less religious counterparts.

Hypothesis 4.

Participants that endorse high levels of religiosity will report less depression than their less religious peers.

Hypothesis 5.

Participants that endorse high levels of religiosity will report less anxiety than their less religious peers.

Hypothesis 6.

Participants that endorse high levels of religiosity will report less stress than their less religious peers.

If higher levels of religious participation and beliefs do contribute to a significant decrease in depression, anxiety, and stress of European and Hispanic American participants, spiritual/religious beliefs and activities will demonstrate an impact on psychological adjustment and well-being. Moreover, religious beliefs and practices may have value in potentially helping depressed, anxious, and stressed populations recover by providing a sense of hopefulness, perseverance, and social support.

Method

Participants

European and Hispanic American Introductory Psychology students from California State University, Fullerton were recruited to participate in the current study. The age of the participants ranged from 17 to 51 with a mean age of 19.73 years and a standard deviation of 3.61 (Hispanic American mean age = 19.44, SD = 2.56; European American mean age = 20.21, SD = 4.86). Self-identification as either European or Hispanic American was a requirement for the study (N = 665). Of the participants, 250 (37.5%) were European American and 416 (62.5%) were Hispanic. Undergraduate students served as a convenient sample as California State University, Fullerton encompasses a total population of 37,677 students and of those students the majority are Hispanic (35%) and White (27%). Due to the majority of subjects being Psychology majors, a predominantly

female major at the university, 600 participants were female (90.1%) and 65 participants were male (9.8%). Religious affiliation was largely Catholic (52.9%) and Christian (29.3%), with the remaining participants identifying as Agnostic/Atheist (9.5%), Coptic Orthodox (3.2%), Judaism (0.8%), Mormon (0.8%), Muslim (0.5%), Buddhist (0.3%) or Other (unspecified; 3.0%).

Measures

Participants completed various self-report questionnaires examining religiosity/spirituality beliefs, practices, and social support derived from religious community, depression, anxiety, stress and a general demographic form.

Religious beliefs.

Participants completed the 15 item Systems of Belief Inventory (SBI-15R), a shortened version of the Systems of Belief Inventory (Kash et al., 1995; Holland et al., 1998). The SBI-15R was used as a means of assessing religiosity/spirituality beliefs (e.g., "I believe God will not give me a burden I cannot carry") and practices (e.g., "I pray for help during bad times"), and the social support derived from a community sharing religious beliefs (e.g., I seek out people in my religious or spiritual community when I need help) (Holland et al., 1998). Participants responded to each item on a four-point Likert scale ranging from 0 (Strongly disagree) to 3 (Strongly Agree). The SBI-15R contains two subscales: beliefs and practices (10-items) and social support (5-items) as well as a total score. Higher scores are indicative of greater levels of religiosity/spirituality beliefs and practices and social support. Previous studies by Holland et al., (1998) found the SBI and the SBI-15R to have a very high correlation ($r = .98, p < 0.001$). Internal consistency of items on the SBI-15R has been found to be high ($\alpha = .93$) indicating good internal consistency, good test-retest reliability, and acceptable convergent, divergent, and discriminant validity (Holland et al., 1998).

Depression, Anxiety, and Stress.

The 21-item Depression, Anxiety, and Stress Scale (DASS-21; Daza, Novy, Stanley & Averill, 2002) was used for the purpose of measuring depression, stress, and anxiety. The DASS-21 is a shortened version of the DASS, a 42-item scale that was constructed by Lovibond and Lovibond (1995). The DASS-21 items are answered using a 5-point scale ranging from 0 (did not apply to me at all) to 4 (applied to me very much or most of the time) to rate the extent that the participant experienced each cognitive, affective, or somatic symptom over the past week. The DASS-21



contains three subscales with 7-items for each emotional state: depression, anxiety, and stress, with the combined total scores ranging from 0-84. Higher scores are indicative of greater levels of distress. Internal consistency assessments yielded Cronbach's alphas of .94 for Depression, .87 for Anxiety, and .91 for Stress (Anthony et al., 1997). DASS-21 subscales highly correlated with the Beck Anxiety Inventory (Beck, Epstein, Brown & Steer, 1988), Beck Depression Inventory-II (Beck, Steer & Garbin, 1988), and State Trait Anxiety Inventory (Anthony et al., 1998), which assessed similar constructs. DASS-21 proved to have good reliability, convergent and divergent validity, and to be an adequate measure of depression, anxiety, and stress (Lovibond & Lovibond, 1995; Norton, 2007).

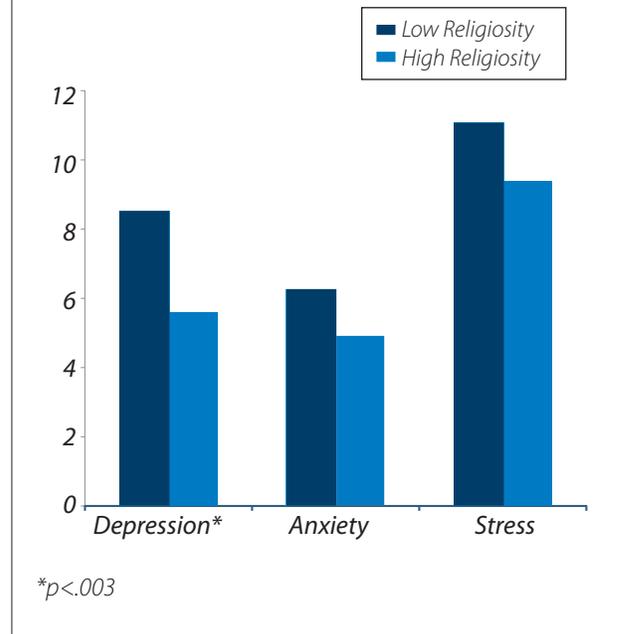
Demographic information.

Participants provided a range of demographic information that included items inquiring as to gender, race/ethnicity, family generation status, yearly income, religion, educational level, major, and prior counseling/psychotherapy experiences. Of the demographic information that was collected, the most pertinent information gathered was ethnicity to verify the participants could be categorized as European or Hispanic American.

Procedure

Subjects were recruited from the SONA research management system, and a pool of Psychology 101 students. Participation was open to all individuals who were either European or Hispanic American and at least 18 years of age. The present study was conducted in a designated research laboratory by a trained experimenter. All experimenters were ethnically diverse undergraduate psychology students/research assistants who were thoroughly trained on the research protocol including the procedures and materials under the direction of a faculty research advisor. Participants completed the study in small groups (no larger than 6 subjects per trial) to minimize distractions and to avoid overcrowding, circumstances that may have influenced their responses to the questionnaires. All participants were informed of the nature of the research study and provided informed consent. Subjects completed a series of self-report questionnaires, which took about 50 to 60 minutes to complete. Participants were thanked and debriefed after completing the study. In exchange for participation, Psychology students were given course credit. Ethical and legal approval was obtained for this study from the California State University, Fullerton Institutional Review Board (IRB). Each participant was assigned a code number to protect the

Figure 1. Depression*, Anxiety, & Stress Across Low and High Religiosity.



anonymity and privacy of participants. Code numbers were labeled on files with the true identity of participants enclosed in files on informed consent forms. Files are stored in filing cabinets in a locked laboratory and are kept for up to five years and later destroyed. Code numbers and data were inputted in a file of the Statistical Package for the Social Sciences – Version 20 (SPSS-20) and statistical data analyses were conducted.

Statistical Analyses

To examine whether European and Hispanic Americans religiosity/ spirituality beliefs and practices differed in levels of depression, anxiety, and stress, between-groups, Analyses of Variance (ANOVA) were conducted. The first ANOVA was performed across ethnic group. The second ANOVA was conducted across religiosity categorization. There were two aspects related to participants that were being investigated. One was ethnicity. Participants' self-identification was the basis of assigning ethnic affiliation. It was also decided to categorize participants into groups along the other variable of interest (religiosity), in order to do means-comparison tests.

Independent and Dependent Variables.

The independent variables were ethnicity (i.e., European, Hispanic Americans) and level of religiosity beliefs (high v. low). A median split divided participants into high religiosity and low religiosity groups based on



their levels of overall religiosity as reflected on Systems of Beliefs Inventory (SBI-15R; Holland et al., 1998). Dependent variables were (1) depression, (2) anxiety, and (3) stress. Each of these were measured by scores on their respective subscale scores from the 21 item shortened version of the Depression, Anxiety, and Stress Scale (DASS-21; Daza, Novy, Stanley & Averill, 2002)

Results

A between-groups ANOVA was performed across ethnicity (Hispanic American, European American) for depression, anxiety, and stress as indicated by DASS-21 subscale scores for each. For all three dependent variables, no significant findings were demonstrated. In regards to depression, the mean score for Hispanic American respondents on this subscale was 6.51, standard deviation of 8.13, while the mean score for European American participants was 6.57, standard deviation of 8.50; $F(1, 643) = 0.01, p = .92$. In regards to anxiety, the mean score for Hispanic American respondents on this subscale was 5.51, standard deviation of 6.34, while the mean score for European American participants was 5.54, standard deviation of 6.85; $F(1, 649) = 0.004, p = .95$. In regards to stress, the mean score for Hispanic American respondents on this subscale was 9.75, standard deviation of 8.51, while the mean score for European American participants was 10.43, standard deviation of 8.93; $F(1, 645) = 0.96, p = .33$. Results did not provide evidence that participants' subjective emotional ratings varied as a function of their ethnicity. Thus, Hypotheses 1, 2, and 3 were not supported.

To investigate if participants with greater religious/spiritual beliefs and practices reported less depression, anxiety, and stress than their less religious/spiritual counterparts, an Analysis of Variance (ANOVA) was conducted. Independent variable was high v. low religiosity. Level of religiosity was obtained by using a medium split of self-reported levels of religiosity, e.g., scores on the SBI-15R. Dependent variables were (1) depression, (2) anxiety, and (3) stress, as represented by DASS-21 subscale scores for each. Results for depression were significant ($F(1, 384) = 5.62, p = .018$) and means (the mean score for High Religiosity participants on this subscale was 5.55, standard deviation of 6.96, while the mean score for Low Religiosity participants was 7.49, standard deviation of 8.98; see Figure 1) were in the predicted direction. Thus, Hypothesis 4 was supported. However, there were no significant differences found for high and low religiosity and anxiety ($F(1, 388) = 1.30, p = .255$); High Religiosity $M = 5.28, SD = 6.01$ and Low Religiosity $M = 6.05, SD = 7.25$ (see Figure 1). Finally, no significant differences emerged

for high and low religiosity and stress ($F(1, 385) = .730, p = .39$; High Religiosity $M = 10.01, SD = 8.46$ and Low Religiosity $M = 10.79, SD = 9.45$. See Figure 1). Consequently, Hypotheses 5 and 6 were not supported.

Discussion

Most Americans have a religious/spiritual life and a large and growing number of empirical studies demonstrate a direct relationship between religiosity/spirituality and positive health outcomes (Ellison, 1991; Koenig, 1994; Pargament and Brant, 1998). However, few empirical studies have been conducted assessing the effects of religiosity on psychological distress between European and Hispanic Americans. The present study evaluated such aspects. Specifically, it was further investigated whether Hispanic Americans experienced and endorsed lower levels of depression, stress, and anxiety in comparison to European Americans as a function of religious and spiritual beliefs, participation, and social support. Additionally, religiosity was examined across all participants to determine whether greater religious beliefs and participation serve as a buffer against depression, anxiety, and stress.

Ethnicity and Depression, Anxiety, and Stress

Contrary to Hypotheses 1, 2, and 3, there were no significant results between ethnicity and depression, anxiety, and stress. Hispanic American college students did not endorse lower levels of depression, stress, and anxiety than their European American peers. No significant differences between European and Hispanic Americans and reported depression, anxiety, and stress were demonstrated. Findings may be explained in the context of the high degree of acculturation amongst our Hispanic American college sample. The participants of Hispanic American ancestry were almost uniformly comfortable with mainstream American values, beliefs, traditions, and activities. While biculturalism was not assessed, it is assumed that many of our Hispanic American participants shared similar life experiences (i.e., college) and common views of healthcare and coping as their European American counterparts. Thus, perhaps the lack of differences of psychological distress across ethnic group is due to the high degree of acculturation of our Hispanic American sample and their more likely cultural similarity than differences from their European American peers.

Religiosity and Depression, Anxiety, and Stress

As hypothesized, participants who endorsed high levels of religiosity did report less depression than their less religious peers. Results demonstrated that people



who possess greater religious beliefs and involvement did not experience depression symptoms to the same extent as their less religious counterparts. Results supported the growing body of literature that reports an association between religiosity and psychological health (Ellison, 1991; Koenig, 1994; Pargament and Brant, 1998). When experiencing significant stressors in life, people tend to turn to their religious beliefs and become more involved in religious activities, such as praying or going more frequently to church (Gall & Guirguis-Younger, 2013). During a time of significant hardships, the social support derived from a religious community and turning to God may prevent or reduce one's level of depression by giving their worries to God, so to speak, and relieving one's feelings of hopelessness and other cognitive, affective, and somatic states often associated with depression that may otherwise arise.

Contrary to what was predicted for Hypothesis 5 and 6, participants who endorsed high levels of religiosity did not report less anxiety or stress than their less religious peers. Although some studies (Ellison, 1991; Koenig, 1994; Pargament and Brant, 1998) have shown that religiosity is a protective factor against some aspects of psychological health, the results of the present investigation indicated that this was not the case for stress and anxiety. Hypotheses 5 and 6 may not have been supported due to the fact that all participants were college students and likely experiencing similar levels of life stress while dealing with similar sources of anxiety. For instance, regardless of degree of religiosity, all participants faced academic stress and dealt with concerns about academic performance (i.e., test anxiety). While religious activities like prayer may help to alleviate symptoms of depression, praying will not necessarily help to decrease test anxiety or the stress of academic performance, such as in writing a paper. In these cases, religiosity may not have had the same protective benefits against perceived stress and anxiety for the participants as may have occurred for depression.

The current study attempted to extend available research on religiosity, depression, stress, and anxiety in European and Hispanic Americans. While most studies on religiosity and psychological health do not focus on psychological distress (i.e., depression, stress, anxiety) without regard to possible ethnic and cultural differences (i.e., European, Hispanic Americans), the present study investigated religiosity and depression, stress, and anxiety between European and Hispanic Americans. This study supported previous research demonstrating that religiosity impacts levels of psychological health (i.e., depression). Levels of

religiosity did not show to have an effect on stress and anxiety within our sample of European and Hispanic American participants, and ethnic categorization as European or Hispanic American did not demonstrate perceived differences in depression, anxiety, and stress.

