

Journal of Psychological Inquiry

Managing Editor

Susan R. Burns

Morningside College

Managing Editors Elect

Jennifer Bonds-Raacke

Fort Hays State University

John Raacke

Fort Hays State University

Associate Editors

Julie Allison

Pittsburg State University

Christie Cathey

Missouri Southern University

Stephen F. Davis

Emporia State University

Jennifer Penner

Hendrix College

Jennifer L. O'Loughlin-Brooks

Collin College

Special Features Editors

Richard L. Miller and Robert F. Rycek

University of Nebraska at Kearney

Founding Editor

Mark E. Ware

Creighton University

Visit the Journal's website:

<http://jpi.morningside.edu>

The *Journal of Psychological Inquiry* (ISSN 1085-6641) is a publication of the Great Plains Behavioral Research Association, a nonprofit, tax-exempt corporation, Robert R. Rycek, President, Department of Psychology, University of Nebraska at Kearney, 905 West 25th Street, Kearney, NE 68849 (voice: 308-865-8235; fax: 308-865-8980, email: rycekr@unk.edu). The *Journal* does not accept responsibility for views expressed in articles and other contributions that appear in its pages but provides opportunities for the publication of materials that may represent divergent ideas, judgments, and opinions.

Postmaster: Send address changes to Susan R. Burns, Journal of Psychological Inquiry, 1501 Morningside Ave., Sioux City, IA 51106

Manuscripts: See Instructions for Contributors in this issue.

Subscription: The price for 2012 is \$10.00 for students, \$15.00 for non-students, and \$25.00 for institutions. Make checks payable to the Great Plains Behavioral Research Association (or GPBRA).

Advertising: Rates vary with the size and complexity of display. The Association reserves the right to reject any advertising.

Copyright © 2012 by the Great Plains Behavioral Research Association

For information about manuscripts, subscriptions, advertising, copyright permission, or change of address, contact Susan R. Burns, Journal of Psychological Inquiry, Morningside College, 1501 Morningside Ave., Sioux City, IA 51106

Journal of Psychological Inquiry

Volume 17, Number 1, Spring 2012

Contents

Acknowledgements - Reviewers.....	3
Acknowledgements - Institutions and Organizations.....	4
Instructions for Contributors.....	5
Editorial.....	6

Articles

The Role of Nitric Oxide in Consolidation and Long-Term Memory in Rats Jake Virgo	7
Is He Gay? Stereotypes Used to Predict a Target's Sexual Orientation Maurita M. Gholston and Wind Goodfriend	13
Effect of Mental Practice on Men's Sociality in Social Interactions with Women Brady M. Beckman	19
The Relationship Between Early Childhood Education and Intelligence Justine L. Bucy	24
Stress from Physical Conflicts Based Upon Sex, Masculinity, and Color Perception Melissa Huntley and Wind Goodfriend	29
How Psychological Reactance Modifies the Effects of Hypocrisy Induction Benjamin S. Clancy and Hayley M. Milam	36
Health Locus of Control and Quality of Life in Mexican Children Melinda Ehren	40
Developing a New Device for Measuring Preferred Body Shapes: A Short Report Ian J. LaForge and Wind Goodfriend	45
Identifying Suspects from Lineups: A Review of Variables Affecting Accuracy Rebecca J. Zeller	50

Psychologically Speaking

In Search of Scientific Literacy: An Interview with Barney Beins
Chuck Sepers, Emily Kubalik and Richard L. Miller..... 54

An Invitation to Contribute to the Special Features Section

I—Evaluating Controversial Issues..... 62
II—Conducting Psychological Analyses—Dramatic..... 63
III—Conducting Psychological Analyses—Current Events..... 64

Acknowledgement - Reviewers

The following individuals reviewed manuscripts for this volume of the *Journal of Psychological Inquiry*. We gratefully acknowledge their valuable contributions to the journal.

Joseph Allen, Creighton University

Josh Arduengo, Collin College

Robin Anderson, St. Ambrose University

Harriet Bachner, Pittsburg State university

Jerry Bockoven, Nebraska Wesleyan University

Jennifer Bonds-Raacke, Fort Hays State University

Richard Clubb, University of Arkansas at Monticello

Matt Diggs, Collin College

Rick Froman, John Brown University

Corey Guenther, Creighton University

Holly Hackett, Missouri Southern State University

Loreen Huffman, Missouri Southern State University

Elizabeth Johnson, Creighton University

Kristine Kelly, Western Illinois University

Patricia Marsh, Park University

Gwen Murdock, Pittsburg State university

Jennifer Peszka, Hendrix College

Valerie T. Smith, Endicott College

Julianne Steel, University of Arkansas

Acknowledgement - Institutions and Organizations

The following institutions and organizations contributed financially to pay for the operating expenses of the *Journal of Psychological Inquiry*. We gratefully acknowledge their valuable support.

Avila University

Benedictine College

Columbia College

Doane College

Emporia State University

Fort Hays State University

Kansas State University

Missouri Western State University

Morningside College

Nebraska Wesleyan University

Newman University

Northwest Missouri State University

Rockhurst University

Union College

University of Central Missouri

University of Nebraska, Kearney

University of Nebraska, Lincoln

University of San Diego

Webster University - St. Louis

Washburn University

Association for Psychological and Educational
Research in Kansas

Nebraska Psychological Society

Cover Design

The creation of the graphic for the logo came about by thinking of how ideas are formed and what the process would look like if we could see into our brains. The sphere represents the brain, and the grey matter inside consists of all the thoughts in various stages of development. And finally, the white spotlight is one idea that formed into a reality to voice. The entire logo is an example of creation in the earliest stages.

Cathy Solarana, Graphic Designer

Instructions for Contributors

The *Journal of Psychological Inquiry* encourages undergraduate students to submit manuscripts for consideration. Manuscripts may include empirical studies, literature reviews, and historical articles; manuscripts may cover any topical area in the psychological sciences. Write the manuscript for a reading audience versus a listening or viewing audience.

1. Manuscripts must have an undergraduate as the primary author. Manuscripts by graduates will be accepted if the work was completed as an undergraduate. Graduate students or faculty may be co-authors if their role was one of teacher or mentor versus full-fledged collaborator.
2. Manuscripts must (a) have come from students at institutions sponsoring the Great Plains Students' Psychology Convention and the *Journal of Psychological Inquiry* or (b) have been accepted for or presented at the meeting of the Great Plains Students' Psychology Convention, the Association for Psychological and Educational Research in Kansas, the Nebraska Psychological Society, the Arkansas Symposium for Psychology Students, or the ILL-OWA Undergraduate Psychology Conference. The preceding conditions do not apply to manuscripts for the Special Features Sections I, II, or III.
3. Submit original manuscripts only. Do not submit manuscripts that have been accepted for publication or that have been published elsewhere.
4. All manuscripts should be formatted in accordance with the APA manual (latest edition).
5. Empirical studies should not exceed 15 double-spaced pages; literature reviews or historical papers should not exceed 20 double-spaced pages. The number of pages excludes the title page, abstract, references, figures, and tables. We expect a high level of sophistication for literature reviews and historical papers.
6. Submissions are made online at <http://www.edmgr.com/jpi/>. You will need to first register with the website and follow the steps outlined on the website for your submission.
7. When prompted, provide e-mail addresses for the author(s) and faculty sponsor.
8. Include a sponsoring statement from a faculty supervisor. (Supervisor: Read and critique papers on content, method, APA style, grammar, and overall presentation). The sponsoring letter should indicate that the supervisor has read and critiqued the manuscript. In addition, assert that the research adhered to the APA ethical standards. Finally, confirm that the planning, execution, and writing of the manuscript represents primarily the work of the undergraduate author(s). This sponsoring statement should be in pdf format and uploaded with the submission.
9. Ordinarily, the review process will be completed in 60 days.
10. If a manuscript requires revisions, the author(s) is (are) responsible for making the necessary changes and resubmitting the manuscript to the *Journal*. Sometimes you may have to revise manuscripts more than once.

PLEASE NOTE: All submissions and reviews will be done electronically using PeerTrack essentials.

To submit your manuscript, log on at: <http://www.edmgr.com/jpi/>.

Editorial

Writing this, my last, editorial is incredibly bittersweet. While serving as Managing Editor for the *Journal of Psychological Inquiry (JPI)* for the past four years, I have experienced many personal and professional rewards. Many of these rewards mirror the reasons why we encourage students to engage in the research process (e.g., developing relationships with mentors, critical thinking skills, networking opportunities, making contributions to the field of psychology, etc.). Over the past years serving in this capacity for *JPI*, I have met many amazing colleagues, students, and faculty alike.

In preparation for writing this editorial, I re-read my inaugural editorial in Issue 13, Vol. 1. Although there have been changes in the editorial board, reviewers, the process for submission, etc. much has remained constant. For example, as stated in my inaugural editorial, I greatly respect the effort put forth by students who submit to *JPI*, and the faculty sponsors who mentor them through the process. Additionally, I continue to be grateful and indebted the efforts of *JPI*'s Editorial Board. Their dedication to undergraduate research and quality of product is stellar and greatly appreciated.

When I began as Managing Editor, I noted that my desire was to bring the same level of commitment to the *Journal* as Dr. Mark Ware, Founding Editor, gave over his 11 year commitment to *JPI*. What I learned in my brief time as Manage Editor was Dr. Ware left big shoes to fill! It was because of his and others' dedication to the *Journal*, students in psychology have such a fine outlet for publishing their work.

As I move into new professional endeavors, I will always be appreciative of this opportunity to give back to the field of psychology. I am pleased to announce that Jennifer Bonds-Raacke and John Raacke from Fort Hays State University in Hays, Kansas will be joining the *Journal* as Managing Editors. Jennifer and John have been long-time reviewers for *JPI*, and more importantly superb advocates and supporter of undergraduate research over the past 10+ years that I have known them. I am certain that with their guidance, *JPI* will continue to thrive. Please direct future inquires regarding the *Journal of Psychological Inquiry* to either Jennifer Bonds-Raacke (jmbondsraacke@fhsu.edu) or John Raacke (jdraacke@fhsu.edu).

Susan R. Burns
Managing Editor

The Role of Nitric Oxide in Consolidation and Long-Term Memory in Rats

Jake Virgo

Monmouth College

Abstract

For many years, nitric oxide has been known to play a role in memory consolidation. Concerning, then, in recent years, athletes have been using nitric oxide supplementation at the risk of potential unknown memory effects. To determine whether there is a risk of memory effects through nitric oxide supplementation, Long-Evans rats ($n = 9$) received 450 mg/kg via oral gavage of the commonly-used supplement L-arginine (from which nitric oxide is synthesized) and were compared to saline control group rats ($n = 9$) in a long-term memory task. All rats were trained on the Win-Shift version of a 12-arm radial arm maze, which involved two stages: Stage 1 provided information about where in the maze food would be found during Stage 2. After training criteria had been met by all rats, and across the 4 days of testing, L-arginine or saline were administered to the groups, immediately after Stage 1 (but two hr before Stage 2). L-arginine was expected to enhance memory consolidation, with memory improvements being seen as fewer errors were made while finding all of the food rewards in Stage 2, and less time required to complete Stage 2 when L-arginine animals were compared to saline control animals. The hypothesis was supported through both measures, suggesting that increasing nitric oxide levels may result in cognitive benefits. These findings add to the growing topic of nitric oxide's role in long-term memory processes.

Keywords: nitric oxide, memory consolidation, Long-Evans rats

Nitrogen monoxide (nitric oxide, NO) is a free-radical, and as such, mediates many pathological and physiological processes, such as vasodilatation (Zinn et al., 2009). After finding that NO is naturally produced by arterial endothelial cells, Dr. Louis Ignarro, the 1998 Nobel Prize winner in medicine, sought to find ways to stimulate its production. He soon discovered that amino acids, such as citrulline and L-arginine, increased the production of, and stabilized levels of, NO (Ignarro, 2005). He also found the increases in arterial blood flow that occur with exercise stimulate NO production, which further increases blood flow and reduces blood pressure. (This finding is the basis of many athletic supplementations, where athletes are seeking ways to increase blood flow to their muscles to improve performance.) The production of NO can be naturally stimulated by eating foods high in protein such as meats, eggs, or seafood; and many dairy products (including chocolate) are rich in amino acids such as L-arginine and citrulline. On the other hand, foods rich in fats and low in protein create oxidative stress and NO deficiency, which can lead to atherosclerosis, stroke, and myocardial infarction (Ignarro, 2005).

L-Arginine, an amino acid found in the body (and the

supplement used by athletes) is metabolized into NO by nitric oxide synthase (NOS; Susswein, Katzoff, Miller, & Hurwitz, 2004). L-Arginine metabolizes into NO primarily in the endothelial cells of arteries by means of two forms of NOS, cNOS and iNOS. However, nNOS (also known as NOS1) makes NO available throughout the brain. NO synthesized from nNOS serves as a lipid-soluble neurotransmitter and is widely used in the neural circuits, diffusing and migrating to a wide variety of cells (Susswein et al., 2004).

High amounts of NOS are found in the hippocampus (i.e., a region of the brain known to play a large role in learning and memory processes); thus, it is likely that NO plays more than one role in the learning and memory process. NO seems to be indiscriminant toward a wide variety of neurons and functions, and it is well known that memory formation is not a unitary process (Susswein et al., 2004). Currently, the best explanation for how new information is integrated into long term memories is a process called long term potentiation (LTP; Jia, Yin, Hu, & Zhou, 2007). The present research was based on the assumption oral administration of L-arginine would increase NO in the central nervous system. Thus, for the purposes of this study, it is important to understand the biochemical role NO plays in LTP. LTP is the process in which the connections between two neurons that are simultaneously stimulated (i.e., firing together) are strengthened. This simultaneous stimulation results in more frequent and stronger connections between the two neurons, consolidating the information passing between them into LTM (Jia et al., 2007). The primary neurotransmitter involved in LTP is glutamate, which is released from the presynaptic cell in greater amounts during LTP. NO's role is to serve as a retrograde neurotransmitter released from the post-synaptic cell into the synapse, signaling the pre-synaptic cell to increase the release of glutamate (Jia et al., 2007). Such regulatory processes at the synapse contribute to memory formation and also play a role in neuroplasticity, which is likely caused by differing rates of stimulation and the activity of nearby cells promoting neuronal spine growth to adjacent cells (Susswein et al., 2007). Thus, as a retrograde neurotransmitter, NO plays an important role in LTP by aiding in the strengthening of neuronal connections.

Support for the role of NO and NOS in learning and memory comes from a variety of research. When the NOS inhibitor N ω -Nitro-L-argininem (L-NNA) is infused directly into the amygdala of rats immediately after inhibitory avoidance fear conditioning, long-term memory retention is impaired (Zinn et al., 2009). The timing of administration is vital, as it suggests NO is important for the actual consolidation of information into LTM, rather than for the

Marsha Dopheide served as Faculty Sponsor for this research.

acquisition or retrieval of such memories. The role of hippocampal NO in immediate, short-term, and long-term memory processes was further demonstrated in a different study using a separate inhibitory avoidance task with rats. In this case (Harooni, Naghdi, & Rohani, 2009), the NOS inhibitor N ω -Nitro-L-arginine Methyl Ester Hydrochloride (L-NAME) and/or L-arginine were directly infused into the CA1 region of the hippocampus prior to training, immediately after training, or immediately before retrieval. Infusions immediately after training showed that L-NAME negatively impacted short- and long-term memory consolidation; but administration of L-arginine reversed these effects. Thus, these results further support the notion that NO is important for the consolidation of memories in the hippocampus (Zinn et al., 2009); and, when NO activity is compromised, L-arginine may recover some of the negative impacts (Harooni et al., 2009).

Contrary to the above findings, others have reported that administration of the NOS inhibitor L-NAME immediately after training on a passive avoidance task had *no* effect on consolidation when tested 24 hours later. However, administration of L-NAME 30 minutes before training and at 23.5 hours did negatively inhibit learning and retrieval respectively (Yildirim & Marangoz, 2004). However, as with the above studies, L-arginine again enhanced retention. Thus, contrary to the previous findings, these results suggest that inhibition of NO impairs *learning* and *retention*, but *not* consolidation (Yildirim & Marangoz, 2004).

As demonstrated by previously mentioned research, in order to assess the effects of compounds on various stages of learning and memory processes, a behavioral task must be used that allows the researcher to assess at least short-term and long-term memory processes. One of the more common methods to measure learning and memory in animal subjects is the radial arm maze (RAM). The most standard maze consists of a center hub with eight arms extending outward. One common version of the RAM is the Win-Stay version, where animals are given successive access to certain arms to retrieve a food reward, and then must return to those same arms when tested for accurate learning or memory of where food reward was previously found. Another version of the RAM, the version selected for this study, is the Win-Shift version. With this version, the animal is tested on the ability to enter arms *not* previously entered in efforts to find food reward that has not already been eaten. Depending on the interest of the researcher, performance can be measured in a variety of ways but typically is measured by number of errors, percent of correctly entered arms, and time to complete the task (Kolata & Kolata, 2009). Previous researchers have successfully used the RAM to determine the various effects of NO in rats. For example, Yamada et al. (1995) found the NOS inhibitor L-NAME inhibited acquisition of the RAM rule in naïve animals in a dose-dependent fashion, but not the retention of the RAM rule in animals that had previously learned the task. Physiological correlates suggested that the inhibition of NO impaired learning, but not memory processing, perhaps through decreasing 5-HT activity (Yamada et al. 1995).

As elaborated previously, past research shows varied effects of NO on learning and memory processes. The purpose of this study was to add to the research by determining the potential effects of NO, when increased during consolidation, LTM retention in healthy, non-compromised rats using the RAM. Furthermore, I strived to clarify the effects of NO on memory, in a context directly applicable to human oral consumption of its precursor, L-arginine. Based on past research demonstrating the positive effects of NO on brain functioning (specifically in the hippocampus), I hypothesized rats administered L-arginine during consolidation would show enhanced LTM in the Win-Shift version of the RAM when compared to a control group.

Methods

Subjects

For this study, 18 Long Evens female rats, bred in the Western Illinois University animal colony, were used. Rats were approximately three months old at the start of the study, with an average weight of 220 grams. The rats were pair housed in Plexiglas containers (18 X 12 X 8) for the entire length of the study. The containers were bedded with Cell-Sorb Plus[®] and changed weekly. Their diet consisted of *ad libitum* access to standard chow pellets (5012 Rat Diet, Ratlab) and standard tap water. The housing room was kept on a 12 hour light/12 hour dark cycle with the light hours being 8 am to 8 pm. All rat subjects were handled for two or more weeks prior to experimentation to habituate the experimenter and the animals to the handling process. All rats were numbered with a marker on their tails for identification purposes. All procedures conformed to American Psychological Association (APA) ethical standards as well as standards set forth by the United States Department of Agriculture (USDA) and the National Institute of Health and Office of Laboratory Animal Welfare (NIH- OLAW).

Apparatus

Testing was done in a radial arm maze (RAM). The RAM was raised 3 feet off the floor for better sight and accessibility. The RAM consists of 12 wooden arms (73.75cm long X 10.00 cm wide X 6.25 cm thick); only six of the arms were used in this study (every other arm). All other arms remained closed throughout the study. Each arm consisted of walls that extended 36.80 cm out and 16.50 cm high. All arms came out from a central platform that was 61.25 cm in diameter, and each arm consisted of a food well at the far end that could be baited with a mini chocolate chip reward. The arms were all able to be separated from the center platform by a 63.5cm guillotine-type Plexiglas door. Each door separating the arms to the central platform was attached to levers by fishing line, creating a pulley system that allowed the experimenter to control each arm as needed. All activities and trials were done with the lights on and with white noise (static reception) playing from a radio to prevent extraneous noise from distracting the animals. Timing in the experiment was done using a standard stopwatch.

Drug Administration

Animals were divided into an experimental group (n = 9) and a control group (n = 9). The experimental group re-

ceived 450 mg/kg at 1 ml/kg of L-arginine through oral gavage. Administration method and dosage were based on previous rat research done with L-arginine that found dose-dependent effects of L-arginine on spreading depression propagation, with 450 mg/kg being the most effective dose (Maia et al., 2009). During the 4 days of testing (but not during habituation or training), the experimental group received their administration of L-arginine immediately after running the forced choice trial in the RAM (described below). In the same fashion, the control group received sham oral gavage treatments of 1 ml/kg standard tap water, the vehicle for the experimental treatments. For each injection, each rat received approximately 4 cc of fluid.

RAM Procedure: Habituation

In order to acclimate the rats to the RAM, habituation occurred for two days. During habituation, each rat was individually placed into the center of the RAM for three minutes, during which time they were free to explore the center arena only of the RAM and to eat six chocolate chips that were placed in the arena. Throughout habituation and the rest of the experiment, rats were run alternately between the two groups, so that the potential confound of time of day could be eliminated. Also, throughout the entire experiment, the RAM was cleaned with a diluted antibacterial solution after each trial in order to prevent any scents potentially left in the maze from influencing performance.

RAM Procedure: Training

Training in the RAM ensured the rats were familiar with the maze and with the rule for obtaining a chocolate chip reward during the testing period. The rats were trained on one "Forced Choice" trial each day for two days (Stage 1), after which time they were introduced to one "Free Choice" trial (Stage 2) on the third day of training.

During Forced Choice trials, three of the six experimental arms were randomly baited with one mini chocolate chip each. Randomization was ensured by the use of an online random number generator to determine which arm would be baited and opened. Following the arms being randomly baited, the rat was placed in the center of the maze, and a ten second delay occurred to signal the start of the trial. Stopwatch timing started, and the door to one baited arm was opened until the rat had retrieved the chocolate chip and returned to the center of the maze. Once that chip was eaten, that door was shut and the door to another baited arm was randomly opened. This process continued until all three chips had been eaten or three min had elapsed, whichever came first. Once a rat had met the criterion of successfully entering all three baited arms and eating all three chips within three min for two consecutive days, the rat was then advanced to training on the Free Choice trial. All rats completed Forced Choice training within 2 days. During the one trial of Free Choice training, Free Choice trials occurred immediately after the Forced Choice trials. Thus, after successfully entering the three baited arms during the Forced Choice trial, the arms to all six arms were raised simultaneously for the Free Choice trial. The goal of the Free Choice trial was for the rat to enter all three new arms, in any order, without entering any of the previously-visited arms from the Forced

Choice trial.

During Free Choice trials, three measures were recorded, "Errors," "Time to Complete," and "Chips Eaten." Errors, which served as a measure of accuracy, were recorded if a rat entered an arm that it had previously entered either during the Forced Choice trial or the Free Choice trial. Time to Complete, which served as a measure of speed, was recorded in seconds to determine how long it took the rat to successfully enter and obtain chips from the six arms. Finally, "Chips Eaten" was recorded as a measure of successful completion. The Free Choice trial was complete as soon as the rat entered all three new arms or three min elapsed, whichever came first. In the event that a rat did not complete the task before three minutes had elapsed, 180 s was recorded for that rat's Time to Complete. After one day of training on the Free Choice trial, animals were moved on to Testing. Also during training, the gavage procedure was practiced with water after each session, in order to habituate the rats and the experimenter to the process.

RAM Procedure: Testing

Testing occurred over four separate days. Testing was identical to training except that, between the Forced Choice trials and the Free Choice trials, the animals were exposed to their drug treatment and 2 hr delays were introduced. Immediately after each rat finished the Forced Choice task, it was given either 450 mg/kg L-arginine at 1 ml/kg or sham gavage at 1 ml/kg and then placed back in its home tub. Then, the experimenter waited for 2 hr to elapse before returning the rat to the maze to complete the Free Choice portion of the trial. As with training, Errors, Time to Complete, and Chips Eaten were recorded for later analyses.

Results

In order to determine the effects of L-arginine on memory consolidation and LTM in rats in the RAM, a multivariate analysis of variance (MANOVA) was conducted in SPSS 14.0, with contrasts run on within-groups effects when necessary. For this study, there was one between-groups independent variable, Treatment (L-arginine or Control), and one within-groups independent variable, Day (with 4 days of testing). The dependent variables were Errors, Time to Complete, and Chips Eaten.

Errors

Overall, there was no significant main effect of Day on errors, $F(3, 48) = .87, p = .45$. There was also no significant main effect of Treatment on errors, $F(1, 16) = .80, p = .38$. However, as depicted in Figure 1, there was a Day x Treatment interaction, $F(3, 14) = 5.14, p = .01$. Whereas no significant differences were found for errors across the four days of testing, ($p > .05$ for all comparisons), directions of the means indicated that L-arginine animals performed more errors ($M = 2.78, SD = .971$) than controls ($M = 1.78, SD = 1.30$) on Day 1; but performed fewer errors than controls on Day 2 (L-arginine $M = 2.44, SD = 1.50$; Control $M = 3.22, SD = 2.04$). This improved performance for the L-arginine rats persisted across Days 3 (L-arginine $M = 1.55, SD = .88$; Control $M = 2.66, SD = 1.80$) and 4 (L-arginine $M = 2.00, SD = 2.06$; Control $M = 2.89, SD = 1.83$).

Jake Virgo

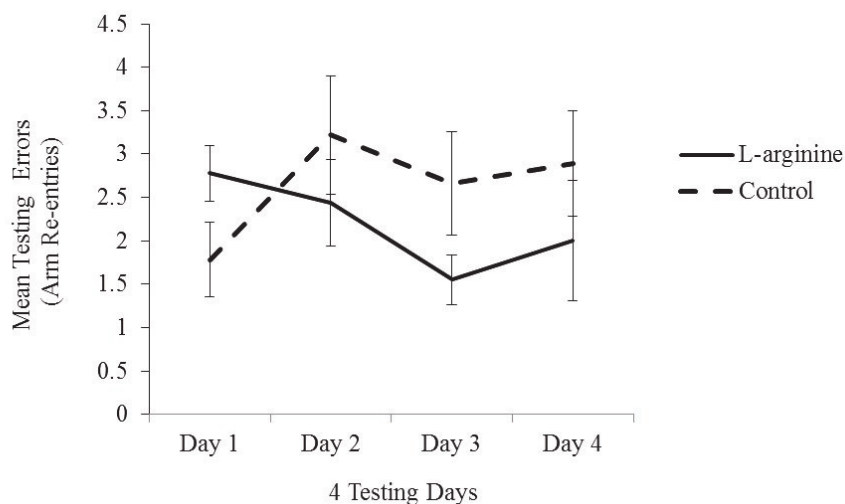


Figure 1. Significant Day x Treatment interaction, $p = .01$, for Errors (re-entering a previously-entered arm) during testing on the radial arm maze, with error bars depicting standard error of the mean. Animals in the L-arginine group performed more errors on Day 1, but fewer errors on Days 2, 3, and 4, compared to animals in the control group.

Time to Complete

As expected with practice, there was a significant within-subjects effect of Day on time to complete, with time to complete decreasing across Days 1 through 4, $F(3, 16) = 10.86$, $p = .01$. Within-subjects contrasts indicated significant differences occurred between Day 1 ($M = 171.06$, $SD = 14.50$) and Day 2 ($M = 148.72$, $SD = 32.92$; $F(1, 16) = 36.96$, $p = .01$), and between Day 2 and 3 ($M = 143.33$, $SD = 35.46$; $F(1, 16) = 7.03$, $p = .02$), but not between Day 3 and 4 ($M = 132.17$, $SD = 34.79$; $F(1, 16) = .02$, $p = .90$). As seen in Figure 2, a Treatment effect was also found on time to complete, with the L-arginine group being significantly faster at completion of the maze ($M = 132.75$, $SD = 29.76$) than the control group ($M = 160.39$, $SD = 21.54$), $F(1, 16) = 9.82$, $p = .01$. No Day x Treatment interaction was found, $F(3, 14) = 2.49$, $p = .10$.

Chips Eaten

There was also a significant within-subjects effect of Day on chips eaten, as was also expected, with animals progressively eating more chips across days, $F(3, 48) = 6.61$, $p = .01$. Within-subjects contrasts indicated that significant differences occurred between Day 1 ($M = 2.11$, $SD = 1.08$) and Day 2 ($M = 2.56$, $SD = 1.08$; $F(1, 16) = 11.49$, $p = .01$), but not between Day 2 and 3 ($M = 2.83$, $SD = .38$; $F(1, 16) = 2.71$, $p = .12$) or Day 3 and Day 4 ($M = 2.89$, $SD = .32$), $F(1, 16) = .01$, $p = .92$. No significant Treatment effects were found on chips eaten ($F(1, 16) = 2.39$, $p = .14$), and there was no Day x Treatment interaction, $F(3, 14) = 1.62$, $p = .23$.

Discussion

The purpose of this study was to investigate the effects of L-arginine on consolidation and LTM in rats. As hypothesized, oral administration of L-arginine enhanced the con-

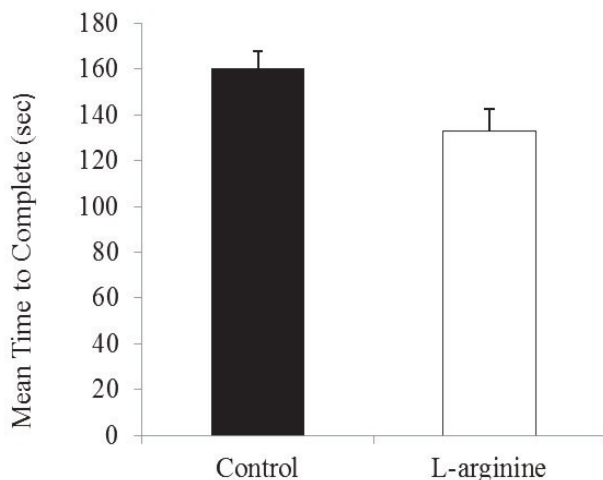


Figure 2. Significant main effect, $p = .01$, of Treatment on Total Time to Complete in the radial arm maze, with error bars depicting standard error of the mean. Animals in the L-arginine group completed the task in less time compared to animals in the control group.

solidation of LTM as L-arginine rats completed the RAM with fewer errors, and in less time, than control group rats. As expected with practice, all animals improved their performance across the 4 days of testing; however, the L-arginine animals improved faster than the control animals. Although neurochemical measures could not be taken, it is expected the improvements seen in the L-arginine animals were due to the body metabolizing NO from L-arginine.

By focusing on consolidation, one goal of this study was to further clarify *when* NO had effects on learning and memory processes (during encoding, storage, or retrieval). Time and space constraints prevented consideration of L-arginine during all three stages of learning and memory. Therefore, NO's effects on encoding/learning (i.e., administration prior to the Stage 1-Forced Choice trials) and retrieval/retention (i.e., administration prior to the Stage 2-Free Choice trials) were not investigated. The effect of L-arginine on consolidation alone was ensured by administering the compound immediately after the Stage 1-Forced Choice trial, when food reward location would be consolidated for retrieval 2 hr later. Some of the previous literature suggests inhibition of NO impairs learning and retention, but not consolidation (e.g., Yildirim & Marangoz, 2004). However, others have found that administration of L-arginine increases retrieval by means of enhancing consolidation (Yamada et al., 1995). Also, NO inhibitors negatively impacted long term memory performance during consolidation (but not learning or retention), an effect decreased by administration of L-arginine (Haroony et al., 2009; Huang & Lee, 1995). Also, L-arginine dose-dependently enhanced memory consolidation in non-compromised animals (Huang & Lee, 1995) and increased NO in the amygdala is a necessary step for consolidation in fear learning (Zinn et al., 2009). Thus, when added to the bulk of the previous literature, the current study provides further support NO may play a role during consolidation processes.

