

# Journal of Psychological Inquiry

## Volume 2, 1997

### Contents

Acknowledgement - Institutions and Organizations .....	2
Acknowledgement - Reviewers .....	3
Instructions for Contributors .....	4
Immediate Versus Delayed Memory Testing on a Multimedia Presentation	
<b>Chad A. Phipps</b> .....	5
Stroop Effect in Long Term Memory	
<b>B. Jean Mason</b> .....	8
Effects of Self-Efficacy Sources on Pain Tolerance in a Cold Pressor Test	
<b>Kristi J. Kiel</b> .....	13
Effects of Music Videos and Age on Aggressive Word Recall	
<b>H. Todd Feaster</b> .....	18
Personality Variables, Stressors, and Sociocultural Influences Affecting Premenstrual Syndrome	
<b>Heather Sabo</b> .....	22
The Influential Life and Career of Eleanor Emmons Maccoby	
<b>Rachael Robinson</b> .....	26
William James on Free Will and Determinism	
<b>Tania D. Maggart</b> .....	30
Writing is Revision: Will I Ever Really be Done with this Paper?	
<b>Richard L. Miller</b> .....	35

## Acknowledgement - Institutions and Organizations

The following institutions and organizations contributed financially to the *Journal of Psychological Inquiry* during academic year 1995-96. We gratefully acknowledge their valuable support.

Arkansas State University	Northeastern State University
Benedictine College	Oklahoma City University
Creighton University	Ouachita Baptist University
Doane College	Rockhurst College
Emporia State University	Saint Louis University
Harding University	Southwest Missouri State University
Hastings College	Stephens College
Iowa State University	University of Missouri - Columbia
John Brown University	University of Missouri at Kansas City
Kansas State University	University of Nebraska - Lincoln
Missouri Southern State College	University of Nebraska at Kearney
Missouri Valley College	Washburn University
Missouri Western State College	Washington University
Nebraska Wesleyan University	Wayne State College
North Central Missouri College	
Nebraska Psychological Society	Association for Psychological and Education Research in Kansas

### 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

## 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.

Paul D. Ackerman - Wichita State University

Mary Beth Ahlum - Nebraska Wesleyan University

Julie Allison - Pittsburg State University

Brian Babbitt - Missouri Southern State College

Steve Brown - Rockhurst College

Thomas Lee Budesheim - Creighton University

John Burden - McPherson College

Jennifer Burleson - Emporia State University

Kevin Byrd - University of Nebraska at Kearney

Chuck Eigenberg - Hastings College

Cleveland Evans - Bellevue University

Marcia Freer - Doane College

Joel Freund - University of Arkansas

Betsy Griffin - Missouri Southern State College

Dori Hilker - Emporia State University

Loreen Huffman - Missouri Southern State College

Matthew T. Huss - University of Nebraska - Lincoln

Ted Jaeger - Westminster College

Robert Johnson - Arkansas State University

Merrell Junkins - Missouri Southern State College

M. James Klingsporn - Wichita State University

Jason Kring - Emporia State University

William Lammers - University of Central Arkansas

Gary K. Leak - Creighton University

Cy Leise - Bellevue University

Tim Maxwell - Hendrix College

Bob McDermid - Missouri Southern State College

Charles Merrifield - Kansas Newman College

Sharon Mockenhaupt - Emporia State University

Rod Peters - Doane College

Kim Pulvers - Midwestern State University

Teri Richardson - Emporia State University

Raymond Russin - Bethany College

Brian Schrader - Emporia State University

Donna Stuber - Friends University

William Sturgill - Rockhurst College

Roxanne Sullivan - Bellevue University

Theresa Wadkins - University of Nebraska at Kearney

Theresa Wozencraft - Midwestern State University

## Instruction for Contributors

The *Journal* 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, or the Arkansas Symposium for Psychology Students.
3. Send original manuscripts only. Do not send 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. The *Journal* requires four (4) manuscripts in near letter quality condition using 12 point font. Faded or poor quality printing may be grounds for returning materials without review.
7. Insert a self-addressed, stamped postcard. On the reverse side of the card, write the name of the primary author and the title of the manuscript.
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).
9. Include a self-addressed stamped envelope of proper size and with sufficient postage to return all materials.
10. On a separate sheet, type the following information:
  - (a) Names, current addresses, and phone numbers of all authors
  - (b) Name and address of your school
  - (c) Name, phone, and address (if other than your school) of your faculty supervisor
  - (d) Permanent address and phone number (if different from current) of primary author.
11. Ordinarily, the review process will be completed in 60 days.
12. If the editor returns a manuscript that 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.