Limitations

This study was conducted with California State University, Fullerton Introductory Psychology college students as participants, and the sample differs in religious preference in relation to the general U.S. population. Therefore, the present results may not generalize to the total U.S. population given these differences in representation. Additionally, 90.1% of participants identified as female, which is not representative of the population at large. Data were self-report in nature and responses may not have been accurate due to participants self-rating their levels of depression, anxiety and stress or answering questions while concerned about social perceptions (i.e., social desirability bias).

Future Directions

Such research endeavors as the present study will hopefully shed new light on the protective effects of religiosity on self-reported depression of European and Hispanic American college students. College students are at a significantly greater risk of suffering from psychological disorders such as depression than the general U.S. adult population (Ibrahim, Kelly, Adams, & Glazebrook, 2012). Further studies that identify protective factors against psychological disorders for this high-risk population are needed. The current study may be expanded to gather data from universities nationwide in hopes of obtaining a representative sample of U.S. college students. Focusing on increasing the generalizability of results by including a wider range of participants and more diverse religious orientations representation may be helpful. Due to the limited empirical literature on religiosity, depression, stress, and anxiety in ethnically diverse college students, future studies are needed to explore the relationships between religiosity, psychological health, and contextual factors, such as ethnical, cultural, and religious preference in college students. ■

“And the peace of God, which surpasses all understanding, will guard your hearts and your minds in Christ Jesus.” ~Philippians 4:7



APPENDIX A: Informed Consent Statement for Research Participants

(Please note: You must be at least 18 years of age in order to consent to participate in research projects. If you have any questions about signing up for the study, when or where the study trial is being held, canceling or rescheduling a meeting, obtaining your credits on Sona-System, etc., call Dr. Mori's research lab at (714) 278-4508.

This study, entitled "Stress Management Techniques", is being conducted by Maricela Aceves, a graduate student in the M.S. Program, under the supervision of Dr. Lisa Mori, Associate Professor of Psychology at California State University, Fullerton. (Dr. Mori is a full-time tenured faculty member in the Psychology Department. She is a clinical psychologist who has also been a licensed psychologist in California since 1989.) You are volunteering to participate in this survey focusing on your stress, anxiety, mood, social support, perceptions of mental illness and psychotherapy. Participation involves reading and answering questions related to these topics, as well as providing background information about yourself, such as your gender, age, education level, household income, ethnicity, as well as your personal preference for language, food, etc. and about your interactions with your own and other ethnic groups. You will also be asked about your own experiences, if any, with mental illness and psychotherapy, including diagnoses received, medications prescribed, and any psychiatric hospitalizations that may have occurred. Results of this study may be helpful to mental health professionals in improving outreach and psychological services to the general public.

There will be three technique groups in this study: music, thought process, and physical awareness. You will be randomly assigned to one of these three groups. You will meet with an experimenter and 2 to 5 other participants in H-624J or other designated room on 4 separate occasions. During each meeting you will be asked to complete paper-and-pencil questionnaires. The first and fourth meeting will last approximately 60 minutes each. The second and third meeting will last approximately 30 minutes each. The first twenty minutes of the second and third meeting will be spent meeting with an experimenter. During the last 10 minutes of these meetings you will be asked to complete some questionnaires. The total time commitment (and experiment credits) for participating in this study is 3 hours.

Your participation in these studies is entirely voluntary. You may refuse to answer any or all questions or terminate your participa-

tion at any time without penalty. If you choose not to participate after reading this consent form, you will not receive experiment credit. If you end your participation prematurely, you will receive credit for the time of study participation completed (to the nearest half hour). These studies will take place between February 4, 2014 and December 12, 2014. If you have questions regarding your rights as a human participant in research, please contact the CSUF Institutional Review Board Coordinator, at (714) 278-7640; her office is located in MH-175. If you should become distressed during or after your participation in the study, you may contact Dr. Mori, the principal investigator and a licensed clinical psychologist, at lmori@fullerton.edu or by telephone at (714) 278-3761. If you are a student at California State University, Fullerton, you may also contact the Counseling and Psychological Services (CAPS) Center for assistance at (714) 278-3040. CAPS is located in the Student Health Center - East. Any incidents of significant distress that occur as a result of participating in this study, although unlikely, will be reported by Dr. Mori to the appropriate parties (e.g., CAPS for crisis assistance during hours of operation; 911 after hours).

The information you provide will be confidential and used for research purposes only. No one will be able to link the information you provide to your identity in any subsequent public presentations or publications, as no names will ever be used. Furthermore, your name will not appear anywhere on the completed protocol. You will be asked to use the last 4 digits of your campus wide identification number (CWID) as your code number on the protocols. Any hard copies of the data will be shredded under the supervision of Dr. Mori within one year from the date of data collection. All electronic copies of the data will be kept on Dr. Mori's password protected lab and office computer hard drives and Maricela Aceves' password protected computer hard drive for up to ten years post-publication or post-presentation of these data. All data/ records will be kept confidential to the extent provided by law.

Thank you for your research participation.

"I have read the above and understand my rights as a research participant. I understand that I can decline to answer any and all questions without penalty. However, if I decline to participate in this study, I will not receive experiment credit. If I choose to end my participation in the study prematurely, I will receive credit for participation time completed. Furthermore, I understand that the items in the questionnaires will focus on my stress, anxiety, mood, social support, perceptions of mental illness and psychotherapy, as well as my own personal experience(s) with mental illness and psychological treatment, if any, including my current mental health. I will be asked demographic and background questions, including my gender, ethnicity, age, educational level, income, personal preference for language, food, etc., interactions with my own and other ethnic groups and so on. I agree to participate in this study of stress management techniques."

Participant's Name (please print) _____ Date _____

Participant's Signature _____ Code Number _____

Experimenter _____ Date _____



APPENDIX B: Demographic Information

1. Your code number (last 4 digits of your CWID):

2. Gender (check one):
Female _____
Male _____
3. How old are you? _____
4. What is your race/ethnicity? (check one):
_____*Caucasian/White*
_____*Hispanic/Latino/Latina*
_____*Asian/Pacific Islander*
_____*African American/Black*
_____*American Indian/Native American/Alaskan Native*
_____*Biracial/Multiracial (specify):* _____
_____*Other (specify):* _____
5. What is your specific ethnic makeup (example: Mexican, Vietnamese, Filipino, Irish; etc.)?

6. Select the family generation status that best applies to you (please scroll down to review all options):
_____*1st generation*
I was born outside the U.S. (and not on a U.S. military base or U.S. territory).
_____*2nd generation*
I was born in the U.S. (or on a U.S. military base or U.S. territory), either parent was born outside the U.S.
_____*3rd generation*
I was born in the U.S. (or on a U.S. military base or U.S. territory), both parents were born in the U.S., and all grandparents were born outside the U.S.
_____*4th generation*
I was born in the U.S. (or on a U.S. military base or U.S. territory), both parents were born in the U.S. and at least one grandparent was born outside the U.S.
_____*5th generation and beyond*
I was born in the U.S. (or on a U.S. military base or U.S. territory), both parents were born in the U.S., and all grandparents were born in the U.S.
_____*I don't know what generation best fits since I lack some information.*
6. What is your total yearly income (or if you are a student not working full-time, mark your family's average yearly household income).
_____*Under \$10,000*
_____*\$10,000-14,999*
_____*\$15,000-24,999*
_____*\$25,000-34,999*
_____*\$35,000-49,999*
_____*\$50,000-99,999*
_____*\$75,000-99,999*
_____*\$100,000-149,999*
_____*\$150,000-199,999*
_____*\$200,000 or more*
7. What is your education level?
_____*College Freshman*
_____*College Sophomore*
_____*College Junior*
_____*College Senior*
_____*College Graduate/ Post Baccalaureate Student*
_____*Graduate Student*
8. What is your major?
_____*Psychology*
_____*Other Humanities & Social Sciences*
_____*Counseling/ Human Services*
_____*Other Human Development & Community Service*
_____*Arts*
_____*Business & Economics*
_____*Communications*
_____*Engineering & Computer Science*
_____*Natural Sciences and Mathematics*
9. What is your marital status?
_____*Single*
_____*In a relationship (not married)*
_____*Married*
_____*Divorced*
_____*Widowed*



10. 7. What is your religious affiliation?

- Catholic
- Christian
- Muslim
- Buddhist
- Judaism
- Agnostic/Atheist
- Other (specify): _____

11. On a scale from one (not at all) to four (very much), indicate how religious you are:

1 2 3 4
 (not at all) (a little) (somewhat) (very much)

12. Have you ever been diagnosed with a mental illness or psychological condition?

- No
- Yes

13. If you have been diagnosed with a mental illness, what was/is your diagnosis?

14. Have you ever taken medication for a mental illness or psychological condition?

- No
- Yes

15. If you have taken medication for a mental illness or psychological condition, what kind of medication(s) did/do you take?

16. Have you ever been hospitalized to treat a mental illness or psychological condition?

- No
- Yes

17. Are you currently receiving some form of treatment for a mental illness or psychological condition (i.e., psychotherapy, medication, etc.)?

- a) I am currently taking medication for psychiatric symptoms.
 - No
 - Yes
- b) I am currently in some form of psychotherapy or counseling for psychological difficulties.
 - No
 - Yes
- c) I am currently receiving treatment other than medication or psychotherapy/ counseling for psychological difficulties.
 - No
 - Yes

18. Please indicate your top three preferences of someone with whom you would speak about a personal or emotional problem:

- Psychologist/counselor
- Professor
- Family member
- Priest/pastor
- Friend
- Other

19. Please explain your rankings:

20. If "Psychologist/counselor" was not in your top three choices, please explain why:



APPENDIX C: Depression, Anxiety, and Stress Scale-21 (DASS-21)

Please read each statement and circle a number 0, 1, 2 or 3, which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all**
- 1 Applied to me to some degree, or some of the time**
- 2 Applied to me to a considerable degree, or a good part of time**
- 3 Applied to me very much, or most of the time**

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty <i>(e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)</i>	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling <i>(e.g., in the hands)</i>	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion <i>(e.g., sense of heart rate increase, heart missing a beat)</i>	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3



APPENDIX D: Systems of Belief Inventory (SBI-15R)

1*	Religion is important in my day-to-day life.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
2*	Prayer or meditation has helped me cope during times of serious illness.
	0—None of the time; 1—A little bit of the time; 2—A good bit of the time; 3—All of the time
3**	I enjoy attending religious functions held by my religious or spiritual group.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
4*	I feel certain that God in some form exists.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
5**	When I need suggestions on how to deal with problems, I know someone in my religious or spiritual community that I can turn to.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
6*	I believe God will not give me a burden I cannot carry.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
7**	I enjoy meeting or talking often with people who share my religious or spiritual beliefs.
	0—None of the time; 1—A little bit of the time; 2—A good bit of the time; 3—All of the time
8*	During times of illness, my religious or spiritual beliefs have been strengthened.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
9**	When I feel lonely, I rely on people who share my spiritual or religious beliefs for support.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
10*	I have experienced a sense of hope as a result of my religious or spiritual beliefs.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
11*	I have experienced peace of mind through my prayers and meditation.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
12*	One's life and death follows a plan from God.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
13**	I seek out people in my religious or spiritual community when I need help.
	0—None of the time; 1—A little bit of the time; 2—A good bit of the time; 3—All of the time
14*	I believe God protects me from harm.
	0—Strongly disagree; 1—Somewhat disagree; 2—Somewhat Agree; 3—Strongly Agree
15*	I pray for help during bad times.
	0—None of the time; 1—A little bit of the time; 2—A good bit of the time; 3—All of the time

* Denotes items loading on Subscale I (Beliefs and practices).

** Denotes items loading on Subscale II (Social support).



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BOOK REVIEWS

Review by Dr. Kelly Campbell

Getting Into Graduate School: A Comprehensive Guide for Psychology and the Behavioral Sciences

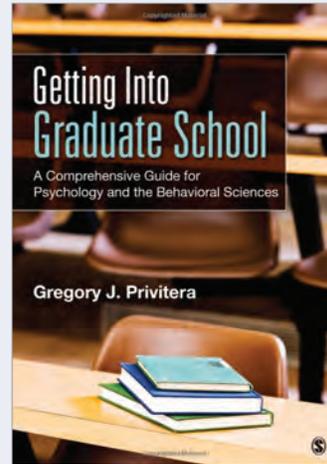
Gregory J. Privitera (2014)

SAGE Publications, Inc

Pages: 232

List price: \$13.72 on Amazon

This book was published in 2015 and provides a step-by-step guide for students who are applying to and interviewing for graduate school. The author, Dr.



Gregory J. Privitera, is an Associate Professor of Psychology at St. Bonaventure University in New York. He has received numerous awards including the APA Early Career Psychologist Award.

I recommend that all students read this book. Although the title suggests it is only for graduating seniors, the content is geared towards students in

all phases of their academic career. The author specifically describes what students should be doing from their freshmen to senior years in order to optimize the chances of getting into graduate school. Dr. Privitera covers topics such as prioritizing academics, goal setting, applying for scholarships, professionalism, searching for graduate schools, the GRE, personal statements, writing a curriculum vitae, interviewing, and how to handle both acceptance and rejection letters. Sample application materials including personal statements, curriculum vitae, and resumes from successful applicants are included. The author uses hypothetical scenarios to expose readers to the inner dynamics of graduate selections meetings. He also weaves expert tips and inspirational quotes throughout the text to keep students motivated. In short, this book is great, read it!



Review by Dr. Ismael Diaz

The Compleat Academic: A Career Guide

Zanna, M. P., & Darley, J. M. (1987)

McGraw-Hill

ISBN-13: 978-1591470359

ISBN-10: 1591470358

Pages: 422

List price: \$13.65 on Amazon

The day my undergraduate advisor learned I would be applying to doctoral programs, he suggested I read a book titled *The Compleat Academic*. After a failed search on amazon, I learned that 'compleat' is an archaic spelling of complete (the word still used to connote being skillful and having everything needed to be skillful).