Huang and Lee (1995) demonstrated bilateral infusion of sodium nitroprusside, which mimics the effects of NO, and L-arginine into the dentate gyrus of the hippocampus had dose-dependent effects on memory retention. Lower and higher doses had no significant effect on performance; however, the median dose significantly enhanced memory retention (Huang & Lee, 1995). Those findings could partially explain the Treatment x Day effects found in this study. As can be seen in Figure 1, the beneficial effects of L-arginine (the decrease in errors) gained in strength between Days 2 and 3, and gradually tapered off by Day 4. Thus, it is possible with moderate amounts of accumulation, L-arginine had beneficial effects; however, at higher doses, these effects declined.

In this study, limited resources prevented the investigation of a dose-response curve. Future research could include additional days of administration and testing, and a range of L-arginine concentrations, to determine if an inverted U-shaped curve emerges regarding the effects of L-arginine on performance in the RAM. Such research would allow a more accurate depiction of the behavioral and cognitive effects of NO and perhaps better align such results with those of Huang & Lee (1995). Related, the incorporation of a de-

lay curve (0 hr delay, 2 hr delay, 4 hr delay, etc.) would better allow conclusions to be made regarding the effects of L-arginine on STM or various lengths of LTM. Also, the current study contained four testing trials of only non-compromised rats. Much of the literature reviewed showed significant effects of L-arginine at various stages of learning and memory, but only in compromised animals that were given NO inhibitors. A better understanding of why effects were found in these uncompromised animals is necessary; perhaps, because these animals were tested at an earlier age than those tested previously, or perhaps it is due to the timing or route of administration of NO inhibitors or agonist. Research comparing compromised and non-compromised rats might further highlight where some of these discrepancies lie.

With NO playing an important modulatory role in LTP, it makes sense increasing NO, through administration of its precursor, L-arginine, could enhance consolidation and LTM (by enhancing glutamate release), as found in this study. In the current study, limited resources prevented the investigation of neurochemical correlates of the observed memory improvement. Future research should include such neurochemical measures to provide an objective measure of nitric oxide enhancement in the brain and to determine the strength of the correlation between memory improvement and nitric oxide levels. The goal of this study was to investigate the potential effects of L-arginine on cognitive processes because many athletes orally ingest NO-based training supplements for increased blood flow to the muscles. Because of this interest, the route of administration used was selected in order to more closely mimic administration in athletes, at the risk of preventing the study of more specific effects of L-arginine on the central nervous system or on specific regions of the brain, such as the hippocampus. The results suggest these athletic supplements may also have a cognitive effect even in healthy individuals who are taking them orally.

NO is still a relatively "young" neurotransmitter as it has only more recently been studied as a neural modulator. NO is also the only retrograde messenger known to be involved in the process of LTP; thus, NO's role in the CNS will be investigated for some time. The implications of the research thus far are broad. It is interesting to consider that manipulation of this chemical messenger, even through oral administration, might aid memory impairments in individuals suffering from neurodegenerative memory disorder. Moreover, NO could also be considered as a cognitive enhancer for healthy individuals. Should future research continue finding that L-arginine enhances consolidation and LTM, L-arginine supplementation could possibly be considered a therapeutic tool for a variety of cognitive disorders.

References

- Haroony HE, Naghdi N, Rohani AH. (2009). The role of hippocampal nitric oxide (NO) on learning and immediate, short- and long-term memory retrieval in inhibitory avoidance task in male adult rats. *Behavioural Brain Research*, 201(1), 166-172.

- Huang, A., & Lee, E. (1995). Role of hippocampal nitric oxide in memory retention in rats. *Pharmacology Biochemistry and Behavior*, 50(3), 327-332.
- Ignarro, L. (2005). Editorial [Hot Topic: Nitric Oxide (Guest Editor: Greg Thatcher)]. *Current Topics in Medicinal Chemistry*, 5(7), 595.
- Jia, P., Yin, J., Hu, D., Zhou, Z. (2007). Retrograde adaptive resonance theory based on the role of nitric oxide in long-term potentiation. *Journal of Computational Neuroscience* 23(1), 129-141.
- Kolata, W., & Kolata, S. (2009). A model of working memory capacity in the radial-arm maze task. *Journal of Mathematical Psychology*, 53(4), 242-252.
- Maia, L., Amancio-dos-Santos, A., Duda-de-Oliveira, D., Angelim, M., Germano, P., Santos, S., et al. (2009). L-Arginine administration during rat brain development facilitates spreading depression propagation: evidence for a dose- and nutrition-dependent effect. *Nutritional Neuroscience*, 12(2), 73-80.
- Susswein, A. J., Katzoff, A., Miller, N., & Hurwitz, I. (2004). Nitric oxide and memory. *The Neuroscientist*, 10, 153-160.
- Yamada, K., Noda, Y., Nakayama, S., Komori, Y., Sugihara, H., Hasegawa, T., et al (1995). Role of nitric oxide in learning and memory and in monoamine metabolism in the rat brain. *British Journal of Pharmacology*, 115, 852-858.
- Yildirim, M., & Marangoz, C. (2004). Effects of Nitric Oxide on passive avoidance learning in rats. *International Journal of Neuroscience*, 114(5), 597-606.
- Zinn, C., Bevilacqua, L., Rossato, J., Medina, J., Izquierdo, I., & Cammarota, M. (2009). On the requirement of nitric oxide signaling in the amygdala for consolidation of inhibitory avoidance memory. *Neurobiology of Learning and Memory*, 91(3), 266-272.

Is He Gay? Stereotypes Used to Predict a Target's Sexual Orientation

Maurita M. Gholston and Wind Goodfriend*

Buena Vista University

Abstract

People are often judged regarding their ostensible sexual orientation. The term “gaydar” has been used to describe the ability to determine a person’s sexual orientation, particularly when the target is homosexual. The primary purpose of this study was to examine what cues individuals use to make assessments of others’ sexual orientation. Two manipulations (i.e., a video priming either homosexuality or heterosexuality, and a confederate who proclaimed the target as homosexual or heterosexual) preceded participant attempts to assign sexual orientation to a target, who presented both homosexual and heterosexual social cues. Results indicate although neither manipulation had an effect on participants’ guesses about the target, participants did focus on the particular cues that supported their guess regarding that target’s sexual orientation. Implications for the use of stereotypes when making judgments of others’ sexual orientation are discussed.

Keywords: homosexuality, sexual orientation, stereotypes

In today’s society judgments regarding sexual orientation are pervasive. One group often receiving the brunt of negative judgments and stereotypes consists of individuals who are homosexual, and in particular, men who are gay (e.g., Geiger, Harwood, & Hummert, 2006). One explanation regarding why many modern societies condemn individuals who are homosexual is so there is less sex role confusion (MacDonald, Huggins, Young, & Swanson, 1973). In short, MacDonald et al. (1973) argue society prefers the role of women and the role of men to be clearly delineated, and people who are homosexual blur the line between these strict role expectations. Another theory as to why heterosexual society condemns homosexuality is that if the heterosexual majority successfully demeans the homosexual minority, the majority can maintain dominance (Sidanius & Pratto, 1999). A primary method for maintaining the view of heterosexual people as “normal” and homosexual people as “deviant” involves the use of stereotypes.

Stereotypes are beliefs and opinions about the characteristics, attributes, and behaviors of members of various groups (Hilton & von Hippel, 1996). There are people who think they can determine the sexuality of a person based on simple, stereotypical things, such as a person’s voice or attire. “Gaydar” is a popular culture term referring to the perceived ability for one individual to correctly identify the sexual orientation of another (Woolery, 2007). With the rise of references to homosexuality in popular culture, the phenomenon of gaydar is being increasingly discussed (Woolery, 2007).

In one study of this phenomenon, Ambady, Hallahan, and Conner (1999) used various “thin slices” of information, either in the form of a photograph or one-second video, and had people (both people who were heterosexual and homosexual) attempt to guess the target’s sexuality. Gay men and lesbians were more accurate in guessing the sexual orienta-

tion of the target than were participants who were heterosexual. One possible explanation for this finding is that gay men and lesbians have the advantage of gaydar because of first impression formations, which come from schema categorization and physical cues (Woolery, 2007). In other words, people who are homosexual are actually more accurate when deciding the sexual orientations of others, whether targets are homosexual or heterosexual, because they have an accurate depiction of what a homosexual is and is not (Woolery, 2007).

Gay men and lesbians are often thought to take on the gender roles of the opposite sex. For example, according to Kite and Deaux’s (1987) inversion theory, people believe gay men and lesbians possess cross-sex characteristics. Lesbians are seen to resemble more closely the average man on a standard set of traits, whereas gay men are thought to be similar to the average woman (Taylor, 1983). Stereotypes of people who are homosexual are based upon the standards of what they are seen to do, how they act, and how they contradict the standards of a “normal” heterosexual male or female. Thus, once an individual is known to be non-heterosexual, stereotypes of a “normal” man or woman are rejected and replaced with stereotypes for the opposite sex—in short, it is assumed that a gay man or lesbian has more in common with the opposite sex than with his or her own biological sex, simply due to his or her sexual orientation.

With gay men, there are assumptions and preconceived notions about appearance and behavior. Whereas there are certainly negative presumptions, “positive” stereotypes have also emerged. Although positive stereotypes refer to beliefs with positive content (e.g., gay men are fashionable), the sheer grouping of a person under this stereotype could be an inaccurate assumption, and therefore, the effects that arise from these “positive” stereotypes are also negative. Madon (1997) found stereotypes about gay men have two parts: the first part is that gay men violate traditional male gender roles; the second component emphasizes “positive” stereotypes and qualities for gay men. Specifically, the belief is gay men have specific traits, such as being fashionable and open about their feelings (Madon, 1997), or being witty and articulate (Morrison & Bearden, 2007).

It would seem that many of the “positive” stereotypes about people who are homosexual have emerged since the recent increase of positive publicity from the media. The success of shows such as *Will and Grace*, *Ellen*, *Queer as Folk*, *Queer Eye for the Straight Guy*, and *Boy Meets Boy* have increased the amount of positive stereotypes associated with gay men and lesbians. Although there have been recent examples of positive stereotypes in these more current media

*Faculty Sponsor

Correspondence may be addressed to: Wind Goodfriend, Ph.D., Psychology Department, 610 W. 4th Street, Buena Vista University, Storm Lake, IA 50588, Email goodfriend@bv.edu, Fax 712-749-2037. The authors would like to thank Trevor Urich and Ian LaForge for their help with this project.

sources, there have also been examples of gay men and lesbians in popular culture portrayed as doomed and depressed (e.g., the pitiful and lonely homosexual who is the effeminate and murderous villain, such as in *Silence of the Lambs*; Taylor, 2002).

With the increase of gay characters on television and in popular movies, more and more of the heterosexual majority may attempt to guess others' sexual orientation. How do they attempt to make these determinations? One famous, pioneering study showed individuals are biased when they view ambiguous cues regarding sexuality. Snyder and Uranowitz (1978) asked participants to read a relatively lengthy biography about a fictional woman named Betty. The story included aspects of her life that could be considered cues of homosexuality (e.g., she never had a boyfriend in high school) and cues of heterosexuality (e.g., she did have a boyfriend in college). One week later, participants came back to the lab and were told that Betty was either married and living with her husband or was a lesbian, living with her life partner (Snyder & Uranowitz, 1978). The key to this study was authors asking participants to recall the biography from a week earlier. Participants who were told Betty was a lesbian were biased in their memories; they recalled more "gay" cues than "straight" cues. Participants told Betty was now married showed the opposite effect. Clearly, participants focused on whichever cues matched their view of Betty, as a way of confirming their stereotypes about her.

The Snyder and Uranowitz (1978) study focused on a kind of hindsight bias, in which participants look back and find evidence to confirm their extant beliefs (e.g., Choi & Nisbett, 2000). Perhaps people focus on different cues to make social judgments, depending on their mindset going into a situation. The concept of psychological "priming" is the idea that environmental cues might influence the direction of a person's thoughts (e.g., Whitley & Kite, 2010). If an individual is primed to think about gay stereotypes, perhaps he or she will fixate and/or later recall cues relevant to these ideas, whereas an individual primed to think about heterosexual stereotypes will notice different cues, even when presented with the same information.

In addition to the possible effects of priming, it is also reasonable to expect participants to trust perceived experts when making social judgments. Research on decision making and judgments (Petty & Cacioppo, 1979) has established when people want to make a quick decision, they often rely on heuristics, or mental shortcuts, to come to a conclusion. Efficient decisions can be influenced by several factors (e.g., physical attractiveness of a speaker, emotional appeals), and one influential factor is perceived expertise (Cook, 1969; Hass, 1981). Woolery (2007) found individuals who were homosexual were more accurate in guessing the sexual orientation of targets, compared to individuals who were heterosexual. If heterosexual participants are asked to make a judgment about the sexual orientation of a target, they may look to any perceived expert in the room for guidance. Thus, the presence of an openly gay person (a confederate) might, therefore, influence the participants in their guesses regarding a target's sexual orientation.

The purpose of this study was to extend past research on judgments of sexual orientation by examining what cues individuals use to make assessments of others. We sought to explore how individuals attempt to judge a target's sexuality based on that target's mannerisms, behavior, appearance, and speech. Three hypotheses were tested:

Hypothesis 1: Participants who are primed to think about homosexuality will be more likely to assume a target individual is gay, compared to participants who are primed to think about heterosexuality.

Hypothesis 2: An openly gay confederate's verbally expressed opinion about the sexual orientation of the target will be reflected in the responses of the participants. In other words, if a gay male confederate identifies the target as gay, the participants will be more likely to also identify the target as gay, and vice versa.

In addition to the main effects predicted in Hypotheses 1 and 2, we also tested for an interaction effect; in other words, individuals who were primed to think about homosexuality and who were in the "gay" confederate condition were predicted to be most likely to identify the target as gay.

Hypothesis 3: When asked to remember what cues led to one's guess about a target's sexual orientation, cues chosen by participants will match their guess selected for the sexual orientation of the target. That is, participants who selected homosexual as the sexual orientation of the target will select the stereotypical "gay" cues provided by a target as the reason why they assumed the target was gay, and participants who select heterosexual will select stereotypical "straight" cues as to why they chose this as the target's sexual orientation.

Method

Participants

Participants consisted of 59 students (27 men, 32 women) currently attending a small, private, Presbyterian university in the Midwestern United States. The age range was 18 to 23 years with a mean age of 19.07 years ($SD = .87$). Most were enrolled in General Psychology courses, and were given the option of participating for some extra credit. Some students who participated were simply volunteers and did not receive anything in return (11.9% of participants).

Participants were asked to identify their ethnicity. The breakdown was as follows: 79.7% Caucasian, 10.2% African American, 3.4% Asian, 3.4% Hispanic, and 3.4% other. Importantly, participants were also asked to identify their sexual orientation. The participants identified as 96.6% heterosexual, 1.7% "other," and 1.7% chose not to respond to the question.

Materials

The procedure included two independent variables (a priming video clip and a confederate outburst), resulting in a 2 (priming clip: homosexual or heterosexual) X 2 (confederate outburst: homosexual or heterosexual) between subjects factorial design.

IV1: Priming film clip. Participant groups were randomly assigned to one of two priming conditions. The first experimental group ($n = 28$) viewed a media clip (from the

television show *Buffy the Vampire Slayer*) containing a heterosexual character. In the second experimental group ($n = 31$), participants viewed a media clip containing a lesbian character from the same television show. In an effort to make the two experimental conditions as identical as possible in every way except for the sexual orientation of the character, the clips were equal in length (five min long). In addition, the clips actually showed the same character from the show; early in the series, the character identified as heterosexual, but as the series progressed, she identified as homosexual.

In the clip from the heterosexual condition, the character has invited her boyfriend over for a romantic evening; she has set the situation so that her boyfriend will be her "first" sexual encounter and take her virginity. They have a discussion about why this is not the right time, and when the right time would be. After the discussion, they kiss, and the scene ends.

In the clip from the homosexual condition, the character has her girlfriend come over. They have a discussion about starting over and forgiveness, for they had a fight, and a slight breakup. In the end of the clip, the character's girlfriend ask her a host of questions, and after asking the questions, the character from the clip rushes over to her girlfriend and kisses her, and the scene ends.

IV2: Confederate Outburst. After the manipulation clips, participants viewed a different video, featuring a target who described himself and what he likes to do. The video was intentionally constructed to have stereotypical cues of both homosexuality and heterosexuality. The video was presented to the participants by having the facilitator say "Here is another clip. Please watch and pay attention." The script of the video was as follows:

Hi, my name is Wesley. I am looking for a new partner that I could possibly spend the rest of my life with. I like to go to the ballet and the theater. I am a Republican. I enjoy listening to classical music and going to the opera. I enjoy playing and watching football and basketball. I am currently taking a couple interior designing classes. I like old cars and restoring hot rods. I enjoy violent movies. Some of my favorite movies are *Bad Boys II*, *Miami Vice*, and any of the movies from the *Die Hard* series. This spring break, I will be traveling to San Francisco and I am looking to take my new partner with me.

As participants viewed the clip, a confederate in the audience spoke loudly. The confederate expressed his opinion that the target was either homosexual (experimental condition 1) or heterosexual (experimental condition 2). An important fact about the confederate is that he is an openly gay student at this small, private, Christian university, and therefore might be viewed as an "expert" for the purposes of the study. In the homosexual condition ($n = 29$), the confederate stated, "Oh, he's gay." In the heterosexual condition ($n = 30$), the confederate simply said, "He's straight."

DV1: Predicted sexual orientation. Immediately following the second video clip that showed the target, all participants were asked to guess the target's sexual orientation.

Participants were asked to check either "heterosexual," "homosexual," or "bisexual."

DV2: Stereotypical cues. The video was designed to include some superficial cues regarding the target's possible sexual orientation, based on social stereotypes. The cues categorized as stereotypical homosexual cues were: use of the word "partner," enjoying the ballet and the theater, listening to classical and opera music, taking interior designing classes, and going to San Francisco as the choice of his spring break trip. The cues categorized as stereotypical heterosexual were: Republican political identification, physical activities, movie selection, and hobbies. After participants marked their guess regarding the target's sexual orientation, they were asked what about the video led them to that guess. The list of cues was then presented, and participants could check off any they believed were relevant.

Procedure

All experimental sessions took place in classrooms and took one hour or less to complete. Two classrooms were used to allow for evening sessions; both rooms were similar, with tables and about 30 chairs. All participants were told that the study was about their attention span, and how well they paid attention to details in film. Participants were first presented with the consent form, which informed them that they would be able to leave at any time should they feel uncomfortable. Different sessions were randomly assigned to the experimental conditions, and all participants in a given session were included in the same condition. The first video clip (the prime manipulation) took five min to view. After viewing one of the manipulation clips, all participants viewed the target video. During the viewing of the target video, the confederate spoke regarding his perception of the individual in the target video. Participants then completed a demographics sheet and the questionnaire about the target. After participants completed all portions of the experiment, they were debriefed, thanked, and dismissed.

Results

Hypotheses 1 and 2

Hypothesis 1 stated participants who were primed to think about homosexuality via the movie manipulation would be more likely to assume the target was a homosexual person, compared to participants who were primed to think about heterosexuality. The data did not support the hypothesis, $\chi^2 = .359$, $p = .836$. Participants who viewed the homosexual movie were equally likely to guess the target as being gay ($n = 12$ out of 31, or 38.7%) as were participants who viewed the heterosexual movie ($n = 10$ out of 28, or 35.7%). See Table 1 for all outcomes.

Hypothesis 2 suggested the confederate's verbally expressed opinion about the sexual orientation of the target would be reflected in the responses of the participants. Like Hypothesis 1, Hypothesis 2 showed non-significant differences between the groups, $\chi^2 = .312$, $p = .209$. Participants for whom the confederate exclaimed the actor was homosexual guessed the target was gay one-third of the time ($n = 10$ out of 30, or 33.3%). In the conditions where the confederate's outburst was that the target is heterosexual, participants

Table 1. Perceived Target Sexual Orientation, by Condition

	Homosexual Movie Prime		Heterosexual Movie Prime	
	Homosexual Confederate Prime <i>n</i> = 16	Heterosexual Confederate Prime <i>n</i> = 15	Homosexual Confederate Prime <i>n</i> = 14	Heterosexual Confederate Prime <i>n</i> = 14
Participant Guesses				
Heterosexual	6 (37.5%)	6 (40.0%)	4 (28.6%)	6 (42.9%)
Homosexual	5 (31.3%)	6 (40.0%)	5 (35.7%)	7 (50.0%)
Bisexual	5 (31.3%)	3 (20.0%)	5 (35.7%)	1 (7.2%)

were about equally likely to say that the target's sexuality was heterosexual ($n = 12$ out of 29, or 41.4%).

A final Chi-square tested for the interaction between these two independent variables (movie prime and confederate outburst). Like the main effects tested above, the interaction was also not significant, $\chi^2 = .052, p = .820$.

Hypothesis 3

Hypothesis 3 suggested participants who believed the target was homosexual would emphasize stereotypically homosexual cues from the video as their reason for their guess about his sexual orientation, whereas participants who believed the target was heterosexual would emphasize stereotypically heterosexual cues. After participants marked their guess regarding the target's sexual orientation, they were asked what about the video led them to that guess. The list of cues was then presented, and participants could check off any they believed were relevant. For each participant, the number of stereotypically gay cues was counted (e.g., liking the ballet) as was the number of stereotypically heterosexual cues (e.g., watching football). Thus, our predictor variable is the guess each participant made regarding the sexual orientation of the target, and the outcomes are the number of cues chosen of each type (homosexual or heterosexual). There were four cues of each type, so the number chosen could range from zero to four for each cue type.

Using two repeated measures analyses of variance, Hypothesis 3 was supported. Participants who believed the target was homosexual were more likely to choose stereotypically gay cues for their guess ($M = 1.57, SD = .73$) than they were to choose stereotypically heterosexual cues ($M = .48, SD = .59$), $F(1, 22) = 30.15, p < .001$. The opposite pattern

was found for participants who believed the target was heterosexual; they were more likely to choose stereotypically heterosexual cues as the basis for their guess ($M = 1.73, SD = .88$) than stereotypically gay cues ($M = 1.23, SD = .81$), $F(1, 21) = 5.92, p = .024$. See Table 2.

Discussion

Prior research suggests people believe they can determine a person's sexuality based on superficial cues such as the target's mannerisms, speech, and activities (Ambady et al., 1999). This general idea was tested in two ways. First, we attempted to influence participants' guesses about a target using two methods (a priming video clip and a confederate outburst). Neither of these manipulations had an effect on guesses regarding the target's sexual orientation, nor was there an interaction effect. However, the second general test was whether a participant would justify his or her guess regarding the target by focusing on stereotypical cues. Here, there was a significant effect. Participants who decided the target was a homosexual person emphasized homosexual stereotypical cues (e.g., enjoying the ballet and going to San Francisco). Alternatively, participants who decided the target was a heterosexual person emphasized more heterosexual stereotypical cues (e.g., watching football and restoring cars).

The latter results provide further evidence participants sometimes rely on stereotypical cues to bolster their opinions about the sexual orientation of others. Research on this topic was pioneered by Snyder and Uranowitz (1978), when they found people who learned about a woman named "Betty" recalled stereotypes to explain information about her sexuality. In some ways, this tendency may be due to a hindsight

Table 2. Number of Stereotypical Cues Chosen, By Gussed Target Sexual Orientation

Gussed Target Orientation	Heterosexual Cues Chosen		Homosexual Cues Chosen		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Heterosexual	1.73	.88	1.23	.81	5.92	.024
Homosexual	.48	.59	1.57	.73	30.15	<.001

bias, in which individuals believe they could have predicted the future or known an outcome was going to occur in advance (e.g., Choi & Nisbett, 2000). After participants in our study made their decisions regarding the target's sexual orientation, when presented with possible "cues" for this decision, they were more likely to emphasize stereotypes that were consistent with their decisions.

Although one possible interpretation of the results from Hypotheses 1 and 2 is participants avoid stereotyping others, the data supporting Hypothesis 3 show once people determine a person's sexual orientation, those individuals may focus on superficial, stereotypical cues to support their judgment. For example, once participants decided a target was gay, they were more likely to check off they guessed this to be the case due to the target using the term "partner" (instead of a non-gender neutral pronoun in reference to a boyfriend or girlfriend). However, other participants who viewed the exact same target as heterosexual were more likely to say that this sexual orientation was obvious due to the target's preference for action movies. Thus, whereas some of the results point to participants showing hesitation to label an individual based on experimental manipulation (or demand characteristics), these same individuals do not hesitate to justify their sexual orientation assignment of others using stereotypes. Even if the specific stereotypes used in the present study are not particularly negative, any stereotype can be harmful to the relevant group (e.g., Glick & Fiske, 2001). Thus, although recently there has been an increase in the number of characters who are homosexual in television shows and movies, and although many of these characters are presented in a positive light, any stereotypes presented may still cause negative consequences to individuals who are sexual minorities (Taylor, 2002).

Limitations

The study took place at small, private, Presbyterian liberal arts university where the total population is approximately 900 students. Many of these students are from rural farming families, and admit to lack of exposure to real-life examples of homosexuality. Perhaps the sample was aware of this lack of exposure when making their predictions, and thus were hesitant to be influenced by either experimental manipulation.

However, an alternate explanation for the lack of significance in Hypotheses 1 and 2 is reactance, or the tendency of individuals to do the opposite of what they are asked in response to a feeling that their freedom of choice is removed (Brehm, 1966). Both of the experimental manipulations were rather heavy-handed and may have caused participants to become aware of demand characteristics regarding the nature of the hypotheses. In order to seem independent and non-biased or non-judgmental, participants may have avoided making guesses based on the manipulations. Future research could avoid this potential problem by changing the manipulations. For example, the time between the experimental priming clip and the target clip could be extended, or filler activities could be placed in between them as a way of distracting participants from the true nature of the study. In addition, the confederate outburst could be made more subtle,

such as a whisper to his neighbor, but still loud enough to be overheard. More subtle manipulations may lead to less reactance in participants, if that is the cause for the present results. Future research could also include explicit probing for suspicion during the debriefing phase of the experiment, as well as a manipulation check to address whether each participant was familiar with the identity of the confederate.

Additionally, the current study was limited by lacking a control condition. This control would be informative, to uncover the responses of participants with no priming at all (i.e., lacking both a priming video and lacking a confederate). In other possible future work, the target individual could be changed in interesting ways. Previous research has established treatment of male homosexuals is quite different from that of lesbians (e.g., Kite & Whitley, 1996); a female target could delineate these differences. In addition, the sex of the individual in the priming video could be manipulated to either match the sex of the target individual (e.g., both female), compared to a mismatch (as was the case in the current study). Perhaps when the priming video shows an individual of the same sex as the target, the priming manipulation would gain strength, due to the more direct comparison between the two individuals.

Finally, there was no control over the lack of variance of the sexuality of the participants. The vast majority of participants identified as heterosexual, and it was the aim of the present study to examine heterosexuals' use of "gaydar." However, having a more diverse sample may have led to different results. Future research should examine the question of how people of different sexual orientations might respond differently to the manipulations used here. For example, homosexual participants might have been more influenced by the confederate's opinion, because he is a gay male. Perhaps they would have, therefore, been more willing to affiliate with him and agree with his assessment.

Conclusion

These results, at least partially, support past research regarding the use of superficial, stereotypical cues in judgments about another person's sexual orientation. Whereas the current participants did not appear to be particularly influenced by experimental manipulations in making judgments about a target, they did identify "evidence" of their predictions by focusing on stereotypical traits displayed by the target. People will likely discontinue making guesses toward each other's sexuality any time in the near future. Although the attempt to guess others' sexual orientation may be a persistent and ubiquitous tendency, research on how people make these assessments could be the key to unlocking how and why individuals feel the need to predict others' sexual orientation, and how accurate (or inaccurate) these judgments may be.

References

- Ambady, N., Hallahan, M., & Conner, B. (1999) Accuracy of judgments of sexual orientation from thin slices of behavior. *Journal of Personality and Social Psychology*, 77, 538-547.

- Brehm, J. W. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Choi, I., & Nisbett, R. E. (2000). Cultural psychology of surprise: Holistic theories and recognition of contradiction. *Journal of Personality and Social Psychology, 79*, 890-905.
- Cook, T. D. (1969). Competence, counterarguing, and attitude change. *Journal of Personality, 37*, 342-358.
- Geiger, W., Harwood, J., & Hummert, M. L. (2006). College students' multiple stereotypes of lesbians: A cognitive perspective. *Journal of Homosexuality, 51*, 165-182.
- Glick, P., & Fiske, S. (2001). An ambivalent alliance: Hostile and benevolent sexism as complementary justifications for gender inequality. *American Psychologist, 56*, 109-118.
- Hass, R. G. (1981). Persuasion or moderation? Two experiments on anticipatory belief change. *Journal of Personality & Social Psychology, 31*, 1155-1162.
- Hilton, J. L., & von Hippel, W. (1996). Stereotypes. *Annual Review of Psychology, 47*, 237-271.
- Kite, M. E., & Deaux, K. (1987). Gender belief systems: Homosexuality and the implicit inversion theory. *Psychology of Women Quarterly, 11*, 83-96.
- Kite, M. E., & Whitley, B. E. (1996). Sex differences in attitudes toward homosexual persons, behaviors, and civil rights: A meta-analysis. *Personality and Social Psychology Bulletin, 22*, 336-353.
- MacDonald, A. P., Huggins, J., Young, S., & Swanson, R. A. (1973). Attitudes toward homosexuality: Preservation of sex morality or the double standard? *Journal of Consulting and Clinical Psychology, 40*, 161.
- Madon, S. (1997). What do people believe about gay males? A study of stereotype content and strength. *Sex Roles, 37*, 663-685.
- Morrison, T. G., & Bearden, A. G. (2007). The construction and validation of the Homopositivity Scale: An instrument measuring endorsement of positive stereotypes about gay men. *Journal of Homosexuality, 52*, 63-89.
- Petty, R. E., & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality & Social Psychology, 37*, 1915-1926.
- Sidanius, J., & Pratto, F. (1999). *Social dominance: An intergroup theory of social hierarchy and oppression*. New York: Cambridge University Press.
- Snyder, M., & Uranowitz, S. W. (1978). Reconstructing the past: Some cognitive consequences of person perception. *Journal of Personality & Social Psychology, 36*, 941-950.
- Taylor, A. (1983). Conceptions of masculinity and femininity as a basis for stereotypes of male and female homosexuals. *Journal of Homosexuality, 9*, 37-53.
- Taylor, G. (2002). Psychopathology and the social and historical construction of gay male identities. In A. Coyle & C. Kitzinger (Eds.), *Lesbian and gay psychology: New perspectives* (pp. 154-174). Brighton, England: Blackwell Publishing.
- Whitley, B. E., & Kite, M. E. (2010). *The psychology of prejudice and discrimination* (2nd ed). Belmont, CA: Wadsworth.
- Woolery, L. M. (2007). Gaydar: A social-cognitive analysis. *Journal of Homosexuality, 53*, 9-17.