Send submissions to:

Mark E. Ware, Managing Editor  
*Journal of Psychological Inquiry*  
 Department of Psychology  
 Creighton University  
 Omaha, NE 68178

Checklist:

- \_\_\_\_\_ Four copies of the manuscript (#6)
- \_\_\_\_\_ Self-addressed, stamped postcard (#7)
- \_\_\_\_\_ Sponsoring statement by a faculty supervisor (#8)
- \_\_\_\_\_ Self-addressed, stamped envelope for the return of all materials (#9)
- \_\_\_\_\_ Names and addresses of authors and sponsor (#10)

# Immediate Versus Delayed Memory Testing on a Multimedia Presentation

Chad A. Phipps

Missouri Southern State College

---

*Prior research about multimedia education has focused on components such as narration and animation (Mayer & Anderson, 1992) or long-term effects (Stoloff, 1995). Because no research was found that investigated one-time multimedia presentation nor the retention of such information when tested 2 and 19 days later, the present study focused on those issues. An introductory Shakespeare unit was taught to high school students using a multimedia format with handout, a multimedia format without handout, and conventional instruction with handout (control group). Students were tested 2 and 19 days following the presentation. Students' interest in the topic was higher for the multimedia groups than for the control group ( $p < .01$ ), but the multimedia groups' overall performance and confidence level were not different from the control group.*

---

With the increased amount of information technology, one should not be surprised that such technology has started to appear in educational settings. Although the traditional lecture method is still the most widely used teaching technique, this new technology provides alternative ways to present information. A multimedia format is one such example.

Kanning (1994) defines multimedia as a combination of video, sound, graphics, still photography, animation, and text. The two basic types of multimedia product are interactive and noninteractive. Interactive multimedia is defined as "a computer interface in which the user's responses and choices direct the computer's presentation" (Kanning, 1994, p. 40). The noninteractive program does not allow viewer choices. Such an approach is similar to a movie in that it presents only what is programmed. According to Burns (1990), the way material is presented is important because it ultimately affects student retention, as well as how well students recall key terms. By using multimedia, teachers can use several channels through which to present information. Multimedia also provides a more sophisticated approach to "related information," which Hanson (1989) defined as a "pictorial representation of an object and a verbal description of the object" (p. 15). Such an approach, combining audio, moving pictures, graphics, and text, may increase students' comprehension.

Redundancy is one key to learning and retention. Reese (1983) found that students learned most from newscasts that provided redundant audio and video material. Drew and Grimes (1987) reported that greater audio and video redundancy produced an increase in recall and a better understanding of the material.

More specific research by Mayer and Anderson (1992) demonstrated that when animation and narration were presented concurrently with instruction, college students showed greater improvement in problem solving than those who received no instruction. In addition, students exposed to concurrent audio and video presentations better understood the workings of a pump or brake.

In another study, Mayer and Sims (1994) used a dual-coding theory of multimedia learning. The authors observed that some students were "better able to transfer what they had learned about a scientific system when visual and verbal explanations were presented concurrently than when visual and verbal explanations were separated" (Mayer & Sims, 1994, p. 399). They also cited a large body of evidence showing that students learned more when text and illustrations were shown together. These results indicated that retention and understanding increased when using multiple forms of presenting information.

Rock and Cummings (1994) examined the use of laser disks to aid in teaching science classes. The laser disks showed difficult dissections that otherwise would have been viewed only through still photographs. The investigators reported that high school students' self-confidence and enthusiasm for science increased with multimedia presentations, as did teacher enthusiasm for improving student outcomes.

A more extensive investigation of multimedia teaching was conducted by Stoloff (1995), who found the use of multimedia in a college classroom did not enhance performance on exams. Stoloff taught a college physiological psychology course for an entire semester using a multimedia approach. The results for the semester taught

---

Brian Babbitt from Missouri Southern State College was the faculty sponsor for this research project.

by multimedia were compared to those of a previous semester taught using a lecture style approach. According to Stoloff, the failure to find a difference between the two approaches may have been, in part, because of a ceiling effect.

Prior research has focused on components such as narration and animation (Mayer & Anderson, 1992) or long term effects of multimedia teaching (Stoloff, 1995). To date, no research has been conducted on the effects of a one-time multimedia presentation and the retention of such information 2 and 19 days later. The focus of this study was to address these issues.

This research used high school students to determine the effects of multimedia teaching techniques versus the more traditional lecture and handout approach. The hypotheses were that (a) participants in the multimedia groups would show higher levels of retention than would participants in the non-multimedia group, (b) participants in the multimedia groups would show greater confidence in their answers than those in the non-multimedia group, and (c) participants in the multimedia groups would rate the presentation more interesting than those in the non-multimedia groups.

## Method

### *Participants*

Forty-three students in a rural, midwestern high school of approximately 800 students participated in the study. Participants were eleventh grade students, ages 17 and 18 years, who were enrolled in a Language Arts III class. Teacher cooperation and administrative consent were obtained. Because of the large number of students under the age of 18 years, informed consent was obtained from parents. The cooperating teacher provided extra credit to those who participated.