The book is an edited collection of invited chapters organized into six sections. I read the first section (about finding a doctoral program, being successful in graduate school and what to do on the job search). I read the second and third sections (about teaching, mentoring, research, and writing) after securing my first tenure-track job. I read the last three sections (about academia, diversity, and managing a career over a lifetime) recently. Every author (each of whom is a big name in various fields of Psychology) offers unique insights

about every step of the process from graduate student to earning emeritus faculty status. As a first generation, low income student of color, academia was new, terrifying, and fraught with anxiety and the sense of doom that comes from expecting the worse. This book gave me context, confidence, and the knowledge to find my dream job.



Review by Dr. John Clapper

Visual Intelligence: How We Create What We See

Hoffman, D. H. (2000)

Norton & Company.

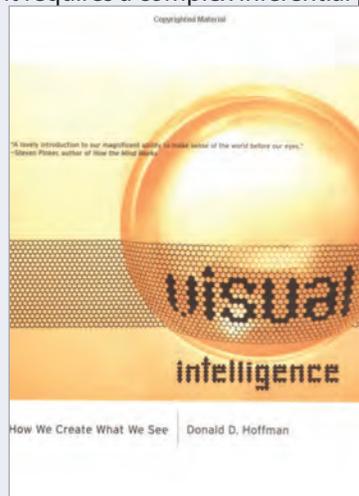
ISBN 0393319679,

9780393319675

Pages: 320

List price: \$12.19 on Amazon

The central problem of vision is that the 2-D information on the retina underspecifies the 3-D world that the person is trying to "see". This means that creating an accurate model of 3-D reality cannot be a mere matter of reading information off the retina. Instead, it requires a complex inferential process by which the



brain constructs its own model of visual reality. It does this based on whatever information it can glean from the retina, plus a set of innate organizing principles -- something like a grammar of vision -- that Hoffman refers to as visual intelligence. The book is a fascinating and highly accessible discussion of how

these principles determine our perception of color, form, depth, and motion, filled with insights, anecdotes and illustrations.

Some of the most interesting discussions concern what happens when specific aspects of visual intelligence are lost due to disease or accident, leading to bizarre and often highly informative visual impairments.

Hoffman also discusses the implications of these principles for technology, the arts, and everyday life, as well as the relationship between perception and reality. Excellent for anyone with an interest in perception, cognition, or the visual arts.



The Relationship Between the Willingness to Work Hard and Career Intentions Among College Students

Author

Daniell J. Study

Abstract

Overlapping models of employability have identified the importance of being willing to work hard to get ahead in one's career. This paper focuses on Hogan, Chamorro-Pre-muzic, and Kaiser's (2013) definition and model of employability, and explores the motivational component of this model; the willingness to work hard. This paper focuses on four personality dimensions; ambition, work ethic, conscientiousness, and proactivity, to help identify individuals that are willing to work hard toward his or her career intentions. Career intentions include educational and career aspirations and whether an individual intends to settle at a particular hierarchical level within an organization. The previously mentioned relationship was explored with structural equation modeling (SEM). Analysis revealed a poor fit of the model to the data. However, correlations among variables revealed a relationship between the willingness to work hard and an individual's career intentions. Limitations of this study along with direction for future research are discussed.



Author Interview

Daniell J. Study

What are you majoring in?

Industrial/Organizational Psychology, MSIO Program

What year are you in school?

First year graduate student

Which professors (if any) have helped you in your research?

Dr. Janet Kottke

What are your research interests?

I am particularly interested in personnel selection and have recently been focusing on employability. Specifically, individual differences that make a person employable in the 21st century.

What are your plans after earning your degree?

After graduation, I plan on applying the knowledge and skills that I have developed throughout the Industrial/Organizational Psychology program in a large organization's Human Resources Department in order to gain hands on experience and help facilitate my long term goals.

What is your ultimate career goal?

My ultimate career goals entail opening a staffing agency with a focus on offering developmental opportunities to help improve individual employability.



Since originally appearing in the United Kingdom in the early 1990's, as a set of policies to help the unemployed and underemployed, employability has been studied from three different perspectives (Haasler, 2013). Researchers have addressed employability at the institutional level (Jackson, 2014), the corporate level (Cobo, 2013), and the individual level (Hogan, Chamorro-Premuzic, & Kaiser, 2013). Typically, emphasis is placed on helping the individual acquire the skills necessary to gain and retain a job. Thus, employability has emerged as a topic of interest to researchers who seek to address whether students are being taught employability skills in the classroom, the skills organizations seek in prospective employees, and the responsibility of the individual to acquire these skills.

Recently, researchers have erected several overlapping models of employability that demonstrate the components required that make an individual employable (Fugate, Kinicki, & Ashforth, 2004; Hogan, et al. 2013; Van der Heidje & Van der Heidjen, 2006; Yorke & Knight, 2007). While each of these models incorporate an ability component, and some include a social component, the current research is interested in the motivational components of these models. Specifically, Hogan et al.'s (2013) rewarding to work with, ability, and willing to do the job (RAW) framework, they introduce a new construct of motivation called "willingness to work hard." Hogan et al. identifies "willingness" as the desire to get ahead in one's career and consists of ambition, conscientiousness, proactivity, and work ethic. Similar to the willingness construct, other researchers have identified this motivational component as 'work drive, which appears to identify the motivation towards a specific job, excluding extra-role behaviors (Lounsbury, et al., 2003). The current research expands on the willingness definition and defines the willingness to work hard as a dispositional construct used to identify an individual that is favorably disposed to work hard, accomplish tasks expeditiously, helps others meet organizational goals, and takes initiative to get ahead in one's career, as a function of the personality trait conscientiousness. To better understand the structure of the latent variable willingness, a review of the literature was performed and four underlying factors were identified. All four factors meet the above criteria for inclusion in the construct of willingness to work hard; ambition, work ethic, conscientiousness, and proactivity.

Although motivational factors have been a long standing interest in Industrial-Organizational (I-O) psychology, several studies have investigated the relationship of personality traits as predictors of work

outcomes (Barrick, Mount, & Li, 2013; Lounsbury, Loveland, Sundstrom, Gibson, Drost, & Hamrick, 2003; Sjöberg, Littorin, & Engelberg, 2005). The majority of this research has been based on the broad taxonomy of the Five Factor Model (FFM) and other lower order constructs, although these characteristics have only been examined separately. Therefore, it is necessary to take a closer look at higher order dispositions in relation to the FFM because they may contribute to a person's willingness to work hard whether initially looking for work or actually doing the work once on the job.

Ambition

The first disposition explored as a motivational factor consistent with the definition of willingness to work hard is ambition. Previous research on the topic has shown ambition is related to organizational commitment (Desrochers & Dahir, 2000), and contextual performance (Hogan, Rybicki, & Borman, 1998). Ambition has been found to be the most important predictor of proactive forms of performance (Huang, Ryan, Zabel, & Palmer, 2014). These findings indicate a propensity for ambitious individuals to not only seek to get ahead, but to take initiative to help others as a commitment to advance one's career. In their study on performance, personality and career advancement, Hogan, et al. (1998) differentiated extraversion into both ambition and sociability components and found that ambition predicts contextual performance when promotions are possible. In this way, Hogan et al. used the higher-order construct of ambition to tap a personality variable. Ultimately, Hogan, et al. (1998) offer the following definition for contextual performance: "Persisting with enthusiasm and extra effort, volunteering for work that is not part of your job, helping and cooperating with others, following organizational rules and procedures, and endorsing, supporting, and defending organizational objectives" (p. 191). These are organizational behaviors outside the actual job requirements. Research on whether initiative at work declines with age has revealed that an individual's level of initiative is stable over time and correlated with work initiative and extraversion (War & Fey, 2001). Thus, ambition shares commonalities with willingness in that both reflect discretionary and proactive behaviors to get ahead, and take initiative to support co-workers. Ambition is discriminated from willingness in that ambition is an intrapersonal motivator to get ahead in one's own career without regard to the interpersonal aspect of willingness, which involves helping others to advance organizational objectives as a whole.



Work Ethic

An additional personality trait associated with previous research on the willingness to work hard is work ethic. Research has found that employees that demonstrate low work ethic quit their job at a significantly higher rate than those that demonstrate high work ethic. Research also indicates that work ethic is indirectly related to turnover and intentions to quit, and directly related to job satisfaction and employee commitment (Saks, Mudrack, & Ashforth, 1996). Therefore, individuals that demonstrate strong work ethic have a tendency to have longer tenure, feel an obligation to the company, and are happier on the job. In an ongoing approach to identify important factors in work ethic, researchers have found that hard work, non-leisure, independence, and asceticism are important dimensions of work ethic (Blau & Ryan, 1997).

In a series of studies, research has found that work ethic is related to a host of subjective job outcomes, and has been identified as a multidimensional construct that consists of a set of attitudes and intrinsic motivation that is reflected in behavior (Miller, Woehr, & Hudspeth, 2002). Further research expanding on Miller et al.'s work has shown work ethic to be related to job involvement, job satisfaction, and organizational commitment (Meriac, Woehr, Gorman, & Thomas, 2013). Additional research examining the relationship between work ethic and personality variables has shown correlations between work ethic and ambition, and work ethic and agreeableness (Christopher, Furnham, Batey, Martin, Koenig, & Doty, 2010). Because individuals today have a "work hard to play hard" attitude (Zemke, 2001), the work ethic and willingness constructs have commonalities consisting of intrinsic motivation that is reflected in hard work, positive work attitude, and can be differentiated by the need for asceticism, non-leisure, and independence from others. Since the willingness to work hard also involves taking initiative in one's career, conscientiousness is an important aspect of willingness.

Conscientiousness

Conscientiousness is another popular area of interest in personality research that is one of the five factors defined in the FFM. Conscientiousness has consistently been correlated with a host of objective and subjective job outcomes across a variety of jobs from semi-skilled to professional occupations (Bakker, Demerouti, & Brummelhuis, 2011; Barrick & Mount, 1991). Conscientiousness, therefore, can be a valid predictor of work behavior regardless of the job. As early as the beginning of the twentieth century, a study of intelligence and character (emotions, self-qualities, activity, social-

ity, and intellect) has shown that will is important for achievement. "Will" has been defined as deliberate volition resulting in consistent behaviors (Webb, 1915). Recent research on the topic defines a conscientious individual as one who is "reliable, hard-working, determined, self-disciplined, and achievement-oriented," and research has found significant correlations between conscientiousness and accomplishment striving (Barrick, Stewart, & Piotrowski, 2002, p. 4). Digman (1990), in a review of the FFM research, found conscientiousness, or will to achieve, to be important to education and work outcomes. Research has found that when participants score low on conscientiousness scales, a decrease in the scores for motivation to accomplish tasks is indicated (Batey, Booth, Furnham, & Lipman, 2011; Costa & McCrae, 1992). In addition, researchers have found conscientiousness to be a predictor of Organizational Citizenship Behaviors (OCBs) (Chiaburu, Oh, Berry, Li, & Gardner, 2011), and contextual behaviors regardless of promotion possibilities (Hogan et al., 1998). Therefore, the extant literature indicates that conscientiousness as an important predictor of whether an individual will complete assigned tasks and help others to complete tasks for the better of the organization, whether or not advancement prospects exist within the organization.

Proactivity

An individual's propensity to complete tasks as they are assigned and not put duties off until the last minute are important components of being willing to work hard (Neenan, 2008). In a meta-analysis examining the relationship between procrastination on job outcomes and personality, Van Eerde (2000) found significant correlations between procrastination and task delay ($r = 0.35$), missing a deadline ($r = 0.29$), conscientiousness ($r = -0.63$) and grade point average ($r = -.028$). These findings demonstrate that an individual's tendency to procrastinate seems to be negatively related to their willingness to work hard.

In organizations that seek to promote employees to higher positions within the company, it is important to identify individuals that are prone to settling in their respective career and have the willingness to work hard because these kinds of individuals desire to move into higher positions within the company. The purpose of this study is to explore the components of work ethic, ambition, conscientiousness, and proactivity as they contribute to the disposition of willingness to work hard, and the relationship between this construct and college student career intentions. It is predicted that students who are willing to work hard will have higher career intentions.



Method

Participants

Participants consisted of students majoring in psychology (N = 319) at a large university in Southern California during the end of the Winter quarter of 2014. Participants were recruited through the SONA research system, a web based survey administration program, and were given class credit for their involvement. Participants were English speaking and a minimum of 18 years of age. All identifying information on the survey was used solely for applying the extra credit incentive. All participants were treated in accordance with the Ethical Principles of Psychologists and Code of Conduct (American Psychological Association, 2002).

Materials

Demographic Sheet. The demographic sheet contained items measuring the following: age, ethnicity, gender, grade point average, and number of college quarters and units completed. In addition, intended educational level was recorded and was used as one of three outcome variables in the model.

Work Ethic Scale. The Multidimensional Work Ethic Profile – Short Form (MWEP-SF) was used to assess work ethic. The multidimensional work ethic profile consists of 28 items which were responded to on a 5-point Likert scale, from 5 = “strongly agree” to 1 = “strongly disagree.” The scale consists of seven subscales: self-reliance, morality/ethics, leisure, centrality of work, hard work, wasted time, and delay of gratification. All subscales retain alpha values ranging between .76 and .89 (Meriac, Woehr, Gorman, & Thomas, 2013). The means of each subscale were taken to produce each subscale score. Sample items from the scale included: “A hard day’s work is very fulfilling” and “I feel content when I have spent the day working.”

Ambition Scale. The Leadership scale is a 10 item scale that has indicated a strong correlation with the Hogan Personality Inventory (HPI) scale of ambition with a reliability coefficient of .82 (Goldberg et al, 2006). This scale was used as a proxy for ambition since there were no published scales of ambition. Respondents answered items on a 5 point scale from “very inaccurate” to “very accurate.” Sample items from the scale included: “Take the initiative,” “Wait for others to lead the way,” and “Am easily discouraged.”

Conscientiousness Scale. The International Personality Item Pool (IPIP) conscientiousness scale has been correlated with the FFM broad domains and consists

of 20 items and has been shown to demonstrate reliability with an alpha of .90 (Goldberg et al, 2006). Conscientiousness items are rated on a 5 point scale ranging from “very inaccurate” to “very accurate.” Sample items from this scale included: “Am always prepared,” “Carry out my plans,” and “Shirk my duties.”