Effect of Mental Practice on Men's Sociality in Social Interactions with Women

Brady M. Beckman

Nebraska Wesleyan University

Abstract

The present study was designed to examine the effects of mentally practicing social dynamics on men's anxiety during an actual interaction with a woman and on their self-esteem after the interaction. Male participants were randomly assigned to one of three groups (i.e., positive mental rehearsal, negative mental rehearsal, or no rehearsal). Following their mental practice, the men conversed with a female confederate for approximately 4 min. Anxiety (i.e., heart rate) was monitored during both the mental rehearsal and the interaction. Though the social interaction did increase anxiety, the type of mental rehearsal the participants practiced did not cause significant anxiety increases or decreases. The participants' self-esteem was significantly higher if they rehearsed either the positive or negative message.

Keywords: mental practice, social interactions, self-esteem, anxiety

Pele, arguably one of the greatest soccer players of all-time, was known for using mental practice before every game he played (Mack & Casstevens, 2004). He sat in a private corner of the locker room, with a towel over his eyes, and attempted to visualize playing the perfect game. He imagined the sights, the sounds, and the smell before they even happened. He saw images of himself scoring goals or making a perfect pass to a teammate. Mack and Casstevens reported Pele swore by the use of mental practice, and mentioned it helped ease his anxiety and direct him toward his goals. Mental practice is best defined as "the cognitive rehearsal of a task in the absence of actual, overt, physical rehearsal" (Driskell, Copper, & Moran, 1994, p. 481). Cognitive rehearsal calls for no muscular movement and is a completely subjective experience. Whereas real activity is rehearsed completely in one's mind, many individuals use mental imagery, the cognitive replay of an occurrence, emotion, or feeling to aid mental practice (Bell & Murray, 2004). Typically, mental practice is initiated by anticipation of future events (Taktek, 2004).

Another area where mental practice may ease anxiety and improve performance is in social interaction. Social interactions are a critical part of maintaining the enjoyment and benefits of social contact. People who are socially anxious may see their performance decline at work, and have difficulty maintaining close relationships (Hirsch, Meynen, & Clark, 2004). Thus, is it reasonable to devote further research into finding techniques for lowering social anxiety, especially given persistence through adulthood. The current study was designed to examine the role mental practice plays in social interactions. I hypothesized a single session of mental practice, which included mental imagery, would affect

men's self-esteem and anxiety level during a cross-gendered interaction.

Mental Practice and Physical Skill/Performance

Whereas the benefits of mental practice on improving skill have been studied in areas such as music, dance, and education, most research has focused on athletic performance. Sports psychologists (Bertollo, Saltarelli, & Robazza, 2009) found mental practice and visualization allowed elite modern pentathletes to suppress their anxiety. The athletes' mental practice boosted their resiliency following negative performance, and contributed to a more self-confident attitude about their abilities. Mental practice has also been effective in improving physical skill sets.

Shackell and Standing (2007) tested the possibility mental training alone could produce a gain in physical strength. A measure of the participants' overall strength was recorded prior to their visualization of the rehearsal of the successful completion of weight lifting repetitions, without any actual muscular movement. Participants were asked to visualize lifting increasing amounts of weight, and given a post-test to measure strength gains over a two-week period. Another group of participants physically lifted weights during this same time period. Both groups showed improvements. The mental practice group's strength increase (23.7% improvement from pre-test) was only five percent lower than the physical practice group's. These results reflect the effectiveness of mental practice.

Sports psychologists also have studied the effect of mental practice on learning and the ability to remember tactical movements. Researchers have analyzed the performance aspect of mental practice in game planning and strategizing (Guillot, Nadrowska, & Collet, 2009). Guillot et al. used mental imagery to increase execution of their team's specific game plans and strategies. Mentally practicing the playbooks created similar performances to those who partook in physical practice. Mental practice, done in the comfort of an armchair, may be a reliable way to prevent over-training and fatigue.

Occupational therapists apply mental practice to stroke rehabilitation (Bell & Murray, 2004). After a stroke, abnormal muscle movement patterns can hinder motor skill performance. In an effort to ignite improved motor functioning, occupational therapists have used guided mental practice of Marilyn Petro served as Faculty Sponsor for this research.

I would like to thank Amanda Hansen, Katie Smith, Mallorie Wickizer, Laura Cejka, and Kelli Means for their help conducting this study, and Dr. Jerry Bockoven and Dr. Marilyn Petro for their guidance throughout this process. Correspondence concerning this article should be addressed to Brady M. Beckman, Department of Psychology, Nebraska Wesleyan University, 5000 St. Paul Ave, Lincoln, Nebraska 68505, or Brady M. Beckman 1520 Kingston Ave., Lincoln, NE 68506.

Email: bradymbeckman@gmail.com

upper limb movement with their patients. Bell and Murray reported the combination of imagined movement and physical practice was shown to be an effective therapy.

Mental Practice and Cognitive Performance

Mental practice is becoming a viable option for those seeking an increase in athletic, physical, and tactical performance. However, many of the potential cognitive benefits of mental rehearsal are still untapped (Taktek, 2004). Cognitive mental imagery correlates with goal achievement as individuals use imagery to outline how they intend to carry out their day (Knauper, Roseman, Johnson, & Kranz, 2009). Also, mental rehearsal can play a critical role in allowing humans to recover implicit information stored in their memory, such as facts or events (Kosslyn & Moulton, 2009).

Mental practice may also cognitively affect the way people manage their anxiety level, and thus changing their confidence. Athletes using mental rehearsal, paired with cognitive confidence management techniques focusing on positive self-talk, find protection against forms of anxiety, particularly before entering a competition (Hanton, Mellalieu, & Hall, 2004). These techniques allow individuals protection from crippling negative thoughts and emotions.

Mental Imagery and Mental Disorders

Research considering the efficacy of mental practice on anxiety led to a major focus on using mental imagery to treating mental abnormalities. For example, Holmes, Lang, and Shah (2009) researched a method to alleviate some of the hardships suffered by individuals who are depressed and anxious. Therapists and counselors have frequently attempted to verbally train depressed individuals into a more positive pattern of thought; hence, Holmes et al. trained their patients to not think negatively. Clinical theories about disorders converge on the idea verbal processing may, in the short-term, reduce negative affect, but it may also be maladaptive. Holmes and colleagues examined the effectiveness of alternative techniques to encourage depressed individuals to think more positively by initiating directed positive mental practice and imagery. After using these methods, the participants reported increases in positive mood and decreases in negative emotion.

The link between anxiety and mental practice is evident (Holmes & Mathews, 2005). In clinical psychology, clients commonly mentally practice interacting with the things they fear or that produce anxiety, in a repetitive fashion. Over time this mental practice has been shown to lessen anxiety. Holmes and Matthews (2005) had participants imagine actual negative events or only verbally process the concepts. These participants reported a greater increase in anxiety with imagery than when only considering the verbal concepts of the anxiety provoking events. Mental imagery has the ability to provoke and lessen anxiety.

Social anxiety can cause many difficulties. When social anxiety becomes a psychiatric disorder it is known as social phobia. Social phobia is the third most common psychiatric disorder; lifetime prevalence rates in the United States population are estimated to be between 7 to 13% (Hirsch et al.,

2004). Heerey and Kring (2007) found college students reporting social anxiety worry about social outcomes such as their ability to make friends or find an intimate partner. During a social interaction participants showed obvious physical signs of anxiety, and self-reported anxiety hindered their overall performance.

One of the mechanisms forming physical signs of anxiety potentially contaminating social interactions is the negative self-image socially anxious individuals create as a part of their mental imagery of the social situation (Hirsch et al., 2004). Some of these images are exaggerated and can lead to an unhealthy chain of negative inferences about one's social abilities. Hirsch and colleagues reported when patients held a negative self-image of their social performance during an actual interaction (i.e., a conversation with someone), they experienced increased anxiety. The patients also stated their anxiety caused a decrease in their overall performance. Interestingly, the participants who conversed with the socially anxious patients also reported the conversation flowed poorly, and was less engaging than with those individuals with a positive self-image of their sociality in mind.

Similar to Hirsch et al. (2004), Hirsch, Mathews, Clark, Williams, and Morrison (2006) took an even more extensive look at the mechanism of negative self-imagery in social anxiety. Instead of working with patients who reported regular feelings of social anxiety, they used negative imagery with individuals in low socially anxious individuals from the non-clinical population. When a continuous sense of negative self-imagery was induced during a social interaction, a boost in anxiety and decreased perceived performance occurred as well. These two studies demonstrate how an individual's social performance during an interaction can be affected by a negative self-image.

Bell and Murray (2004) suggested mental practice involves the manipulation of mental imagery. Mentally practicing social situations by imagining one's self-image in specific situations has been shown to affect both anxiety and performance. Vassilopoulos (2005a) examined the difference between individuals using mental imagery of recalled events as opposed to those only considering mental images relating to what could go wrong in a speech situation for both high and low socially anxious people. The anticipation anxiety was greater in high socially anxious participants who imagined actual incidents than in any of the other conditions. In a second study (Vassilopoulos, 2005b), participants actually gave a speech. Participants were given a directed mental practice prompt, giving them either positive or negative interaction components to visualize repeatedly during their speech. Although the participants high in social anxiety who experienced negative mental practice saw more performance deficits in their speech than the high anxiety people receiving positive mental practice, neither the positive nor negative mental practice appeared to affect the low socially anxious individuals. Vassilopoulos's research is one of the few to actually have participants perform mental practice before and during actual social interactions.

The Current Study

The current study was designed to analyze the effectiveness of mentally practicing social interactions, through either positive, negative, or no cognitive rehearsal, before entering an actual social interaction, on anxiety and self-esteem. The benefits of mental practice in lowering anxiety and increasing performance in sports related situations have been demonstrated (Bertollo et al., 2009; Shackell & Standing, 2007). As previously described, research has demonstrated negative mental imagery increases anxiety in individuals facing social situations (Hirsch et al., 2004; Hirsch et al., 2006). This heightened anxiety may lead the individual to perform poorly (Vassilopoulos, 2005a; 2005b) and to avoid future social interactions. Although the negative self-images individuals hold in their mental imagery impacts performance in social situations, research dealing with techniques to manipulate this negativity is limited. Positive interaction between sexes is important in corporate settings, dating, and relationship maintenance. Thus, based upon the review of the literature, I hypothesized Male college students would interact with less anxiety and report higher self-esteem if given a directed, positivity inducing, mental practice session prior to the interaction, than students given negative or no mental practice.

Method

Participants

Thirty male undergraduate participants were recruited from the general population of a small Midwestern liberal arts university. The participants ranged in age from 18 to 22 years, and were at various stages of their academic careers (8 first-year students, 4 sophomores, 7 juniors, 11 seniors). The cultural diversity of the participants was limited but consistent with the larger population of the university from which the sample was drawn (90% White, 6.67% African American, 3.33% Asian).

Materials

Biological indications are the most evident type of data for researchers determining overall anxiety. Increases in heart rate are related to reports of increased anxiety (Gerlach, Murlane, & Rist, 2004). Changes in heart beat per minute (BPM) were obtained by three electrodes placed on each participant's body (i.e., underside of the left wrist, and above the inside of both ankles), and connected to a *BIOPAC MP 35* system (Biopac Systems, Inc.). The participant remained as still and relaxed as possible to ensure accurate readings.

The participants were given the Rosenberg Self-Esteem questionnaire to measure their self-esteem (RSE, Rosenberg, 1989). Multiple studies have examined the reliability (test-retest correlations of .82 to .88) and validity of the RSE (The Rosenberg Self-Esteem Scale, 2009). A high score on the RSE indicates a high self-esteem. A portable mp3 player (iPod) was used to record the positive and negative rehearsal scripts and provided the prompt for a mental rehearsal practice session. For the control condition (no rehearsal), participants listened to an instrumental version (no lyrics) of the song "Lights," by Journey (Cain, 1982), also recorded on the iPod. All three recordings were 4 min in duration.

Procedure

Participants were met in a small, semi-public psychology lounge with two adjacent couches and a coffee table. Participants were informed they would be participating in a visualization session regarding their social skills, and then take a test assessing their self-esteem in social situations and asked to sign an informed consent form. The 30 participants were randomly assigned to one of three conditions ($n = 10$) of mental rehearsal (i.e., positive rehearsal of a cross-gendered social interaction, negative rehearsal of the same, or a control condition where they listened to music).

The participant sat on one of the couches, and the electrodes were placed to measure heart rate. Then he was instructed to listen to the designated four min audio recording. Participants in both the rehearsal conditions were asked to focus and to make a conscious effort to involve themselves in the information being presented. They were told to remove the headphones after the audio recording was finished and to wait for the researcher to return. The audio recording began simultaneously with the first measurements of BPM. The researcher then left the room, with the door remaining open.

Approximately one min after the audio recording ended, and the participant removed his headphones, a female confederate entered the room and sat on a couch adjacent to him. Five different women participated as confederates; however, their activities in the interaction were consistent throughout the study, as a script was provided for them to follow. The female confederate brought a number of academic-appearing papers to shuffle through after she sat down, and avoided immediate initiation of conversation with the participant. If the male participant did not begin communication within 30 s, the female initiated conversation, simply by asking the participant about the electrodes. She asked, "What is that thing all about?" If a conversation did not naturally flow from her question, she began to ask him if he was a psychology major and if he knew much about a particular professor. From then on, the confederates were asked to try to create free-flowing conversation for the duration of the interaction. The researcher sent the confederate a text-message after 4 min cueing her to leave.

The researcher waited another minute, before entering the room. The participant was asked to remove the electrodes and complete the RSE. Finally, the participant was debriefed.

Results

A 3 x 2 mixed design ANOVA on heart rate (in beats per minute, BPM) was calculated with type of mental rehearsal (positive, negative or none) as the between subjects factor and time (during rehearsal or during social interaction) as the within subjects factor. An alpha level of .05 was used for all statistical tests. A main effect of time on BPM was determined (see Table 1). The BPM recorded during the mental rehearsal messages were significantly lower than the BPM during the social interaction, $F(1,27) = 75.07, p < .001, \text{partial } \eta^2 = .74$. A main effect of mental rehearsal condition indicated those participants who received positive mental rehearsal had a higher heart rate than either those in the control condition or those receiving the negative message condi-

Table

Men's Mean Heart Rate (SD) during both Mental Rehearsal and a Social Interaction with a Female Confederate

Rehearsal Type	Heart Rate During Message	Heart Rate During Interaction	Main Effect of Condition
Control	71.4 (7.0)	74.4 (7.3)	72.9 ^{ab}
Positive	74.8 (11.7)	80.2 (7.6)	77.5 ^a
Negative	65.1 (6.3)	70 (9.1)	67.6 ^b
Main Effect of Time	70.5 ^c	74.9 ^c	

Note: Table indicates the Mean (SD) heart rate (beats per minute) of the participants. Marginal means for mental rehearsal condition and time (during mental rehearsal or during interaction) of the heart rate measurements are also presented. Means with same superscript letter were significantly different ($p < .05$) from one another.

tions, $F(2,27) = 3.66$, $p = .04$, $partial \eta^2 = .21$. Pair-wise comparisons indicated that the significant differences in heart rate during the social interactions were due to differences between the positive mental rehearsal condition and the control condition, and between the negative mental rehearsal condition and the control group. The positive and negative mental rehearsal groups did not differ from one another. No interaction between time and rehearsal condition was apparent, $F(1,27) = 2.02$, $p = .15$, $partial \eta^2 = .13$.

The self-esteem scores of the three mental rehearsal groups were determined to be significantly different as determined by a one-way ANOVA, $F(2, 27) = 4.13$, $p = .03$, $\eta^2 = .23$. Pair-wise comparisons indicated the group receiving the control music had significantly lower self-esteem ($M = 21.40$, $SD = 0.76$), as measured on RSE questionnaire, than either the group receiving the negative message ($M = 25.00$, $SD = 1.10$) or the group receiving the positive message ($M = 25.00$, $SD = 1.10$).

Discussion

I hypothesized pre-interaction, positivity inducing mental rehearsal would cause decreases in anxiety (heart rate) during the interaction, as well as higher levels of self-esteem reported after the study. The social interaction did appear to induce anxiety; however, the type of mental rehearsal (i.e., either positive, negative, or no rehearsal) the participant practiced did not produce differential changes in heart rate either during the mental rehearsal or during the interaction, thus failing to support the hypothesis. Although the group receiving the negative mental rehearsal had the lowest heart rate between the groups, all three groups had similar increases in heart rate during the social interaction. The findings of this study are inconsistent with recent reports indicating when positive mental rehearsal is used to change overall mental imagery, social anxiety can be lessened (Heerey & Kring, 2007; Vassilopoulos, 2005a).

My original hypothesis suggested positive mental rehearsal would result in increased levels of self-esteem after the interaction, whereas the negative mental rehearsal would result in lowered self-esteem. This hypothesis was only par-

tially supported. Interestingly, although the control group reported the lowest self-esteem scores, the participants who received a positive or negative mental rehearsal reported higher self-esteem scores. The self-esteem data revealed individuals reported equally high self-esteem when they were prompted to think about their negative social capabilities as they when they were told to think about positive abilities. These findings, though seemingly counterintuitive, suggest the participants' self-esteem might rise when they are asked to reflect on an important aspect of their lives. The participants who received negative mental rehearsal could have reported the same level of self-esteem as the positive rehearsal group because of aspirations to self-defend their social capabilities by identifying opposite to the negative aspects they were prompted to rehearse. The decrease observed in this group's heart rate during the negative rehearsal could indicate they were attending more closely to the message and the interaction.

Perhaps the confederate's initiation of a conversation with the male participants caused an increase in the men's self-esteem more powerful than the practice of mental rehearsal. This boost of the men's self-esteem could give him reason to self-defend against a negative message. Future studies should analyze how individuals' self-esteem is affected when others manipulate their personal understanding of their social capabilities, as well as how a man's self-esteem is affected by a female-initiated social interaction.

The primary threat to external validity in this study was the homogeneity of the participants and the small sample size. Certainly, the study would benefit from a much larger sample. The majority of the participants in the study were Caucasian and between the ages of 18 and 22 years. Although this sample did reflect the population at the university, it does limit generalizability.

This research might have also been limited by threats to internal validity. One threat might be the depth at which participants were involved with the mental rehearsal. The differences in focus and effort could also cause variability in their anxiety levels during the social interaction. The current study

used one brief episode of mental rehearsal. The effect of multiple rehearsal episodes for varying durations needs to be examined.

Additionally, the nature of the conversation during the interaction could not be replicated exactly in each trial and not appear to be contrived. The confederates were given a short script of initiative dialog, but the remainder of the interaction was improvised. Another threat involves the use of five different female confederates. Increased variability in the anxiety measure may have resulted from the confederates varying characteristics, which may have included perceived attractiveness, conversation styles, and familiarity with the confederate prior to the experiment. A few of the participants mentioned they had the confederates in class with them, and were familiar with them. Others mentioned they were suspicious the confederate was a part of the experiment. Using the same confederate in all conditions and who was also not a student would eliminate many of these problems.

Another threat to internal validity could have been the song used in the control condition. The song "Lights," by Journey, portrays a lonely individual in a city, yearning for an individual he cares about to return. This song could have primed the participants to feel emotions related to love or liking, thus making the cross-gendered interaction seem more romantic-oriented. The participant listened to an instrumental version, however some of the participants may have had previous knowledge of the song's lyrics.

Mental practice allows individuals to rehearse social interactions without overt performance. Although it was suggested mental rehearsal of positive social interactions would lead to decreased anxiety during an actual cross gendered interaction as compared to either a negative rehearsal or no rehearsal, the present male participants experienced an increase in anxiety during social interactions with women regardless of mental practice condition. However, men did appear to experience higher self-esteem after reflecting on and using their social skills regardless of the valence of the mental practice in comparison to those who only listened to music.

References

- Bell, A. R., & Murray, B. J. (2004). Improvement in upper limb motor performance following stroke: the use of mental practice. *British Journal of Occupational Therapy, 67*, 501-507.
- Bertollo, M., Saltarelli, B., & Robazza, C. (2009). Mental preparation strategies of elite modern pentathletes. *Psychology of Sport and Exercise, 10*, 244-254. doi: 10.1016/j.psychsport.2008.09.003
- Cain, J. (1982). *Lights*. Frontier Album (CD). United States: Columbia Records.
- Driskell, J. E., Copper, C., & Moran, A. (1994). Does mental practice enhance performance? *Journal of Applied Psychology, 79*, 481-492.
- Gerlach, A., Mourlane, D., & Rist, F. (2004). Public and private heart rate feedback in social phobia: a manipulation of anxiety visibility. *Cognitive Behavioral Therapy, 33*, 36-45. doi: 10.1080/16506070310014682
- Guillot, A., Nadrowska, E., & Collet, C. (2009). Using motor imagery to learn tactical movement in basketball. *Journal of Sport Behavior, 32*, 189-206.
- Hanton, S., Mellalieu, S. D., & Hall, R. (2004). Self-confidence and anxiety interpretation: A qualitative investigation. *Psychology of Sport and Exercise, 5*, 477-495. doi: 10.1016/S1469-0292(03)00040-2
- Heerey, E. A., & Kring, A. M. (2007). Interpersonal consequences of social anxiety. *Journal of Abnormal Psychology, 116*, 125-134. doi: 10.1037/0021-843X.116.1.125
- Hirsch, C. R., Mathews, A., Clark, D.M., Williams, R., & Morrison, J. A. (2006). The causal role of negative imagery in social anxiety: A test in confident public speakers. *Journal of Behavior Therapy and Experimental Psychiatry, 37*, 159-170. doi:10.1016/j.jbtep.2005.03.003
- Hirsch, C. R., Meynen, T., Clark, D. M. (2004). Negative self-imagery in social anxiety contaminates social interactions. *Memory, 12*, 496-506. doi: 10.1080/09658210444000106
- Holmes, E. A., Lang, T.J., & Shah, D. M. (2009). Developing interpretation bias modification as a cognitive vaccine for depressed mood: Imagining positive events makes you feel better than thinking about them verbally. *Journal of Abnormal Psychology, 118*, 76-88. doi: 10.1037/a0012590
- Holmes, E.A., & Mathews, A. (2005). Mental imagery and emotion: A special relationship? *Emotion, 5*, 489-497. doi: 10.1037/1528-3542.5.4.489
- Knauper, B., Roseman, M., Johnson, P. J., & Krantz, L. H. (2009). Using mental imagery to enhance the effectiveness of implementation intentions. *Current Psychology Research & Reviews, 28*, 181-186. doi: 10.1007/s12144-009-9055-0
- Kosslyn, S. M., & Moulton, S. T. (2009). Mental imagery and implicit memory. In K. D. Markham, W.M.P. Klein, & J.A. Suhr. *Handbook of imagination and mental simulation* (pp. 35-51).
- Mack, G., & Casstevens, D. (2004). *Mind gym*. New York: McGraw-Hill Co.
- Rosenburg, M. (1989). *Society and the adolescent self-image*. Revised edition. Middletown, CT: Wesleyan University Press.
- Shackell, E. M., & Standing, L. G. (2007). Mind over matter: Mental training increases physical strength. *North American Journal of Psychology, 9*, 189-200.
- Taktek, K. (2004). The effects of mental imagery on the acquisition of motor skills and performance: A literature review with theoretical implications. *Journal of Mental Imagery, 28*(1&2) 79-114.
- The Rosenberg Self-Esteem Scale. (2009). *University of Maryland & the Morris Rosenberg Foundation*. Retrieved from <http://www.bsos.umd.edu/soc/research/rosenberg.htm>
- Vassilopoulos, S. (2005a). Anticipatory processing plays a role in maintaining social anxiety. *Anxiety, Stress, and Coping, 18*, 321-332. doi: 10.1080/10615800500258149
- Vassilopoulos, S. (2005b). Social anxiety and the effects of engaging in mental imagery. *Cognitive Therapy and Research, 29*, 261-277. doi: 10.1007/s10608-005-2993-4.

The Relationship Between Early Childhood Education and Intelligence

Justine L. Bucy

Creighton University

Abstract

Twin and adoption studies have established a genetically inherited aspect of intelligence (Gorey, 2001). However, environmental factors such as education also play a role in determining adult intelligence. This report examines the relationship between early childhood education programs, such as preschool, and intelligence. The wide variety of preschool and childcare options available presents some difficulties in drawing conclusions across all forms of preschool programs. Despite this obstacle, research provides evidence suggesting early childhood education does have a positive correlation with children's intelligence levels (Lee, Schnur, & Brooks-Gunn, 1988). The long-term relationship between preschool participation and intelligence is ambiguous, although some research (Reynolds, Temple, Robertson, & Mann, 2001) indicates the benefits of early childhood education extend into adulthood.

Keywords: childhood, education, intelligence

In the first years of life, an individual undergoes significant physical, psychological, emotional, and cognitive development. An infant who is completely dependent on parents and other caregivers for survival grows into a young child who begins to assert independence and develop personalized talents and opinions. As research began to explore the physical, cognitive, and emotional developments occurring in the first five years after birth, parents and educators began to question if participation in educational programs during this time would be related to increases in a child's intellectual ability beyond that of a child who does not participate in an early childhood educational program.

Although twin and adoption studies have provided evidence to support a genetic factor of intelligence, some environmental influences also shape adult human intelligence (Gorey, 2001). The issue under debate is to determine the relationship between formal early childhood educational programs such as preschools and intelligence. In this paper, I first examine the difficulties in assessing intelligence outcomes from early childhood educational programs, and then review current research on the relationship between preschool programs and intelligence levels. Finally, I examine the long-term correlation between preschool program participation and intelligence levels.

The term *preschool* is used to refer to many different forms of early childhood education. Preschool can refer to programs designed for children ages 3-5 years to attend before entering kindergarten, and preschool can also refer to any structured childcare program for children between birth and kindergarten. In this paper, preschool will refer to the broad range of programs available to children from birth to kindergarten, unless otherwise specified. Factors encouraging the popularity of preschool in our society are the increas-

ing number of parents who work outside the home and knowledge about the significant cognitive developments that occur in early childhood (Raikes, Edwards, & Jones-Branch, 2008). When parents work outside the household, they rely on family, daycare facilities, and babysitters to watch their children. When financially and practically possible, parents are increasingly choosing structured educational programs over traditional daycare facilities. The relationship between early childhood educational programs and intelligence can be measured through cognitive assessments and intelligence tests.

Obstacles in Assessing Preschool Outcomes

Assessing the quality and effectiveness of preschool programs involves several complicated issues. First, there is a wide variety of preschool programs. Generalized statements about the relationship between preschools and intelligence are difficult because preschools include many different models of educational programs. Some programs involve children attending a program outside of their home, such as Head Start (Raikes et al., 2008); other programs send teachers to visit children in their own homes. Programs vary in whether they focus on structured education or learning by exploring the environment and creative play. Certain programs such as Federal Even Start Family Literacy focus on improving childhood experience by educating parents about parenting topics and basic education (Raikes et al., 2008). The focus of this paper is on the general relationship between preschool participation and intelligence, and therefore I acknowledge studies that examine a single preschool model (e.g., Barnett, 1996; Belfield, Nores, Barnett, & Schweinhart, 2006; Lee et al., 1988; Reynolds et al., 2001) and studies that examine more broadly the influences of preschool participation (e.g., van Tuijl & Leseman, 2007), including meta-analyses of several models of early childhood education (e.g., Barnett, 1995; Gilliam & Zigler, 2000; Gorey, 2001).

A second obstacle in assessing preschool programs is controlling for other environmental factors affecting intelligence. Socioeconomic status, nutrition, parenting, and educational opportunities are all environmental factors theorized to affect intelligence (Gorey, 2001). Designing a study that controls for all possible extraneous environmental variables affecting intelligence is virtually impossible. Likewise, researchers should exercise caution when selecting a control sample of children who did not attend any early childhood education program. Programs such as Head Start, which are specifically targeted toward children from low-income families, are not capable of serving all eligible children (Gilliam & Zigler, 2000). Children from low-income families who have limited access to cognitively stimulating experiences

Isabelle Cherney served as Faculty Sponsor for this research.

may be overrepresented in the population of children who do not attend an early childhood education program. Van Tuijl and Leseman (2007) attempted to control for individual participant differences by conducting a within-subjects design in which all participants attended preschool and completed a pre- and post-test. There was no control group of children who did not attend a preschool program. This type of design eliminates confounding participant variables; however, it prevents the researchers from drawing conclusions about the intelligence of preschool participants compared to the intelligence levels of children who did not attend preschool.

A final obstacle in determining the extent of the relationship between preschool participation and intelligence is establishing whether increased scores on intelligence assessments are the result of a true relationship between preschool participation and intelligence increases or learned test-taking abilities (van Tuijl & Leseman, 2007). That is, increased intelligence scores may be a true illustration of a positive relationship between preschool participation and intelligence levels; however, increased scores could also be affected by the child's exposure to standardized tests and other assessment methods in the preschool program. Lee et al. (1988) attempted to avoid this obstacle by measuring changes in participants through standard evaluations such as the Peabody Picture Vocabulary Test and the Caldwell Preschool Inventory, in addition to more unique evaluations such as the Motor Inhibition Test. The Motor Inhibition Test is not an intelligence test; it measures children's impulsivity through the performance of three motor tasks (Lee et al., 1988). Although not an intelligence test, differing performance at pre- and post-test can verify preschool participation is related to a change in intelligence level, and thus changes in scores on standardized intelligence tests at post-test should in part reflect a positive correlation between preschool participation and intelligence.

The purpose of identifying possible obstacles when measuring the relationship between preschool and childhood intelligence is to establish intelligence is a complicated issue. Genetics, education, childhood experiences, and nutrition may all contribute to each individual's adult intelligence level.

No Relationship between Preschool Participation and Intelligence

Some scholars believe intelligence is genetically determined and cannot be significantly altered by environmental influences like early childhood education programs. Whereas some studies (Gilliam & Zigler, 2000) indicate preschool participation has a positive relationship with academic aspects such as elementary school attendance, preschool has no correlation to increased intelligence levels in individuals who participate in an early childhood education program (e.g., Barnett, 1995; Gilliam & Zigler, 2000).