### *Materials*

The multimedia presentation was designed to provide information about the life and works of William Shakespeare. Presentation was on a Macintosh 660AV using Astound (1993) presentation software and displayed on a screen using a Dukane 4000 overhead projector and a Sharp 1650 LCD display panel. The presentation itself was developed from a series of handouts traditionally used by the cooperating teacher. The presentation included text, graphics, music, and 13 color and 2 black and white scanned photographs. These pictures included Shakespeare's birthplace, Ann Hathaway's cot-

tage, the Globe Theatre, and others. Five movie clips from *Hamlet*, *Much Ado About Nothing*, *Henry V*, and *Macbeth* were digitized for computer presentation. The length of clips varied from 30 to 75 s. The multimedia presentation was designed to aid the teacher in explaining the material. At the same time, interactive buttons allowed the teacher to control the program and the pace of the lecture. A test over the material consisted of 10 multiple choice, 7 matching, 11 short answer, and 9 true-false items.

Participants were asked to answer each question and rate their confidence in the correctness of their answer using a scale from 1 (*very confident the answer was wrong*) to 7 (*very confident the answer was correct*). A rating of four indicated the answer was a guess. One additional question asked participants to rate, on a seven-point scale, how interesting they found the presentation and another how much they felt they had learned.

The participants were assigned to one of three groups. Each group met at the hour in the day during which it had class. The first experimental group (MH,  $n = 14$ ) received the lecture using a multimedia approach and handout. The handout outlined the material and provided a place to take notes for further explanation. The second experimental group (MN,  $n = 11$ ) also received the lecture using a multimedia approach but did not receive the handout; this group was responsible for greater note taking. The regular instruction, control group (RI,  $n = 18$ ) was presented a Shakespeare introductory unit with a traditional lecture and handout method. All three presentations lasted the entire 50-minute-class period for each group.

Two days after the material was presented, participants were given the first test. The students were administered the same test 19 days after the presentation. The tests were administered in the regular classroom. The study was a 3 (Type of Instruction) x 2 (Delay of Test) factorial design with repeated measures on the second variable.

## Results

A mixed ANCOVA was computed on the retention measures, in part, to accommodate the use of intact groups. The students' percentage grade in the class at the time of testing was the covariate. No significant differences were found (all  $p$ 's > .10) for the type of instruction or delay of test variables.

There were no differences in confidence in answers on the test as a function of the type of presentation. This result did not support the second hypothesis. However students in the multimedia groups were more confident in their correct answers ( $M = 6.1$ ) than their incorrect answers ( $M = 4.9$ ). There was a similar finding the second time the test was administered; the mean for correct and incorrect answers was 5.9 and 5.0, respectively.

An ANCOVA was also done on the student ratings of their interest level in the topic. There was a difference depending on the type of instruction,  $F(2, 39) = 5.9, p < .01$ . A Newman-Keuls post-hoc comparison revealed that both multimedia groups rated the presentations significantly more interesting (MH,  $M = 6.0$ ; MN,  $M = 6.2$ ) than the RI group ( $M = 4.8$ ).

An ANCOVA was computed for the ratings of how much students thought they learned. There were no significant differences.

### Discussion

The results from this study parallel the findings from Stoloff (1995) who found no difference in multimedia and traditionally taught college classes. The multimedia teaching conducted in the present experiment was similar to that which Stoloff employed; the instructor was in control of the pace at which the material was taught. One difference was that Stoloff taught an entire college semester compared to the single class period used in the present study. One implication is that neither a lesser nor a greater amount of exposure aids in increasing learning.

The outcomes of the two studies failed to demonstrate that either traditional or multimedia teaching approaches is superior. The lack of differences between the approaches might be attributed to a lack of sensitivity in the dependent variable. The results might also be attributed to a ceiling effect; students in all three groups scored consistently high on the tests. Using a multimedia program in the classroom can still be very efficient because it provides the instructor with a more flexible platform. For example, showing pictures, video, text, and sound is much easier if all are combined in one program.

A methodological limitation in the study was the use of intact groups. Random assignment of participants to groups is the ideal. However, in this case, random assignment was not possible. To help reduce the undesirable consequences of using intact groups, analysis of covariance was used. However, this procedure does not eliminate threats to internal validity.

The results from this study do not support either of two views concerning multimedia teaching. The first view is that the use of multimedia in the classroom will increase retention. The second view is that the large quantity of technical equipment used in a multimedia approach will distract from learning. The results failed to indicate that multimedia presentation was inferior to lecturing. An encouraging finding in this study was that students in the multimedia groups indicated a higher interest level toward the material than did students who received the lecture. This result may suggest that with increased use of technology, teachers may need to include multimedia approaches to maintain student interest. However, because only 21% of school districts currently have the resources to provide this type of instruction (Rock & Cummings, 1994), schools will have to invest considerable amounts of money to implement this technology. Findings to date do not offer much support for such an investment.