Proactivity Scale. To evaluate levels of proactive work behavior, Tuckman’s (1991) procrastination scale was used. Although this scale does not measure proactivity, procrastination and proactivity can be thought of as opposing constructs. Therefore, this scale was used as an indicator of lack of proactivity. This scale consists of 35 items designed to measure a person’s self-regulation through his/her tendency to avoid or put off activities. Items were rated on a 4 point scale ranging from “That’s me for sure” to “That’s not me for sure.” Sample items included: “When I have a deadline, I wait till the last minute” and “I am an incurable time waster.” This scale has good reliability with an alpha of .90 and good concurrent validity showing negative correlations with a scale of self-regulated performance.

Career Aspirations Scale (CAS). The Career Aspirations Scale assesses levels of career aspirations within a chosen field (Gray & O’Brien, 2007). The scale consists of 10 items rated on a 4 point Likert scale from “not at all true of me” to “very true of me.” The scale has demonstrated reliability with an alpha of .72. Sample items included: “I hope to move up through any organization or business I work in” and “I think I would like to pursue graduate training in my occupational area of interest.” For the purpose of the present study, this scale was broken into two subscales (career leadership and career settling) that were assessed along with intended educational level as outcome variables.

Procedure

Participants completed the survey via the web-based SONA system. After consenting to partake in the survey, participants were allowed as much time as needed to respond to the survey items. Participants were then thanked for their involvement and debriefed.

Design and Analysis

Several pre-screening analyses were conducted to assess distributions at the univariate and multivariate levels. For this study, SPSS 22 and Bentler’s (1985) EQS 6.1 software were used to analyze the data. By evaluating variables with SEM, multiple independent and dependent variables were assessed simultaneously.



Results

Table 1. Descriptive Statistics

	Mean	Standard Deviation
Conscientiousness	3.8396	.61706
Work Ethic	4.0711	.70423
Ambition	3.6137	.76760
Procrastination	2.2155	.54383
Career Settling	2.6557	.74651
Career Leadership	4.1951	.69160
Educational Aspirations	2.9648	.49246

Note. N = 246

Seventy surveys were removed from the dataset due to failure to pass an attentiveness check. In addition to these deletions, three surveys were identified as outliers and removed from the analysis. Of the remaining 246 participant surveys, 10 were not included in the SEM due to missing data.

The initial analysis explored means, standard deviations (see Table 1), and correlations for the observed and latent variables (see Table 2) using SPSS 22 software. Conscientiousness, ambition, work ethic, and career leadership were all positively correlated with each other. Procrastination positively correlated with career settling, and negatively correlated with

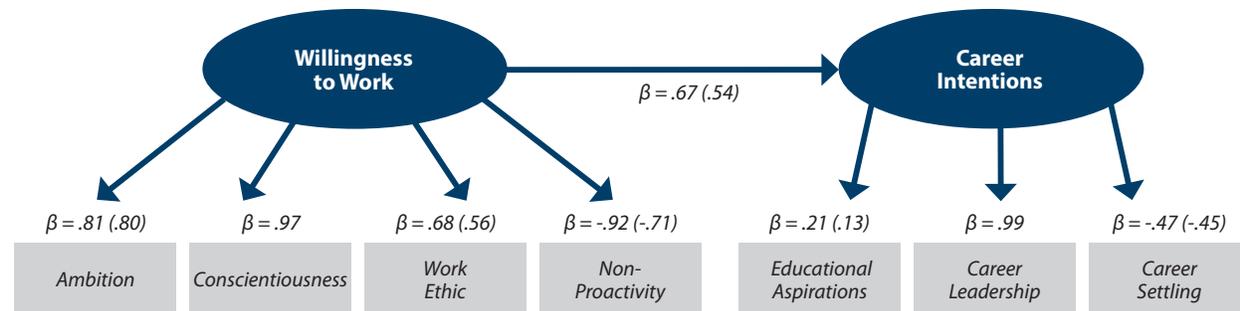
Table 2. Bivariate correlations for study variables

		Conscientiousness	Work Ethic	Ambition	Procrastination	Career Settling	Career Leadership	Educational Aspirations
Conscientiousness	Pearson Correlation	1	.438**	.569**	-.765**	-.208**	.411**	0.08
	Sig. (2-tailed)		0	0	0	0.001	0	0.215
	N	243	243	242	239	240	242	243
Work Ethic	Pearson Correlation	.438**	1	.340**	-.360**	-0.094	.315**	-0.001
	Sig. (2-tailed)	0		0	0	0.146	0	0.987
	N	243	246	245	242	243	245	246
Ambition	Pearson Correlation	.569**	.340**	1	-.561**	-.267**	.526**	0.072
	Sig. (2-tailed)	0	0		0	0	0	0.264
	N	242	245	245	242	242	244	245
Procrastination	Pearson Correlation	-.765**	-.360**	-.561**	1	.218**	-.379**	0.033
	Sig. (2-tailed)	0	0	0		0.001	0	0.605
	N	239	242	242	242	239	241	242
Career Settling	Pearson Correlation	-.208**	-0.094	-.267**	.218**	1	-.398**	0.053
	Sig. (2-tailed)	0.001	0.146	0	0.001		0	0.407
	N	240	243	242	239	243	243	243
Career Leader	Pearson Correlation	.411**	.315**	.526**	-.379**	-.398**	1	.166**
	Sig. (2-tailed)	0	0	0	0	0		0.009
	N	242	245	244	241	243	245	245
Educational Aspirations	Pearson Correlation	0.08	-0.001	0.072	0.033	0.053	.166**	1
	Sig. (2-tailed)	0.215	0.987	0.264	0.605	0.407	0.009	
	N	243	246	245	242	243	245	246

Note. **Correlation is significant at the 0.01 level (2-tailed).



Figure 1. Model of Willingness to Work and Career Intentions



Note. Standardized coefficients shown with unstandardized in parenthesis, $p < .01$.

all other variables. All relationships between the aforementioned variables were significant except for the relationship between career leadership and work ethic. The only significant correlation for educational aspirations was with career leadership.

To investigate the relationship between the latent variables willingness to work hard and career intentions, a path model was tested with EQS 6.1 software utilizing maximum likelihood solution and robust statistics. Figure 1 represents the model of willingness to work hard as it predicts college students' career intentions. The overall fit of the model was good when gauged by Satorra-Benter $\chi^2(15, 246) = 139.23, p < .001, CFI = .98, CI = 0.16 - 0.22$ (90 percent). However, the RMSEA indicated that there may be some issues with the model because this value was recorded at .19, above the threshold of .05.

Discussion

Although the model as a whole did not meet all pertinent fit indices, correlations among the model variables indicate that the personality variables can be used as predictors of college students' intent to climb the employment ladder or settle at a particular hierarchical level after obtaining an undergraduate degree. This is important since dispositions tend to be stable over time (Soldz & Vaillant, 1999), and can therefore be used as a measure to indicate which employees have the intention to move into higher positions within their respective careers. Results suggest that those who intend to acquire higher levels of education, aspire to be leaders, and do not feel like settling in a chosen career have higher career intentions. Furthermore, individuals who rate high on the dispositions of ambition, conscientiousness, work ethic, and proactivity are willing to work hard to get ahead in the career

of their choice. This is important for organizations in that it can help human resource managers decide where to invest funds for leadership development.

One limitation of the present study is the relatively small size of the model, which may explain the lack of fit as indicated by the RMSEA. Future research may seek to expand on this model to include additional variables relating to the willingness to work hard and college students' career intentions. Additional limitations include the length of the survey, which contained redundant items that could have potentially been removed from the survey. The equivocal results for model fit suggest that other personality traits (e.g. tenacity, core self-evaluations) and career intention (e.g. career attitudes, entrepreneurial intentions) variables should be explored. Implications for this research include the importance of identifying certain personality traits which may play an important role in influencing career goals. Theoretical implications for this research include the identification of variables that can explain a critical component of the RAW model of employability. Specifically, an individual's willingness to work hard to get ahead in one's career. Despite these potential limitations, this study contributes to the literature on personality variables as they relate to motivational factors of employability. ■

"I'm a greater believer in luck, and I find the harder I work the more I have of it"

— Thomas Jefferson



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Alignability and Distinctive Features in Free Categorization

Author

Timothy Meyer and John P. Clapper, Ph.D.

Abstract

We propose a two-stage model of free categorization in which people first select specific objects to compare, and then decide whether they belong to the same category. Stage one is determined by salience, e.g., distinctive cues that automatically draw attention to certain objects in a visual display. Stage two is determined by alignability, i.e., whether the objects have the same overall structure or body plan. People should automatically compare objects that share a distinctive cue, but only see them as a natural kind if they are alignable overall. In this experiment, objects sharing a distinctive cue were either alignable or non-alignable. The instructions stressed grouping (high demand) or grouping only if valid categories were present (low demand). People grouped both types of objects in the high-demand condition but only alignable objects in the low-demand condition, suggesting that psychologically natural categories (kinds) are preferentially based on overall alignability, rather than individual distinguishing features.



Author Interview

Tim Meyer

What are you majoring in?

Psychology

What year are you in school?

Senior

Which professors (if any) have helped you in your research?

Dr. Clapper is my primary mentor and worked with me on this particular project.

What are your research interests?

I hope to do research on gamification to investigate how exactly games hijack aspects of our cognition.

What are your plans after earning your degree?

I would like research gamification and maybe use some of that research to help influence the development of games or online learning centers like Khan Academy.

What is your ultimate career goal?

Become World Emperor.



Categorization is often thought to be a cornerstone of human cognition (Corter & Gluck, 1992; Mervis & Rosch, 1981). Yet, in spite of categorization's fundamental nature, many of the mechanisms of categorization remain a mystery. What are categories exactly, and how do people acquire them? These questions are fundamental to our overall understanding of human cognition.

Much of the basic structure of our mental categories arises through unsupervised categorization, which is the name for the process by which people discover categories according to their own perceptions, without corrective feedback from another person (Clapper & Bower, 1994). There are many possible types of unsupervised learning, depending on the particular task and circumstances in which categories are acquired. Here we will focus on one particular type of unsupervised learning, namely, the spontaneous creation of new categories in sorting or free categorization tasks.

Categories in unsupervised tasks must be based on an objective pattern or structure in the training stimuli; otherwise, there is nothing for the person to discover. In general, psychologically good or natural categories tend to have members with greater overall resemblance to each other than to members of other categories (Rosch & Mervis, 1981). Similarity is a highly intuitive way of defining category goodness. For example, members of basic level categories tend to subjectively look alike (Rosch, 1978), and many studies demonstrate that category membership is based on similarity-based comparison to other category members (Pothos & Chater, 2002, Pothos et al. 2011; Rosch & Mervis, 1981). Moreover, theories of category utility (Anderson, 1990; Anderson, 1991; Corter & Gluck, 1992), generally imply that a category's predictive power should be closely related to the similarity or "family resemblance" among its members.

Studies of simple, metrically varying stimuli seem to confirm the belief that categories are based on overall similarity. For example, Pothos et al. (2011) used a free-sorting task and presented the participants with schematic spiders, which varied metrically (continuously) on two dimensions. The overall similarity of the stimuli accurately predicted the participants' patterns of categorization during the free-sorting task (Pothos et al. 2011). That is, people put similar objects into the same categories and dissimilar ones into different categories. Importantly, this similarity was based on both dimensions of the objects.

However, when stimuli vary on several dimensions, rather than on one or two, and the features that vary

are discrete and separable, people no longer seem to sort based on overall similarity (Medin, Wattenmaker, & Hampson, 1987, Regehr & Brooks, 1995). Under these conditions, participants tend to sort on the basis of a single dimension, even when the experimenters take steps to try and prevent such sorting methods (Medin et al., 1987). Thus they might sort objects that vary on color, shape, and size entirely on the basis of shape, while completely ignoring the other two dimensions. This preference for single-dimension sorting is robust in conditions with more than two varying features, with features that vary discretely, and with features that are perceived as separable rather than integral (Handel & Imai, 1972; Imai & Garner, 1965; Medin & Wattenmaker, 1987).

Regehr and Brooks (1995) argued that the cognitive load to compare overall similarity of multidimensional stimuli across an entire array is too demanding; therefore, participants try to sort on the first saliently discriminatory dimension they find. Using a match to standards task to reduce cognitive demand for sorting, Regehr and Brooks (1995) found that participants would often sort on the basis of similarity. The match to standards task differs from free sorting in that the experimenter sets up two stimuli to serve as category standards or prototypes, and people then assign the rest of the stimuli to one of these categories based on their similarity to the two standard prototypes. This suggests that the one-dimensional sorting often found in free categorization tasks might be an artifact of the entire array of stimuli being visible at the same time. However, as noted by Regehr and Brooks themselves, this result does not necessarily imply that family resemblance is the primitive principle underlying human categorization.

Milton and Wills (2004) found that overall similarity sorting was not always prevalent in the match to standards task. Under low cognitive load people would sort on an overall similarity basis, whereas under a higher cognitive load, they would sort on a single-dimension basis (Milton, Longmore, & Wills, 2008). Furthermore, Wills, Milton, Longmore, & Hester (2013) demonstrated that not only did a higher cognitive load reduce the amount of overall similarity sorting, but participants who sorted based on overall similarity from the outset had larger working memory capacities, and when instructions encouraged meticulous categorization, the prevalence of overall similarity sorting rose. This evidence shows that overall similarity sorting, when it does occur, is an analytic, strategic process requiring more cogni-



tive resources than one-dimensional sorting (Milton & Wills, 2004; Milton et al., 2008; Wills et al., 2013).

Taken together, the match-to-samples studies seem to suggest that overall similarity is not the natural or primitive basis of free categorization. In particular, the argument for similarity seems to collapse if similarity-based categorization is a highly demanding process that can only be carried out when participants have ample time or few enough stimuli. There seems to be no decisive evidence that similarity is indeed the mechanism that drives categorization. This is disconcerting given how much our views on categorization are based on this assumption, and counterintuitive when examining real-world natural categories because these categories often seem so obviously based on similarity.

It is important to note that the match to standards task is not an example of free categorization, since the experimenter sets up the categories for participants in advance and categorization involves only a series of proscribed pairwise comparisons rather than an attempt to partition the set as a whole. Even if people did find similarity-based classification easier and more natural than one-dimensional sorting in this particular task, the implications for free categorization in general would remain unclear. The failure to obtain similarity-based sorting in a full-array procedure is, therefore, still a cause for puzzlement and concern.