Cawley, Burrow, and Goodstein (1970) performed an early study on the effectiveness of preschool programs, specifically the Head Start program, in improving the development of economically disadvantaged children. At the time of this study, preschool programs were a relatively new trend in

American society. Cawley et al. (1970) found no significant difference in intelligence (IQ) or mental age between children who attended Head Start and children who did not. In this study, kindergarten students were evaluated using the Peabody Picture Vocabulary Test to determine IQ and mental age, and the scores of students who attended a Head Start program were compared with students in the same kindergarten class who did not attend a Head Start Program (Cawley et al., 1970). Cawley and colleagues (1970) conducted similar assessments with the same students during first grade and again found no significant intellectual differences between the participants, suggesting no significant relationship between preschool participation and intelligence level.

Gilliam and Zigler (2000) conducted a meta-analysis examining the effectiveness of state-funded preschool programs across the United States designed for children from low-income families. Preschool participation was positively correlated with a variety of intelligence measures such as school and national achievement tests, student grades during kindergarten, and other evaluations such as the Peabody Picture Vocabulary Test-Revised immediately following participation; however, the strength of the correlation diminished significantly in the two years post-preschool (Gilliam & Zigler, 2000).

Research by Plomin and Spinath (2004) suggested the heritable aspect of intelligence increases during adulthood. Environmental influences like family atmosphere and educational experiences may have a significant positive relationship to intelligence in childhood, but the strength of the relationship is significantly reduced by adulthood (Plomin & Spinath, 2004). This idea is relatively consistent with the findings of Gilliam and Zigler (2000), who suggested preschool has an immediate, positive correlation with a child's intelligence level with the strength of this relationship decreasing rapidly with time.

A Positive Correlation between Preschool Participation and Intelligence

Environmental influences, including preschool participation, may also be a determining factor in an individual's intelligence level (Gorey, 2001). In contrast with Cawley et al. (1970) and Gilliam and Zigler (2000), other research has found significant increases in intellectual abilities that are positively correlated with preschool participation. Lee et al. (1988) compared Head Start preschool participants with a control group of children who did not attend preschool, and a group of children who attended a different preschool program. They used four measures: the Peabody Picture Vocabulary Test, the Caldwell Preschool Inventory, the Motor Inhibition Test and the Eight-Block Sorting Test to measure various intelligence skills including analytic, cognitive, vocabulary, and motor ability (Lee et al., 1988). Contrary to Cawley et al.'s (1970) conclusions, Lee et al. (1988) found the scores of children who attended Head Start for one year increased significantly more than did the scores of children in the other groups on evaluations such as the Peabody Picture Vocabulary Test, the Caldwell Preschool Inventory, and the Motor Inhibition Test. This discovery led to the conclusion a posi-

tive correlation exists between preschool participation and intelligence level (Lee et al., 1988).

More recent research supports the conclusions of Lee et al. (1988). A study conducted in the Netherlands examined the relationship between preschool participation and scores on measures of verbal and fluid intelligence (van Tuijl & Leseman, 2007). Researchers administered the Revised Amsterdam Child Intelligence Test (RAKIT) as a pre- and post-test to children who participated in a preschool program for 30 months (van Tuijl & Leseman, 2007). The researchers found preschool participation has a positive relationship with intelligence levels, specifically verbal and fluid intelligence. The children were split into two age groups in order to fully analyze the data obtained in this study. The younger children were between 48 and 57 months old, whereas the older children were between 58 and 65 months old at the pre-test (van Tuijl & Leseman, 2007). Both age groups showed relatively similar gains in fluid intelligence scores, interpreted as evidence that the strength of the relationship between preschool and fluid intelligence does not decrease over time (van Tuijl & Leseman, 2007). The younger children showed higher gains on verbal intelligence scores compared to the scores of the older children, which researchers interpreted as evidence the strength of the relationship between preschool and verbal intelligence decreases over time (van Tuijl & Leseman, 2007). The lack of a control group in this study inhibits forming conclusions about how verbal and fluid intelligence changes in preschool participants compared to children who did not attend preschool. However, van Tuijl and Leseman (2007) note the use of a control group was nearly impossible because they conducted their research in the Netherlands, where preschool attendance is required at age 5 years and nearly universally attended by younger children as well.

In both this study (van Tuijl & Leseman, 2007) and the study conducted by Lee et al. (1988) the children with the lowest initial scores showed the largest score increases on the post-test. This result supports the reaction range model of intelligence, which suggests each individual has a range of possible intelligence capabilities, and an individual's location along that range is affected by environmental factors such as education, nutrition, and family influences (Bronfenbrenner & Ceci, 1994). Participants in the studies by van Tuijl and Leseman (2007) and Lee et al. (1988) were children from low-income families. The reaction range model of intelligence would suggest children from low-income families score lower on tests of academic ability in comparison to children from families with higher socioeconomic status because their families' socioeconomic status prevented them from being raised in an enriched environment stimulating intellectual development. The model would suggest the participants with the lowest initial scores would benefit the most from participation in an early childhood education program. Prior to participation these participants would be located on the low end of their individual intelligence range as a result of growing up in a less enriched environment, and participation in a preschool program could allow them to advance along their individual intelligence range, and show the greatest score increase on the post-test. In contrast, large

score increases may reflect the influence of other environmental features associated with preschool. For example, score increases may reflect a relationship between intelligence and the social interactions or supplemental nutrition available to low-income children during preschool participation (Gorey, 2001). One of the goals of the Head Start program is providing nutrition and improving the health of participants (Barnett, 1995). Intelligence increases following participation in a preschool program may have no relationship to the educational enrichment of preschool, but rather, intelligence increases may reflect a positive correlation with other environmental factors such as nutrition or social interaction.

Long-Term Effects of Preschool Participation

Reynolds et al. (2001) examined the long-term effectiveness of the Chicago Child-Parent Center (CPC) Program designed to provide family health services, preschool and kindergarten education, and additional educational resources to participants. Similar to other studies (e.g., Lee et al., 1988; van Tuijl & Leseman, 2007), this research (Reynolds et al., 2001) found an immediate positive relationship between participation in the CPC program and intelligence that extended into elementary school, when CPC participants were compared with the control group who attended alternative early educational programs or no preschool program. This evidence is not entirely convincing of a long-term relationship between preschool and intelligence, because the CPC program provided resources and services to children throughout elementary school; however, research on another preschool program, the High/Scope preschool model, supported these findings and suggested the impact of the relationship between preschool and intelligence continued to be observed at least until age ten, when preschool participants scored on average 27 points higher on intelligence tests than the control group of students who did not attend preschool (Schweinhart & Weikart, 1997).

Gorey (2001) suggested the relationship between preschool and intelligence has a long-term effect on intelligence and academic achievement tests. Gorey's (2001) study was a meta-analysis including the data from more than 18,000 students who attended a variety of different early childhood education programs in over 200 different locations. His research found, after ten years, preschool participants still had significantly higher intelligence scores than the control group individuals who did not attend a preschool program (Gorey, 2001). Whereas he found the strength of the relationship between preschool and intelligence seems to decrease slightly with the passage of time, after five years 74% of students who attended intensive, longer preschool programs scored higher on IQ tests than the average control group participants who did not attend a preschool program (Gorey, 2001). Additionally, 80% of students who attended more intensive programs performed higher on school achievement tests than the average students in the control group (Gorey, 2001). This research suggests a strong, positive correlation between pre-

school participation and intelligence that exists years after participation has ended.

Gilliam and Zigler (2000) found preschool participation was positively correlated with performance on achievement tests and grades during kindergarten, but students rarely retained the benefits of preschool participation in first grade and beyond. The strongest long-term correlations were found between preschool participation and school attendance and grade retention, whereas no long-term relationships were found between preschool participation and grades or IQ scores (Gilliam & Zigler, 2000). These results suggest preschool participation is positively correlated with specific long-term academic outcomes; however this relationship does not include intelligence.

Barnett (1995) reviewed the results of 36 studies on the long-term relationship between preschool participation and intelligence levels in children from low-income families. Results suggested high school graduation rates and increased socialization had the largest, long-term relationship with preschool participation (Barnett, 1995). Increased intelligence, measured by IQ scores was related to preschool participation in all studies, but most studies reported a decrease in the strength of the relationship after the children entered kindergarten. The strongest relationship between preschool and intelligence was seen in children who began attending long, intensive educational programs as infants. In these children, the relationship between preschool and intelligence could be seen through adolescence (Barnett, 1995).

Barnett (1998) further supported the strength of the relationship between preschool and intelligence decreases rapidly once the children enter kindergarten. This author suggested a long-term relationship between preschool participation and school achievement tests but not between preschool and intelligence. However, participation in an early childhood education program was positively correlated with intelligence increases immediately following participation.

Ultimately, the relationship between preschool participation and long-term intelligence increases is ambiguous. Longer, more intensive early childhood educational programs seem to suggest the most positive long-term relationship (Barnett, 1995; Barnett, 1998; Gorey, 2001), however, most preschool programs indicate a positive correlation between participation and intelligence immediately following the program (Barnett, 1995; Barnett, 1998; Gilliam & Zigler, 2000).

Discussion

Early childhood education has developed primarily over the past 50 years. The popularity of preschool programs is likely to continue to grow in the current economic situation where it is common for both parents to work outside the home. Although some research (Cawley et al., 1970; Gilliam & Zigler, 2000) found little or no relationship between preschool participation and intelligence level, other research (Lee et al., 1988; Reynolds et al., 2001; van Tuijl & Leseman, 2007) has presented evidence of a positive correlation between preschool and childhood intelligence. The available research suggests the positive relationship between preschool and intelligence decreases with the passage of

time, but longer, more intensive preschool programs may provide the best evidence of a long-term relationship (Barnett, 1995; Barnett, 1998; Gilliam & Zigler, 2000; Gorey, 2001).

Evidence suggests preschool is an environmental factor contributing to intelligence levels, but this conclusion does not suggest preschool necessarily causes increased intelligence. Likewise, the research presented here supports a positive correlation between participation in an early education program and increased intelligence. None of the references used can suggest a causal relationship between the two or eliminate the possibility of extraneous variables. Given the nature of the relationship between intelligence and preschool participation, it would be very difficult to design and conduct a study to establish a causal relationship.

There continue to be many models of early childhood education programs, and one issue remaining undetermined is which programs are the most positively correlated with increased childhood intelligence. This issue may not have a definite solution because it is possible certain preschool programs work best in certain cultural or socioeconomic settings. Perhaps, specific programs work best with different age groups of children. An incredible amount of cognitive, physical, emotional, and psychological development occurs between birth and age five or six years when children enter kindergarten, thus, different education models may need to be tailored to children at specific levels of development.

Future research should investigate the extent to which increased scores on intelligence tests are due to actual intelligence increases and to what extent increased scores are affected by exposure to test-taking methods and assessment practices in preschool. This further research could be conducted by matching children who were being enrolled in a preschool program with children of similar family environment, socioeconomic status, geographical location, and medical histories whose parents have elected not to send their children to any form of preschool program. All participants could be given a pre-test in the fall before the experimental group entered their chosen preschool program, and participants then could be given a post-test the following spring. Care should be taken to prevent the experimental participants from completing any academic tests while in the preschool program, which is necessary to assure any score increases between the pre- and post-test are not due to learned test-taking ability. There is no doubt the relationship between early education programs and intelligence levels will continue to be the focus of research as parents, educators, and psychologists seek out methods of maximizing human intellectual potential.

References

- Barnett, W. S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. *The Future of Children* 5(3), 25-30. doi:10.2307/1602366
- Barnett, W. S. (1996). Lives in the balance: Age-27 benefit-cost analysis of the High/Scope Perry preschool program [Monograph]. *Monographs of the High/Scope Educational Research Foundation Number Eleven*.

- Barnett, W. S. (1998). Long-term cognitive and academic effects of early childhood education on children in poverty. *Preventive Medicine: An International Journal Devoted to Practice and Theory* 27, 204-207. doi:10.1006/pmed.1998.0275
- Belfield, C. R., Nores, M., Barnett, S., & Schweinhart, L. (2006). The High/Scope Perry preschool program: Cost-benefit analysis using data from the age-40 follow-up. *The Journal of Human Resources*, 41, 162-190.
- Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: A bioecological model. *Psychological Review*, 101, 568-586.
- Cawley, J. F., Burrow, W. H., & Goodstein, H. A. (1970). Performance of Head Start and non-Head Start participants at first grade. *Journal of Negro Education*, 39, 124-131. doi:10.2307/2966836
- Gilliam, W. S., & Zigler, E. F. (2000). A critical meta-analysis of all evaluations of state-funded preschool from 1977 to 1998: Implications for policy, service delivery, and program evaluation. *Early Childhood Quarterly*, 15, 441-473.
- Gorey, K. M. (2001). Early childhood education: A meta-analytic affirmation of the short- and long-term benefits of educational opportunity. *School Psychology Quarterly*, 16, 9-30. doi:10.1521/scpq.16.1.9.19163
- Lee, V. E., Schnur, E., & Brooks-Gunn, J. (1988). Does Head Start work? A 1-year follow-up comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Developmental Psychology*, 24, 210-222. doi:10.1037/0012-1649.24.2.210
- Plomin, R. & Spinath, F. M. (2004). Intelligence: Genetics, genes, and genomics. *Journal of Personality and Social Psychology*, 86, 112-129. doi:10.1037/0022.3514.86.1.112
- Raikes, H. H., Edwards, C., & Jones-Branch, J. (2008). Preschool and nursery school. In M. Haith & J. Benson (Eds.), *Encyclopedia of Infant and Early Childhood Development* (pp. 614-624). Denver, CO: Academic Press.
- Reynolds, A. J., Temple, J. A., Robertson, D. L., & Mann, E. A. (2001) Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15- year follow-up of low-income children in public schools. *Journal of American Medical Association* 285, 2339-2346. doi:10.1001/jama.285.18.2339
- Schweinhart, L. J., & Weikart, D. P. (1997). Lasting differences: The High/Scope preschool curriculum comparison study through age 23 [Monograph]. *Monographs of the High/Scope Educational Research Foundation Number Twelve*.
- van Tuijl, C., & Leseman, P. P. M. (2007). Increases in the verbal and fluid cognitive abilities of disadvantaged children attending preschool in the Netherlands. *Early Childhood Research Quarterly*, 22, 188-203. doi:10.1016/j.ecresq.2007.02.002

Stress from Physical Conflicts Based Upon Sex, Masculinity, and Color Perception

Melissa Huntley and Wind Goodfriend*

Buena Vista University

Abstract

Physical conflict, as well as the traditional gender roles surrounding it, has existed since the beginning of time. Research has shown that men are encouraged to be more dominant and aggressive to facilitate engagement in such conflicts, whereas women are encouraged to avoid such acts (Holt-Lunstad, Clayton, & Uchino, 2001; Kimmel, 1994). In a physical point-style karate sparring match, the following variables' association with stress were tested: (1) sex of the opponent, (2) psychological gender of the participant, and (3) color of opponent's uniform. Results showed that none of these variables had a significant effect on stress, which implies reactions to conflict may be more complex than previously thought.

Keywords: conflict, gender, stress, color

Physical conflict has been a tool of history. Wars have been fought to settle disagreements, and at the head of each army stands a strong, stoic fighter. With the obvious price of losing a physical conflict, it comes as no surprise that stress accompanies humans when they enter conflict, regardless as to whether they enter willingly or not. Traditionally, men were exclusive to the hoards of warriors; therefore they underwent training that would target the stress a fighter experiences. The modern equivalent of conflict on a battle field is conflict in the workplace (Lothaller, Mikula, & Schoebi, 2009). Because of this historical exclusivity, men would also only be conflicting with other men. What happens when women are introduced into this age-old ritual? The purpose of this study was to observe differences in stress in men and women as they react to physical conflict, including the environmental variables of sex of the opponent, color of the opponent's clothing, and the amount of masculine aggression in the individuals themselves.

Physical Conflict

Conflict is the contentions occurring between a number of different events, most often contradictions in the cognitive process (Piaget, 1977, as cited in Druyan, 2001). As discussed by Sigel (1979), conflict consists of three different categories: the discrepancies between two internal events (labeled "intrapersonal conflict," by Levin & Druyan, 1993), the discrepancies between two external events, and the discrepancies between an internal stimulus and an external event.

When an individual observes a conflict in his or her environment, he or she is subjected to external-external conflict (Cannon, 1932). Stress arises in the individual from the tension and possible witnessed fear. Intrapersonal conflict arises when an individual has conflicting thoughts and must deal with the unclear thoughts. This conflict causes stress from the mental instability or cognitive dissonance (Festinger,

1957). The internal-external category refers to the discrepancies that arise between individuals (e.g., a physical altercation with another individual). This conflict creates intrapersonal conflict in an individual in the form of the fight-or-flight response. As an individual is warring with oneself and warring with another, the two categories of conflict work together to create the stressful environment of pugilism (Cannon, 1932).

Differential Gender Reactions

Stereotypically, views of a man's success, and ultimately his masculinity, rest on how assertive, competitive, and dominant he is (Kimmel, 1994). These characteristics are closely associated with physical conflict and the success of such conflicts. Davis (1990) stated that the violation of this "success" norm means that men are seen as less likeable and attractive. For example, "Even men who are not strongly masculine in their orientation still experienced stress in situations that were appraised as threatening to male control or competence" (Eisler, Skidmore, & Ward, 1988, p. 93, as quoted by Holt-Lunstad et al., 2001). Suzuki, Kumano, and Sakano's (2003) tracking of male stress showed despite alternative coping mechanisms, men retain anxiety and high levels of irritability when put under physical stressful situations.

Reactions to stress. Many studies reveal that though there is very little difference in intensity of stress experienced by men and women when faced with stressful situations (Weinstein, Brown, & Ryan, 2009), the male and female reactions to a stressor are vastly different. The larger amount of estrogen found in women is believed to be a stress suppressor; estrogen is a natural hormone designed to relieve some of the immense stress that accompanies pregnancy and menopause (Kajantie, 2008). Holt-Lunstad et al. (2001) found that on average, men respond to stressful competitive tasks with a higher cardiovascular reaction (operationalized by measuring blood pressure) than women. Both sexes, when reinforced in their social sex roles, were better able to handle stress (Kolk & van Well, 2007; Rustemeyer, 2001).

Reactions to competition. In conjunction with Holt-Lunstad and colleagues' (2001) "Male Norm of Success" we are also introduced to the "Female Fear of Success," the opposite problem for the opposite sex. Note, the authors are referring to biological sex, not psychological gender. The female sex-role standard may result in women doing far more poorly in competitive situations than in cooperative ones as well as having a worse competitive performance when competing against men (Horner, 1972). Although

*Faculty Sponsor

Correspondence may be addressed to: Wind Goodfriend, Ph.D., Psychology Department, 610 W. 4th Street, Buena Vista University, Storm Lake, IA 50588. Email Goodfriend@bv.u.edu, Phone 712-749-2108, Fax 712-749-2037. The authors would like to thank Thomas Fitzgerald, Jessica Christensen, and Arielle Butler for their help with this project.

the roles of women have changed since Horner's research, studies have found that women are still exhibiting the same behaviors to competitive tasks, as a result of female stereotypes (Diekmann & Eagly, 2000; Lash, Gillespie, Eisler, & Southard, 1991). Research suggests women feel more comfortable competing with women regardless of winning or losing, and that women feel more anxious when winning against a man than winning against a woman (Holt-Lunstad et al., 2001). Although society's demands are different on men and women, both experience stress as a result of competition.

Men and women respond differently when pitted against opponents of the same or different sex (Holt-Lunstad et al., 2001), based on a combination of individuals' perception of the opposite sex and the societal codes that each must follow. A major difference in the roles of men and women is the common belief women are less aggressive than men (Barber, Foley, & Jones, 1999). Societal norms encourage aggressive behavior in young boys and allow men to use aggression to solve problems and "complete" their social roles (Holt-Lunstad et al., 2001). Women are raised by societal standards to be communal and to veer away from aggressive means to fulfill aspirations and goals. The punishment for violating these norms is not only rejection from men but rejection from other women as well; women who are perceived as aggressive receive harsher punishments than men with the same level of aggression (Barber et al., 1999).

Reactions to conflict. Traditionally, society demands men to be competitive and encourages conflict. This expectation, as Thompson (1991) suggested, creates a traditional male role with natural aggressive qualities. Some men believe they are required to behave competitively and decisively to enact their gender role as the result of masculine gender socialization (Levant et al., 1992). This traditional view is increased in the presence of women, and in "disobedient" women, the masculine role is severely threatened. In a study involving self-report and monitored situations, this masculine ideology was so threatened that the female-threat variable may have completely eliminated any other variable in the study (Eisler, Franchina, Moore, Honeycutt, & Rhatigan, 2000). In this study, men were given situations in which they were confronted with varying levels of aggression on varying topics. When confronted by another man, several factors (e.g., confrontational tone, intimidating body posture) were self-reported to be important to the conflict. However, when confronted by a woman, gender became the only issue. Because a man's ideology may include maintaining control and power over others, especially women, when he is criticized by a woman, this information overrides all other constructs in the situation and it automatically becomes a sex issue. In general, men pride themselves on self-reliance, physical strength, and endurance, and they expect to excel and dominate in these categories, not only over other men, but especially over women (Franchina, Eisler, & Moore, 2001).

Importantly for the current study, problematic masculinity is not necessarily tied with biological sex. Many studies now are looking toward gender orientation rather than the stereotypes of men and women. Thompson (1991) explored

the stereotypes of the male sex and found it is not the "man" who is more likely to become violent, but the amount of "maleness." In other words, if an individual has a higher amount of "masculine aggression," he or she is more likely to commit a traditionally masculine response, from mild violation of a partner's sexual consent (Margolin, 1990) to violence in a dating relationship (Thompson, 1991).

Although the tradition of aggression is increasingly being spread across the sexes (Diekmann & Eagly, 2000), this does not automatically imply the need for competition stretches the same gap. Physical conflict is no longer exclusive to the male population (Holt-Lunstad et al., 2001; Thompson, 1991). Because women are engaging in more physical conflict, they are experiencing the same reactions traditionally exclusively male reactions. In addition, individual reactions are not simply based on biological sex, but also on psychological gender (i.e., levels of masculinity or femininity; Barber et al., 1999). Thus, reactions to kinesthetic conflict may be predicted by both biological sex and by gender.

Reactions to Color

Colors are an integral part of everyday life, and through research on the psychological impact of color in advertisements, colors are consistent, almost non-conscious messages dictating emotions. In most cases, advertisers are hoping these emotions will create physical responses, such as buying their products. Different colors provide separate stimulation as the light reaches the human retina (Kulikowski, McKeefry, & Robson, 1997). However, the meanings of these hues alter with culture and situation (Aaronson, 1971). For example, whereas green may represent envy and jealousy, it can also represent freshness and clean nature.

White and black are the two most basic colors that hold similar meanings across cultures (the only exception being the reversal of the meanings in Southeast Asia; Aaronson, 1971). White generally stands for purity and holiness; black is a nearly universal color for mourning. Black is strongly associated with depression and anxiety, while white is a calming color (Aaronson, 1971). These colors contrast so much they are used for the most basic of tasks: writing, drawing, and anything to display information. Few other colors are as universally understood as black and white.

Hypothesis 1

The competition demanded of men in order to achieve success (Kimmel, 1994), is the primary stressor in a physical conflict. Although the fear of physical harm cannot be discounted, it is more likely a man will fear failure in a confrontation as opposed to a woman. Holt-Lunstad et al. (2001) stated the nature of the male social role is heavily emphasized on competition. *Hypothesis 1: men will have a higher level of stress, measured by a higher blood pressure level, when they are in a physical conflict with another man, rather than with a woman.*

Hypothesis 2

Women have been conditioned to be communal (Weinstein et al., 2009), to avoid conflict, rather than participate in it. Also, on average, women are physically smaller

than men. Combined with the societal push to concede to men (Holt-Lunstad et al., 2001), women will more likely be very uncomfortable in a kinesthetic conflict with men; thus, it is reasonable to believe women will experience stress in altercations due to the taboo of fighting in the female social role. *Hypothesis 2: women will experience more stress, measured by a higher blood pressure level, when put in a physical confrontation with a man, rather than with another woman.*

Hypothesis 3

Masculinity is quickly spreading across the gap of male and female (Thompson, 1991). Women are increasingly making sexual consent violations against their partners considered alarmingly socially acceptable, such as “stealing a kiss” from their unsuspecting or unwilling partner (Carr, 2005; Margolin, 1990). This growth of masculinity in women shows tradition does not control everything and everyone. Although women are encouraged to be non-aggressive, if they have acquired masculine aggression, it would follow they would hold the same comfort level as men with similar levels of masculinity. *Hypothesis 3: across all conditions, women’s masculinity scores will be negatively correlated with stress (measured by blood pressure).*

Hypothesis 4

Society dictates many of the roles for men and women, and in some cases requires positions for competitors and people to concede. One can assume these roles are most likely to be followed when an individual puts value in society’s demands. The more value put into societal roles, the greater the reaction or punishment, when these roles are broken. The punishment results from stress caused by a breaking of important traditions for an individual. A major breaking of tradition is the act of a kinesthetic conflict between the sexes (Thompson, 1991), and this conflict could result in a high stress level situation for a traditionalist. *Hypothesis 4: individuals who perceive themselves as traditional will experience more stress (i.e. higher blood pressure levels) when physically conflicting with a person of the opposite sex compared to individuals who perceive themselves as not traditional.*

Hypothesis 5

As described previously, black is an extremely common sign for menacing figures, whereas white is associated with benign figures (Aaronson, 1971). These subtle messages are constantly used in hopes to psychologically affect one’s opponent in competition, prominently in the form of uniforms (hence why one does not often see football players wearing pastels; Aaronson, 1971). The colors one perceives can most definitely have an effect on the amount of stress he or she may experience. *Hypothesis 5: individuals engaging in conflict with opponents in black clothing will experience more stress (i.e., higher blood pressure levels) than individuals who conflict with opponents in white clothing.*

Method

Participants

This study included 53 college undergraduate students (26 men, 27 women) between the ages of 18-58 years (Mean_{age} = 20.53 years, *SD* = 5.465). The students were solicited through university bulletins, class announcements, and advertisements posted around campus; most participants received extra credit for a psychology course in exchange for their time. Two lotteries of \$50 cash prizes were offered in place of extra credit if participants so desired (one prize for each participant sex).

Independent Variables

There were two independent variables manipulated, creating a 2 (sex of opponent: male or female) X 2 (color of uniform: black or white) factorial design. To test differences in individuals’ stress levels depending on the sex of the opponent, participants were randomly assigned to physically spar a male or female opponent. The sparring match consisted of two minutes of karate point-style sparring as set by the rules of the North Central Karate Association. The two available opponents were similar in height, weight, body build, and overall appearance. Both the male and the female assistants had the same martial arts training for the same amount of time and were at the same skill level, eliminating most confounding variables.

Finally, the uniform color of the opponent was selected to test the experimental effect of hue intimidation. The uniforms were either a white 7 oz. light-weight cotton poly-blend uniform or a black 12 oz. heavy-weight canvas uniform. The uniforms did not alter the performance of the opponents in any aspect because the opponents were trained to behave identically regardless of uniform condition.

Predictor Variables

Masculinity. Participants completed the 60-item Bem Sex Role Inventory (BSRI; Bem, 1974) which includes both masculine and feminine items (e.g. “forceful,” “tender”). The scale was a 7-point Likert scale with 1 = *Never true of me*, 4 = *Sometimes true of me*, 7 = *Always true of me*. The BSRI was scored by adding up the responses for every third answer (e.g., “1, 4, 7” and “2, 5, 8”). The first set (1, 4, 7, etc.) measured masculinity. The sample’s mean was 4.76 (*SD* = .61). Femininity was measured by the second set (2, 5, 8, etc) and the mean was 4.82 (*SD* = .56). The internal consistency for this scale was good, masculinity $\alpha = .83$ and femininity $\alpha = .78$.

Traditionalism. The Attitudes towards Women Scale (AWS; Yoder, Rice, Adams, Priest, & Prince, 2004) was used to identify how participants felt about the female gender role and the enforcement of said roles with 15 statements and a scale of A (*Strongly Agree*), B (*Agree Mildly*), C (*Disagree Mildly*), or D (*Strongly Disagree*). Examples are as follows: “Swearing and obscenity are more repulsive in the speech of a woman than a man,” and, “Women should be given equal opportunity with men for apprenticeship in the various trades.” Seven items were reverse scored, then each letter was assigned a numerical value (A = 1, B = 2, C = 3, and D = 4). The mean for the sample was 3.24 (*SD* = .39), indicating slightly traditional (higher scores on the scale indi-

cate more traditionalism), with a good internal consistency $\alpha = .79$.

Dependent Variable: Blood Pressure Levels

Blood pressure has been linked with stress and is a common measure for the amount of stress. Systolic blood pressure is most commonly used to measure short-term stress (Kannel, 2000). To eliminate outliers who already had pre-existing high or low levels, blood pressure was taken before and after the physical activity, the after measurement was immediately following the sparring conflict. Participants were seated for both blood pressure measurements and chose the arm they preferred, but the same arm was used each time. The sphygmomanometer serial number was 19030305. The final number used to identify stress experienced was post-test systolic blood pressure minus pre-test systolic blood pressure.

Procedure

College students were recruited in psychology courses and by campus-wide advertisements. Participants not in psychology courses were entered into a lottery for a \$50 prize. Participants in psychology courses were offered the choice between extra credit upon completion of the study or entry into the cash lottery. The participants signed up for a time slot that was offered by the researcher and was 30 minutes long on a weekday evening or on the weekend. Prior to signing up for the study, they were informed that the study would involve a physical activity and to dress appropriately. Participants were asked if they had any experience with martial arts; this variable had no significant effect on any of the results tested, and therefore is not mentioned further in the paper.

Participants were tested in an empty classroom cleared for space. They were instructed to complete a packet of surveys that included the attitudes toward women scale (Yoder et al., 2004) and the gender orientation inventory measuring masculinity and femininity (Bem, 1974); all surveys were publicly available without permission of the creators. Once the participants were done with the survey, the researcher measured their blood pressure with a standard blood pressure cuff. Afterwards, the designated opponent was called into the classroom. The opponent was either a man or a woman (by random assignment) and was either wearing a black or white (also by random assignment) martial arts uniform and blue dipped foam protective sparring gear. Participants were then given identical gear (except in red) and instructed on how to dress.

The researcher explained how the sparring match would go and demonstrated legal and non-legal targets, contact, and strikes per the North Central Karate Association (NCKA) rules. Participants were instructed sparring would last for a total of two min, with the researcher as time keeper and official. The trained opponent was instructed before the experiment to treat the participant as a beginner in martial arts. The opponent was told to engage the participant but not to intimidate. Opponents were also told to encourage the participant

to physically reciprocate the amount of movement and techniques.

Once the two min were over, the opponent politely bid farewell and left the room while the participants had their blood pressure taken and recorded a second time. After two minutes of rest, the researcher explained the study was about stress experienced with sex differences. The participants were then allowed to ask any follow-up questions, thanked for their involvement, and dismissed.