### References

- Astound Ver 1.0 [Computer software]. (1993). Streetsville, Ontario, Canada: Gold Disk Inc.
- Burns, R. A., (1990). Designing presentations to help students remember. *Journal of College Science Teaching, 14*, 301-305.
- Drew, D. G., & Grimes, T. (1987). Audio-visual redundancy and TV news recall. *Communication Research, 14*, 452-461.
- Hanson, L. (1989). Multichannel learning research applied to principles of television production: A review and synthesis of the literature. *Educational Technology, 29*(10), 15-19.
- Kanning, R. G. (1994). What multimedia can do in our classrooms. *Educational Leadership, 51*(7), 40-44.
- Mayer, R., & Anderson, R. (1992). The instructive animation: Helping students build connections between words and pictures in multimedia learning. *Journal of Educational Psychology, 84*, 444-452.
- Mayer, R., & Sims, V. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of multimedia learning. *Journal of Educational Psychology, 86*, 389-401.
- Reese, S. D. (1983). *Improving audience learning from television news through between-channel redundancy* (ERIC Document Reproduction Service No. ED 229 777).
- Rock, H., & Cummings, A. (1994). Can videodiscs improve student outcomes? *Educational Leadership, 51*(7), 46-50.
- Stoloff, J. (1995). Teaching physiological psychology in a multimedia classroom. *Teaching of Psychology, 22*, 138-141.

# Stroop Effect in Long Term Memory

B. Jean Mason

*University of Nebraska at Kearney*

---

*The Stroop phenomenon is a mental delay or error in identifying a color name that was printed in an incongruent color. This experiment explored the phenomenon in conjunction with long term memory. Eighty-one undergraduate psychology students performed a Stroop memory using a computerized presentation of color names followed by a distracter task. A recognition test measured reaction time and accuracy of responses. The hypotheses were that (a) participants would have faster response times for color names that were not used in the stimulus presentation than for those color names or text print colors, (b) participants would less accurately recognize text print colors than color names used in the stimulus presentation, and (c) participants who were presented the stimuli for a longer duration would more accurately recognize color names previously viewed than text print colors. The results indicated that participants had longer reaction times to names that were not used in the stimulus presentation and that they more accurately recognized these distracter names and color names than text print colors.*

---

The Stroop phenomenon is an interference effect between conflicting visual stimuli. More specifically, naming speed is slowed when a word that spells the name of one color is printed using a different color of ink (Stroop, 1935). Most explanations of the Stroop phenomenon hypothesize attentional difficulties at the sensory or short-term memory level (MacLeod, 1991). However, attentional interference might extend to encoding and other long-term memory processes. Previous studies have not examined the Stroop phenomenon using long term memory.

Stroop research has examined the effects of reaction time for incongruent and congruent color word stimuli (Head & Pedoe, 1990; Shimada, 1990). An incongruent color word stimulus is the name of a color printed in a different color print (e.g., the word blue printed in green ink), whereas a congruent color word stimulus is the name of a color printed in the same color (e.g., the word blue printed in blue ink). According to Head and Pedoe (1990), the reaction time for incongruent color word stimuli were longer than for the congruent color word stimuli, but they found no difference between the two in

the number of errors made. Shimada (1990) also found that reaction times were longer for incongruent color word stimuli, regardless of the addition of auditory stimuli. Both studies provided evidence for increased reaction times that supported findings with the Stroop phenomenon for incongruent color word stimuli. In an additional study testing verbal reading of the Stroop task (Shimada & Nakajima, 1991), participants found it easier to name the color of the text print than the name of the color word in an incongruent stimulus.

Previous research on long term memory suggests similarity, mental images, familiarity, and order recognition. Nairne and Neumann (1993) found higher order retention when lists contained similar versus dissimilar items. These findings suggest that participants need to access the correct representation in memory. Memory access is easier when all items share a common feature, such as color words. Brandimonte, Hitch, and Bishop (1992) concluded that ease in naming an object increased the memory for that object. These findings are consistent with a study by Cowan (1993) who found that long term lexical familiarity has a great impact on whether knowledge will be activated in a short term task. Another study on long term memory (Daniels & Ellis, 1974) showed increases in recognition performance for short delay tasks and a slight decrease in performance for longer delay tasks. In examining long term memory using the Stroop phenomenon, one can study the memory encoding and retrieval process of conflicting visual stimuli.

Traditional Stroop studies (see MacLeod, 1991) have dealt primarily with the effects on short term or sensory memory. In the original Stroop task, the dependent measures were the time required to verbalize incongruent word stimuli and the number of errors in this verbalization. No studies have examined recognition or recall of Stroop stimuli using long term memory.

---

I am grateful to Victoria Dugger and Christina Mash for initial research and Dr. Robert Rycek for assistance with manuscript preparation. The results of this study were presented at the 15th Annual Great Plains Students' Psychology Convention, Emporia, KS, April 1995.



The purpose of this study was to examine the effects of the Stroop phenomenon on long term memory by measuring reaction times and recognition of color names using two different stimulus presentation times. Because of possible interference between actual color names and text print color names, the hypothesis was that reaction time would be greater for color names and text print colors actually presented, than for distracter color names that were not used during the stimulus presentation. Another hypothesis was that participants would less accurately recognize text print colors versus color names actually presented. The third hypothesis was that participants, who were presented the stimulus for 0.5 s versus 2.5 s, would be less accurate in recognizing color names that were actually presented.