One reason to believe that the insensitivity to similarity observed in free sorting tasks is not merely an artifact of simultaneous presentation is the fact that people often show the same insensitivity in sequential unsupervised learning tasks. For example, Clapper and Bower (2002; Clapper, 2006) carried out several experiments in which people were presented with verbal descriptions of objects, such as trees, which were completely distinct with 9 consistent non-overlapping dimensions, and three dimensions that varied independently within each category. None of the variable features overlapped between the categories, and no features were found in both. Clapper and Bower (1991) manipulated the order in which the stimuli were presented, finding that categories presented in a random order resulted in little evidence of learning, but categories presented with a blocked training phase at the start were easily learned.

According to Clapper and Bower (1991, 2002), when participants saw a series of stimuli from the same category first, they were able to learn it, detect stimuli that did not fit with that category, and create a new category for these divergent stimuli. However, when the stimuli were presented in random order, the participants had trouble separating the categories because

they could not learn one of them well enough to allow them to distinguish it from the other. In this case, people seem to average or aggregate the two categories together, obscuring the consistent structure within each. Once this aggregation has occurred, people may remain trapped indefinitely in an “unlearned” state because all further examples will continue to fit the aggregated category, and thus the learner never experiences the sense of contrast or mismatch needed to trigger the formation of separate categories.

Critically, this kind of aggregation or averaging process depends on the fact that members of both categories varied along the same attribute dimensions. Obviously, if they were described in terms of different dimensions such as averaging would be impossible. Thus far, experiments on unsupervised categorization have generally used stimuli that varied along the same dimensions (Handel & Imai, 1972; Kloos & Sloutsky, 2008; Milton et al. 2008; Pothos, 2011; Regehr & Brooks, 1995; Ward et al., 1986). For example, categories of butterflies were distinguished by different antenna length, stippling pattern, and body size in the experiments by Milton et al. 2008. This means that all the stimuli could in principle be averaged across their shared “dimensional structure” (Garner, 1974), with the result that the person’s overall impression of the set would be dominated by this shared structure. While aware of the range of values on each individual dimension, they would not necessarily be aware of the patterns of dependent variation along different dimensions that could potentially define separate categories within such a set. If no distinct categories stand out to the participants, they are left to search for any salient way to divide the stimuli and create categories. Hence, they use single-dimension sorting.

This suggestion that people are mainly aware of the shared dimensional structure among the objects within a set, and that they are not aware of different similarity-based categories within that set, might be taken to imply that that similarity in general is not the basis for categorization. However, given the compelling intuitions and real world data in favor of similarity, a better approach may be to redefine similarity so that it fits the way people actually categorize. In particular, we suggest that defining similarity around dimensional structure or alignability, or the set of correspondences that exists between their features rather than specific matching features may lead to a more useful approach. For example, if one were to superimpose an image of a dog on top of another type of dog, some of the features may be moderately different from one another, but the overall structure of the image would

match or be alignable. However, if one were to superimpose the image of a dog over the image of a whale, many of the features would not match, thus the two images would not be alignable. In addition, alignable stimuli seem subjectively similar in an overall sense, and non-alignable stimuli seem subjectively dissimilar, at least in the domain of concrete physical objects.

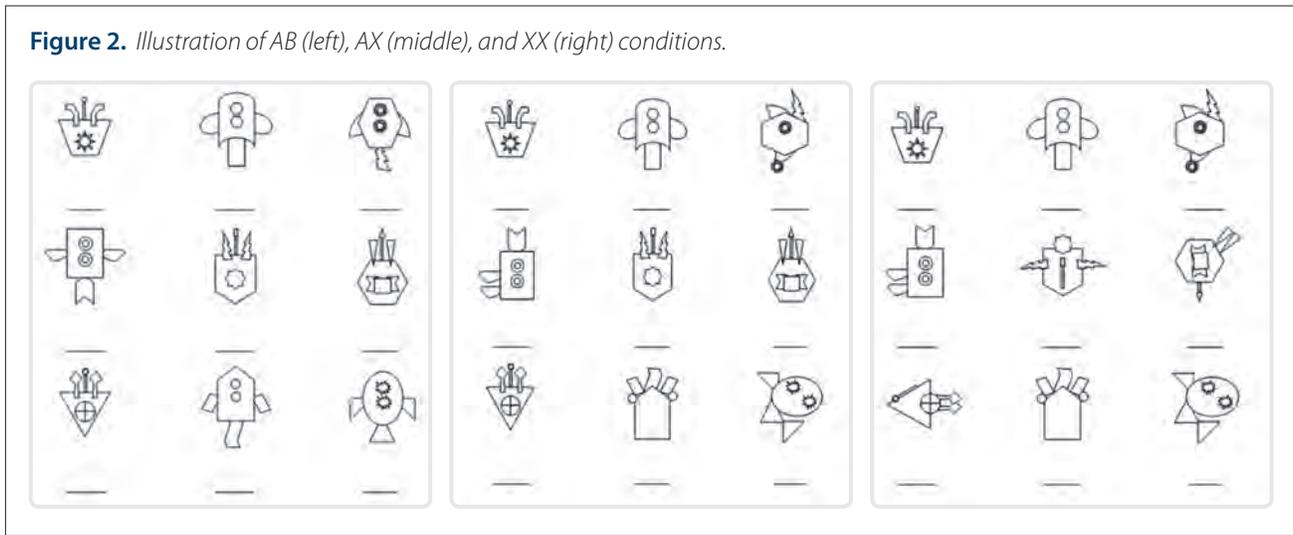
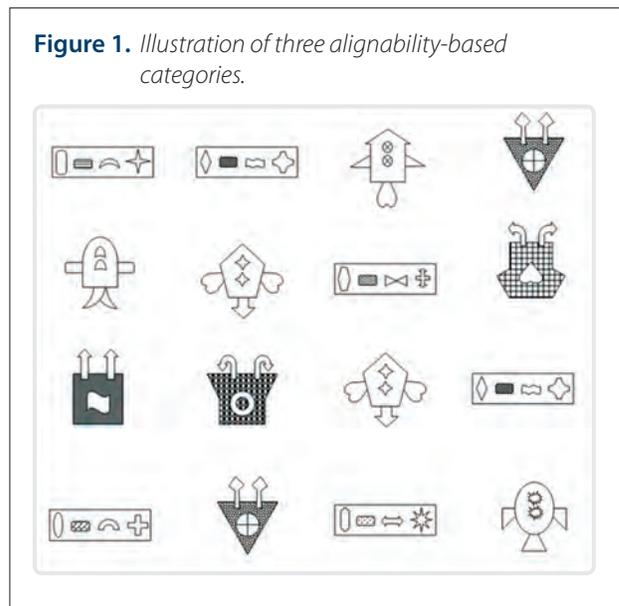
The idea that judgments of similarity, and in fact any comparison, involve a process of overall alignment is found in the discussion of similarity by Medin, Gentner and Goldstone (1993). Thus, in order to compare the features of two objects one must establish a mapping or system of correspondences between them. In other words, one must identify which features of an object correspond to which features of the other object. This comparison highlights the relevant features of the stimuli, with alignable differences (the differences between corresponding features of the objects) being perceived as more relevant than non-alignable differences (the differences between non-corresponding features, see e.g., Markman & Gentner, 1997).

This definition of similarity allows for a somewhat different conception of category goodness. Under this paradigm, good categories should have members that are highly alignable. Ideally, the parts and features of one object should have a one-to-one correspondence to those of other objects within the same category; however, the actual versions of these parts and features found in one category member may differ from those of another. Thus, implying that participants should create categories based on the arrangements of parts or features of stimuli, not the features themselves.

An example of artificial categories constructed according to this alignability principle is shown

in Figure 1. Within each type or categories, the objects differ on all variable attributes or dimensions; in that sense, within-category similarity is rather low. However, all objects within a category are generally alignable, and on that basis the objects appear to have an overall “family resemblance” and fall into psychologically natural groupings.

Clapper (2014) carried out a number of experiments using stimulus sets like those shown in Figure 1, and the result is that people appear to strongly recognize the alignability based categories, being much more likely to place alignable than non-alignable objects into the same self-generated category. One problem with such demonstrations, however, is that it is possible that people are not constructing categories based on





alignability per se, but rather on some individual feature that may uniquely distinguish category members from non-members. For example, some of the stimuli in Figure 1 have a rectangular outline that clearly separates them as a category of their own, i.e., it is a feature shared by all members of that category and by none of the non-members present in that display.

We can test this alternative hypothesis by showing people the same stimulus set but scrambling the features. For example, if we create stimuli by arranging simple geometric shapes and place those stimuli in an array, participants should pick out the alignable stimuli (the stimuli whose parts are arranged in the same way). However, to check against single dimension sorting we

can include a control condition in which the stimuli are composed of the same parts and features as before, but have the arrangement of these parts scrambled in some arbitrary fashion. If participants are using a single part or feature as the basis for their categories, they should create categories based on the stimuli's possession of that part in both intact and scrambled condition (in other words, performance should look about the same in both).

Clapper (2014) conducted experiments with arrays of stimuli created in this manner, all of which included a target category (see Figure 2). In one condition all of the stimuli, including the target stimuli, were composed of scrambled features (XX condition). In another condition, the target stimuli were composed of arranged features to form an alignable category but the rest of the stimuli were made up of scrambled features (AX condition). In the final condition, category A was one alignable category while the remaining stimuli formed a second alignable category (AB condition). Clapper (2014) found that in conditions where category A was alignable, the participants were much more likely to discover that category (AB and AX conditions). However category A was recognized significantly better in the AB condition than in the AX condition, implying some difficulty in the AX condition.

From this, Clapper (2014) hypothesized that people might be having difficulty "finding"

Figure 3. AX versus XX conditions, distinctive texture cue added to A examples in both.

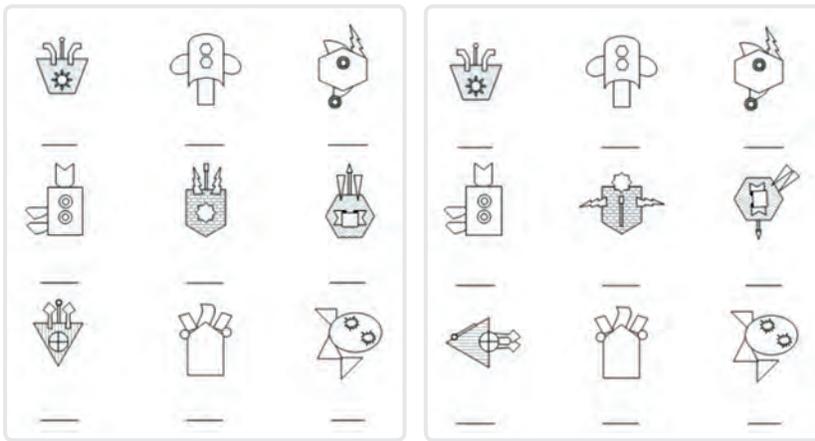
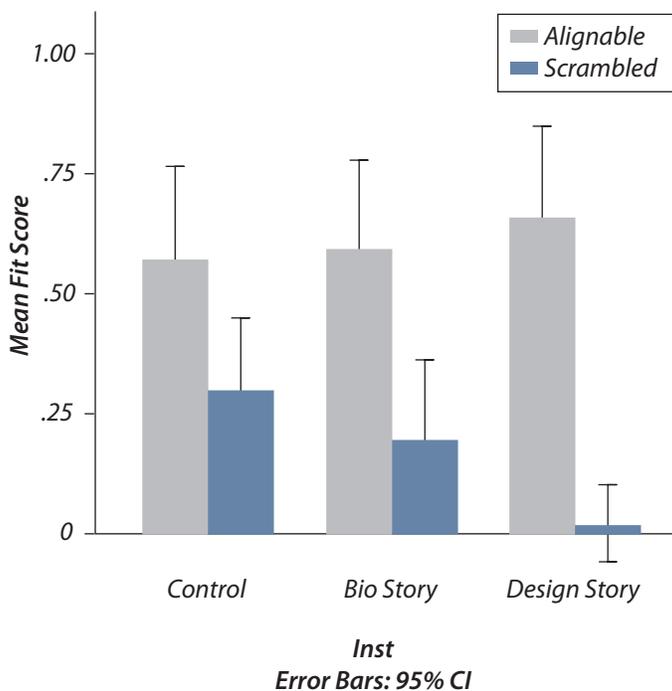


Figure 4. Grouping of target (A) objects across different alignability x instruction conditions.





the alignable category in the AX condition, because there are many possible comparisons and the relevant ones do not necessarily “pop out” to participants. In this case, adding individual distinctive features might help promote attention and comparison of the relevant target objects, thus improving recognition of the A category. However, that alignability would determine if participants perceive stimuli as belonging to a meaningful category. To test this, Clapper (2014) added a distinctive texture cue to Category A in both AX and XX conditions (see Figure 3). Although this improved the categorization of the target category in the AX condition as expected, it also prompted increased grouping of the scrambled stimuli sharing the distinctive cue in the XX condition, contrary to expectation.

We hypothesize that this latter result may actually be a product of perceived demand. Participants in Clapper (2014) may have felt compelled to create categories in any way possible since categorization was the explicit goal of the task. Therefore when a particularly conspicuous cue was added to some of the objects in a set, participants may have felt encouraged to create categories on the basis of that cue, even if they did not see the objects as comprising a truly meaningful category. To test this hypothesis, we created one set of instructions which encouraged all participants to create categories, and two sets in which participants were encouraged to categorize only if they saw clear, psychologically meaningful categories in the array. In one of the second set of instructions, referred to as the Bio Story condition, we manipulated the framing of the task by reminding participants that it is just as important not to create meaningless categories as it is to create meaningful categories. They were told that the creatures in their array came from a collection containing many families, and it was likely that each stimulus in the array may have come from separate families. In the second manipulation, referred to as the Design Story condition, participants were told that there was a 50% chance they were in the control condition of the experiment in which all stimuli come from different families. In both conditions, they were told that if all the creatures were from different families,

Table 1. Means and standard deviations from all conditions.

Inst	Align	Mean	Std. Deviation	N
Control	<i>Alignable</i>	.5687500000	.46465177061	24
	<i>Scrambled</i>	.2956521748	.35523563722	23
	Total	.4351063834	.43283463512	47
Bio Story	<i>Alignable</i>	.5916666667	.43569590048	24
	<i>Scrambled</i>	.1923611117	.40117518061	24
	Total	.3920138892	.46082962443	48
Design Story	<i>Alignable</i>	.6569444446	.45324691891	24
	<i>Scrambled</i>	.0210144935	.18106150172	23
	Total	.3457446813	.47079524737	47
Total	<i>Alignable</i>	.6057870371	.44654086675	72
	<i>Scrambled</i>	.1700000007	.34230204822	70
	Total	.3909624417	.45337636751	142

and they did not see any meaningful categories, they should simply assign all stimuli a different family label.