Results

Hypothesis 1

The first hypothesis stated men would experience more stress when physically conflicting with another man than with a woman. An independent *t*-test between the change in systolic blood pressure of participants in the same-sex condition (male participant vs. male confederate) and participants in the opposite-sex condition (male participant vs. female confederate) was conducted to test Hypothesis 1. The mean change in blood pressure for the same-sex condition was 40.43 ($SD = 28.42$) and for the opposite-sex condition, the mean was 28.54 ($SD = 17.29$). Although the means were in the predicted direction, no significant differences were found in stress levels, $t(25) = 1.30, p = .205$, and therefore Hypothesis 1 was not supported.

Hypothesis 2

The second hypothesis suggested women will experience more stress, measured by a higher blood pressure level, when put in a physical confrontation with a man, rather than with another woman. Again, a *t*-test between the same-sex condition (female participant vs. female confederate) and opposite-sex condition (female participant vs. male confederate) change in stress (measured by systolic blood pressure) was conducted to test the hypothesis. The same-sex condition had a mean change in blood pressure of 22.31 ($SD = 10.45$) and the opposite-sex condition mean was 23.5 ($SD = 18.80$). No significant differences were found, $t(24) = .039, p = .969$; thus, Hypothesis 2 was not supported.

Hypothesis 3

The third hypothesis stated, across all conditions, women's masculinity scores will be negatively correlated with stress. A Pearson correlation between all female participants' masculinity scores (as measured by the BSRI, Bem, 1974) and stress levels (as measured by changes in systolic blood pressure) was conducted to test Hypothesis 3. There was a weak negative relationship $r(27) = -.204, p = .307$, but it was not statistically significant, and therefore Hypothesis 3 was not supported.

Although there was not a specific hypothesis regarding men's masculinity scores and stress, this correlation was also calculated and was $r(26) = .194, p = .341$. Thus, the trend for men was in the opposite direction, but neither correlation was statistically significant.

Hypothesis 4

Hypothesis 4 predicted individuals who hold traditional values (specifically traditional sex-role values) will experience more stress when physically conflicting with a person

of the opposite sex compared to individuals who do not hold traditional values. Amount of traditionalism was measured by the previously mentioned Attitudes towards Women Scale (Yoder et al., 2004), which produced continuous data correlated with the level of stress changes (changes in the systolic blood pressure) in conditions that involved opposite sex opponents. A very weak non-significant negative correlation was found, $r(26) = -.080$, $p = .70$. Hypothesis 4 was therefore not supported.

Although there was no specific hypothesis, a correlation was also conducted to test the association between traditional sex-role values and stress for participants in the same-sex opponent condition. Here, the association was almost non-existent, $r(27) = -.05$, $p = .82$.

Hypothesis 5

Finally we hypothesized individuals engaging in conflict with opponents in black clothing will experience more stress (higher blood pressure levels) than individuals who conflict with opponents in white clothing. A t-test found that the change in systolic blood pressure between the different colored groups was not significant, $t(51) = -1.399$, $p = .168$. The participants who competed against someone in a white uniform had a mean change in systolic blood pressure of 24.36 ($SD = 14.89$). Participants who sparred against a black uniformed opponent had a mean of 32.32 ($SD = 24.72$) units of change in systolic blood pressure. Thus, although the means were in the predicted direction, Hypothesis 5 was not supported.

Discussion

The first hypothesis, which specifically examined the effect of sex of the opponent and stress levels in men, did not identify any statistically significant differences in same-sex versus opposite-sex pairings for men. Whereas the results were not significant, the pattern of means was in the predicted direction. Hypothesis 2 was similar, but focused on women. Here, there was essentially no difference between participants in the same-sex versus opposite-sex conditions (the average difference between the two groups was less than .25 units).

Although neither hypothesis was supported in a statistically significant manner, inferences can still be drawn from these findings. The first two hypotheses show that sex may not be the powerful predictor of intimidation that previous research has shown (Eisler et al., 2000, Holt-Lunstad et al., 2001). Although there was some support men would experience more stress when engaging in a physical conflict with another man, the lack of significance indicates this effect may not be particularly powerful. For women, there was practically no difference in stress scores between conditions, furthering this idea.

The simplest explanation for the similarities between conditions is body size and stature. Size of opponent is a definitive factor of intimidation. A larger opponent is more likely to inspire more fear, and thus more stress, than a smaller opponent. Because men are typically physically built larger than women, it is easy to see how the idea of men as intimidating opponents becomes a standard. Although an

individual's body build may be affected by his or her sex, the main stress factor in a physical conflict may be the former, rather than the latter. In addition, the lack of significant findings in the stress variable may be attributed to the controlled and safe setting of the research lab; participant stress could have been reduced due to their feelings of relative safety in this context.

The limited variance of participants as a population sample, and the small sample size, could also account for lack of statistical significance. The variation was not very great as participants were recruited from the same undergraduate Midwestern college environment. This homogeneity results in participants from the same generation, leading to participants having similar values, goals, and experiences with sex differences. We believe a greater age range would result in statistically significant differences as values and goals are likely to change between generations. For example, instead of gathering a sample of young adults in college, participants from several different environments are more likely to represent the population in general. Older participants may show more traditionalism or be more reticent to physically fight with someone of the opposite sex. Finally, a limitation of the methodology used in the current study was the lack of a control group. As exercise increases blood pressure regardless of stress, future research could use a control group that engages in a non-conflict activity of similar physical exertion to provide a comparison.

Our third hypothesis suggested masculinity in women would predict how much stress they experienced in a physical conflict. We believed the more masculine a woman was, the less stress she would experience. Results did not support this prediction. The lack of influence from masculinity to stress in women may be because in modern U.S. society, the emphasis on closing the gender gap is strong in many areas. Diekmann & Eagly (2000) suggested women in general are becoming more "masculine" over time, while men are remaining stable. If the difference between men and women in terms of traditional masculine traits is evaporating, masculinity in women might no longer be a particularly strong predictor of behavior.

Although Hypothesis 3 did not show that masculinity was a predictor variable for stress, the findings could have been incomplete. Only one gender role scoring device was used and the design of the inventory was to look at masculinity as its own construct, as opposed to being the opposite of femininity. Isolating the masculinity may not have been the most accurate way to identify a woman as masculine, as high masculinity and femininity scores on the BSRI may indicate an androgynous woman as opposed to a particularly masculine one (Bem, 1974).

Hypothesis 4 tested traditional sex-role values and stress by correlating the Attitudes towards Women Scale (AWS; Yoder et al., 2004) scores and blood pressure levels. We thought more traditional individuals would experience more stress when fighting someone of the opposite sex, because traditional sex roles forbid this type of cross-sex confrontation. Like the other hypotheses, results were not significant. The measure used here only assessed perceptions of female

roles. In future research, a more specific measure might be used that assesses individuals' perceptions of "acceptable" interactions between men and women; this more focused measure might be more relevant to the procedure used here.

The final hypothesis predicted opponents in black clothing would be more intimidating and cause more stress than opponents in white clothing. As reported in the results, means were in the expected direction, as participants who conflicted against someone in a black uniform experienced more units of stress than participants who sparred against someone in a white uniform; however, this difference was not statistically significant, which may reveal some flaws in society's acts of associating intangible emotions to colors. Because this coding begins from birth (e.g., pink for girls, blue for boys) and is used in everyday life (e.g., green for go, red for stop) the recognition of the colors should be automatic. However, because this is a system used for so long and is growing more and more complex, it is most likely the connection is no longer automatic, but now has a built-in skeptic step. Instead of "red means stop," we may be experiencing "red should mean stop to me depending on the situation." Because of this additional step, black and white may not inherently represent different levels of intimidation, but simply suggest intimidation.

The results of this study pertaining to sex and gender beg for further research. The most enlightening research would most likely come from altering the type of confederates. Instead of equal-sized male and female confederates, a woman of larger stature and a man of smaller stature should be used. Perhaps participants who conflict with larger opponents would experience more stress, regardless of sex. In addition, a limitation of the current study was that stress was measured exclusively via blood pressure. Additional methods could include chemical testing of cortisol levels in saliva (Loving, Gleason, & Pope, 2009), which may provide a more comprehensive test of stress reactivity.

The addition of victory or defeat in the activity could also be added to identify any gender differences. Masculine aggression has been tied to competition (Margolin, 1990); therefore, more masculine participants should show more stress when a win/lose situation is on the line, as opposed to a learning situation. The manipulation of assured victory, assured defeat, or uncertain of either would be an interesting additional variable.

In conclusion, there are an innumerable amount of variables in any conflict, physical or otherwise. Dissecting these variables and identifying what causes people to be stressed in these conflicts will allow researchers to predict and handle conflicts that arise in the future. This study suggests sex and gender may have surprisingly little to do with physical conflicts. Although there are many more variables to test, this study brought us one step closer to understanding stress reactions in physical conflicts.

References

- Aaronson, B. S. (1971). Color perception and affect. *The American Journal of Clinical Hypnosis, 14*, 38-43.
- Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology, 42*, 155-162. doi:10.1037/h0036215
- Barber, M. E., Foley, L. A., & Jones, R. (1999). Evaluations of aggressive women: The effects of gender, socioeconomic status, and level of aggression. *Violence and Victims, 14*, 353-366.
- Cannon, W. B. (1932). *The wisdom of the body*. New York: Norton.
- Carr, J. L. (2005). *American College Health Association campus violence white paper*. Baltimore, MD: American College Health Association.
- Davis, S. (1990). Men as success objects and women as sex objects: A study of personal advertisements. *Sex Roles, 23*, 43-51.
- Diekmann, A. B., & Eagly, A. H. (2000). Stereotypes as dynamic constructs: Women and men of the past, present, and future. *Personality and Social Psychology Bulletin, 26*, 1171-1188.
- Druyan, S. (2001). A comparison of four types of cognitive conflict and their effect on cognitive development. *International Journal of Behavioral Development, 25*, 226-236. doi:10.1080/01650250042000276
- Eisler, R. M., Franchina, J. J., Moore, T. M., Honeycutt, H. G., & Rhatigan, D. L. (2000). Masculine gender role stress and intimate abuse: Effects of gender relevance of conflict situation on attributions. *Journal of Men and Masculinity, 1*, 30-36.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson.
- Franchina, J. J., Eisler, R. M., & Moore, T. M. (2001). Masculine gender role stress and intimate abuse: Effects of masculine gender relevance of dating situations and female threat on men's attributions and affective responses. *Psychology of Men and Masculinity, 2*, 34-41. doi:10.1037//1524-9220.2.1.34
- Franchina, J. J., Eisler, R. M., & Moore, T. M. (2001). Masculine gender role stress and intimate abuse: Effects of masculine gender relevance of dating situations and female threat on men's attributions and affective responses. *Psychology of Men and Masculinity, 2*(1), 34-41.
- Holt-Lunstad, J., Clayton, C. J., & Uchino, B. N. (2001). Gender differences in cardiovascular reactivity to competitive stress: The impact of gender of competitor and competition outcome. *International Journal of Behavioral Medicine, 8*, 91-102. doi:10.1207/S15327558IJBMO802_01
- Horner, M. S. (1972). Toward an understanding of achievement-related conflicts in women. *Journal of Social Issues, 28*, 157-176.
- Kajantie, E. (2008). Physiological stress response, estrogen, and the male-female mortality gap. *Current Directions in Psychological Science, 17*, 348-353.
- Kannel, W. B. (2000). Elevated systolic blood pressure as a cardiovascular risk factor. *The American Journal of Cardiology, 85*, 251-255.

- Kimmel, M. (1994). Masculinity as homophobia: Fear, shame and silence in the construction of gender identity. In H. Brod & M. Kaufman (Eds.), *Theorizing masculinities* (pp. 119-141). Newbury Park, CA: Sage.
- Kolk, A. M., & van Well, S. (2007). Cardiovascular responses across stressor phases: The match of gender and gender-role identification with the gender relevance of the stressor. *Journal of Psychosomatic Research, 62*, 197-205. doi:10.1016/j.jpsychores.2006.09.004
- Kulikowski, J. J., McKeefry, D. J., & Robson, A. G. (1997). Selective stimulation of colour mechanisms: an empirical perspective. *Spatial Vision, 10*, 379-402.
- Lash, S. J., Gillespie, B. L., Eisler, R. M., & Southard, D. R. (1991). Sex differences in cardiovascular reactivity: Effects of the gender relevance of the stressor. *Health Psychology, 10*, 392-398.
- Levant, R. F., Hirsch, L., Celentano, E., Cozza, T., Hill, S., MacEachern, M., Marty, N., & Schnedeker, J. (1992). The male role: An investigation of norms and stereotypes. *Journal of Mental Health Counseling, 14*, 325-337.
- Levin, I., & Druyan, S. (1993). When sociocognitive transaction among peers fails: The case of misconceptions in science. *Child Development, 64*, 1571-1591. doi:10.1111/1467-8624.ep9402220362
- Lothaller, H., Mikula, G., & Schoebi, D. (2009). What contributes to the (im)balanced division of family work between the sexes? *Swiss Journal of Psychology, 68*, 143-152. doi:10.1024/1421-0185.68.3.143
- Loving, T. J., Gleason, M. E., & Pope, M. T. (2009). Transition novelty moderates daters' cortisol responses when talking about marriage. *Personal Relationships, 16*, 187-203. doi: 10.1111/j.1475-6811.2009.01218.x
- Margolin, L. (1990). Gender and the stolen kiss: The social support of male and female to violate a partner's sexual consent in a noncoercive situation. *Archives of Sexual Behavior, 19*, 281-291.
- Rustemeyer, R. (2001). Interrelations among gender-role conflict, typicality of occupations, and self-esteem. *Psychological Reports, 89*, 489-494.
- Sigel, I. E. (1979). On becoming a thinker: A psychoeducational model. *Educational Psychologist, 14*, 70-78.
- Suzuki, S., Kumano, H., Sakano, Y. (2003). Effects of effort and stress coping processes on psychophysiological and psychological stress responses. *International Journal of Psychophysiology, 47*, 117-128.
- Thompson, E. H. (1991). The maleness of violence in dating relationships: An appraisal of stereotypes. *Sex Roles, 24*, 261-278.
- Weinstein, N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional well-being. *Journal of Research in Personality, 43*, 374-385. doi:10.1016/j.jrp.2008.12.008
- Yoder, J. D., Rice, R. W., Adams, J., Priest, R. F., & Prince II, H. T. (2004). Reliability of the attitudes toward women scale (AWS) and the personal attributes questionnaire (PAQ). *Behavioral Science, 8*, 651-657. doi: 10.1007/BF00289898

How Psychological Reactance Modifies the Effects of Hypocrisy Induction

Benjamin S. Clancy and Hayley M. Milam

University of Nebraska at Kearney

Abstract

Psychological reactance is a response in contradiction to rules or regulations that threaten freedom. The purpose of this study was to see if individuals who experience psychological reactance are more or less influenced by hypocrisy induction. Hypocrisy induction occurs when a person is shown their actions do not reflect their beliefs with the intention of causing their actions to align with their beliefs. We hypothesized people with high psychological reactance would be less affected by hypocrisy induction and, therefore less likely to change their beliefs. Level of reactance was determined by using the Hong Psychological Reactance scale. Belief in subliminal messaging was used as the focus of the hypocrisy induction. Hypocrisy was induced by making salient the inconsistency between being a knowledgeable college student and belief in pseudoscience. We found people with high psychological reactance who received the hypocrisy induction were less likely to change their beliefs than those with low reactance.

Keywords: reactance, hypocrisy induction

A lack of consistency between actions and beliefs is a common occurrence among human beings (Pratkanis & Aronson, 2001). For example, people may believe that it is important to wear seatbelts, yet not always wear one themselves, unless made aware of the inconsistency. To help explain this, Leon Festinger (1957) proposed cognitive dissonance theory, which suggests people are motivated to maintain consistency between their beliefs and actions. When there are inconsistencies, a person may feel discomfort because of the contradiction. The feeling of discomfort is called dissonance, and most people are motivated to reduce dissonance by acting according to their beliefs or changing their beliefs to fit their actions. Several dissonance reducing techniques have been shown to be effective, including counter-attitudinal advocacy (Cohen, 1962; Miller, Wozniak, Rust, Miller, & Slezak, 1996), forced compliance (Festinger & Carlsmith, 1959), and trivialization (Simon, Greenberg, & Brehm, 1995).

To induce hypocrisy, one needs to make an individual mindful of his/her failure to act in accordance with a previously advocated position (Fointiat, 2004). Hypocrisy manipulations have been used successfully to encourage a variety of pro-social behaviors. For example, previous research examined the inconsistency between college students' belief in condom use and actually using condoms (Stone, Aronson, Crain, Winslow, & Fried, 1994). Because instilling the fear of acquiring sexually transmitted diseases in students has shown to cause denial rather than changes in behavior in past research (Fisher & Misovich, 1990), Stone et al. (1994) examined the effects of hypocrisy induction on condom use. In their experiment, Stone and colleagues had students advocate

for condom use. They then asked the students about their own condom use, thus making the students mindful of the inconsistency between their beliefs and actions. They hypothesized the participants in the hypocrisy induction condition would be most likely to buy condoms at the end of the experiment. The hypothesis was supported; participants in the hypocrisy induction condition were more likely to buy condoms and they bought more condoms than did those participants in the other conditions. Stone et al. believed this was due to cognitive dissonance. Thus, the participants believed in what they were publicly advocating, but were not practicing it themselves; therefore, the purchase of condoms was an immediate way to reduce the uncomfortable feelings of dissonance.

Stone, Weigand, Cooper and Aronson (1997) continued the study of hypocrisy induction by pointing out participants' inconsistencies with regards to their generosity toward the homeless. Again, those in the hypocrisy induction condition were more likely to give to the homeless and therefore match their actions to their beliefs. Dickerson, Thibodeau, Aronson and Miller (1992) also illustrated the effectiveness of hypocrisy induction. By showing female swimmers their belief in water conservation did not match their own water usage when showering, the experimenters were able to measure significantly shorter showers for those who received the hypocrisy induction. However, it would appear hypocrisy induction does not work on everyone. Research on using hypocrisy induction to overcome students' beliefs in extra sensory perception resulted in a bi-modal distribution with some participants responding positively to the hypocrisy induction and some participants responding negatively (Stickney, Dymak & Bechtol, 2005). One possible explanation for this result is 'some of the participants demonstrated psychological reactance.

Psychological reactance is defined as a motivational state aroused to restore loss of freedom when it is threatened or eliminated (Brehm, 1966). In Stickney et al.'s (2005) experiment, some participants demonstrated an increased belief in extra sensory perception when they felt pressured to change that belief, in order to maintain their freedom of choice. Because individuals may differ on how reactive they are, Hong and Faedda (1996) created the Hong Psychological Reactance Scale, which measures the degree to which a person tries to restore their freedom once it is reduced or threatened. We chose to use this scale because it has been used in previous research and because it provided a test-retest reliability of .73.

The aim of this study was to see if a person's reactivity would affect whether they are influenced by hypocrisy induction. We hypothesized people with high psychological reactance would be less affected by hypocrisy induction

Richard Miller served as Faculty Sponsor for this research.

and therefore less likely to change their beliefs and those with low psychological reactance would be more affected by the hypocrisy induction and more likely to change their beliefs.

Method

Participants

The participants in this study were 65 students from various Psychology classes at the University of Nebraska at Kearney. All students received extra credit for their participation. Of the 65 students involved, 21 were men and 44 were women. The age of the participants ranged from 18 to 32 years ($M = 19.7$).

Materials

The study took place in two Psychology Department lab rooms at the University of Nebraska at Kearney as well as through a mailed survey. A questionnaire, entitled "The Scale of Logic and Human Nature," was given in the lab, consisting of 25 questions. Thirteen of the questions were from Hong's Psychological Reactance Scale (Hong & Faedda, 1996) and 12 items were randomly selected from the Belief in Pseudoscience scale (Tobacyk & Milford, 1983). The scale for each question was a 5-point Likert scale ranging from 5 (*strongly agree*) to 1 (*strongly disagree*). A piece of paper was also given to the participant in the lab on which to write a short essay. The prompt at the top of the page read, "Why is it important to use logic and the scientific method in everyday life? Be sure to include examples of how scientific evidence is a necessity in becoming an intelligent, college-educated citizen."

To measure the effects of psychological reactance and hypocrisy induction on students' belief in pseudoscience and to minimize experimenter effects, we used a mail survey. The mail survey appeared to be a marketing survey from the campus bookstore. The survey and cover letter were typed on bookstore letterhead and the return envelope was stamped with the bookstore address. Recipients were informed that the bookstore was interested in expanding the range of products available to students. The survey instructions asked students to indicate the extent to which they would agree or disagree with stocking a variety of products. The types of products included in the survey were snack items, computer supplies, newspapers, magazines, audio items, and convenience products. For each of the 16 products, participants were asked to indicate their own interest in having such products available (Would Personally Buy) as well as their opinion about the interest of other students (Carry in the Bookstore). Each of these were accompanied by a five-point Likert-type scale, ranging from 5 (*strongly agree*) to 1 (*strongly disagree*). The item used to measure the effectiveness of the hypocrisy induction was "subliminal self-help tapes" imbedded within the audio items listed on the survey. We chose to use belief in subliminal self-help tapes through a pre-experiment examination and because of the prevalence of the pseudoscience in popular culture.

Design and Procedure

The design was a 2 x 2 between-subjects design. One independent variable was the extent to which participants

scored high or low on the psychological reactance scale. We separated the participants into one of these two groups using a median split of the scores on the Hong scale. The other independent variable was whether the participant received the hypocrisy induction or not. The participants were divided into an experimental group (hypocrisy induction) and a control group (no hypocrisy induction), using random assignment. The dependent variable was how likely the participant was to buy the subliminal self-help CD's and the degree to which they would want such CD's stocked in the Antelope Bookstore.

The experiment began with the participant filling out a form to receive extra credit and an informed consent form. They were then given the "Scale of Logic and Human Nature" questionnaire, which took approximately 3 min to complete. Next, the participant was asked to write a short essay to the prompt about logic and the scientific method. They were allowed 7 min to write the essay. Those in the control group were thanked for their participation and were finished with the experiment. With the experimental group, we looked at their questionnaire to see how they ranked their belief in subliminal messaging. If the belief was ranked higher than a 1 (all of them were), we entered the room and read over the essay in front of them and induced the hypocrisy. We said, "This is a great essay, but I was just looking over your questionnaire and noticed you rated your belief in subliminal messaging quite high. Isn't that inconsistent with this essay you just wrote?" The participant was then allowed to respond and they were thanked for their participation.

Results

We conducted a 2 x 2 between-subjects analysis of variance on the questions of stocking a self-help tape and buying a self-help tape. With regards to whether participants would want subliminal self-help CD's stocked, there was no main effect for hypocrisy induction $F(1,56) = .65, p = ns$, nor was there a main effect for psychological reactance $F(1,56) = .70, p = ns$. There was not significant interaction $F(1,56) = 1.69, p = ns$.

With regards to whether participants would personally buy subliminal self-help CD's, there was no main effect for hypocrisy induction $F(1,58) = 1.10, p = ns$, nor was there a main effect for psychological reactance $F(1,58) = 2.60, p > .05$. However, we did find an interaction between hypocrisy induction and reactance when the participants were asked if they would buy a subliminal self-help CD. People in the experimental group with high reactance ($M = 2.86$) were significantly more likely to want to buy subliminal self-help CD's than those in the experimental group with low psychological reactance ($M = 1.77$; see Figure on next page).

Discussion

This experiment was conducted to see if a person's reactivity would affect whether they are influenced by hypocrisy induction. We hypothesized people with high psychological reactance would be less affected by the hypocrisy induction and, therefore, less likely to change their beliefs. Likewise, people with low psychological reactance would be more affected by the hypocrisy induction and more likely to change

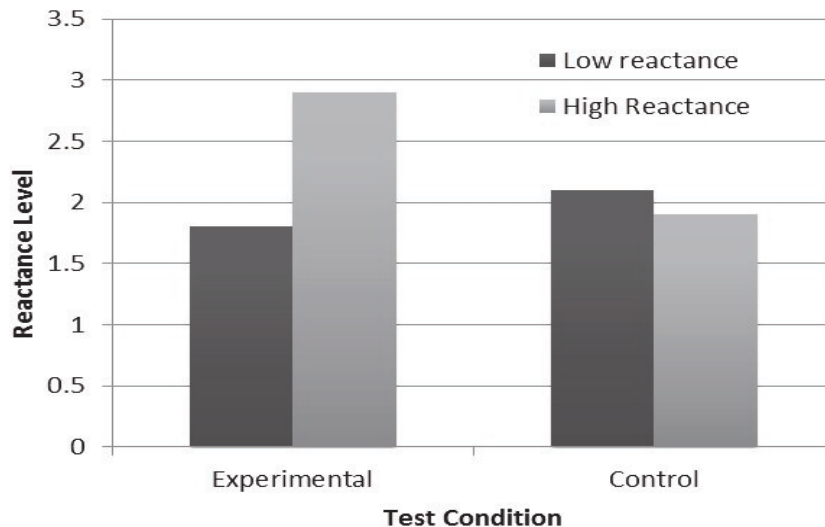


Figure. Interaction between hypocrisy induction and psychological reactance for buying self-help CD's.

their beliefs.

The results supported our hypothesis. We found people with high psychological reactance in the experimental group were more likely to want to buy subliminal self-help CD's than those in the experimental group with low reactance. When people with a strong desire for freedom of choice (those with high psychological reactance) are made aware of the inconsistencies between their actions and beliefs, they are more likely to rebel and strengthen their beliefs than to submit to outside influence. On the other hand, when people have a low need for freedom of choice (those with low psychological reactance) and the inconsistency is pointed out, they are likely to be persuaded and change their beliefs. This study allowed us to come to the conclusion that although hypocrisy induction is one way to exert social influence, it does not work on everyone. In fact, when used on someone with high psychological reactance, it backfires and causes people's previous beliefs to become stronger.

However, just as important as our significant findings was our lack of significant main effects for the "would stock" question. Because an item being stocked does not affect the individual, or reduce their freedom in any way, we would not expect an individual's level of reactance to influence their level of response to that question. This finding supports our conclusion that psychological reactance played a role in this study in that the restricted freedom of choice caused reactance.

These findings have implications for a variety of influence situations. For example, knowing how people react to challenged beliefs could be helpful in a learning setting. Students enter college with their own set of beliefs so being able to get the students to reevaluate their own beliefs and consider new ones would be very beneficial. Critical thinking is an important aspect of academia and hypocrisy induction could be a way to introduce that way of thinking. However, if we

could train teaching professionals to identify how reactive a person is and to adjust their teaching style to match, we could greatly increase our teachers' success. Another sector that could benefit from this research would be creators of public service announcements (PSA's). Many PSA's are preachy and try to induce hypocrisy, such as Sara McLaughlin trying to get people to help abused animals. The creators assume the viewers want to help animals, and in order to get them to actually help, they show images of animals that have not been helped. Nevertheless, we would suspect that in doing so, they are turning off many people with high reactance. To target people with high reactance, a PSA should give the audience choice that says, if this issue is important to you then here is how to get involved would go over better then tactics that play on emotions.

In conclusion, our results demonstrated when people with high psychological reactance are given the hypocrisy induction, it can backfire and strengthen their beliefs, whereas hypocrisy induction generally works for people with low psychological reactance. Thus, our findings support the hypothesis that people with high psychological reactance would be less affected by the hypocrisy induction and people with low psychological reactance would be more affected and more likely to change their beliefs. Future research should examine techniques to reduce defensiveness in people with high psychological reactance.

References

- Brehm, J. W. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Cohen, A. R. (1962). "An experiment on small rewards for discrepant compliance and attitude change." In J. W. Brehm & A. R. Cohen (Eds.) *Explorations in cognitive dissonance* (pp. 73-78). New York: Wiley.

- Dickerson, C., Thibodeau, R., Aronson, E., & Miller, D. (1992). Using cognitive dissonance to encourage water conservation. *Journal of Applied Social Psychology, 22* (11), 841-854.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Festinger, L. A., & Carlsmith, J. M. (1959). Cognitive consequences of forced compliance. *Journal of Abnormal and Social Psychology, 58*, 203-210.
- Fisher, J. D., & Misovich, S. J. (1990). Social influence and AIDS-preventive behavior. In J. Edwards, R.S. Tinsdale, L. Heath, & E. J. Posavac (Eds.), *Applying social influence processes in preventing social problems*. (pp. 39-70). New York: Plenum.
- Fointiat, V. (2004). "I know what I have to do, but...": When hypocrisy leads to behavioral change. *Social Behavior and Personality, 32*, 741-746.
- Fried, C. B., & Aronson, E. (1995). Hypocrisy, misattribution, and dissonance reduction. *Personality and Social Psychology Bulletin, 21*, 925-933.
- Hong, S. M., & Faedda, S. (1996). Refinement of the Hong Psychological Reactance Scale. *Educational and Psychological Measurement, 56*, 173-182.
- Miller, R. L., Wozniak, W., Rust, M., Miller, B., and Slezak, J. (1996). Counterattitudinal advocacy as a means of enhancing instructional effectiveness: How to teach them what they don't want to know. *Teaching of Psychology, 23*, 215-219.
- Pratkanis, A., & Aronson, E. (2001). *Age of propaganda. 1*, 241-244. New York: W.H. Freeman and Company.
- Simon, L., Greenberg, J., & Brehm, J. (1995). Trivialization: The forgotten mode of dissonance reduction. *Journal of Personality and Social Psychology, 68*, 247-260.
- Stickney, L., Dymak, D., & Bechtol, R. (2005, March). *Hypocrisy induction*. Paper presented at the Great Plains Psychology Students' Conference, Omaha, NE.
- Stone, J., Aronson, E., Crain, A. L., Winslow, M. P., & Fried, C. (1994). Inducing hypocrisy as a means of encouraging young adults to use condoms. *Personality and Social Psychology Bulletin, 20*, 116-128.
- Stone, J., Weigand, A. W., Cooper, J., & Aronson, E. (1997). When exemplification fails: Hypocrisy and the motive for self-integrity. *Journal of Personality and Social Psychology, 72*, 54-65.
- Tobacyk, J., & Milford, G. (1983). Belief in paranormal phenomena: Assessment instrument development and implications for personality functioning. *Journal of Personality and Social Psychology, 44*, 1029-1037.

Health Locus of Control and Quality of Life in Mexican Children

Melinda Ehren

University of San Diego

Abstract

The study was designed to analyze the relationship between self-reported health locus of control and quality of life in a sample of children from a private Mexican orphanage. I tested the hypotheses: (a) those with a greater reported internal locus of control would report a higher quality of life; and (b) those with a greater reported external locus of control would report a lower quality of life. Scores on two valid, reliable questionnaires did not yield a significant association between either an internal or external locus of control and quality of life. The results suggested the group endorsed a significantly greater internal locus of control, thus supporting the efforts of volunteers and health care professionals in their promotion of personal health care behaviors with this population.