## Method

### Participants

The 81 participants in this experiment were 38 male and 43 female undergraduate students enrolled in introductory psychology classes at the University of Nebraska at Kearney. Only participants with self-reported accurate color vision were used in this study. The participants were randomly divided into one of two treatment conditions. In one of these groups, the results of one participant was discarded because of a failure to follow directions. All participants received extra credit points in exchange for their participation.

### Procedure

When participants arrived at the testing site, a small room containing a desk, chair, and computer with color monitor, they were asked to sign a consent form and wait their turn to complete the experiment. Participants entered the testing room individually and were told to follow the directions on the computer. Although each participant was given unlimited time to complete the experimental task, most participants finished in three to five minutes.

The procedure consisted of a computer-based presentation designed to test memory of color names presented in a different text print color. The colors used in the text print for the stimulus presentation were formulated using a Macintosh Performa with a color monitor. The program began with directions to the participant that read: "You will be shown a series of color names. Your task is to remember which color names you see." When they were ready to begin, participants pressed a key, and eight color names in incongruent text print colors were

presented, one at a time. Half the participants had a half second stimulus presentation, whereas the other half had a two second stimulus presentation. The color names were presented in 72 point bold print font in a text print color that was different than the color name.

Following stimulus presentation, all individuals participated in a distracter task to ensure they were accessing long term memory. The distracter task gave directions to count out loud backwards by 3s, starting with the number 150. The distracter task lasted 30 seconds.

At the conclusion of the distracter task, participants were given instructions that read: "You will be shown, one at a time, a list of color names. Respond as quickly as possible yes (Y) or no (N) as to whether you previously saw the color name." One at a time, 24 color names in 72 point bold print font were presented in black on a white background. After each color name was shown, participants pressed a key indicating whether they had previously viewed the color name. Following a response, a new color name was shown. The 24 color names consisted of 8 color names that had been shown in the stimulus presentation, 8 text print color names used in the stimulus presentation, and 8 distracter color names that had not been used in any capacity during the stimulus presentation. Three individuals selected the 24 color names (see Table 1) from a collection of paint samples. The 24 colors were chosen based on ease of recognition, common labeling, and variety of hues. These 24 colors were then randomly assigned to one of the three conditions.

Table 1  
*Color Status for Words*

Color Name	Text Print Color	Distracter Color Name
beige	red	brown
green	violet	mustard
purple	yellow	khaki
maroon	peach	pink
lavender	olive	navy
blue	rust	turquoise
orange	lime	tan
fuchsia	sky	gray

### Design

The design of the experiment was a 2 x 2 x 3 mixed factorial with two between-subject and one within-sub-

ject variables. The between-subject variables consisted of gender (men or women) and stimulus presentation time (0.5 s or 2.0 s). The within-subject variable was color status (color names, text print colors, and distracter color names). Dependent variables were the reaction time required for each response and the number of correct responses about color names.

### Results

The results of ANOVA calculation on the reaction time data yielded a significant main effect for color status,  $F(2, 152) = 22.08, p < .001$ . Simple effects analyses showed that the distracter color names' condition caused a significantly longer reaction time ( $M = 1.27$  s) than the text print colors' condition ( $M = 1.11$  s),  $t(79) = 5.80, p < .001$ , or the color names' condition ( $M = 1.06$  s),  $t(79) = 4.67, p < .001$ . Reaction times for the text print colors' condition and the color names' condition were not significantly different,  $t(79) = 1.45, p = .15$ . There were no significant differences in reaction times for gender, stimulus presentation time, nor the interaction between the two.

Analysis of the correct response data yielded a significant interaction between gender, stimulus presentation time, and color status,  $F(2,152) = 4.94, p < .001$ . The interaction (see Figure 1) was primarily because of the main effect, color status. Using a post hoc probability of .01 to control for familywise Type I error, simple effects comparisons showed that color names ( $M = 7.35$ ) was significantly different from text print colors ( $M = 6.36$ ),  $t$

(79) = 6.61,  $p < .001$  but was not significantly different from distracter color names ( $M = 7.24$ ),  $t(79) = .96, p = .34$ . Text print colors was also significantly different from distracter color names,  $t(79) = 5.99, p < .001$ . In other words, participants more accurately recognized distracter color names and color names than text print colors. The lesser accuracy in recognizing text print names than color names was consistent with the original hypothesis. However, the 0.5 s-male condition accounts for the other part of the interaction. Simple effects analyses indicated that for distracter color names, the 0.5 s-male condition was significantly different from the other three distracter color names' conditions combined,  $t(78) = 2.72, p < .008$ . In general, those in the 0.5 s-male group less accurately identified distracter color names. This result suggests that there may be a difference between men and women concerning the ability to correctly discriminate color names not actually presented as part of the original stimulus. There were no significant differences in correct responses for any main effects or other interactions.