In this experiment, we tested if participants created categories based on alignability, and if instructions affected this category creation. It was predicted that participants would sort based on alignability and create the target category more often when the array was comprised of alignable stimuli than when the stimuli were scrambled. However, as in Clapper (2014), it was also predicted that people would show significant grouping, even in the scrambled condition, in response to the distinctive texture cue, with instructions that stressed categorization. However, that grouping of scrambled stimuli based on the cue alone would be eliminated in the two “special instruction” conditions, because the demand to categorize would be reduced. In other words, we predicted that the distinctive feature cue would increase category creation among both alignable and scrambled stimuli when people are given instructions encouraging categorization in all cases, but it will only promote grouping of the alignable stimuli when people are given meticulous categorization instructions.

Method

Participants

One hundred sixty undergraduate students enrolled in a Perception course at California State University, San Bernardino received extra credit for completing



the study. All participants were English speaking, over 18 years of age, and treated in accordance with the American Psychological Association (2011) guidelines.

Procedure

The test was administered in a quiet classroom. Participants were given one test booklet, containing instructions and the proper arrays, and then told to follow the instructions in the test booklet.

The participants were instructed to pretend they were a interplanetary biologist who has just received a collection of novel organisms. It was their job to classify the new organisms into both “family” and “species” levels. The stimuli were labeled with a letter for family and a number for species (ex: A1 or B4). Participants were also instructed to either categorize the stimuli meticulously or liberally, depending on the participant’s condition. Following these instructions, participants were presented with a 3x3 array of already-classified stimuli as an example to the participant of how to label the objects.

The participants then proceeded to the actual array, which was similar to the example array in a 3x3 grid of stimuli with lines underneath for participants to write their classifications (see Figure 3). Once the participants have labeled all the objects in this array, they were thanked and debriefed.

Design

This was a 2 category (alignable, scrambled) x 3 instructions (design, bio, control) factorial design, creating six conditions. In the alignable (AX) condition, category A consisted of four alignable stimuli, while the remaining five (X) stimuli in the array were made up of scrambled features so that these stimuli were mutually non-alignable. In the scrambled (X, X) condition, both categories of objects in the arrays consisted of only scrambled features, so that all objects in the array were non-alignable. A distinctive texture cue was added to the four target stimuli in all conditions, thus providing a unique and perceptually salient basis for grouping the target objects in both (AX) and (XX) conditions. There were also three “instruction conditions.” In the control condition, the participants were given direct instructions to create categories whenever they saw them. In the “Bio Story” condition, participants were encouraged to create categories, but also told that it was equally important not to create non-meaningful categories. In the “Design Story” condition, the participants were informed that about half the displays would not contain any categories, and if they felt they

had such a display, they should simply place each object in its own separate category (family). (See the Appendices for the instructions from each condition)

Materials

Materials for this study consisted of paper-and-pencil test booklets. Each test booklet consisted of an informed consent form, an instructions page, a second instructions page for each instruction condition, two sample pages illustrating the labeling procedure, and finally, a test page containing objects for the participant to classify. The test page consisted of nine objects shown in a 3 x 3 grid arrangement, with a blank line under each. for the participants to fill in their label for that object.

We used the stimuli adapted from Clapper (2014), similar to those shown in Figures 2 and 3. These stimuli were created out of parts from a pool of features. The features were simple shapes such as circles, rectangles, arrows, lightning bolts, etc. Objects within each category varied along four dimensions, i.e., they had four parts that varied across different category members. Each set consisted of two categories of objects. These categories were defined in terms of alignability. For example, all objects within a category have the same general types of parts in the same overall arrangements, but each object has different versions of each of these parts. In some cases, these stimuli were shown in their original form, or alignable. In others, the parts of the objects were scrambled, eliminating the alignability among their features on which the category was originally defined.

The 3x3 arrays were different combinations of these stimuli. The scrambled array (XX) only contained stimuli that were non-alignable, meaning that the objects from both categories were scrambled. The alignable arrays (AX) contained one category of four alignable (A) stimuli while the five stimuli from the other (X) category were scrambled, and therefore non-alignable. The distinctive cue that was added to the four target stimuli in all conditions consisted of a texture pattern (e.g., shading, crosshatching, etc.), In the (AX) array the texture cue was added to the alignable category and in the (XX) array the texture cue was added to the smaller of the two non-alignable categories (four rather than five examples present).

Instructions explicitly encouraged participants to create categories (control condition), or to create categories only if they truly saw meaningful categories in that particular stimulus set (meticulous conditions). The liberal instructions were the same as those used in pre-



vious experiments, which simply encouraged people to divide the objects in a set into families and species as a biologist would do for a new collection of specimens that he or she was examining. The meticulous instructions had an identical first page to the control condition but also contained an explicit note with additional instructions for each condition. In the “Bio Story” condition, the additional instructions explicitly discouraged creating ad hoc categories by emphasizing the importance of only creating meaningful categories, plus the high a priori likelihood of all the creatures coming from separate families. The “Design Story” instructions informed participants that about half of the arrays are from the “control condition” and do not contain any groups or categories, i.e., all the objects in those arrays are unrelated and come from different categories. In this situation, participants were to simply assign a different category (family) label to each object in such arrays. Participants in each condition also saw sample pages illustrating the labeling procedures.

Discussion

Consistent with previous experiments, there was a main effect for alignability overall. In addition, this effect was present in all instructions conditions. However, the size of this effect varied between conditions. As predicted, the effect of alignability was strongest in the Design story condition and weakest in the control condition. This demonstrates a significantly reduced proclivity for the participants to group scrambled stimuli in the design story condition. In fact, there was no grouping of the scrambled stimuli in the design story condition at all in this experiment. Furthermore, the instruction conditions had no effect on the categorization of alignable stimuli. This interaction between alignability and instructions is consistent with our “demand effect” explanation of how pop out cues affected categorization of non-alignable stimuli in previous experiments.

The persistent categorization of alignable stimuli shown in this experiment replicates previous experimental results, in which categorization is based on alignability. The categorization of scrambled stimuli in the control condition reinforces the idea that pop out cues help to facilitate categorization by guiding the participant’s attention to the relevant objects. However, the differences between instruction conditions for scrambled stimuli suggests that though there is an attentional facilitation effect for pop out cues, categories based solely on them are an artifact of demand.

We argue that the difference between salient cues, which draw attention, and overall alignability, which

determines perceived similarity and categorization, implies that the process of creating categories in free categorization can actually be divided into separate stages. In the first stage, the person selects two stimuli to compare. In the second stage, the person compares the two stimuli and determines whether they are actually similar in a meaningful way. This similarity computation involves aligning the two objects and comparing them along corresponding dimensions. Finally, based on the similarity computed in the second stage, the person decides whether to put the objects in the same category. The probability of two objects being put in the same category is a function of all three stages. The cues can help to attract attention to those objects in stage one and thereby serve as a sort of catalyst for possible categorization. However, these cues should not be enough to inspire categories in and of themselves. During stage two, the overall alignability of the objects, determines the person’s impression of similarity or family resemblance. This is the main factor that determines whether or not they are seen as being the same “natural kind.” During stage three, the person compares the output of stage two to an internal decision criterion and decides whether to put the objects in to the same category; which is affected by contextual factors.

In previous studies it has been observed that people do not always notice alignable categories, and concluded that pure alignment is not noticed automatically. This means that there is a selection problem that must be solved to discover valid categories. Individual popout cues provide a potential solution to this problem by directing participant’s attention to the target objects. In previous studies, adding a cue increased detection of alignable categories, but also increased grouping of nonalignable objects. This is consistent with our prediction that pop out cues should increase the probability of comparing objects sharing that cue to determine whether or not they are alignable. However, the added cue should not by itself have caused the target objects to form a natural kind, meaning it should not affect the outcome of the second stage comparison process. When the perceived demand to create categories to satisfy task demands was eliminated (by the design instructions) the effect of the cue on overall categorization was eliminated as well.

The present results provide strong support for our general claim that alignability is the main factor that affects whether a group of objects is perceived as belonging to the same natural kind. At the same time, they point to the role of attentional cues in helping people to solve the selection problem by directing attention to useful comparisons, and highlight the role of instructions and



contextual factors in people's decision process. In some circumstances people may find it useful to create ad hoc categories to satisfy task demands, while under others only natural kinds will do. Our instructional manipulation shows that our participants were sensitive to the difference between what might be thought of as ad hoc versus psychologically natural categories.

Interestingly, this multi stage model of free categorization bears a strong resemblance to models of analogy. Analogies work in several stages as well (Gentner & Forbus, 2011). First we must notice the things that we are going to compare. In many models of analogy this is called the retrieval stage, meaning that the current stimulus must inspire us to recall a stimulus we have examined previously (Gentner, Ratterman, & Forbus, 1993; Gentner & Forbus, 2011; Ross, 1989). Once two items have garnered enough attention to inspire a comparison, we then attempt to map their structure to identify any correspondences between them (Gentner & Forbus, 2011). In the case of analogy, such correspondences can be highly abstract and non-obvious. Once the analogy has been identified, it may then be used to draw inferences about a current problem, serve as the basis for a general schema, etc. (Gick & Holyoak, 1983; Catrambone & Holyoak, 1989). In both models of analogy and our model of categorization, the recall or selection stage and the mapping/comparison stage are separate and affected by different independent variables.

In contrast to this reasoning, categorization and analogy are usually thought of as quite distinct and different. Analogies are often thought of as a rare conscious effortful process which occurs when people are being inventive or creative, while categorization is thought to be a frequent subconscious mental process (Hofstadter, & Sander, 2013). A more concrete discrepancy between categorization and analogy is that categorization is thought to apply to entities while analogy applies to relations (Hofstadter et al., 2013).

Our results are consistent with a multistage model of categorization in which selection, comparison, and the actual categorization decisions are separate processes. These stages and the distinctions between them are analogous to the stages in models of analogy. In fact, we suggest that categorization may actually be a form of spontaneous perceptual analogy. In the real world, both analogy and categorization often occur spontaneously, and are dependent on noticing a conspicuous and novel object or concept that reminds us of a previously experienced object or concept. In both situations, whether a stimulus is noticed is due to chance and the attentional salience of that stimulus.

For present purposes, the most important parallel is the fact that both models distinguish between a selection/retrieval stage and a comparison/mapping stage. In both models there is a distinction between whether we notice potentially analogous or categorizable things and whether we actually put them in the same category. Many studies have shown that the likelihood of noticing an analogous relationship between two objects is dependent on those objects sharing some salient surface features (Gentner, Ratterman, & Forbus, 1993; Gentner & Forbus, 2011; Ross, 1989). These salient features are responsible for facilitating the retrieval stage of analogy (Gentner & Forbus, 2011). However, it has also been demonstrated that the usefulness of an analogy is a product of the mapping of the deep structural alignability of the two objects, or how well the parts of each object corresponds to the parts of the other (Gentner & Namy, 1999). This may be completely independent of their surface similarity.

This is parallel to our model of categorization. In the first stage of our model, which parallels the retrieval stage for analogy, stimuli must draw enough attention to be compared. The cues added to the target categories can help to attract attention to the objects and thereby serve as a sort of catalyst to stage one of categorization. However, as stated in the analogy models and demonstrated by the current experiment, these cues are not enough to inspire categories in and of themselves. This exemplifies the second stage of categorization and analogy, which requires more meaningful associations from the stimuli being compared. These parallels would be just as obvious if we showed the stimuli one at a time instead of in an array. The factors that influence attention when stimuli are presented simultaneously are also likely the factors that determine memory retrieval when they are presented serially. Thus a distinctive pop out cue shared by two objects in an array is likely to cause them to be noticed and compared; the same shared cue in a sequential condition would be likely to cause one object to remind us of the other.

One reason for the close parallels between categorization and analogy is that in both cases the learner faces a kind of selection problem in finding useful comparisons. In analogy and categorization there are a nearly infinite amount of comparisons that could, in principle, be made, and only the tiniest fraction of these possible comparisons would actually be useful. According to both models, the solution seems to be that the automatic processes of attention and memory, as they are affected by salience, determine which comparisons are actually made. Though the efficaciousness of this type



of system is often questioned, especially with regard to analogy, the argument has also been made that superficial cues often correlate with meaningful similarities in the real world (Gentner & Forbus, 2011). Thus, using automatic attention processes for winnowing may actually be an efficient system for real world learning.

This new model of categorization places categorization within the theoretical framework of analogy, which, in turn, connects categorization to many other issues in cognitive science. It also directs our attention to the spontaneous nature of free categorization and its dependence on the noticeability of stimuli, and emphasizes that categorization of literally similar objects is actually rather abstract, being based on corresponding structure (alignability) rather than individual features. In these ways, our new model contrasts with many standard models of categorization in which categories are the product of deliberate intentions, error feedback, and individual shared features.

The model suggests that people are likely to discover categories that are highly alignable and have attention grabbing cues, which help to distinguish the potential category from other ambient stimuli. People should be less likely to create categories, which do not have a salient cue, at least on first exposure, even if the relevant objects are highly alignable. Moreover, although they may create ad hoc categories based on these distinct but individual features to satisfy task demands or use in a particular context, they are unlikely to perceive these categories as psychologically meaningful in the sense of perceiving them as the same natural kind (such as biological species). This may help to explain why basic categories are often found to be relatively easy to learn compared to subordinate and superordinate categories as members of basic level categories tend to be strongly alignable. Furthermore, this may be useful in practical situations, such as class rooms when teaching specific categories. In such cases it may be helpful to add salient cues to categories that we want children to form. It will be an important goal for future research to further elucidate these nuances of categorization for practical purposes, as well as to help relate categorization to analogy and human cognition more broadly. ■

I'm very much into making lists and breaking things apart into categories.

— David Byrne

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The College of Social and Behavioral Sciences Writing Lab

The writing lab, located in the Social and Behavioral Science building, room 354, aims to provide CSUSB students with directed assistance for the specific writing required in the College of Social and Behavioral Science major programs.

The lab helps all majors within social sciences from the conception and formation of a writing assignment to editing and grammar assistance.