Keywords: health locus of control, quality of life

Health disparities within and across cultures are well documented, and the beliefs and behaviors influencing them continue to be explored. Locus of control and quality of life are, among others, two psychological constructs that reflect individual differences in health care beliefs and subsequent health outcomes. Both constructs can be reliably measured in children and adults with self-report measures and, therefore, provide researchers with data that indicate how people interpret and practice health care throughout the lifespan.

Health Locus of Control

During the course of development, acquiring health-promoting behaviors (e.g., washing hands and brushing teeth) is an important developmental process. Understanding how these health-related behaviors affect health outcomes varies across populations. Locus of control, defined as an individual's beliefs regarding the source of control over his or her own health, is generally considered an important construct in understanding and predicting health behaviors (Malcarne, Drahota, & Hamilton, 2005). However, locus of control also varies with age, gender, and culture (Parcel & Meyer, 1978). Specifically, Olvera et al. (2001) found age to be negatively correlated with external loci of control. Literature describing locus of control divides the construct into three domains to account for differences in beliefs: internal beliefs, powerful others beliefs, and chance beliefs, with the latter two collectively composing external beliefs (Parcel & Meyer, 1978). An individual who endorses an internal locus of control believes he or she can do things that impact his or her own health. An individual who endorses a powerful others (external) locus of control assumes health is controlled by those who are more knowledgeable (e.g., doctors or nurses). And finally, an individual who endorses a chance (external) locus of control assumes good or bad health is a result of luck or otherwise uncontrollable circumstances (Malcarne et

al., 2005; Olvera, Remy, Power, Bellamy, & Hays, 2001; Parcel & Meyer, 1978).

Research cited by Malcarne et al. (2005) indicated that health-related locus of control beliefs affect health outcomes, including the development of health behaviors, treatment compliance, and adjustment to health problems. Specifically, an internal locus of control is positively associated with health knowledge and attitudes, psychological adjustment, and health behaviors. On the other hand, an external locus of control is associated with negative health behaviors and poor psychological adjustment. Health-related locus of control, however, can be influenced by several demographic variables.

Malcarne et al. (2005) found that socioeconomic status and ethnicity impacted health locus of control beliefs, such that at low-income levels, socioeconomic status exerts a greater effect on locus of control than when family income is adequate. When family income is adequate, they found that cultural considerations play a greater role in locus of control beliefs. Specifically, Malcarne and colleagues found Latino and African American children endorsed more chance (external) beliefs than Caucasian American children. Similarly, Parcel and Meyer (1978) found Caucasian American children endorsed more internal locus of control beliefs than Latino or African American children, supporting the role of culture in the acquisition of these beliefs.

Studies examining the role of families, especially in the Mexican American culture, have also shed light on factors contributing to locus of control beliefs. Olvera et al. (2001) found that in low-income Mexican American families, mothers' health-related locus of control beliefs contributed to their parenting and socialization strategies, which in turn influenced children's health-related locus of control beliefs. These findings account not only for the impact of families on the development of locus of control beliefs, but also for the fact children are still exposed to experiences with illness and treatment strategies that can contribute to their individual beliefs as they mature. In a study of Mexican American adolescents, Guinn (1998) found Mexican American immigrants who identified most with Mexican culture, as opposed to those who had acculturated to American culture, endorsed more powerful others beliefs. Research cited by Guinn suggested this finding is consistent with the Mexican culture, which emphasizes family structure and reliance on community in matters of healthcare. Because health-related locus of control beliefs impact resulting health care behaviors, there may be a connection between locus of control beliefs and an individual's overall quality of life.

Quality of Life

Quality of life is defined as the extent to which individu-

Kenneth Keith served as Faculty Sponsor for this research.

als' needs and desires are met and they claim to be happy. Although quality of life is a construct often measured in education and social services, a great deal of research has focused on its application to individuals' health. Keith and Schalock (2000) defined health-related quality of life as "how well individuals function in daily life, and their perceived well-being" (p. 365). The many techniques and instruments used to assess health-related quality of life can be used in both healthy and ill populations.

In a study examining the potential contributors to health-related quality of life in a school-based population of urban minority children, Mansour et al. (2003) found the child's grade in school, relationship with parents, perception of school connectedness, and the family's income level were all positively correlated with health-related quality of life. Through an examination of demographic, environmental, and personality correlates of adolescents' positive life satisfaction reports (synonymous with quality of life reports), Ash and Huebner (2001) found although demographics were not related to life satisfaction, positive and negative life experiences were in fact related to life satisfaction. They suggested an internal locus of control as the cognitive process that mediates the relationship between life experiences and life satisfaction. Dew and Huebner (1994) also reported a strong positive correlation between internal locus of control and greater life satisfaction.

In addition, prior cross-cultural research has suggested a significant positive correlation between self-determination and quality of life (Lachapelle et al., 2005; Wehmeyer & Schalock, 2001; Wehmeyer & Schwartz, 1998). Wehmeyer (1996) characterized self-determination as "acting as the primary causal agent in one's life and making choices and decisions regarding one's life free from undue external influence or interference" (p. 18). The construct of internal locus of control may be related to self-determination. If so, Wehmeyer's conclusions may further support a relationship between an internal locus of control and quality of life.

Given the reported positive correlations between personal characteristics (e.g., self-determination and self-esteem) and quality of life (Gilman & Huebner, 2003; Wehmeyer & Schalock, 2001), the present study was designed to test the relationship between locus of control and quality of life in a sample of Mexican children. The study aimed to test the following hypotheses:

H₁: Participants who endorse a greater internal locus of control, as defined by self-reported locus of control scores, will report a higher quality of life, as defined by self-reported quality of life scores;

H₂: Participants who endorse a greater external locus of control, as defined by self-reported locus of control scores, will report a lower quality of life, as defined by self-reported quality of life scores.

I also examined the relationship between age and locus of control and compared the locus of control scores of male and female participants.

Method

Participants

I conducted this study in conjunction with a university sponsored health-screening program at a private Mexican orphanage. A convenience sample of 137 children, ages 6-16 years participated in the study. Of the 137 participants, 79 boys and 58 girls represented roughly 31% of the total population of children living at the orphanage, who live together as brothers and sisters of a family and will not be adopted out of the orphanage, their permanent home. Children participated in the study in age-specific cohorts such that all the children in each cohort were invited to participate.

Materials

I administered self-report questionnaires, including a health locus of control scale and a quality of life scale. In addition, participants reported their age and sex.

Health Locus of Control. The Children's Health Locus of Control Scale (CHLC; Parcel & Meyer, 1978), designed for use with elementary school-aged children, measured self-reported locus of control. The authors reported good internal consistency (.75) and test-retest reliability (.62). Furthermore, Guinn (1998) used the scale in a study of Mexican American youth and reported reliabilities that justify its use cross-culturally: "internal control" (.76), "powerful others control" (.72), and "chance control" (.80). A native Spanish speaker, who is fluent in both Spanish and English created the translation for purposes of the study, and the translation was further reviewed and approved by the Spanish-speaking medical director of the orphanage prior to its distribution. The 20 items of the scale aim to determine to what degree the participant believes he or she has control over his or her own health. The three subscales include six items pertaining to internal control (one can do things that impact his or her health), nine items pertaining to powerful others control (health is controlled by those who are more knowledgeable), and five items pertaining to chance control (good or bad health is a result of luck or otherwise uncontrollable circumstances). The items prompt "yes" or "no" responses and the score is derived from the number of "yes" responses to the items of each subscale. Higher subscale scores indicate greater agreement with the perspective defined by each subscale. Sample items include: "I can do things to keep from getting sick" (internal control); "I can only do what the doctor tells me to do" (powerful others control); and "Good health comes from being lucky" (chance control).

Quality of Life. The Pediatric Quality of Life Inventory (PedsQL; Varni, Seid, & Kurtin, 2001) measured self-reported quality of life. The authors reported internal consistency reliabilities greater than .70, and provided a Spanish translation of the PedsQL, which has been deemed reliable in all published languages (Varni et al., 2001). The instrument contains 23 items that assess quality of life based on four subscales: eight items pertaining to "physical functioning," five items pertaining to "emotional functioning," five items pertaining to "social functioning," and five pertaining to "school functioning." Responses to each item are based on a 5-point scale, and scores are calculated for each subscale.

Subscale scores contribute to a physical functioning score, a psychosocial health summary (sum of the emotional functioning, social functioning, and school functioning subscale scores), and a total quality of life score (sum of all four subscale scores). Lower scores indicate a higher perceived quality of life. Sample items include: "It is hard for me to walk more than one block" (physical functioning); "I feel afraid or scared" (emotional functioning); "I have trouble getting along with other kids" (social functioning); and "It is hard to pay attention in class" (school functioning).

Procedure

Participation in the study occurred during prearranged visits to the living quarters of each cohort. Staff at the orphanage translated the explanation of the study and terms of participation. After a period for children's questions, those who chose to participate received study materials, and those who chose not to participate completed an alternate activity. The materials were organized such that four of the cohorts completed the CHLC first and the other three cohorts completed the PedsQL first to account for any potential effects from the order in which the questionnaires were completed. The children sat quietly and completed all study materials individually. The staff and I helped children who required assistance reading, with approximately 30% of the participants requiring such assistance. The study required a mean time of 39 min for each of the seven cohorts to complete both questionnaires. Upon completion of the questionnaires or alternate activity, I presented the participants with an assortment of small prizes.

Results

Means and standard deviations for boys and girls for both CHLC and PedsQL scores appear in Table 1. The relationship between reported health locus of control and quality of life was examined using the Pearson product-moment correlation coefficient (see Table 2 on the next page). In reference to the first hypothesis, greater internal locus of control did not correlate with higher quality of life scores. However, regarding the second hypothesis, results indicated

a weak, negative correlation between external locus of control and reported quality of life, $r = -.17, p = .09$. Further examination of the relationship between external locus of control and quality of life indicated a weak negative correlation between external locus of control and physical quality of life, $r = -.19, p = .05$, and a weak negative correlation between external locus of control and psychosocial quality of life, $r = -.17, p = .09$.

Pearson correlations indicated a weak relationship between age and internal locus of control, $r = .17, p = .06$, and a weak negative relationship between age and external locus of control, $r = -.16, p = .09$. The latter correlation suggests younger participants may have a slight tendency to report a greater external locus of control. Additional Pearson correlations, dividing the external locus of control items into powerful others and chance beliefs, indicated a significant negative relationship between age and chance beliefs, $r = -.21, p < .05$. This division more clearly explains the correlation between age and external locus of control and the tendency for younger participants to endorse a greater external locus of control.

An independent samples *t*-test compared the mean values of the CHLC subscales (internal, powerful others, and chance control) between the sexes. Results indicated that, overall, males ($M = 8.65$) endorsed more external locus of control beliefs than females ($M = 7.44$), $t(115) = 3.00, p < .01$, Cohen's $d = .56$. Specifically, males ($M = 6.49$) had significantly greater powerful others locus of control beliefs than females ($M = 5.51$), $t(124) = 3.18, p < .01$, Cohen's $d = .57$. Furthermore, males ($M = 2.29$) also had significantly greater chance locus of control beliefs than females ($M = 1.88$), $t(123) = 2.12, p < .05$, Cohen's $d = .38$. An independent samples *t*-test comparing mean values of boys and girls reported PedsQL scores revealed no significant difference in quality of life scores between the sexes.

Finally, an internal locus of control index and external locus of control index were calculated by averaging scores of internal and external items for each participant to account for

Table 1
CHLC and PedsQL Mean Scores and Standard Deviations for Male and Female Participants

Measures	Males		Females		Overall	
	M	SD	M	SD	M	SD
CHLC						
Internal control	4.63	1.40	4.61	1.06	4.62	1.26
External control	8.65**	2.25	7.44	2.03	8.11	2.23
Powerful Others	6.49**	1.73	5.51	1.71	6.08	1.78
Chance	2.29*	1.25	1.88	0.85	2.10	1.11
PedsQL						
Physical QOL	70.40	17.25	68.06	16.09	69.36	16.72
Psychosocial QOL	64.00	15.36	64.70	14.71	64.29	15.03
Total QOL	66.56	14.30	65.77	13.95	66.22	14.09

Note. QOL = quality of life.

* $p < .05$, ** $p < .01$.

Table 2

Pearson Correlation among CHLC, PedsQL, and Age

Variable	Int. Locus	Ext. Locus	Pwr Others	Chance	Phys QOL	Psysoc QOL	Total QOL
External Locus	.009						
Powerful Others	.10	.88***					
Chance	-.17	.65***	.21**				
Physical QOL	.02	-.19*	-.09	-.06			
Psychosocial QOL		.004	-.17*	-.10	-.09	.59***	
Total QOL		-.04	-.17*	-.10	-.08	.83***	.95***
Age	.17*	-.16*	-.12	-.21**	-.06	.02	.00

Note. QOL = quality of life.

* $p < .10$ (approaching significance), ** $p < .05$, *** $p < .01$

the unequal number of items corresponding to each subscale. This combination allowed for analysis of the differences within the sample between internal and external locus of control indices. Results of a paired samples t -test indicated a significant difference with a large effect size between the internal ($M = .77$) and external ($M = .58$) locus of control beliefs. Overall, the group reported a significantly greater internal locus of control, $t(111) = 7.61$, $p < .001$, Cohen's $d = 1.00$.

Discussion

Although the data did not strongly support either hypothesis regarding the correlation between locus of control and quality of life, a marginal negative correlation between external locus of control and quality of life was evident. This finding may suggest the possibility that those with a greater external locus of control may report a lower quality of life, but the correlation was not significant in this sample. Furthermore, it is important to consider that locus of control is not measured dichotomously; persons may possess both internal and external beliefs in different situations and at different points in their lives.

The data indicated a significant relationship between age and chance beliefs, suggesting younger participants may possess more external locus of control beliefs than internal locus of control beliefs at their given age. This result is consistent with prior research that found age significantly negatively correlated with chance and powerful others beliefs (Malcarne et al., 2005; Olvera et al., 2001).

The finding whereby the group of Mexican children overall reported an internal locus of control contradicts the findings of Malcarne et al. (2005) who found Latino children to endorse greater chance (external) beliefs. The finding further contradicts the belief Mexico is a collectivist culture (Hofstede, 2001), which emphasizes family and community structure. However, because the children participating in this research did not live in traditional family settings, the effects of living in the orphanage may have influenced their sense of collectivism. The study therefore supports the current view that research should assess people within and across cultures individually rather than as a homogenous group based on their culture.

There were no significant differences between the sexes in quality of life. However, contradictory to the findings of Malcarne et al. (2005), there were significant differences in locus of control beliefs. Results indicated boys endorsed significantly greater external locus of control beliefs than girls. Specifically, boys endorsed more powerful others and chance beliefs than girls, which is consistent with other research cited by Malcarne et al. who found male participants support more powerful others beliefs than females. The finding boys were more external in their locus of control beliefs may be reflective of developmental differences between the sexes. Perhaps, as both boys and girls age they tend to endorse more internal beliefs, but boys do so at an older age when compared to girls.

When considering the findings of the study, the limitations should also be noted. This study is limited by its sample size and the fact that the sample was from a single, private Mexican orphanage. Although the sample included 137 participants, both male and female, across a 10-year age range, the generalizability of the findings remains limited. The study was also cross-sectional and correlational in nature. Longitudinal and experimental investigations are needed to further explain the relationship between locus of control and quality of life in children. Furthermore, collecting data from multiple sources (e.g., caretaker and teacher ratings) would enhance the data.

Although the instruments were carefully selected, translations cannot exactly preserve the original meaning of each of the items. The CHLC proved to be a challenging instrument to use with a sample of Mexican children, as it was developed for American, English-speaking children. This challenge could be evaluated in future research through use of a back translation procedure (Brislin, 1993). The PedsQL was also limiting to the extent that it provided five response choices, thus increasing the complexity of, and the time needed to respond to, each item. This process proved especially challenging for the younger participants.

Nevertheless, the findings from this study have implications for future research that continues to explore the relationship between locus of control and quality of life cross-culturally. Because an individual's environment helps shape these constructs, future research should continue to explore

contributing factors to both self-reported locus of control and quality of life, in children and adults alike. Furthermore, the finding whereby age negatively correlated with chance beliefs may suggest that children are more likely to use an educational message about health-related behaviors as they get older, indicating a potentially important role for schools in teaching health-promoting behaviors.

Children within and across cultures vary in their health-related cognitions and the degree to which they believe variations in their health are due to their own behaviors. Furthermore, every culture measures quality of life differently and fosters different health-promoting behaviors. Health care professionals and educators should acknowledge these differences and tailor health education messages accordingly to account for differences in locus of control beliefs and expected outcomes. The results suggest health locus of control beliefs can be the targets of preventive or interventional programs designed to improve not only children's health-promoting behaviors, by Mexican and American standards in this case, but also their overall quality of life.

References

- Ash, C., & Huebner, E. S. (2001). Environmental events and life satisfaction reports of adolescents: A test of cognitive mediation. *School Psychology International, 22*, 320-336.
- Brislin, R. (1993). *Understanding culture's influence on behavior*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Dew, T., & Huebner, E. S. (1994). Adolescents' perceived quality of life: An exploratory investigation. *Journal of School Psychology, 32*, 185-199.
- Gilman, R., & Huebner, S. (2003). A review of life satisfaction research with children and adolescents. *School Psychology Quarterly, 18*, 192-205.
- Guinn, B. (1998). Acculturation and health locus of control among Mexican American adolescents. *Hispanic Journal of Behavioral Sciences, 20*, 492-499.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Keith, K. D., & Schalock, R. L. (Eds.). (2000). *Cross-cultural perspectives on quality of life*. Washington, DC: American Association on Mental Retardation.
- Lachapelle, Y., Wehmeyer, M. L., Haelewyck, M. C., Courbois, Y., Keith, K. D., Schalock, R., Walsh, P. N. (2005). The relationship between quality of life and self-determination: An international study. *Journal of Intellectual Disability Research, 49*, 740-744.
- Malcarne, V. L., Drahota, A., & Hamilton, N. A. (2005). Children's health-related locus of control beliefs: Ethnicity, gender, and family income. *Children's Health Care, 34*, 47-59.
- Mansour, M. E., Kotagal, U., Rose, B., Ho, M., Brewer, D., Roy-Chaudhury, A.,... DeWitt, T. G. (2003). Health-related quality of life in urban elementary schoolchildren. *Pediatrics, 111*, 1372-1381.
- Olvera, N., Remy, R., Power, T. G., Bellamy, C., & Hays, J. (2001). Observed maternal strategies and children's health locus of control in low-income Mexican-American families. *Journal of Family Psychology, 15*, 451-463.
- Parcel, G. S., & Meyer, M. P. (1978). Development of an instrument to measure children's health locus of control. *Health Education Monographs, 6*, 149-158.
- Varni, J. W., Seid, M., & Kurtin, P. S. (2001). PedsQL 4.0: Reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. *Medical Care, 39*, 800-812.
- Wehmeyer, M. L. (1996). Self-determination as an educational outcome: Why is it important to children, youth and adults with disabilities? In D. J. Sands & M. L. Wehmeyer (Eds.), *Self-determination Across the Life Span: Independence and Choice for People with Disabilities* (pp. 15-34). Baltimore: Paul H. Brookes.
- Wehmeyer, M. L., & Schalock, R. (2001). Self-determination and quality of life: Implications for special education services and supports. *Focus on Exceptional Children, 33*, 1-16.
- Wehmeyer, M. L., & Schwartz, M. (1998). The relationship between self-determination, quality of life, and life satisfaction for adults with mental retardation. *Education and Training in Mental Retardation and Developmental Disabilities, 33*, 3-12.

Developing a New Device for Measuring Preferred Body Shapes: A Short Report

Ian J. LaForge and Wind Goodfriend*

Buena Vista University

Abstract

The present research sought to create a new device to measure body shape preferences. Several past studies have focused on measuring body shape preferences using hip-to-waist ratios (e.g., Maisey, Vale, Cornelissen, & Tovée, 1999) and/or waist-to-shoulder ratios (e.g., Braun & Bryan, 2006). However, measurement of these ratios has been limited to Likert-type scaling based on rough drawings of human bodies. The device offered here measures preferred body shapes by allowing participants to directly manipulate the “waist,” “hips,” and “shoulders” of a computer-generated image representing a human torso. This new, innovative device allows for continuous measures of several ratios simultaneously, and provides more accurate and detailed information for future studies on body shape preference.

Keywords: body shape, hip-to-waist ratio

Images of attractive people parade daily across the media in a never-ending show of sexualized glamour. Escaping these images of attractive ideals is nearly impossible, whether they are famous athletes posing on a billboard or starlets walking down a red carpet on the television. Over the past few decades, research shows the kinds of messages are being proliferated. The trend of physical attractiveness established for women, identified by looking at *Playboy* centerfolds, Miss America pageant contestants, and the content of women’s magazines from the 1970s forward, is one of thinness and fitness (Guillen & Barr, 1994; Singh, 1993b; Wiseman, Gray, Mosimann, & Ahrens, 1992). With regard to men, examination of action figures and *Playgirl* centerfolds, Western culture has been imposing a more muscular and “denser” build as the physically attractive ideal (Leit, Pope, & Gray, 2001; Pope, Olivardia, Gruber, & Borowiecki, 1999).

But what does the average person actually find attractive? In addition to various methods using archival data, the most popular methodology has been to use prepared line drawings, painstakingly edited to manipulate figures’ body ratios and overall body mass index (BMI; Singh, 1993b). However, this method is clumsy, labor-intensive, and limited in the amount and types of data that can be collected. For example, previous methods rely primarily on hand-drawn or non-realistic images; thus, this form of measurement requires new and multiple iterations and drawings for each additional variable of interest. The purpose of the current project was to create a new device that would tackle these obstacles and help improve the ease of future attraction research.

Body Shape Attractiveness

Before discussing the device itself, it is important to examine previous research that has investigated body shape attractiveness. Singh has demonstrated, through several studies, one of the most important factors influencing a woman’s physical attractiveness is the measurement of her waist as a

ratio to her hips: her waist-to-hip ratio (WHR; Singh, 1993a, 1993b; Singh & Randall, 2007). When men were asked to judge the attractiveness of multiple line drawings depicting different WHRs, drawings of women with a narrower waist than hips (i.e., those with low WHRs) were consistently perceived by men as healthier, appearing more youthful, as having a higher reproductive capacity, and as being more desirable overall than women with larger WHRs. This finding is a trend that remained true across varying levels of overall weight (Singh, 1993a, 1993b; Singh & Randall, 2007; Singh & Young, 1995). These perceptions of health and fitness are justified by research suggesting women with a lower WHR are found to have better general health, lower risk of cardiovascular disease, and better reproductive ability (Singh, 1993a).

More recently, researchers are examining what traits are most important in determining the physical attractiveness of men. Maisey et al. (1999) examined three factors of the physical attraction of men: body mass index (BMI), waist-to-chest ratio (WCR), and WHR. They found men’s WCRs were most important in determining their physical attractiveness to women, with a narrower waist than chest being most attractive. Other researchers found an analogous trend with men’s waist-to-shoulder ratios (WSR), wherein a waist narrower than the shoulders was much preferred by women (Braun & Bryan, 2006; Dixon, Halliwell, East, Wignarajah, & Anderson, 2003).

A limitation of most past approaches is the exclusive focus on heterosexual individuals. One major advantage of the new device is it can be used for either sex, and for any sexual orientation, as it does not present a gendered image. Finally, the new device is more versatile in its ability to calculate additional ratios previously ignored, such as hip-to-shoulder ratios, which may provide further, more detailed insight into body shape preferences.

The Device

To align with the considerable body of research already assembled on attraction, it was decided that the new device should measure participant-preferred WHRs and WSRs. To accomplish this outcome in a way easy for participants and future researchers to use, the device was built as an interactive internet application embedded within a webpage. When loaded, a black rectangle appears with three sliders to the left of it: the top slider labeled “shoulders,” the middle, “waist,” and the bottom, “hips.” For a visual example of this device,

*Faculty Sponsor

Correspondence may be addressed to: Wind Goodfriend, Ph.D., Psychology Department, 610 W. 4th Street, Buena Vista University, Storm Lake, IA 50588, Email goodfriend@bvu.edu, Fax 712-749-2037. The authors would like to thank Renee Fagen, Ben Trask, and Dan Messen for their help with this project.

please see the Appendix. As a participant moves each slider, the corresponding part of the rectangle gets wider or thinner, depending on which direction the participant drags the slider.

By developing the device to be digital and interactive, a number of advantages are gained. Firstly, the participant can directly and precisely indicate what body shape he or she finds attractive. This device's flexibility allows for a greater amount of precision in the data gathered than do pre-manipulated line drawings. Additionally, the digital nature of this device allows it to export data directly into a table, ready for analysis, without the need for time-consuming data entry. Furthermore, the device lends itself to being readily integrated into existing online surveys, allowing for quick and easy access by any potential participant with an internet connection. These advantages significantly broaden the potential pool of participants and reduce paper waste.

Pilot Study

To test the validity of the proposed device, a pilot study was first performed. Twenty-seven self-reported heterosexual undergraduate students (17 men, 10 women) were recruited from General Psychology courses at a small private university in the Midwest and received extra credit for their participation. In addition to these 27 people, two participants who were not from the United States were removed from the data to reduce any potential cross-cultural confounds. These participants were removed due to research indicating some cultures vary in the type of body shape men and women prefer in the opposite sex (e.g., Marlowe & Wetsman, 2001). In addition, two individuals indicated they were either homosexual or bisexual; these individuals' scores are not reported further. Participants self-identified as 78% Caucasian, 14% African-American, and 8% Latino and ranged in age from 18 to 30 years ($M = 19.29$, $SD = 2.33$).

Method

Human subjects approval was obtained for both the pilot and main study prior to data being collected. Participants entered an ordinary classroom during one of three predetermined times and were instructed to go to a website address written on the white board at the front of the room. All students at the university used their personal, school-issued laptops. This website contained the survey materials (see Appendix for display of scale). Participants were first met with a page describing the nature of the study, that it was "a research study on attraction preferences and gender." After consenting to participate, they were led to the next page, which contained the proposed measure of body shape preference. Participants were asked to "adjust the sliders so that the shape represents the body shape that would be most attractive to you if possessed by a member of the sex that attracts you most." After participants finished adjusting the sliders and clicked the "continue" button, they completed other scales unrelated to the study. Finally, the last page of the online survey included debriefing material.

Results and Discussion

The software program measured each width automatically and compared them to each other to provide the desired ratios. For example, waist-to-shoulder ratios were calculated

by the software program comparing the indicated waist width to the indicated shoulders width for each participant. Because of the small sample size, medians were used instead of means to eliminate the influence of outliers. The median male WSR preferred by women was .71 ($SD = 0.13$). A similar method was used to calculate men's desired waist-to-hip ratios. The median female WHR preferred by men was .72 ($SD = 0.20$). Previous research indicates that women prefer WSRs of .75 or lower (Braun & Bryan, 2006; Dixon et al., 2003), and men prefer low WHRs near .70 (Singh, 1993a, 1993b; Singh & Randall, 2007; Singh & Young, 1995). Therefore, the data gathered by the new device corroborated established results closely enough that testing the device with a wider sample would be constructive.

Main Study: Validating the Device Participants and Procedure

For the larger study, participants were recruited through general psychology classes and postings on the internet. After eliminating five individuals not from the United States, and 14 individuals who self-reported being bisexual or homosexual, the sample contained 53 self-reported heterosexual participants (25 men, 28 women). The mean age of the final sample was 20.15 years ($SD = 4.09$) with a range from 18-48 years. Eighty-five percent of participants identified as Caucasian, 5.7% as Native American, 3.8% as Hispanic/Latino, 3.8% as Asian/Pacific Islander, and 1.9% as African-American. The procedure was exactly the same as in the pilot.

For the device to be valid and usable for future research, the data collected from it needed to replicate that of previous researchers (e.g., Dixon et al., 2003; Singh & Randall, 2007). In short, the new device needed to indicate that heterosexual women would prefer low waist-to-shoulder ratios (WSRs) whereas heterosexual men would prefer low waist-to-hip ratios (WHRs).

Results and Discussion

As expected, we found participants did exhibit preferences for certain WHRs and WSRs. Women's preferences for male waist-to-shoulder ratio were similar to that of previous work, showing a marked preference for a WSR of 0.6 to 0.8 (Dixon et al., 2003). Women indicated a preference for men to have a small waist compared to their shoulders ($Mean_{WSR} = .77$, $SD = .12$, $Median = .80$). As expected, women did not emphasize preferences for low WHRs as much in potential male partners as men preferred in potential female partners; this ratio for female participants was much closer to one ($Mean_{WHR} = .88$, $SD = .14$, $Median = .89$).

Heterosexual men, as expected, expressed a desire for a small waist in comparison to hips in female partners. Men's desired waist-to-hip ratio was thus similar to (but slightly higher than) previous research (Dixon et al., 2003; $Mean_{WHR} = .73$, $SD = .20$, $Median = .67$). Also as expected, men did not indicate a preference for low WSRs in potential female partners; this ratio was much closer to one ($Mean_{WSR} = .86$, $SD = .43$, $Median = .78$).

Additional analyses: Hip-to-shoulder ratio. Previous methods, such as the use of line drawings (e.g., Singh, 1994),

would have made analysis of hip-to-shoulder ratios (HSRs) time consuming and cumbersome, requiring the preparation of many versions of the drawings. However, due to the unique nature of the new measuring device presented here, it was possible to easily collect and analyze HSR preferences.

Women in the present study indicated a preference for similar sized hips and shoulders in potential male partners; the mean hip-to-shoulder ratio (HSR) for women was .90 ($SD = .21$, $Median = .86$). For men, a different pattern emerged; men indicated they were attracted to female partners with larger hips than shoulders, as indicated by their mean preferred HSR of 1.21 ($SD = .44$, $Median = 1.17$).

General Discussion

The purpose of this study was to develop and validate a new device to aid future experimenters in researching participants' body shape preferences. In comparing the results gathered with regards to participants' preferred WSRs and WHRs, the device was found to generally replicate previous findings. With participants having direct control over indicating their preferences for shoulder, waist, and hip widths, researchers are presented with more options for data analysis; whereas, with pre-generated line drawings, comparing preferred HSRs, WHRs, and WSRs would require a substantial number of individual drawings through which participants and researchers would have to sort.

The body of research on HSRs and their relationship to attractiveness is minimal, but there are a couple of studies that support the findings found in the present study. One such study found potential male rivals with high shoulder-to-hip ratios (which translate to low hip-to-shoulder ratios) evoked more jealousy in men and were found to be more attractive (Dijkstra & Buunk, 2001). Another study found men with higher shoulder-to-hip ratios (i.e., low hip-to-shoulder ratios) had sexual intercourse at an earlier age than their peers, more sexual partners, and more sexual experience with people already involved in a different relationship (Hughes & Gallup, 2003). Although the authors of these studies did not directly measure the role of HSR in perceptions of attractiveness, the evocation of jealousy and the early onset, and number, of sexual encounters associated with HSRs would indicate low HSRs (as found in the current study) also play a role in attractiveness.