### Discussion

The results did not support the hypothesis that reaction time would be longer for color names and names of text print colors actually used in stimulus presentation than for distracter color names. Contrary to expectation, the exact opposite was true. Distracter color names required longer reaction time to respond to than did actual color names and text print color names. Related to the reaction time data, participants were more accurate in

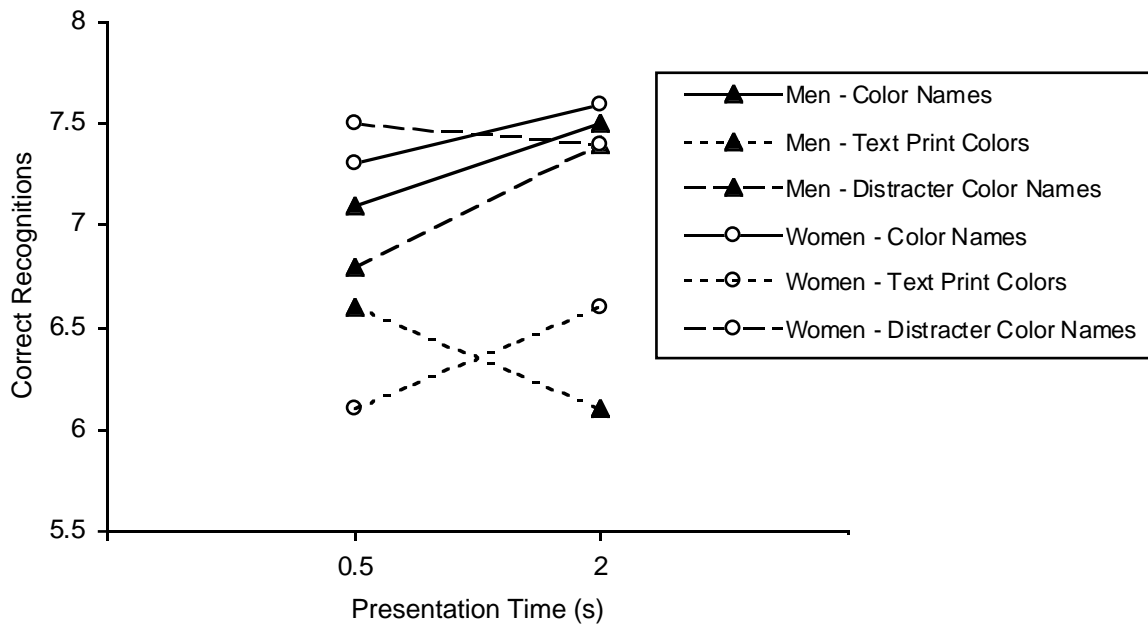


Figure 1. Mean number correct recognitions by presentation time and sex.

recognizing that distracter color names had not been used in stimulus presentation. A priming effect explains these findings. Because participants were presented with color names and text print colors, they may have used more time to mentally review the 16 colors actually used in the presentation before ruling out the distracter color names. Distracter names seemed to require an exhaustive memory search, whereas the color names and text print color names did not.

Data supported the hypothesis that participants would less accurately recognize the text print color names compared to the color names actually presented in the stimulus. The results also indicated that participants had little difficulty in accurately ruling out the distracter color names. The decreased accuracy in recognizing text print colors is consistent with expectations about the Stroop phenomenon.

The findings did not support the final hypothesis that participants who were presented the stimulus for 2.0 s would have increased accuracy compared to participants who experienced the 0.5 s presentation. The basis for this hypothesis was that a 2.0 s presentation would allow individuals more time to process the stimuli according to color name and text print color name. For the 0.5 s presentation, the expectation was that participants would not have adequate time to process the color names and the text print color names separately, thus causing increased interference and reduced accuracy in recognition. The lack of a significant difference between the two presentation times might be, in part, because a large number of participants had near perfect recognition. Because there were only eight color names to remember, ceiling effects may have contributed to the failure to find differences in performance. Perhaps additional research can clarify whether the failure to find a difference in accuracy in recognizing stimuli reflects a Type II error.

The significant interaction between gender, stimulus presentation time, and color status is of interest. Although men and women were able to recognize the color names accurately, there were differences in their ability to distinguish between distracter color names and color text print color names. Women in both time conditions were slightly more accurate in recognizing color names they had read, but women with the 0.5 s presentation had less accuracy in recognizing text print colors. However, men with the 0.5 s presentation had greater accuracy in recognizing text print colors and less accuracy in recognizing the distracter color names. This result is of particular interest because MacLeod (1991) reported no sex differences at any age for Stroop interference.

In examining research of the Stroop phenomenon, no studies were found that dealt with its effects on long term memory (MacLeod, 1991). This lack of research may be because of the lack of available color stimuli. Although there seems to be a vast range of colors, there are few colors that can be identified with one word. Also, because of the range of colors, perception of the exact hue and shade of any given color can vary among individuals, along with the labeling of the given color. This wide array of color subjectivity may limit the number of stimuli and the types of research that can be done on long term memory using the Stroop phenomenon. Nevertheless, the results suggest that the Stroop effect can be used to study long term memory processes. Specifically, Stroop-like stimuli seem to interfere with the retrieval process for long term memory as evidenced by the longer reaction time for distracter words. This interference is similar to the interference found in the traditional Stroop studies examining the effects on short term and sensory memory (MacLeod, 1991).