The writing lab also offers multiple resources, including workshops on grammar and APA formatting.

To schedule an appointment with the writing lab, call 909-537-7539 or e-mail: csbswl@csusb.edu.

An interview with writing lab tutor Timothy Meyer

How long have you been working for the writing lab?

Since Fall of 2014.

What is your favorite part about working at the writing lab?

What I find is that most people who come into the lab don't understand research thinking, so helping them conceptualize and understand the research paradigm and then using that to build logic for their papers is very rewarding.

Had you taken 311 before you started working in the writing lab?

Yes. The majority of the tutors in the lab have taken 311, but it is not a requirement for working here.

Have you found working in the writing lab beneficial to your writing?

On one hand, I pay more attention to the little details in my writing, but on the other hand I also get hung up on those little details, and make less progress. So, it works for you and against you. Also, because I often have to teach people the rudimentary aspects of writing, I find myself focused on those aspects and end up getting stuck writing in a rudimentary way.

What is the greatest challenge you have faced helping others in the writing lab?

Meeting students who are too insecure to be willing to want to work and learn other things while they are here. If they are insecure, they don't want to ask questions. So, I don't know what to help them on. It's also hard to tell them where they need to work on something, because you don't want to hurt their feelings and they can get defensive about the edits.



Do you only see students from the Psychology Department?

No, we see students from anthropology, sociology, criminal justice, even the health sciences; we get a surprising amount of nursing students.

Do you see undergraduate and graduate students?

Yes, although not nearly as many graduate students as undergraduate students.

What services does the lab offer students?

Technically speaking, the lab is strict on what it offers students. We're supposed to take people who struggle in some area of writing and teach them how to be better, so we're essentially supposed to be tutors. That's what our title is, "tutor." But that's not necessarily the reality of it. The reality is we'll help you with literally anything you need help with. Aviel and I have even been known to help people with statistics on occasions.

Do you help students with their psychology 311 papers?

Oh yeah, of course. That's probably our main job.

Can the staff help with APA formatting?

Generally speaking, that's probably what we're best at. We're really good at helping people who have specific questions about APA.

Do you have to make an appointment?

No, you can walk-in. The way it works though, is that appointments take precedence, so, if you make an appointment you will definitely get that time. If you don't make the appointment, there is no guarantee that we will be able to see you that day. It's dependant on how busy we are. So my suggestion is: If you want to come to the writing



Writing lab tutors Aviel Millan (top), Tomothy Meyer (left) and Janhavi Dhargalkar (right).

lab the day before a psychology 311 paper is due, you may want to make an appointment.

Where do students go to schedule an appointment for the writing lab?

The students can come in to schedule an appointment or they can call the lab.

What should students bring with them to their appointment?

Their paper. Well, they don't necessarily need to bring their paper. Starting at the beginning with their ideas and conceptually how they build a logical argument out of their paper. So, I don't mind if people just show up with ideas. As long as they show up here wanting to work, then it's fine.

What do you wish students knew about the writing lab?

That we're not editors. A lot of people come in here and say, "Here, look at my grammar," but I'm not here to go over your paper with a red pen making your corrections for you. I'm not interested in doing that and it's not what I'm supposed to do. My job is to tutor you so that you can be better writer, not just fix your mistakes. I am always game to teach you how to do things or answer questions, but I don't care to read your paper and make your corrections for you.



What is the difference between this writing lab and the writing center in University Hall?

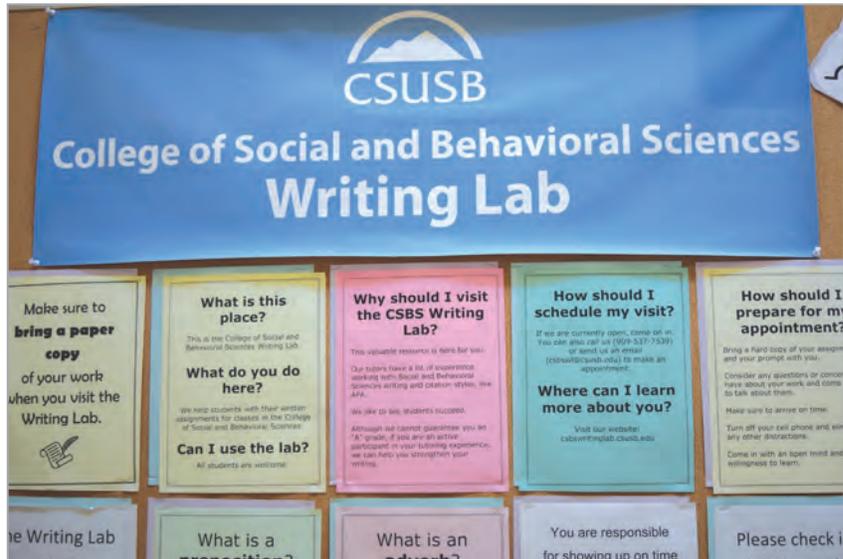
I'm under the impression that the writing center in UH will do more editorial stuff. But, I've never been to the writing center so I can't speak very accurately on the services they offer. What I do notice from students who come here and talk about their experience with the writing center is that they do get more of the editorial process with the writing center. They'll go through the paper and make the comments, but they won't necessarily look at the logic and analyze what the person is doing or not in regards to the paper specifics. So, students tend to get more effort on the editorial process but less effort on the theoretical framework and less actual "teaching." Also, I suspect that the tutors in the writing center are not necessarily as far along in their collegiate career as the tutors are here. It's about half graduate students and half advanced upper division students that work in the lab.

Why might a social science specific writing lab be of benefit for students?

This actually kind of has a complicated answer to it. The way we are taught to write in English, especially in high school English, is very different from how you write in science in general, but especially the social sciences. So, one of the things that people really struggle with especially when they take classes like 311 is that there is an entirely different philosophical approach to writing in scientific writing. The most important part in scientific writing is that it is all about clarity. It doesn't matter if you're boring, or if your topic sounds uninteresting. All that matters is that you are clear. For example, in high school and other English

classes, if you use the same word too many times, you're supposed to find a synonym. That's exactly what you're not supposed to do in social science writing. So I think having a lab dedicated to teaching and helping students with this disparate approach to writing is very beneficial to students who find themselves writing in it.

The PSRJ would like to thank Janae Koger for conducting the interview, Timothy Meyer for taking the time to complete the interview, and the Writing Center staff for participating in this endeavor. ■



Writing lab tutor Janhavi Dhargalkar (right) helping a student with her



The Effects of Shame and Self-Blame on Disclosure in Survivors of Sexual Assault

Author

Monica E. Aguilar

Abstract

Sexual Assault is a prevalent issue that is encountered in college life. As per a national sampling, 6.6% of females will experience sexual violence at some time in their lives, and in a college setting, women are (25%) more likely to experience sexual assault at any given time of the year (Catalano, 2013; Black et al., 2011; Fisher, Cullen, & Turner, 2000). Upon experiencing sexual victimization, the survivor can disclose their experience to informal (e.g., friends or family) or formal support services (e.g., emergency or medical personnel; Sabina & Ho, 2014). Disclosure has been linked to posttraumatic growth (Hassija & Turchik, in press). However, sensations of shame and self-blame may be obstructing disclosure and productive outcomes for survivors. The present study seeks to elucidate the effects of shame and self-blame on disclosure in survivors of sexual assault. It is hypothesized that self-blame will be negatively associated with disclosure to formal and informal support services (H1), shame will be negatively associated with disclosure to informal and formal support sources (H2), shame should be positively associated with self-blame (H3) and that shame should mediate the relationship between self-blame and disclosure to informal and formal support services (H4). College women from the local university's research pool were recruited for participation in the study on the condition that they had reported exposure to sexual victimization within the last five years. The study was administered via an online survey system. Participants then completed measures assessing trauma history, guilt and shame, disclosure and self-blame. Pearson's r correlations reveal shame was associated with disclosure to informal support sources ($r = .16, p < .01$) and not associated with disclosure to formal support services ($r = -.09, p > .05$). Shame was not associated with the tendency to self-blame ($r = .12, p > .05$). Self-blame was also not associated with disclosure to formal ($r = .11, p > .05$) and informal ($r = .03, p > .05$) support sources. Overall disclosure was associated with disclosure to formal ($r = .50, p < .001$) and informal ($r = .70, p < .001$) support sources. Mediation analyses (was conducted in the method outlined by Preacher & Hayes, 2008) to evaluate the mediating effects of shame on self-blame and disclosure. Shame did not emerge as a significant mediator in the relationship between self-blame and disclosure ($F(2, 227) = 1.71$; 95% CI: Lower Limit $-.001$ to Upper Limit $.04, p > .05, r^2 = .15$ (NS)). Limitations of the study can include salience of sexual victimization on university campus where research was conducted, and items failing to be transcribed onto the final survey completed by participants. Results from the present study can be implicated to the realm of clinical treatment, as well as the creation of disclosure sensitive techniques for individuals who may experience the disclosure of a sexual assault survivor.



Author Interview

Monica E. Aguilar

What are you majoring in?

Clinical/Counseling M.S.
(Marriage and Family Therapy).

What year are you in school?

This is my first year as a graduate student, and I will quickly be moving into the second year of my graduate program.

Which professors (if any) have helped you in your research?

Dr. Donna Garcia was the first professor to get me interested in research. Soon after I was able to identify my current mentor, Dr. Christina Hassija, who has been instrumental in my research journey. She has influenced my writing style and helped me to further understand the parallels between research and application of psychological treatment. I am very grateful to have had her mentorship throughout my undergraduate and graduate careers.

What are your research interests?

My research interests focus primarily on sexual assault survivors, their cognitions, help seeking behaviors, and common psychological disorders that arise as a result of experiencing a traumatic event (i.e. PTSD, or depression). My areas of study also include what could impede the survivor from experiencing posttraumatic growth after victimization (e.g. self-blame, shame, or negative cognitive appraisals).

What are your plans after earning your degree?

Hopefully teaching at the university level, conducting research, mentoring students and having a private practice.

What is your ultimate career goal?

I wish to obtain a Ph.D. in clinical psychology.



There are various crimes that can occur on a college campus; unfortunately, sexual assault is among these crimes. Sexual assault can be defined as sexual acts that are performed against a victim without their consent (Koss, 1993). In some instances, the sexual act may be threatened verbally with coercion, or in extreme cases the perpetrator will actualize the crime by utilizing physical force (e.g. shoving, hitting or overpowering the sexual assault survivor). The severity of the abuse can range from fondling, penetration or forced oral favors (Koss, 1993). In a national sample, 6.6 % of females will experience sexual violence once in their life time; which illustrates that sexual victimization is still a prevalent issue (Catalano, 2013; Black et al., 2011). In college student populations, women are 25% more likely to experience sexual violence at any given time in an academic year (Fisher, Cullen, & Turner, 2000). Exposure to sexual assault can lead to psychological maladjustment in survivors. This maladjustment can manifest as psychological disorders such as posttraumatic stress disorder (PTSD) or depression; which are often comorbid disorders among survivors of trauma (Campbell et al., 2009). Alternatively, a number of resilience factors may buffer the effects of trauma. Resilience characteristics such as self-efficacy, foster approach coping in survivors of sexual assault, however; survivors with greater internal locus of control appear to have a higher rate of psychological maladjustment (Walsh, Blaustein, Knight, Spinazzola, & Van Der Kolk, 2007). In disclosing the details of sexual victimization, the survivor can reduce distress associated with the event (Sabina & Ho, 2014), which can go onto result in posttraumatic growth (Hassija & Turchik, in press).

Disclosure of Sexual Assault

The disclosure of an unwanted sexual experience can present potential benefits and risks to the survivor. Disclosure can be defined as the act of relaying the experience of sexual assault to a trusted individual (Orchowski & Gidycz, 2012; Fisher, Daigle, Cullen, & Turner, 2003). However, the act of disclosing such sensitive information can be met with either favorable or pejorative reactions from the individual the survivor decides to confide in. Receiving negative social reactions upon disclosure, (e.g. blaming the individual for the traumatic event or reacting with disbelief); has been associated with greater posttraumatic distress (Ullman, 1996; Hassija & Gray, 2012). Individuals who experience sexual assault tend to disclose to a female counterpart (95%) over a male, with mothers and peers of the same age being the targets of disclosure (Orchowski &

Gidycz, 2012). Unfavorable reactions to sexual assault may stem from socio-cultural factors. Long standing gender roles (e.g. submissiveness in females) or even religious teachings (e.g. sin and chastity) may dictate the manner in which an individual reacts to the disclosure of a sexual assault survivor (Sabina, Cuevas, & Schally, 2011). Unfortunately, the survivor is unable to gauge the reaction of the listener until they recount their experience. However, it has been noted that there appears to be a near equal chance of either receiving a supportive or negative response to disclosure (Ullman & Filipas, 2001a). Literature related to disclosure and the projected benefit for survivors, often peers of the same age group as the survivor (especially on college campuses) tended to provide emotional support; which contributed better psychological adjustment (Sabina & Ho, 2014; Orchowski & Gidycz, 2012). Thus, disclosure in survivors of sexual assault can have a latent effect on psychological adjustment.

Psychological adjustment in survivors of sexual assault is influenced by the consequences of disclosure. Upon disclosing the experience of trauma, the sexual assault survivor can be treated differently by being offered support or being blamed for recounting their experience. A study by (Orchowski, Untied, & Gidycz 2013) on a female college student population suggests that being treated differently upon disclosure has beneficial outcomes if the survivor receives a supportive reaction. The resulting effect was emotional support-seeking that stemmed from disclosure. The researchers suggested that seeking emotional support from peers afforded sexual assault survivors the chance to reprocess their trauma. Reprocessing trauma is a form of problem focused coping, that draws upon cognitive strategies that allow the survivor to make sense of their trauma and accept the experience in an adaptive manner to foster posttraumatic growth (Linley & Joseph, 2004). It is worthy to note that while disclosure can lead to helpful outcomes, the type of support received from both formal and in formal sources also contribute to healing.