The larger theoretical framework found in evolutionary mate selection theories also supports the present study's findings related to hip-to-shoulder ratios. The core concept of these theories is that physical attractiveness is determined by sets of clues that reveal underlying mate value as measured by Darwinian fitness (i.e., capacity for survival and reproduction). Thus, women with typically feminine weight distributions, with larger hips, suitable for birthing, are perceived as more valuable mates and are perceived to be more attractive. Similarly, men with a more masculine weight distribution (i.e., wide shoulders) are seen as fit, strong, and healthy mates and are considered more attractive (Buss, 1994; Grammer, Fink, Møller, & Thornhill, 2003). The results related to hip-to-shoulder ratios found in the present study fit into these theories by adding further evidence men still prefer wide-

hipped women in relation to any other torso measurement. In addition, women also prefer narrow waists and hips, with shoulders broader than both, demonstrating again a traditionally masculine body shape is preferred.

More importantly, the device produces a more accurate and telling set of data as it does not force participants to choose a figure with a WHR or WSR that does not accurately represent their preferred body shape (e.g., they can choose a WHR of 0.76 using this device, versus being forced to pick between two figures that have WHRs of 0.7 and 0.8). This device allows for more specificity in the final data sets, more accurately describing individuals' preferences for certain body shapes.

Further modifications to the device for consideration may be the addition of a slider that allows participants to adjust the relative height of the torso. This addition would provide an even wider array of body shape information to allow researchers to assemble a more complete model of attraction. Additionally, there may be room for a photo-realistic model to be developed. This model would require less abstraction on the part of participants, and may provide more accurate data by presenting participants with an image of an actual person on whom to adjust the related measurements. However, great care should be taken to develop this device in such a way that the model does not become grotesquely inhuman when the sliders are adjusted. Perhaps the current abstract nature of the device is actually a benefit, allowing any person, regardless of sex, gender, sexual orientation, culture, and nationality to use the device without it needing to be customized for each group being examined. One major advantage of the device in its current abstract form is that it allows researchers to avoid potential confounding variables such as facial attractiveness, hair style, skin tone, etc. that might otherwise threaten the internal validity of experiments making use of more traditional methodologies (e.g., photographs or line drawings).

Another useful future direction would be to further validate the current results by asking participants to indicate their preferences using the new device as well as older, established ways of assessing body preference. This comparison would allow for inferential statistics that would provide convergent and construct validity. If significant correlations are not found between different forms of measurement, additional research could explore how perceptions of different body preference devices may affect results.

Despite these few limitations, this device engineered to measure preferred body shapes brings forward an exciting new approach allowing for an even deeper analysis of participants' preferences, while simultaneously making data collection and analysis faster and easier. This new tool, abstract and easy to adapt to many situations, can help modernize and replicate previous literature in a way that may provide more useful and accurate results and lead to future innovations.

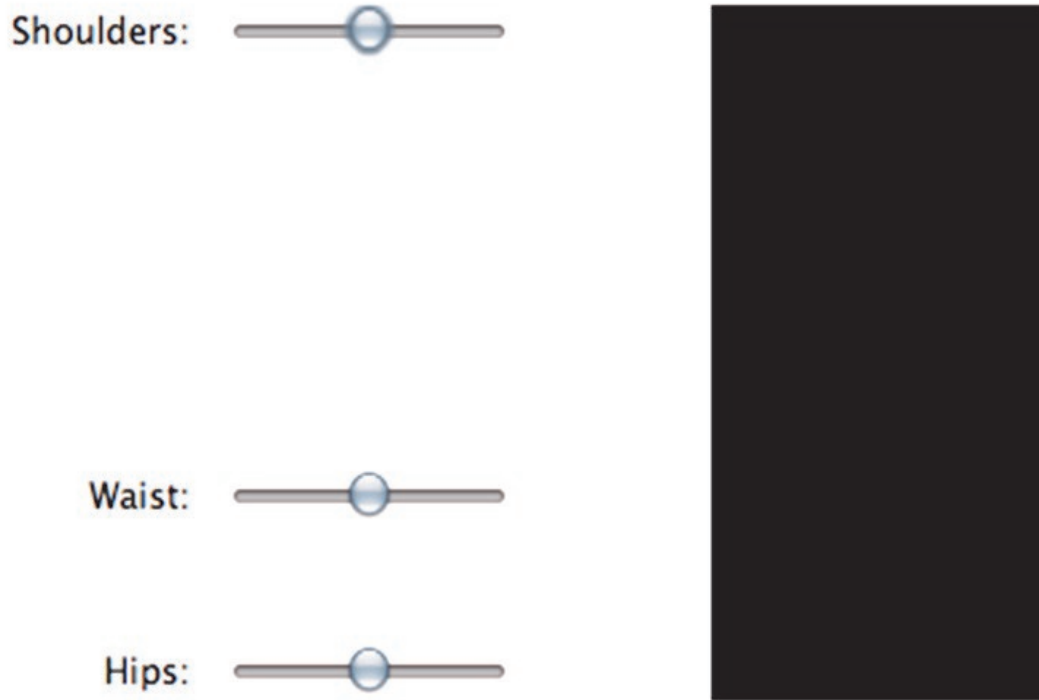
References

- Braun, M. F., & Bryan, A. (2006). Female waist-to-hip and male waist-to-shoulder ratios as determinants of romantic partner desirability. *Journal of Social and Personal Relationships, 23*, 805-819. doi: 10.1177/0265407506068264
- Buss, D. (1994). *The evolution of desire: Strategies of human mating*. New York, NY: Basic Books.
- Dijkstra, P., & Buunk, B. P. (2001). Sex differences in the jealousy-evoking nature of a rival's body build. *Evolution and Human Behavior, 22*, 335-341. doi:10.1016/S1090-5138(01)00070-8
- Dixson, A. F., Halliwell, G., East, R., Wignarajab, P., & Anderson, M. J. (2003). Masculine somatotype and hirsuteness as determinants of sexual attractiveness to women. *Archives of Sexual Behavior, 32*, 29-39. doi: 10.1023/A:1021889228469
- Guillen, E. O., & Barr, S. I. (1994). Nutrition, dieting, and fitness messages in a magazine for adolescent women, 1970-1990. *Journal of Adolescent Health, 15*, 464-472. doi: 10.1016/1054-139X(94)90493-M
- Grammer, K., Fink, B., Møller, A., & Thornhill, R. (2003). Darwinian aesthetics: Sexual selection and the biology of beauty. *Biological Review, 78*, 385-407.
- Hughes, S. M., & Gallup, G. G. (2003). Sex differences in morphological predictors of sexual behavior: Shoulder to hip and waist to hip ratios. *Evolution and Human Behavior, 24*, 173-178. doi:10.1016/S1090-5138(02)00149-6
- Leit, R. A., Pope, H. G., & Gray, J. J. (2001). Cultural expectations of muscularity in men: The evolution of *Playgirl* centerfolds. *International Journal of Eating Disorders, 29*, 90-93. doi: 10.1002/1098-108X(200101)29:1<90::AID-EAT15>3.0.CO;2-F
- Maisey, D. S., Vale, E. L., Cornelissen, P. L., & Tovée, M. J. (1999). Characteristics of male attractiveness for women. *The Lancet, 353*, 1500. doi: 10.1016/S0140-6736(99)00438-9
- Marlowe, F. & Wetsman, A. (2001). Preferred waist-to-hip ratio and ecology. *Personality and Individual Differences, 30*, 481-489. doi:10.1016/S0191-8869(00)00039-8
- Pope, H. G., Jr., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders, 26*, 65-72. doi: 10.1002/(SICI)1098-108X(199907)26:1<65::AID-EAT8>3.0.CO;2-D
- Singh, D. (1993a). Adaptive significance of physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology, 65*, 293-307. doi: 10.1037/0022-3514.65.2.293
- Singh, D. (1993b). Body shape and women's attractiveness: The critical role of waist-to-hip ratio. *Human Nature, 4*, 297-321. doi: 10.1007/BF02692203
- Singh, D. (1994). Ideal female body shape: Role of body weight and waist-to-hip ratio. *International Journal of Eating Disorders, 16*, 283-288. Retrieved from <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EAT.html>
- Singh, D., & Randall, P. K. (2007). Beauty is in the eye of the plastic surgeon: Waist-hip ratio (WHR) and women's attractiveness. *Personality and Individual Differences, 23*, 329-340. doi: 10.1016/j.paid.2006.12.003
- Singh, D., & Young, R. K. (1995). Body weight, waist-to-hip ratio, breasts, and hips: Role in judgments of female attractiveness and desirability for relationships. *Evolution and Human Behavior, 16*, 483-507. doi: 10.1016/0162-3095(95)00074-7
- Wiseman, C. V., Gray, J. J., Mosimann, J. E., & Ahrens, A. H. (1992). Cultural expectations of thinness in women: An update. *International Journal of Eating Disorders, 11*, 85-89. doi: 10.1002/1098-108X(199201)11:1<85::AID-EAT2260110112>3.0.CO;2-T

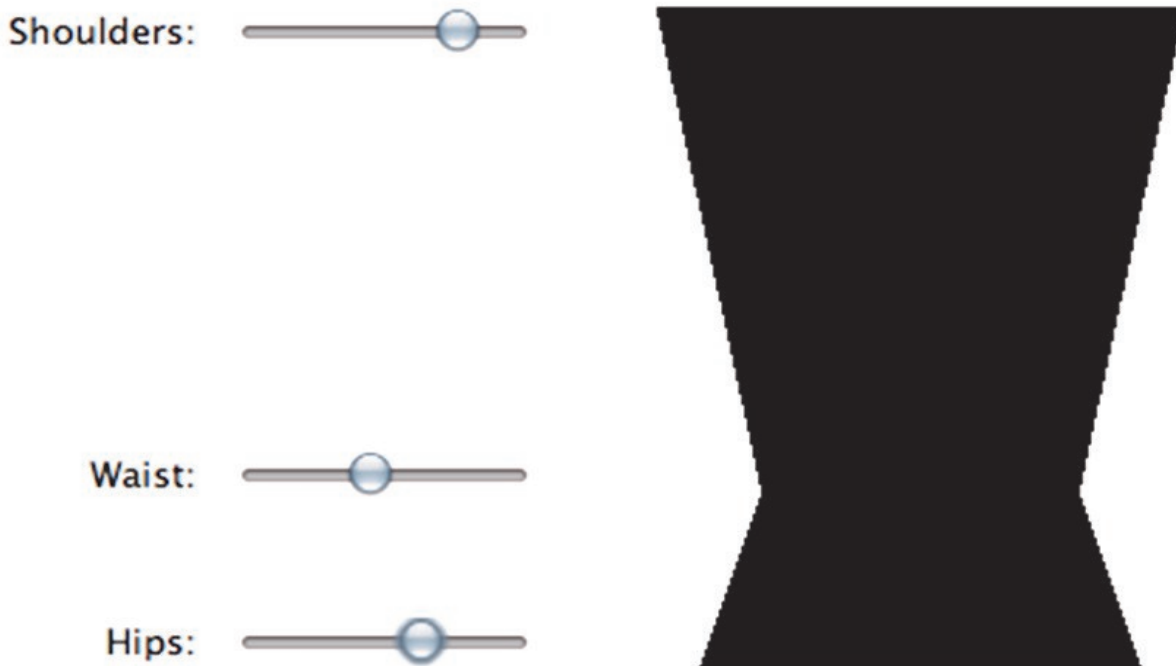
Appendix

Visual Display of Body Shape Preference Device

The device as seen when the web page first loads



The device after a participant has moved the sliders.



Identifying Suspects from Lineups: A Review of Variables Affecting Accuracy

Rebecca J. Zeller

Benedictine College

Abstract

The purpose of this paper is to review factors influencing accuracy of identifications made from lineups. Law enforcement has used the simultaneous lineup procedure, in which eyewitnesses view all the lineup members at the same time, as its primary mode of identifications. Recent research, however, has shown the sequential lineup method, in which eyewitnesses view lineup members one at a time, can reduce inaccurate identifications. This literature review examines lineup procedures, as well as several additional variables impacting accuracy, such as lineup similarity, multiple identification variables, and the presence of multiple perpetrators. Research findings reveal the importance of whether the target is either absent or present in lineups, which greatly influences identification accuracy.

Keywords: eyewitness identification

When trying to decide the guilt or innocence of a suspect, eyewitnesses are often called upon to testify as to what they have seen and heard at the time of the crime (Kneller, Memon, & Stevenage, 2001). Often, eyewitness testimony is the only evidence in a case before a jury in deciding a conviction. This reliance on eyewitnesses presents a potential crisis due to the fact that identification procedures are not infallible (Pryke, Lindsay, Dysart, & Dupuis, 2004). As of today (February 17, 2011), there have been 266 cases in the United States in which men and women who were wrongfully convicted were later exonerated by DNA evidence. Eyewitness misidentification is the greatest cause of wrongful convictions nationwide; 75% of conviction cases overturned by DNA evidence have involved eyewitness error (Innocence Project, 2010).

Early research on eyewitness evidence focused on the extent to which eyewitnesses were accurate. In the late 1970s, psychologists began to focus on preventing eyewitness errors by focusing on “estimator variables (outside the control of the justice system) and system variables (under the control of the justice system)” (Pryke et al., 2004, p. 73). Estimator variables include such variables as the lighting conditions at the time of the crime and whether the culprit was wearing a disguise (Greene, Heilbrun, Fortune, & Nietzel, 2007). System variables, which can be controlled, include the type of instructions given to eyewitnesses and the type of lineup or photospread used (Greene et al., 2007, p. 132). Given that system variables are controllable, they therefore present more promising means of avoiding errors in an investigation compared to estimator variables (Greene et al., 2007). The purpose of this review, is thus to focus on the role played by multiple system variables in predicting eyewitness accuracy. Specifically, this review focuses on lineup method (simultaneous versus sequential), target-present versus target-absent lineups, lineup similarity, multiple identification variables and cases involving multiple perpetrators.

Simultaneous and Sequential Lineups Defined

When identifying a perpetrator in legal proceedings, police officers often resort to showing the eyewitness several possible suspects in a lineup at the same time. This is referred to as a simultaneous lineup. The target may be present or absent from the lineup. In these conditions, eyewitnesses tend to compare each lineup member to the others based on their memory of the perpetrator, choosing the one who most resembles their memory or description of the suspect. This process of comparing each lineup member to the others is called relative judgment (Stebly, Dysart, Fulero, & Lindsay, 2001). Members of the lineup who are not the suspect but are similar to the suspect are called foils (known error). The simultaneous lineup is the most commonly used lineup method in the United States (Kneller et al., 2001).

The sequential lineup method is less commonly used. In sequential lineups, lineup members are presented one at a time and eyewitnesses are to make a decision as to whether or not that member is the culprit. Through this method, the eyewitness must use an absolute decision making strategy instead of relying on relative decision making. Steblay et al., (2001) report

eyewitness cannot be sure that the next (not yet viewed) person does not look even more like the perpetrator... this would force eyewitnesses to use a more “absolute” criterion (i.e., Is this the perpetrator or not?) rather than the relative-judgment criterion (i.e., Is this person more similar to the perpetrator than the other lineup members?). (p. 460)

Research over the last 25 years on eyewitness identification has shown eyewitnesses are apt to make errors in identifying the culprit (Flowe & Ebbesen, 2007), and the type of lineup utilized might play a role in those errors. This review will begin with meta-analysis conducted by Steblay et al., (2001), which included 23 studies published from 1983 to 2000, and examined whether or not sequential lineups produce fewer eyewitness errors than do the more commonly utilized simultaneous lineups.

Stebly et al., (2001) conducted a meta-analysis in which they compared identification accuracy rates obtained with simultaneous versus sequential lineups. The goal of this study was to find variables throughout numerous studies that would moderate the sequential-superiority effect.

By way of example, studies that were included in the meta-analysis examined whether sequential or simultaneous lineups are better. A study done in the meta-analysis by Lindsay and Wells (1985) looked for ways to prevent eyewitness-

Amy Posey served as Faculty Sponsor for this project.

Correspondence concerning this article should be addressed to Amy Posey, Psychology Department, Benedictine College, Atchison, KS, 66002. Email: aposey@benedictine.edu

es from making relative judgments. The researchers Lindsay and Wells (1985) believed the relative-judgment strategy used in simultaneous lineups was a major source of false identification, and the sequential procedure should prevent relative-judgment strategy. Lindsay and Wells (1985) revealed that although the culprit was more likely to be identified through simultaneous versus sequential lineups (51% of the time versus 34%) when the culprit was present, higher rates of false identifications occurred in simultaneous lineups when the culprit was absent. This finding represents an interaction between lineup style and presence of the target in the lineup. In target-absent simultaneous lineups, 35.0% of eyewitnesses identified an innocent person. However, only 18.3% identified innocent people sequentially.

In another study, Sporer (1993) compared sequential and simultaneous lineup procedures with identification outcomes using target present and target absent lineups. The study showed correct identifications when the target was present were comparable (44% in simultaneous; 39% in sequential). However, correct rejections in the identification of a suspect in a target absent lineup were higher in sequential (61%) versus simultaneous (28%) lineups. The results of Sporer's (1993) and Lindsay and Wells's (1985) study, shows an interaction between lineup style (simultaneous versus sequential) and the presence of the culprit in the lineup.

Although the two studies are inconclusive in themselves, they show comparable findings to the other studies examined in the meta-analysis. The meta-analysis included 23 studies and 4,145 participants. Sample sizes ranged from 32 to 327 (Stebly et al., 2001). Results of Stebly and colleagues (2001) study suggested for sequential lineups, the overall accuracy rate was 56%; for simultaneous lineups, the accuracy rate was 48%, yielding a small effect size, $r = .09$, favoring the sequential lineup format. For lineups in which the actual culprit was present, correct identifications were more likely for simultaneous lineups (50% correct) versus sequential (35%). False rejections (i.e., rejecting a lineup in which the actual culprit was present) were significantly fewer in simultaneous lineups (26%) than in sequential lineups (46%). Overall, participants viewing sequential lineups were less likely to make a choice from the lineup. For lineups in which the target was absent, the witnesses were more likely to make an identification from simultaneous (27%) lineups than from sequential (9%), thus increasing false identification errors. Therefore, the overall pattern of sequential superiority for avoiding false identifications was supported by this meta-analysis.

Speed of Identification

Kneller, et al. (2001) studied both simultaneous and sequential lineups and the target present and target absent conditions. In addition, they investigated whether decision times were related to eyewitness accuracy. Participants were undergraduate psychology students who participated in one of the four experimental conditions (i.e., simultaneous versus sequential and target present versus absent). Participants were shown a brief 60 s video of a man trying each of the doors on a car to see if they were unlocked in a parking lot. Following the video, participants were asked to identify the suspect in a

photo lineup (Kneller, et al., 2001). When the target was present in the lineup, correct identifications were somewhat higher in simultaneous versus sequential lineups. However, when the target was absent, there was a higher rate of false identifications in simultaneous versus sequential lineups.

In addition, results of Kneller, et al.'s study support the notion the faster the witness identifies a suspect, the more likely it is that the identification is accurate. For simultaneous lineups, accurate decisions were made more quickly than inaccurate decisions. Time data were not collected for sequential lineups due to the nature of the task (Kneller, et al., 2001).

Lineup Similarity

Based on the previous research included in Stebly et al.'s (2001) meta-analysis, Flowe and Ebbesen (2007) focused on finding out whether the similarity of the faces in sequential or simultaneous lineups affects recognition accuracy. When eyewitnesses view the suspects and foils known by the police simultaneously, it presents a dilemma, because when the witness can see all the similar-looking faces at once, the identification task becomes more challenging (Flowe & Ebbesen, 2007). Specifically, witnesses are more likely to make a positive identification in simultaneous lineups, because at least one of the faces is likely to match the culprit in their memory, even if the culprit is not in the lineup. On the other hand, when presented with the sequential lineup in making identification decisions, they cannot make "direct visual comparisons of lineup members" (Flowe & Ebbesen, 2007, p. 34). Instead, they must compare each lineup member to the culprit within their memory.

Flowe and Ebbesen (2007) conducted two experiments for their study. In Experiment 1, they intermixed three different identification procedures (simultaneous, sequential, and showup, for which a suspect is presented alone) with the lineups' structure of similar faces. "The lineups contained two dimensions of variation: similarity of the foils to the study face, and the similarity of the suspect in the lineup to the study face" (Flowe & Ebbesen, 2007, p. 36). In each lineup condition, college students had to identify the suspect in a lineup of faces that were similar based on various facial features such as eyes, nose, face shape, hair, mouth, and so forth. Participants were shown a set of faces to study before identifying the faces in each lineup from their memory. The results showed that having similar foils in the lineup did affect the witness's memory of the culprit. Accuracy was higher in showups (Flowe & Ebbesen, 2007) versus the other two lineups, which revealed that having foils in the lineups affects a person's memory (Flowe & Ebbesen, 2007). Findings of this study showed participants were more likely to pick a suspect from lineup if the foil's similarity to the study face participants studied before identifying faces in lineup was low. However, when the study face was present in the lineup, the structure of the lineup had very little effect on accuracy in simultaneous lineup, versus none in sequential lineups (Flowe & Ebbesen, 2007).

In Experiment 2, Flowe and Ebbesen (2007) used the same method as Experiment 1, except they ranked the faces from least to most similar and removed the suspect from the

lineup without replacing the suspect with another member (foil). The purpose of this method was to see if the eyewitness would choose a foil, instead of rejecting the lineup entirely. Results showed foils were chosen at a higher rate in simultaneous, target absent lineups than in sequential lineups (Flowe & Ebbesen, 2007).

Multiple Identification Variables

Pryke et al. (2004) studied the effect of using multiple independent identifications of various suspect features such as face, body (shoulders down) and voice. They reasoned that, should the person identify the various features belonging to the same person, it increases the likelihood that identification accuracy has occurred. The researchers conducted two separate experiments that showed three different simultaneous lineups of the face, the voice, and the body. A clothing lineup feature of grey sweatshirts on a hanger was added in the second experiment and was done via sequential lineup method. The face was shown first in both experiments should further evidence be collected if the suspect is identified from the face lineup to avoid bias in identification of other features (Pryke et al., 2004). Results indicated instead of showing just one type of lineup, presenting more than one type of independent lineup variable, such as the face, body (shoulders down) and voice to an eyewitness improves accuracy, such that when the same eyewitness makes several independent identifications of various suspect features, it is a good indication of guilt (Pryke et al., 2004).

Multiple Perpetrators

For purposes of exploring other identification scenarios, Dempsey and Pozzulo (2008) conducted a study on how the presence of multiple perpetrators influences eyewitness identification accuracy. Rather than using a sequential lineup, they used an elimination lineup. As explained by Dempsey and Pozzulo, an elimination lineup uses two judgment decision processes. The first involved making a relative judgment in choosing those people who look most like the suspect. In the second judgment, the eyewitness used absolute judgment by comparing their memory of the culprit to the person that looked most like the perpetrator and determining if that person is the culprit (Dempsey & Pozzulo, 2008). Elimination lineups were originally developed for child witnesses in order to reduce false-positive responding.

Some participants were presented with an elimination lineup, whereas others were given a simultaneous lineup. The target was either present or absent, and all participants viewed two lineups, one lineup for the thief and one for the accomplice (Dempsey & Pozzulo, 2008). By using simultaneous and elimination lineups including target present and absent, they investigated the reliability of multiple perpetrator identifications of the assailant versus the accomplice.

College-student participants watched a video in which two women (one a thief, the other an accomplice) stole some CDs from a store. After this, participants completed a form in which they described the event and the two suspects seen in the video. Following this, participants viewed two consecutive photo lineups (either simultaneous or elimination): one for the accomplice and one for the assailant. Results showed

identification accuracy did not vary based on lineup procedure when either the thief or accomplice was present. However, when the thief or accomplice was absent, correct rejection rates were higher in elimination versus simultaneous lineup procedures (Dempsey & Pozzulo, 2008). Regardless of which lineup procedure was used, witnesses were more likely to correctly identify the assailant versus the accomplice.

Discussion

Based on the studies included in this review, findings suggested when the actual culprit is present, correct identifications are higher in simultaneous versus sequential lineups (Lindsay & Wells, 1985; Sporer, 1993; Steblay et al., 2001). However, when the actual culprit is absent, higher rates of false identifications occur with simultaneous than sequential (or elimination) lineups (Dempsey & Pozzulo, 2008; Flowe & Ebbesen, 2007; Lindsay & Wells, 1985; Steblay et al., 2001). This trend is consistent throughout this review. Accurate eyewitnesses are crucial due to the fact that sometimes their testimony is the only solid lead in a case. However, eyewitnesses sometimes make mistakes due to several factors, including pressure from police (Greene et al., 2007). Despite much research, data has shown the sequential lineup to yield fewer false identifications, still, one can see how members of the law enforcement community might be resistant to abandoning the simultaneous method, given its superiority when the culprit is present. However, as Wells (n.d.) points out, the apparent superiority may be artificial:

Some witnesses who have rather weak memories will nevertheless pick out the culprit because they are simply picking the person who looks most like the culprit compared to the other lineup members. These weak memory witnesses would not, however, be able to identify the culprit from a sequential lineup because they don't have a good enough memory to do anything but make the shallow relative decision. (para. 2)

The issue has not been completely resolved, as there is some debate within the legal psychology literature as to whether one can conclude that the sequential lineup format is, in fact, superior (see Malpass, Tredoux, & McQuiston-Surret, 2009; Steblay, Dysart, & Wells, 2011).

Aside from the findings regarding sequential and simultaneous lineups, research discussed in this review reveals that lineup similarity reduces identification accuracy (Flowe & Ebbesen, 2008), identifications that are made quickly tend to be more accurate than those that take longer (Kneller et al., 2001), and asking the witness to make separate identifications of physical attributes of the culprit enhances credibility of the identification (Pryke et al., 2004). In addition, in cases with multiple perpetrators, witnesses tend to identify the assailant more often than the accomplice (Dempsey & Pozzulo, 2008). These findings suggest the swifter, and more detailed the witness is, the greater the probability that the witness is correct. However, the more similar the foils are in the lineup, the harder it is for the witness to identify the culprit. Paying closer attention to lineup similarity in further research may help us to better understand the many implications of using sequential versus simultaneous lineups.

Research that hones in on the individual variables that impact the decision making process in identification is needed in order to better apply previous research findings. Having witnesses identify separate physical attributes of the suspects, as was done in Pryke et al.'s (2004) study of multiple identification variables, would provide a good starting point for further research. For example, such a technique might provide insight into the own-race effect (i.e., people are better at identifying those of their own race than they are at identifying those of other races; Meissner & Brigham, 2001). Using an identification technique that breaks down the physical components can help us better understand what aspects of the cross-racial identification are the most difficult.

In spite of the enormous body of research examining eyewitness identification accuracy, many questions remain unanswered. An important next step for researchers is to test the extent to which findings related to one identification issue can be applied to the understanding of another. One relevant example is taking Pryke et al.'s (2004) study of multiple identification variables and strictly applying that to the sequential versus simultaneous lineups to determine if either lineup is more accurate as a result of the additional identification variables.

References

- Dempsey, J. L., & Pozzulo, J. D. (2008). Identification accuracy of eyewitnesses for a multiple perpetrator crime: Examining the simultaneous and elimination lineup procedures. *American Journal of Forensic Psychology, 26*, 67-81.
- Flowe, H. D., & Ebbesen, E. B. (2007). The effect of lineup member similarity on recognition accuracy in simultaneous and sequential lineups. *Law and Human Behavior, 31*, 33-52. doi: 10.1007/s10979-006-9045-9
- Greene, E., Heilbrun, K., Fortune, W. H., & Nietzel, M. T. (2007). *Psychology and the legal system*. (6th ed.). Belmont, CA: Thomson Wadsworth.
- Innocence Project. (2010). Eyewitness Misidentification. Retrieved from <http://www.innocenceproject.org/understand/Eyewitness-Misidentification.php>
- Kneller, W., Memon, A., & Stevenage, S. (2001). Simultaneous and sequential lineups: Decision processes of accurate and inaccurate eyewitnesses. *Applied Cognitive Psychology, 15*, 659-671. doi: 10.1002/acp.739
- Lindsay, R. C. L., & Wells, G. L. (1985). Improving eyewitness identifications from lineups: Simultaneous versus sequential lineup presentation. *Journal of Applied Psychology, 70*, 556-564.
- Malpass, R. S., Tredoux, C. G., & McQuiston-Surrett, D. (2009). Public policy and sequential lineups. *Legal and Criminological Psychology, 14*, 1-12.
- Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in Memory for faces: A meta-analytic review. *Psychology, Public Policy, & Law, 7*, 3-35.
- Pryke, S., Lindsay, R. C. L., Dysart, J. E., & Dupuis, P. (2004). Multiple independent identification decisions: A method of calibrating eyewitness identifications. *Journal of Applied Psychology, 89*, 73-84. doi: 10.1037/0021-9010.89.1.73
- Sporer, S. L. (1993). Eyewitness identification accuracy, confidence, and decision times in simultaneous and sequential lineups. *Journal of Applied Psychology, 78*, 22-33.
- Stebly, N., Dysart, J., Fulero, S., & Lindsay, R. C. L. (2001). Eyewitness accuracy rates in sequential and simultaneous lineup presentations: A meta-analytic comparison. *Law and Human Behavior, 25*, 459-473.
- Stebly, N. K., Dysart, J. E., & Wells, G. L. (2011). Seventy-two tests of the sequential lineup superiority effect: A meta-analysis and policy discussion. *Psychology, Public Policy, and Law, Vol. 17*(1), 99-139.
- Wells, G. L. (n.d.). Does the Sequential Lineup Reduce Accurate Identifications in Addition to Reducing Mistaken Identifications? Yes, but...Retrieved from <http://www.psychology.iastate.edu/~glwells/SequentialNotesonlossofhits.htm>

Psychologically Speaking

In Search of Scientific Literacy: An Interview with Barney Beins

Chuck Sepers, Emily Kubalik and
Richard L. Miller

University of Nebraska at Kearney



is a junior with a double major: psychology and exercise science. His research explores the efficacy of walking programs and health related terror management. After graduation, he plans on pursuing a doctorate in health psychology.

Bernard C. (Barney) Beins was born and raised in Toledo, Ohio and received a BA in psychology from Miami University of Ohio. His doctorate was in General-Experimental Psychology from the City University of New York. After a short stint of science reporting for the Columbus, Ohio affiliate of National Public Radio, and a year as a statistical analyst at Blue Cross of Central Ohio he entered the academic world at Thomas More College. Since 1986, he has been on the faculty at Ithaca College where he currently serves as Department Chair. Barney served several years as Secretary of the Society for the Teaching of Psychology and in 2004 was elected President. For two years he was Director of Precollege and Undergraduate Education at APA. In 1994, he founded the Northeastern Conference for Teachers of Psychology, which continues in conjunction with the New England Psychological Association convention. Barney is the author or co-author of books on research methods, best practices in teaching, and with his daughter, Agatha, effective writing. He was the recipient of the 2010 Charles L. Brewer Distinguished Teacher Award from the American Psychological Foundation of the American Psychological Association.