To enhance the success of future studies on long term memory using the Stroop phenomenon, researchers may want to generate more color stimuli to prevent possible ceiling effects. In addition to larger lists of color stimuli, a shorter presentation time may further reduce ceiling effects. Future research may also include an open-ended question at the conclusion of testing to help determine the methods that participants used to process information and assist memory.

Although the present study may be one of the first experiments about long term memory and the Stroop phenomenon, there are considerable opportunities for additional research. One such opportunity includes examining sex differences for processing visual and semantic information into long term memory.

## References

- Brandimonte, M. A., Hitch, G. J., & Bishop, D. V. (1992). Verbal recoding of visual stimuli impairs mental image transformations. *Memory & Cognition*, *20*, 449-455.
- Cowan, N. (1993). Activation, attention, and short-term memory. *Memory & Cognition*, *21*, 162-167.
- Daniels, T. C., & Ellis, H. C. (1974). Stimulus codability and long-term recognition memory for visual form. *Journal of Experimental Psychology*, *93*, 83-89.
- Head, A. S., & Pedoe, D. S. (1990). A choice-reaction time task utilizing congruent and incongruent color/word stimuli: Another reaction to Stroop. *Perceptual and Motor Skills*, *71*, 115-119.

- MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109*, 163-203.
- Nairne, J. S., & Neumann, C. (1993). Enhancing effects of similarity on long-term memory for order. *Journal of Experimental Psychology, 19*, 329-337.
- Shimada, H. (1990). Effect of auditory presentation of words on color naming: The intermodal Stroop effect. *Perceptual and Motor Skills, 70*, 1155-1161.
- Shimada, H., & Nakajima, Y. (1991). Double response to Stroop stimuli. *Perceptual and Motor Skills, 73*, 571-574.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*, 643-662.

# Effects of Self-Efficacy Sources on Pain Tolerance in a Cold Pressor Test

Kristi J. Kiel

Nebraska Wesleyan University

---

*This experiment compared self-efficacy for pain tolerance created by comparison to peer performance and measured self-efficacy as a result of past experience with pain. Thirty-one college students were administered a cold pressor test. Estimates for tolerating pain and length of time participants held an arm in 5 °C water were the dependent variables. There was a significant correlation ( $p < .05$ ) between self-efficacy estimates and pain tolerance times only for those in the measured self-efficacy group. A 2 x 2 factorial ANOVA indicated a significant interaction ( $p < .05$ ) between origin and level of self-efficacy. This study expanded previous findings about the relationship between self-efficacy and pain tolerance.*

---

Eighty percent of medical patients consult physicians because of pain-related problems, millions of Americans suffer from chronic pain, and more than \$900 million are spent annually by Americans on medications to relieve pain (Turk, Meichenbaum, & Genest, 1983). Pain is a complex phenomenon that depends on sensory stimulation, attention, cognitive appraisal, and coping techniques activated to deal with the painful stimulus (Bandura, 1986).

Although medication may be the most common method for coping with painful experiences, recent research has investigated a wide variety of non-chemical methods for coping with and reducing pain. Many cognitive techniques have been shown to reduce experienced pain and to increase pain tolerance (Devine & Spanos, 1990). These techniques include focusing on sensory aspects of stimuli (Gilligan, Ascher, Wolpar, & Bochachevsky, 1984); directed attention, breathing and relaxation techniques, and analgesic suggestions (Holmes, Hekmat, & Mazingo, 1983); social encouragement and Lamaze training (Worthington, Shumate, & Martin, 1983); pleasant cognitions (Stevens & Rogers, 1990); and muscle relaxation and placebos (Reese, 1983).

These findings support the contention that underlying cognitive processes affect the experience of pain. Turk et al. (1983) stated that “the coping strategies that subjects bring into the laboratory may prove as effective

as, or more effective than, the coping strategies that the investigator teaches” (p. 102). These authors discussed an experiment in which women experiencing pain were asked to describe their feelings while coping. Women who thought they could use coping strategies to affect the pain showed significantly higher tolerance for pain than women who reported less conviction about the usefulness of the cognitive strategies they used and less confidence in their own abilities to affect pain. Turk et al. (1983) concluded that cognitive processes appear to distinguish between low and high tolerance for pain. One possible explanation for the source of these cognitive processes is self-efficacy.

## *Self-Efficacy*

Bandura (1977) defined self-efficacy as an individual’s self-perception and assessment of skills leading to the execution of a behavioral response. Bandura (1986) later proposed that a mediating factor, self-referent thought, must occur before an action can be produced. An individual must analyze the task that he or she is to perform, decide what skills are needed to execute the task, and evaluate personal ability to use those skills.