Formal and Informal Support

The type of aid a survivor receives is often dependent on whether the survivor discloses their experience to informal or formal support sources. Formal sources of support can be mental health staff (e.g. therapists or crisis center staff) or first responders such as the police or emergency personnel. However, many survivors may feel inclined to report to informal sources of support such as friends or family members (Sabina & Ho, 2014). For certain survivors, disclosing to an informal source of support may provide more comfort than reaching



out to a formal source (Ullman & Filipas, 2001 b). It may be the case that disclosing the traumatic event to an unknown individual or a perceived authority figure such as an officer or crisis center staff may be more anxiety provoking. Stigma surrounding reporting to formal support services may also contribute to cases of unreported sexual assault. As stated earlier the reaction received upon disclosure can often determine whether or not the survivor will go on to seek formal sources of support. Social support from informal sources has been associated with greater likelihood that a survivor will go on to seek mental health services (Ullman & Filipas, 2001b). However, there are factors that may inhibit disclosure in survivors that are more internal, such as maladaptive self-perceptions (Zinzow & Thompson, 2011).

The Roles of Shame and Self-blame on Disclosure

Sensations of shame and self-blame in sexual assault survivors may be factor influencing the decision to disclose. A heightened sense of characterological self-blame, or the propensity to blame oneself for the assault based upon a character trait, has been associated with less posttraumatic growth especially after receiving a negative social reaction upon disclosure (Ullman & Nadjowski, 2011). Additionally a heightened sense of self-blame in survivors of sexual assault has been shown to impede reporting and treatment seeking behaviors. A study conducted by Zinzow and Thompson (2011) revealed that (43%) of female college undergraduates did not report their experience of sexual assault due to feeling shame or experiencing self-blaming cognitions that resulted from their trauma. This can lead to the creation of internal self-schemas that influence the way the survivor perceives themselves and their trauma. Shame is caused by maladaptive thoughts about oneself that arise from erroneous self-schemas (Vidal & Petrak, 2007). Schemas are the way an individual organizes information into related clusters in their mind. A sexual assault survivor may engage in "schema congruence" which is when they accept a shame related schema about themselves such as the thought "I am worthless" (Lee et al., 2001). If the survivor considers this thought to be true about themselves, it may effectively prevent them from disclosing their experience of sexual victimization or even seeking help.

However, there are more resilient individuals who may engage in "schema incongruence", which occurs when a shame related schema about the self is rejected and the individual may disclose or seek treatment. Using the same example, the individual may think "I am

worthless" but reject this thought because they understand that their traumatic experience merits attention and treatment. Schema incongruence, however, is not met without its hindrances particularly when it occurs in a less resilient individual. For example, the individual rejects their initial thought of "feeling worthless" but then could go on to accept a thought that is even more harmful such as "I deserved to be assaulted" and choose not to disclose as a result (Lee et al., 2001; Vidal & Petrak, 2007). Shame related self-schemas then become sensations of self-blame. The individual blames themselves for the experience of trauma as a result of accepting their own shame related schemas (Lee et al., 2001; Starzynski, Ullman, Townsend, Long, & Long, 2007). Understanding the effects of shame and self-blame can lend insight into what occurs in survivors minds before they seek help or disclose.

The Present Study

Based upon the aforementioned literature, this study seeks to evaluate the mediating effects of shame and self-blame on disclosure in survivors of sexual assault. Individuals that experience shame resulting from schema congruence and schema incongruence may have a greater overall negative self-impression which can then lead to sensations of self-blame, being that they consider facets of themselves to be stable or unchanging (Lee et al., 2001). Furthermore shame, as reported by a college survey, was the number one reason that males and females chose not to disclose their experience of sexual victimization (Sable, Danis, Mauzy, & Gallagher, 2006). Adoption of negative shame related schemas can latently contribute to sensations of self-blame that may be present before disclosure and worsen after a negative social reaction (Ullman & Nadjowski, 2011; Breitenbecher, 2006). Both shame and self-blame prevent individuals from seeking treatment which can eventually lead to posttraumatic growth, which is why both phenomena merit further investigation if disclosure is to be encouraged in survivors in sexual victimization.

Based upon the aforementioned literature it is hypothesized that self-blame was to be negatively associated with disclosure to formal and informal support services (H1), that shame would be negatively associated with disclosure to informal and formal support sources (H2), the presence of shame should be positively associated with self-blame (H3) and lastly that shame would mediate the relationship the relationship between self-blame and disclosure to informal and formal support services (H4).



Method

Participants

All Participants were treated within concordance of the Ethical Principles of Psychologists Code of Conduct (American Psychological Association, 2002) and the present study was approved by the university's institutional review board. Participants (n=230) were gathered from the university's psychology student pool. Students who had experienced a traumatic life event were encouraged to volunteer their participation in exchange for course credit.

Measures

Demographic Questionnaire

Participants completed a demographic questionnaire that assessed their age, gender, marital status, ethnic background, racial background, student yearly income and year in college.

Assessment of Traumatic Events

Participants' trauma exposure was assessed with the Life Events Checklist (LEC; Gray, Litz, Hsu, & Lombardo, 2004). The LEC is comprised of 17 items that assess exposure to potentially traumatic events. Examples of traumatic events assessed for include natural disasters, physical assault, sexual victimization and injury. For the purposes of the current study only participants who endorsed "sexual assault" or "an other unwanted or uncomfortable sexual experience" within the past 5 years were evaluated and presented in results. This measure has been shown to have satisfactory validity and reliability when co-administered with other measures (e.g. CES-D for depression, PCL5- for PTSD). (Gray et al., 2004).

Self-Blame

Qualitative attributions for participants' sexual victimization experience were measured by utilizing a self-made measure with one open ended response item, while the rest of the items were questions with answers to be rated on a semantic differential scale. For example this is an item that requires the individual to rate their experience from one to seven on a Likert-type scale, "Is the cause of your unwanted sexual experience due to something about you or something about other people or circumstances?". Selecting one indicates they believe their victimization was due to other people or circumstances (i.e. external blame), where seven indicates that they perceive the event as being their fault (self-blame).

Disclosure and Perceived Effectiveness

Disclosure to formal and informal support sources was measured by using a short self-made disclosure questionnaire that will also investigate the degree to which individuals found their disclosure experience to be helpful (E.g. How helpful was it to discuss details relating to your sexual experience with members of your family?). The responses to the questions were rated on a semantic differential scale with seven available options (E.g. "Not at all= 1", "A great deal= 7"). Formal support services include emergency personnel such as law enforcement or firefighters and examples of informal support services can also include family and friends (Sabina & Ho, 2014).

Measuring Shame

To measure shame we have utilized the Shame and Guilt Proneness Scale (GASP; Cohen, Wolf, Panter, & Insko, 2011). The GASP consists of 16 items that expose readers to short scenarios that they must rate for their common reaction of shame or guilt to the event. Response choices are indicated by endorsing a number one through seven on a Likert scale (e.g. 1= very unlikely, 7= very likely). Scoring consisted of averaging related items together. For example, official coding items 3,6,10 and 13 measure shame related self-evaluations; totals from these scores are then averaged to evaluate the degree to which an individual would experience shame. This measure has shown good reliability and validity when co-administered with other measures (Cohen, Panter, Turan, Morse, & Kim, 2013).

Measuring Self-blame

To evaluate self-blame The Measure of Self-blaming Attributions (MSA; Hassija & Gray, 2013) was utilized. This measure consists of 40 items that evaluate the presence of characterological and behavioral self-blame. The measure asks individuals to consider what caused their sexual victimization. For example the attribution presented "I ignored my feeling that something was wrong or that I was in trouble," the individual must endorse how they felt on a Likert type scale with one indicating "not at all" (or that the individual did not feel this contributed to their sexual victimization) or five indicating "A great deal" (that the individual felt this statement to be a great deal of what contributed to their sexual victimization).

Procedure

Participants were recruited from the psychology department's participant pool by utilizing the SONA survey system. Individuals were asked to participate



if they had experienced “sexual assault” or an “unpleasant sexual experience” within the last five years, course credit was offered as an incentive. Individuals were notified that the survey would take 60 minutes to complete. After consenting on a voluntary basis, participants were provided with a link to access the survey which included the LEC, A self-made disclosure questionnaire that assessed the degree to which individuals found their disclosure to be helpful and to whom they disclosed to (formal or informal support sources), the GASP and the MSA. Upon completion participants were debriefed and thanked for their participation.

Design and Analysis

Data was analyzed by using Pearson’s r correlation coefficients and mediation analyses that made use of a bootstrapping method with significance levels set at $p < .05$ (Preacher & Hayes, 2008). The present study employed a repeated measures design.

Results

Demographic Data

Results of the demographic analyses revealed that the sample was comprised of individuals who identified ethnically as Hispanic ($n = 155$; 67.4%) and not Hispanic ($n = 72$; 31.3%) and ($n = 3$; 1.3%) being unknown. Racial background data revealed the overwhelming majority of the sample identified as Caucasian ($n = 85$; 37.0%) and as the other category ($n = 78$; 33.9%). Participants’ year in college included mostly juniors ($n = 92$; 40%) and seniors ($n = 89$; 38.7%). Yearly income was reported as the majority of participants’ earning \$0 to \$14,999 dollars a year ($n = 179$; 76.5%), with yearly earnings of \$15,000 to \$29,999 being the second most reported yearly income ($n = 41$; 17.8%). Marital status of participants was primarily single ($n = 102$; 44.3%) with the second highest majority being in a committed relationship ($n = 73$; 31.7%). Participants’ gender was overwhelmingly female ($n = 219$; 95.2%) with male reporting being minimal ($n = 9$; 3.9%).

Association between Variables

Pearson’s r correlation coefficients were calculated to determine the strength of associations between variables of interest. The predictor variable shame

Table 1. Bivariate Correlations

	1	2	3	4	5
1. Shame (GASP)	_____				
2. Self-blame (Trauma attributions)	.12	_____			
3. Formal Support (Self-made)	-.09	.11	_____		
4. Informal Support (Self-made)	.16*	.03	.37**	_____	
5. Overall Disclosure (Trauma attributions)	.12	.05	.50**	.70**	_____

Note. $N = 120$. * $p < .05$ ** $p < .01$.

was positively associated with disclosure to informal support sources ($r = .16$, $p < .01$) and not associated with disclosure formal support services ($r = -.09$, $p > .05$). Interestingly, shame was not associated with the tendency to self-blame ($r = .12$, $p > .05$). Self-blame was also not associated with disclosure to formal ($r = .11$, $p > .05$) and informal ($r = .03$, $p > .05$) support sources. Further analysis revealed that overall disclosure was positively associated with disclosure to formal ($r = .50$, $p < .01$) and informal ($r = .70$, $p < .01$) support sources.

Mediation Analysis

The mediation hypothesis was tested using a multiple-mediation bootstrapping procedure as recommended by Preacher & Hayes (2008). The predictor variable shame was entered as a potential mediator of the relationship between self-blame and disclosure. Shame did not emerge as a significant mediator in the relationship between self-blame and disclosure ($F(2, 227) = 1.71$; 95% CI: Lower Limit $-.001$ to Upper Limit $.04$, $p > .05$, $r^2 = .15$ (NS)).

Discussion

In evaluating the first hypothesis self-blame was not related with disclosure to informal and formal support sources (H1). Shame was positively associated with disclosure to informal support sources and not associated with disclosure to formal support services (H2). Shame was not associated with self-blame (H3) and shame did not significantly mediate the relationship between self-blame and disclosure to formal and informal support services (H4). There are reasons as to why these hypotheses may not have turned out as expected.

In the case of the first and third hypotheses, it could be that the construct self-blame was not related to disclosure to formal and informal support services because the population was actively engaged in disclosing sexual assault. The experience of self-blame



and the different types of self-blame such as characterological self-blame (blaming an aspect of an individuals' personality) or behavioral self-blame (the blame of one's behavior prior to assault) have been associated with less post-trauma adjustment (Frazier, 1990). However, results of the present study reveal that individuals are disclosing to formal and informal support services which connotes a certain degree of resilience in individuals who were able to disclose the experience of their sexual assault to informal or formal support services. This also serves as an attractive explanation as to why shame and self-blame were not related in the present study. Sensations of shame are predicated upon negative self-schemas which then can become sensations of self-blame after the experience of a trauma (Lee et al., 2001). If a population is inherently resilient, then the chance of experiencing shame after a traumatic experience could diminish just as sensations self-blame would.

With regard to the second and fourth hypotheses the construct of shame may not have exerted enough influence on disclosure behaviors. Shame had no relationship to formal support services making it difficult to evaluate the relationship between shame and disclosure behaviors. However, shame was positively and significantly associated with disclosure to informal support services which may suggest that individuals despite experiencing sensations of shame are still comforted by reporting to family members or friends (Ullman & Filipas, 2001b). In addition, these mixed findings may have weakened the potential of shame to mediate the relationship between self-blame and disclosure behaviors. Limitations of the study may have contributed to these mixed findings.

A limitation of the present study are items in measures that failed to be transcribed and put into the final survey that was completed by participants, and salience of sexual assault on the university campus. The GASP measure was utilized to measure participants' perceived shame, unfortunately one item in the measure failed to make it to transcription into the final survey released for participants to complete making one of the measures of shame impossible to evaluate. Furthermore, the college campus experienced a series of attempted sexual assault events which made the nature of sexual assault and reporting behaviors salient to the student population which could have altered results of the data collected (Serna, 2015). While there are limitations of the present study there are still relevant implications and directions for further study.

Results of this study have implications for clinical psychology in regards to sexual assault survivors. While shame may not have been a significant mediator of self-blame, perhaps shame has the potential to moderate the effects of shame and decrease disclosure behaviors. Efficacy of sexual education programs targeting disclosure, sexual assault prevention and rape myths can also be attractive avenues for further research. They may foster resilience and pejorative outcomes for survivors of sexual assault as seen in our sample which endorsed disclosure. Future directions can include how self-blame, shame and perceptions of control (locus of control) may be related to either productive or pejorative posttrauma outcomes (Frazier, Mortensen & Steward, 2005). ■

Somewhere, something incredible
is waiting to be known.

— Carl Sagan

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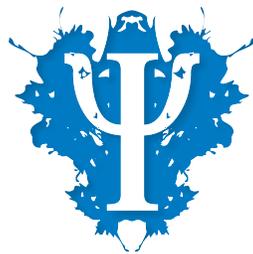
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Pictured from left to right

Kamiya Stewart, Erin Alderson, Andrea Barrera, Ryan Radmall,
Ashley Araiza, Kirk Fortini, Marina Ibrahim

Not pictured:

Julian Kirkham, Janae Koger, Christopher Morin, Jung-Jung Lee,
Timothy Meyer, Monica Aguilar, Kathleen O'Donnell, Graham Kaplan,
Kristy Rendler, Eric Cazares, Zachary Harmony



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