Undergraduate Research

Sepers: We will begin by asking the loaded question. Why did you enter the field of psychology?

Beins: When I started college, I was a math major. After two 5 credit-hour calculus courses, I thought that English was a better choice and after a year as an English major, I thought that psychology would be a good choice. By then it was time to graduate, so I was a psychology major.

Actually, there was more to it than that. I had the opportunity to do independent research on the psychology of learning with a professor named John Jahnke at Miami University in Oxford, Ohio. It really captivated me. I always liked going to school so after I graduated I thought, "Why stop now?" I then went into a doctoral program, and have been enjoying myself ever since.

Sepers: You mentioned your exposure to research as an undergraduate student. What was the extent of that research in terms of the number of different projects you have worked on, including the learning research you mentioned?

Beins: I worked on two projects during my junior and senior years. The first one was in social psychology. A psychologist by the name of Art Miller was doing research on cheating and he needed a confederate to do some cheating, so I agreed to be one of his confederates. I spent several weeks in a cubicle trying to make it clear to the person next to me I was cheating on the task that we were supposed to be doing. They had been told that the person who got

Miller: The *Journal of Psychological Inquiry* publishes undergraduate student research. In addition, there is a Special Features section that serves a variety of purposes. It is a forum for student essays on topical issues and also features, from time to time, articles that provide information of interest to both faculty and students related to the research process. We have asked you for this interview in order to explore your thoughts on the role of undergraduate research in teaching. The audience the interview is primarily designed for are students, and secondarily for faculty. Particular emphasis is on the scholarly component of teaching and learning and how that relates to students conducting research and subsequently presenting and publishing the results of that research. The two students who will be conducting this interview are both undergraduate students at the University of Nebraska at Kearney. Emily Kubalik is a senior honors student majoring in psychology with a minor in sociology. Her research examines self-concept resiliency. She plans on pursuing a doctorate in the area of clinical psychology. Chuck Sepers

the better score on the task would win something. In general, the actual participant would mostly not pay attention to my cheating. I would have to shift my chair around to look at the answers on the back wall and make a big production out of it. We still couldn't get people to cheat, which was sort of interesting. The next year when I was a senior, I did some conditioning of pigeons in a Skinner Box for a doctoral student who was working on his dissertation. One of the interesting things was that nobody did undergraduate research the way they do now. Because you know now that the student is involved from beginning to end. The students create the study, carry it out, and analyze it. Back then that didn't happen. If undergraduates were interested in research, they were sort of an add-on to somebody else's research in the way that I described, but it was enough to get my interest.

Sepers: I understand that you have spent some time investigating humor. How have you been able to translate humor into science? What have you learned from investigating the scientific aspects of humor? In other words, is there any actual science to humor?

Beins: You know this is an area where there isn't much research being done. The original discussion of humor was by Freud, and it was totally nonscientific. Freud was a good observer of people, but he wasn't a particularly good scientist. During the era of behaviorists, humor was dying a slow death. Because humor is cognitive, behaviorists didn't pay much attention to it. It hasn't been until the last 20 or 30 years that people have started doing significant amounts of scientific research on humor. And the amount that we know now is still fairly small because the world of humor researchers in psychology is quite small. I would imagine that there would not be more than a few dozen people who are actively pursuing humor research. And I hope my contribution is to provide a reasonable addition to what we know about the psychology of humor

We are working on the contextual factors in humor appreciation, which is basically a combination of cognition and social psychology. Some of the work that we've done has to do with priming people to expect things to be funny or not and, depending on the message we give them, they buy it. We told participants that "You are going to hear jokes that other people found funny; we want to know if you think they are funny" or "Other people found these not funny at all, and we want to know what you think". Of course, they are the same jokes, regardless of the message. When we say that other people found the jokes to be funny, the ratings go up; and when we say other people didn't like the jokes, the ratings go down. The priming effect and the context

are important. A student of mine, Dave Wimer, published an article in the journal *Humor* based on that research. Some other research I hope to write up for publication, that I haven't done yet, deals with offensiveness and priming.

We did the same thing in terms of manipulating the message. We primed one group by saying that other people found these jokes to be offensive, and we asked our participants what they thought? Then they would rate the jokes on a scale of 1 to 7 regarding how offensive they found the jokes. You can't really prime participants in a way in which they actively expect non-offensive jokes, so we had a neutral condition in which we didn't prime them one way or the other, and we got a real interesting priming effect there. When we said, "Expect these to be offensive," the offensiveness ratings were lower, so we figured we did something wrong. Then we replicated the study, and it happened that way again. When you prime people for offensiveness, they rated the jokes as less offensive, at least with the jokes that we had. In those sets of studies we were working to establish some context in terms of humor appreciation.

Beins: We've also just finished a study on terror Management theory (TMT) that we think is really neat.

Their research was a direct consequence of some early research by Sheldon Solomon, who is one of the foremost investigators in TMT. Solomon and his co-workers primed people with either physical or romantic aspects of sex. They would have people read statements with a physical prime. It would be something like, "I like the feeling of my partner's sweat on my body," or something like that. And then for the romantic, it would be, "I like feeling emotionally close to my partner". Afterward, they gave people word fragments to complete like, "C-O-F-F-blank-blank," and what they discovered is people high in neuroticism were more likely to complete them with death-related words when they had been primed with physical aspects of sex; that didn't happen with romantic aspects of sex. Individuals who scored high on our neuroticism inventory would make "C-O-F-F-I-N," coffin, and the people who had scored low in neuroticism were more likely to produce "C-O-F-F-E-E," for coffee. And of course the mortality salience issue is important there. What we decided to do on my research team is to look at sex-related jokes. We couldn't find any romantic sex-related jokes; in the joke universe, it's all physical. So we couldn't get a comparison group for a romantic prime, but we did get a set of jokes, some of which were sexual and some nonsexual. Participants then completed word fragments. High neuroticism people completed the fragments with

An Interview with Barney Beins

significantly more death-related words. And that's pretty cool, because some of the speculation about humor is that it may be good because it's comforting—it protects you and redirects your mental focus away from your anxieties, so the humor may have ameliorative effects because of that. But we reasoned that if people scoring high on a neuroticism inventory read sex-themed jokes, it wouldn't redirect their thoughts away from their anxieties. We found that for people scoring high in neuroticism, jokes provide cold comfort at best. That didn't happen for people scoring low in neuroticism.

Sepers: You currently teach research methods, have authored and edited several books on statistics and writing in psychology, and actively mentor numerous undergraduate researchers. What were your experiences as an undergraduate student within psychology?

Beins: I really liked most of my psychology professors quite a bit, and it's always easier to get involved and engaged when you like the people you are dealing with. When I took psychology of learning with John Jahnke, he was inspiring. He was a nice man to begin with, but he was also an excellent psychologist. There was something about him and his demeanor that attracted me to him. He was very receptive and I enjoyed the conditioning work with pigeons that I did with one of his graduate students. The environment was a whole lot different back then. I graduated with my bachelor's degree in 1972 and there was a sort of a line between faculty and students so that faculty weren't your friends. It's still the case that you're not necessarily super close with faculty members, but you are friendly with them. There is more of a congenial relationship and not as much of a separation. When I was an undergraduate, there was really very little direct contact with faculty other than particular times in a class or in a research setting. You didn't see them in the hall and have conversations with them about baseball or movies or anything like that. It was a very different environment. As I mentioned, I went to Miami University, which had about 12,000 or 13,000 students. There were a lot of other students and in order to be noticed by your professors, you really had to take action on your own. Professors would not approach students and say, "Would you be interested in doing things."

Sepers: You mentioned your work with John Jahnke. How has that experience and other experiences with faculty advisors influenced the way you mentor students?

Beins: Good question.

Sepers: Do you feel yourself drawing from that experience?

Beins: You know, I've never thought about it quite like that. When I think about my first job, which was at a small liberal arts school, Thomas More College in Northern Kentucky, I just thought it would be important for students to have an experience doing research. I didn't connect it to the mentoring I had when I was an undergraduate, but I can't help thinking now that my past experiences was an important element, because it was a modeling situation. And so maybe I never overtly said, "Hmmm, I should do what John Jahnke did," but it seemed to me that it was a good thing to be doing. Undoubtedly it had its roots from when I was an undergraduate.

I didn't connect it to the mentoring I had when I was an undergraduate, but I can't help thinking now that my past experiences was an important element, because it was a modeling situation.

Sepers: The number of psychology majors that continue on to graduate school represent a small percentage. What do you feel is the value of undergraduate research for students, particularly for those that do not plan on going on to graduate study?

Beins: At Ithaca, all psychology majors spend three semesters doing research with the same professors and it is called *research team*. On my research team this semester I have 12 students, some of them are first semester, some are second semester, and some are third semester. One of the good things about that setup is that the advanced students can help mentor the beginning students. This experience makes a big difference, in that students develop skills that are very helpful when they seek a career. One of the things employers constantly say in interviews is that when they hire people, the employees don't know how to work in teams. It is important for students to learn how to work in teams and the *research team* fosters that. I also put a high premium on writing. Students do APA style simply because I think they need to learn how to do disciplined writing, even if they don't use APA style in the future. At least having a sense of how to organize ideas will help them. In fact, I have heard former students, when they have to do presentations in the workplace start off by saying, "Here is the nature of the problem", then "This is what we know," followed by, "This is what we did." And finally they'll say, "Here are the results and here is what we've concluded." This is a similar format to an APA style paper and employers and supervisors are very impressed with that kind of organization. Many people graduate from college

not knowing how to organize things so that a naïve audience can digest it. For that reason, I try to work on communication skills with my students. Another thing that I have started doing recently is when students do the first draft of the results section of their APA style paper, I tell them that they are not allowed to use any numbers or technical jargon. They are not to talk about statistics. What they have to do is take the ideas and represent the ideas in words. Once they do the words, they can use the statistics to support the ideas that they've generated. I hope then, that the students recognize that statistics are just a tool and that they are really unimportant in and of themselves. Students find this task very difficult, because they take statistics and they learn things like, $t(35) = 4.2, p < .001$ is statistically significant, but that doesn't say anything meaningful. Instead, what I say is, "You can't give me the statistics. You have to tell me what it means." Students who aren't going to go to graduate school, whom I presume are going to be going on to positions of responsibility and authority in the workplace, will have skills to take technical material and communicate it in an understandable way. They'll be able to organize their thoughts and be able to present them in a coherent way. They'll be able to work in a team to get things done. All of those things are skills that I hope my students leave with. They also do oral presentations in front of the class, so they learn good, useful skills. At least that's my hope.

Sepers: How have your research interests changed over the years and how have these changes influenced your role as a research mentor?

Beins: Several years ago, I had occasion to pick up my bound dissertation. I read through it and found it incredibly boring. It was just absolutely painful to look at. My degree is in experimental psychology, but I specialized in cognition. I looked at the dissertation and wondered how anybody could actually be interested in something like that. Of course, when I looked at it, it was way out of date, but the important thing is that I started out in cognition and my first research with my students was cognitive. It involved memory for frequency, where we varied the number of presentations in a stimulus item, and subjects would estimate how often it had occurred. We did quite a few similar studies and then I discovered that I didn't particularly want to do that kind of research anymore, and students weren't particularly interested in it, either. I have always been interested in language, so I started doing humor research. I wanted to do research on linguistic aspects of humor. Students didn't care about linguistic aspects of humor, so it has morphed into what we see now. Part of what we are doing now is taking a look at humor, sense of humor, and personality cor-

relates, the Big Five and that sort of thing. One other thing that I think is pretty neat is that when we get done, they know something that as Charles Brewer, a famous teacher of psychology, said, "That no other biped in the Universe knows". I tell my students, "You've created knowledge that did not exist until you did this research." The business about the word fragments being completed with death-related words, or not, that's an example. Nobody has done a study remotely like that—ever. Thus, they are in possession of brand-new knowledge. When I work with my students, I try to foster that idea, that we're putting together ideas that no one has come up with before. That's the sort of thing with the humor research—it leads students in a direction that nobody else has gone before.

I tell my students, "You've created knowledge that did not exist until you did this research."

Teaching of Psychology

Kubalik: Much of your research and publications are focused on the teaching of psychology. How has your work in this area influenced your teaching and how do you conceptualize the educational path of undergraduate students in your own teaching?

Beins: Well, I think that teaching is so much better now than it was when I was an undergraduate because teachers have more interest in teaching. The scholarship of teaching and learning, or the emergence of that type of scholarship, has meant that people can take teaching seriously. And particularly at schools oriented toward undergraduates, it has made a big difference. Since sometime around the early 1980's, psychology faculty have been more actively engaged with undergraduates doing research. That I think has made a big difference in the undergraduate experience. So the work and the reading that I've done convinces me that the active engagement allows students to flourish and to thrive in ways that simply sitting in a classroom won't. I think that the work I've done on the scholarship of teaching and learning has really raised my awareness of both what I can offer a student and also the limitations to what I can offer a student. Learning is a collaborative affair. In addition, there is as much an emotional aspect of learning as there is a cognitive aspect. That has become more and more apparent to me as time has gone on; you need this engagement with students, both cognitive and emotional to maximize learning. I think my exposure to this area and what I've done has really changed the way that I teach. I have always tried to incorporate active learning in

my classroom. I think that I have a better sense now of what works. Mostly what I teach are research-type courses. It's easy to get students actually doing things when you are teaching research and applications.

Kubalik: You previously mentioned research teams. Can you tell us more about the team you work with and the role of the research team at Ithaca College?

Beins: One of the things that the department stresses is that Research Teams are not simply a medium to get the professor's research done. Students don't come in simply as research assistants and the professor doesn't say, "OK. You do this, and you do that," but rather it is a vehicle for student learning. We take that idea very seriously. Every team functions a little bit differently, but in my team I'll come in and say to the students, "Here's the question I think we want to address. How do we go about doing it?" We will have a discussion of how we should do the study. We'll go out and find jokes, which is always enjoyable, and we will come back and have a discussion about which of these are going to work and get us where we want to go. We will also make the many small decisions, such as, "Here's our experiment, and how many jokes do we include?" We don't want to have too many, so people get bored. We don't want to have too few so we don't have reliability of measurements. So we spend a lot of time discussing how we will actually carry out this study? I let students spend time discussing things that are not particularly useful because it is important to know how to discern between "these are useful" and "these are not". Before we did computer studies, if we had three conditions, A, B, and C, we would color coordinate all of the materials. For instance, for Condition A everything would be on green paper all the paper for Condition B would be blue, and Condition C would be yellow. It is easier when you are in a rush to set up a testing session to pick up everything that is green; you know that you have the right material. And so, I remember one particular time, we probably spent half of an hour of the research team class that day figuring out what color should paper be, which you know, is an absolutely trivial decision and makes no difference to anything, but I think it's important for students to go through the discussion and then say to them, "OK, did we need to spend half of an hour doing this?" So we spend a lot of time talking about what seems to be nothing, but as part of a whole package, students learn, "this is important" and "this isn't," so again, they get a better sense of the details of how to do the study. That's how I orient my team and when the data come in, we analyze it and they write their papers. One of the nice things about research team is it extends over three semesters. It's not like many

[W]e spend a lot of time talking about what seems to be nothing, but as part of a whole package, students learn, "this is important" and "this isn't," so again, they get a better sense of the details of how to do the study.

places where you need to have your experiment done the 14 weeks of a semester, which often means collecting data in weeks 12 and 13 and analyzing it and writing it in week 14, which is not a good way to do it. But I can say to my students, "Well, you're coming back after break, so we'll finish up working then," so we don't have to have a rush job. I think the product ends up being better than it might otherwise be, and I don't have to worry about cutting off discussion when we are talking about what we should do. For the most recent study we collected data from 80 to 90 participants in the fall, but we needed more. We just waited until we came back for spring semester and finished up with another hundred. We didn't have to worry about running out of time.

Kubalik: You have also been involved with Division 2 of the APA, The Society for Teaching of Psychology, and have over 30 years of experience in teaching. What would you say are some of the advancements in the teaching of psychology since your own undergraduate experience?

Beins: One of the things that is clear is that there is more of everything. When I first started teaching, the only computers that were around were Apple IIs; they didn't even have a hard drive. I did some programming in BASIC and we collected data on the Apple IIs. Now there is a wealth of resources. There are data collection programs, like Survey Monkey and Qualtrics for more professional data collection. Even Google has a data collection form. There are lots and lots of resources, including the internet that we can use to bring materials into the classroom. I think this wealth of resources is probably the biggest change. There are also technical changes. In the old days, I would make slides. You guys have probably never used carousel slide projectors? Those used to be high tech. When I started, that's what we used when we wanted to display stimuli or when making a presentation at a conference. After that, there were overhead transparencies and now there's the internet. Every classroom, it seems, has internet access. There is more and more and more, although I'm not convinced that more material necessarily leads to better learning. You probably know

that there is too much information out there for you to absorb to begin with, so by giving you more, it's not guaranteed to enhance your knowledge. What I think is the most important thing, among psychologists, is the emphasis on critical thinking. In the past, when I was an undergraduate, they didn't ask us to think, they asked us to listen to them and give back to them what they thought we needed to know. I think it is a whole lot better now. It's like my research methods class where I ask questions like, "Well, why do you think this happened?" I emphasize that it is a judgment call. Maybe the students are coming up with the best explanation and maybe they're not, but they need to give it their best shot with their competing explanations. I think that the critical thinking approach has made a big difference, and I think students are better off for it. The technology is nice. It's a good toy for teachers, and I think that when people get excited about the technology, they may also get excited about their teaching, but I don't think the technology itself is going to make that much difference. It's the human element, the teacher getting excited and the students becoming engaged that makes the difference.

The technology is nice. It's a good toy for teachers, and I think that when people get excited about the technology, they may also get excited about their teaching, but I don't think the technology itself is going to make that much difference. It's the human element, the teacher getting excited and the students becoming engaged that makes the difference.

behavior, the limitations to conclusions you draw based on data, and the need to use a lot of different sources. I am hoping that when students graduate, they recognize the complexities of things, and they recognize that they have to ask questions about, "How do we know this is true? Where did this information come from?" My big hope is that, first of all, they know how to ask questions and get answers, and then they develop the second part of the whole constellation of skills--being able to communicate what they know and pursue questions beyond the obvious.

Kubalik: In your courses you emphasize the integration and impact of research on society. How do you feel that your own research has made an impact?

Beins: My humor research has probably made zero impact beyond the three people who have read it. My work on the scholarship of teaching and learning may have helped psychology teachers. Whatever impact I may have had will have been in the area of the scholarship of teaching and learning, developing activities for critical thinking and that sort of thing. I heard something years and years ago that I don't actually know is true, that the average journal article is read by one person. It would probably be folly to think that anything I've done has made an impact that's going to revolutionize anybody's thinking, but I think I've made a few small contributions here and there in terms of teaching enterprise and critical thinking.

Kubalik: What would you say would be your greatest contribution then, as far as your research? What contribution has brought you the most satisfaction?

Beins: Probably the recent research that I did with Jeff Holmes, a colleague at Ithaca, on psychology in scientific literacy. I think that's something people need to know, something people outside of psychology need to know.

Professional Career

Kubalik: You have held various positions in APA. What do you feel is the accomplishment that brought you the most satisfaction during your employment with APA?

Beins: One of the things I think that has had a very big impact is the learning outcomes for psychology majors. The APA had a task force on undergraduate outcomes when I was there. I participated on the task force, and I think that may have very far-reaching impact. I know that a lot of psychology programs have adopted the learning outcomes as "the guide" for the way they orient their curriculum. I think that may be the high point of my work at

Kubalik: Your lecture at this conference and much of your research emphasizes the role of critical thinking in the education process. What do you think is the value of critical thinking skills for students as they move beyond their undergraduate careers?

Beins: I am hoping that students, by the time they graduate, stop accepting things blindly. It's sort of interesting watching the students, particularly first-year students. First-year students are dichotomous thinkers, there is a right answer and there is a wrong answer. For example, when I teach intro psych, a lot of times students don't get it that there is not going to be a single best answer. They just want to know what is the correct answer. As students go through the program, they recognize the variability in human

APA.

Kubalik: In 2004, you served as President of Division 2 of APA, what are you most proud of accomplishing during your presidential year?

Beins: That's a good question. It's been long enough that I am having a hard time dredging up what actually happened during that year because a lot was going on. I think the initiatives on the scholarship of teaching and learning have been important. Of course, all of this is incremental; it is part of a whole; it's not something that I did alone, but rather I was part of this ongoing path, this stream. I think I'm most proud of my contributions to the scholarship of teaching and learning that took place.

Kubalik: You are also a member of the Committee for the Strengthening of Psychological Literacy. What do you hope to accomplish through your involvement with the committee?

Beins: We don't know yet. The process has been ongoing, so I don't know what the ultimate goal will be. I think it's probably creating more awareness that psychology is a tool for getting people to think critically and scientifically and for being able to evaluate how we think about things. So I think in a general sense, that's what the task force is all about.

Kubalik: One of your current projects is editing the teaching section of the Journal of the History of Psychology. What are you hoping to do with this project?

Beins: That's a lot of fun. I've always been interested in the history of psychology, and I'm hoping that this section will let people know that history isn't something that just came and went. A lot of the things about the history of psychology, from a century ago, are still having a direct or an indirect impact on psychology now. The article that I wrote for that section of the journal was on intelligence and the conceptualizations of intelligence since James McKeen Cattell back in the 1890's when he coined the term *mental test* and how people have tried to measure what they thought intelligence is. There was a high degree of failure because it's a complicated concept. In 1923, the psychological historian E. G. Boring was asked, "What is intelligence?" His response was, "Intelligence is what intelligence tests measure." We still don't know what intelligence is, but we still try to measure it. They are smart psychologists, and they come up with good measurement techniques, but they all have limitations. Sometimes the ideas fall by the wayside, but the ideas continually change. One of the things I think is important for students to learn is psychology isn't static. So that when you measure intelligence now, using the Stanford-Binet, or the WAIS or the WISC, that's

One of the things I think is important for students to learn is psychology isn't static... History provides examples of how things not only do change, but they must change.

just what we use now, and it may not be the same 50 years from now. By bringing history into contemporary classes, talking about common current constructs and concepts, it lets students know that people think about things in different ways and that we are not locked into thinking about it in the same way now and forever. History provides examples of how things not only do change, but they must change.

Kubalik: What are the professional accomplishments, throughout your career you are most proud of?

Beins: I started the Northeastern Conference for Teachers of Psychology--a teaching conference. For the first 5 years, it was held at Ithaca College. When I left to work at APA for a couple of years, it became affiliated with the New England Psychological Association Convention. Now it's a preconference teaching institute. I'm pleased with the role I had in starting that event. I have enjoyed being a participant in APA's national meetings devoted to undergraduate education. In 1991, I was part of what was called the St. Mary's Conference at St. Mary's College in Maryland and then in 1999, I was part of the Psychology Partnership Project that met at James Madison University, and most recently at the University of Tacoma in Tacoma, Washington for the National Conference of Undergraduate Education of Psychology. I was honored to be a participant in all of those.

Personal Life

Sepers: I had the privilege of speaking with your wife, Linda, while attending the National Conference for Undergraduate Research in Ithaca a few weeks ago. She mentioned your love of eclectic books and the book club that has grown from that interest. How did this begin and what are exactly are you reading?

Beins: How did it begin? I enjoy reading non-fiction and a number of my good friends and colleagues do as well. At one point, we got together and Suzie Baker from James Madison University said, "Oh, what are you reading now?" and I responded. She said, "We ought to start a book group," because she enjoys the same types of books. So we started an online reading group called the *BOB Group*. BOB stands for Barney's Obscure Books. What we do is select a book everybody will read and we comment on it via

email. Actually, not everybody reads every book, but not reading it doesn't mean they don't comment. People are free to say anything they want. Over the past 4 years, we have read a couple of dozen books on various topics. The nature of the books is such that you might think that nobody would be interested in them, but they are actually a fascinating collection of books. One of them was a real high point. It is called *The Ghost Map* and is about the cholera epidemic in London in the mid 1850's. It was an absolutely fascinating book. One of the characters in the book, John Snow, was the one who identified cholera as being a water-borne disease. His work is very well known in epidemiological research. The book was well written, and the story was riveting. We read a book called *Stiff* by Mary Roach. The subtitle is *The Curious Lives of Human Cadavers*. It's a book about what people do with cadavers after people die. One of the uses is forensic investigation of the decomposition of bodies, which is done at the body farm in Tennessee. Various researchers use cadavers to look at decomposition, and they've used cadavers as crash test dummies. There are some surprising things in the book, which was marvelous. What we've done over the past 4 years is when we're finished with one book, we'll say, "OK, what do we want to read next?" People have no shortage of suggestions. One of the things that might be coming up for the next book is called *Sleights of Mind*, which is a book about the neuroscience of magic. A couple of neuroscientists actually started studying and working with magicians to figure out why people fail to see these magical things. Some of it is gimmick, of course, but some of it is perceptual and cognitive. Magicians just redirect your focus to something so they can carry out something unbeknownst to you. The interesting books of course are always the ones that are about more than just what the title suggests. We have had a lot of very interesting and wide-ranging conversations about the books.

Sepers: Your "lunchbox" basketball games are a well-documented affair. How did "lunchbox" basketball get its start? How long have you been playing? I hear you have a mean hook shot.

Beins: Well, the game was in existence long before I got to Ithaca College, but every day at noon, people show up and whoever shows up, plays. I have been playing at least three times a week and when I can, five times a week, since 1986.

Sepers: In closing, the Beins garden—what is it that you grow and is this a stress-relief activity or a scientific pursuit?

Beins: Since my life is spent doing things that I like doing, I don't have much stress, so I don't have anything that I need to use for relief. My garden is just because it's fun. I like doing it. Every year we grow garlic, and onions, peppers, tomatoes, beets, lettuce, spinach, the usual kinds of things. Until recently, when I put up a more or less permanent fence, we shared too much of it with the deer, but I think I have solved that problem, at least temporarily, so we do get some produce from the garden.

Invitation to Contribute to the Special Features Section—I

Undergraduate students are invited to work in pairs and contribute to the Special Features section of the next issues of the *Journal of Psychological Inquiry*. The topic is:

Evaluating Controversial Issues

This topic gives two students an opportunity to work together on different facets of the same issue. Select a controversial issue relevant to an area of psychology (e.g., Does violence on television have harmful effects on children?—developmental psychology; Is homosexuality incompatible with the military?—human sexuality; Are repressed memories real?—cognitive psychology). Each student should take one side of the issue and address current empirical research. Each manuscript should make a persuasive case for one side of the argument.

Submit 3-5 page manuscripts. If accepted, the manuscripts will be published in tandem in the *Journal*.

Note to Faculty:

This task would work especially well in courses that instructors have students debate controversial issues. Faculty are in an ideal position to identify quality manuscripts on each side of the issue and to encourage students to submit their manuscripts.

Procedures:

1. All manuscripts should be formatted in accordance with the APA manual (latest edition).
2. Include a sponsoring statement from a faculty supervisor. (Supervisor: Read and critique papers on content, method, APA style, grammar, and overall presentation). The sponsoring statement should indicate that the supervisor has read and critiqued the manuscript and that writing of the essay represents primarily the work of the undergraduate student.
3. Submit your manuscripts online (<http://www.edmgr.com/jpi>) as a Special Features: Controversial Issues submission.

Invitation to Contribute to the Special Features Section—II

Undergraduate students are invited to contribute to the Special Features section of the next issue of the *Journal of Psychological Inquiry*. The topic is:

Conducting Psychological Analyses – Dramatic

Submit a 3-5 page manuscript that contains a psychological analysis of a television program or movie.

Option 1—Television Program:

Select an episode from a popular, 30-60 min television program, describe the salient behaviors, activities, and/or interactions, and interpret that scene using psychological concepts and principles. The presentation should identify the title of the program and the name of the television network. Describe the episode and paraphrase the dialogue. Finally, interpret behavior using appropriate concepts and/or principles that refer to the research literature. Citing references is optional.

Option 2—Movie Analysis:

Analyze a feature film, available at a local video store, for its psychological content. Discuss the major themes but try to concentrate on applying some of the more obscure psychological terms, theories, or concepts. For example, the film *Guess Who's Coming to Dinner?* deals with prejudice and stereotypes, but less obviously, there is material related to attribution theory, person perception, attitude change, impression formation, and nonverbal communication. Briefly describe the plot and then select key scenes that illustrate one or more psychological principles. Describe how the principle is illustrated in the movie and provide a critical analysis of the illustration that refers to the research literature. Citing references is optional.

Procedures:

1. All manuscripts should be formatted in accordance with the APA manual (latest edition).
2. Include a sponsoring statement from a faculty supervisor. (Supervisor: Read and critique papers on content, method, APA style, grammar, and overall presentation). The sponsoring statement should indicate that the supervisor has read and critiqued the manuscript and that writing of the essay represents primarily the work of the undergraduate student.
3. Submit your manuscripts online (<http://www.edmgr.com/jpi>) as a Special Features: Conducting Psychological Analyses – Dramatic submission.

Invitation to Contribute to the Special Features Section—III

Undergraduate students are invited to contribute to the Special Features section of the next issue of the *Journal of Psychological Inquiry*. The topic is:

Conducting Psychological Analyses – Current Events

Submit a 3-5 page manuscript that contains a psychological analysis of a current event. News stories may be analyzed from the perspective of any content area in psychology. The manuscript should describe the particular event and use psychological principles to explain people's reactions to that event.

Example 1: Several psychological theories could be used to describe people's reactions to the destruction of the World Trade Center on September 11, 2001. Terror management research has often shown that after reminders of mortality people show greater investment in and support for groups to which they belong and tend to derogate groups that threaten their worldview (Harmon-Hones, Greenberg, Solomon, & Simon, 1996). Several studies have shown the link between mortality salience and nationalistic bias (see Greenberg, Simon, Pyszczynski, & Solomon, 1992). Consistent with these findings, the news reported that prejudice towards African Americans decreased noticeably after 9/11 as citizens began to see all Americans as more similar than different.

Example 2: A psychological concept that could be applied to the events of September 11 would be that of bounded rationality, which is the tendency to think unclearly about environmental hazards prior to their occurrence (Slovic, Kunreuther, & White, 1974). Work in environmental psychology would help explain why we were so surprised by this terrorist act.

The analysis of a news event should include citations of specific studies and be linked to aspects of the news story. Authors could choose to apply several psychological concepts to a single event or to use one psychological theory or concept to explain different aspects associated with the event.

Procedures:

1. All manuscripts should be formatted in accordance with the APA manual (latest edition).
2. Include a sponsoring statement from a faculty supervisor. (Supervisor: Read and critique papers on content, method, APA style, grammar, and overall presentation). The sponsoring statement should indicate that the supervisor has read and critiqued the manuscript and that writing of the essay represents primarily the work of the undergraduate student.
3. Submit your manuscripts online (<http://www.edmgr.com/jpi>) as a Special Features: Conducting Psychological Analyses – Current Events submission.