An accurate judgment of one’s self-efficacy for any given situation is important. Underestimating capabilities can cause avoidance of difficult situations, and low self-efficacy is subsequently reinforced by lack of experience to improve skills. Overestimation of capabilities can cause people to fail in tasks that they thought they could handle, causing them to doubt their abilities.

## *Origins of Self-Efficacy*

Bandura (1986) outlined four basic sources for self-efficacy judgments: performance attainments, observing others, verbal persuasion, and physiological state. Performance attainments are past experiences of a certain situation. Levels of past success can affect future judgments of self-efficacy for the same situation.

---

Ken Keith from Nebraska Wesleyan University was the faculty sponsor for this research project.

Observation of others is a second common source of efficacy judgments and occurs most often when an individual has little prior experience with the situation involved (Brown & Inouye, 1978). After viewing another person successfully completing a task, an individual may feel more likely to perform well in the same situation. However, if the other person is not successful, the individual may feel less able to complete this task.

Using verbal persuasion as encouragement also has some effect on self-efficacy judgments by showing an individual that someone else has confidence in his or her success. Verbal persuasion can also have negative effects and can be used to lower self-efficacy through discouragement (Bandura, 1986).

Although the previous examples are all situations from which judgments of self-efficacy can be made, these judgments do not happen automatically. An individual must first recognize the situation as a source of efficacy. Then, all of the available information involving a task or behavior must be integrated and a judgment of self-efficacy formed.

### *Self-Efficacy and Pain Tolerance*

The most common method for measuring the effect of self-efficacy on pain tolerance has been to provide participants with a method for coping with pain, followed by an evaluation of their ability to tolerate pain using that method. Once participants have been trained in the method and self-efficacy has been measured, they are subjected to pain in a laboratory setting, most often with a cold pressor test. Several investigators have found self-efficacy to be a more accurate predictor for coping with pain than the strategy employed to cope with the pain (Manning and Wright, 1983; Reese, 1983; Bandura, O'Leary, and Taylor, 1987; and Baker and Kirsch, 1991.).

Litt (1988) developed another method to test the effects of self-efficacy on pain tolerance. Self-efficacy was created by comparing participants' scores on a cold-pressor test to those from a national average. Participants were asked how well they thought they would do on a cold pressor test (self-efficacy) and then given a baseline trial to measure performance. After the test, they were given false scores that ranked them either high or low in comparison to a national average. Self-efficacy was again measured for a subsequent cold-pressor test. After the second test, a false comparison was again given, self-efficacy was measured, and a third cold pressor test was administered. Results showed that manipulation of information about participants' performance had the expected

effect on self-efficacy for subsequent tests and that self-efficacy strongly affected pain tolerance (Litt, 1988).

The present study was designed to compare the effects of personal self-efficacy as a result of past experience to experimentally induced self-efficacy on the prediction of pain tolerance. Stevens and Rogers (1990) proposed that tolerance time is a more important measure of coping than the reported level of pain because often the only way to deal with chronic pain is to endure it.

Although many experiments have been designed to test the effects of self-efficacy created in a laboratory setting, I found no research comparing self-efficacy on past experience to the creation of self-efficacy through either cognitive strategies or comparison to peers. Bandura (1986) described both personal experience with a certain task and comparison to others' performances as valid sources of self-efficacy information, but he stressed that actual experience of a situation provides a stronger source of efficacy information. Specifically, this experiment tested the hypotheses that (a) self-efficacy as a result of past experience would predict pain tolerance as well as self-efficacy created in the laboratory by comparison to peer performance, and (b) participants with high self-efficacies for pain tolerance would tolerate pain in a cold pressor test longer than those with low self-efficacies.

## Method

### *Participants*

Participants were 31 college students (12 men, 19 women) ages 18-22 years ( $M = 19.1$ ) enrolled in Nebraska Wesleyan University. The purpose of the experiment was explained to them, and they volunteered to participate by signing consent forms. Students from one class received credit for participating. Participants were randomly assigned to either measured self-efficacy or created self-efficacy groups.

### *Materials*

All testing took place in a small laboratory room containing two tubs each of which contained about 29 L of water. The first tub contained water at 20 °C to equalize participants' hand temperatures before testing. The second bucket contained water maintained at 5 °C. A stopwatch was used to measure pain tolerance times. The questionnaire used to measure self-efficacy as a result of past experience contained a variety of multiple-choice items describing certain painful situations and asked how

well participants believed they could tolerate pain in these settings. Each answer was given a score ranging from 1 (*low self-efficacy*) to 7 (*high self-efficacy*).

### Procedure

Participants assigned to the measured self-efficacy group were first given the past experience questionnaire to measure self-efficacy for pain tolerance in a variety of real-life situations. Average questionnaire scores ranged from 3.8 to 6.0. Participants scoring higher than the mean were assigned to the high measured self-efficacy group, and those scoring lower than the mean were assigned to the low group. All participants were then given a preliminary cold pressor test. A base constant arm temperature was established by having participants place their non-dominant arm in the bucket of 20 °C water for two minutes. The same arm was then placed in the bucket of 5 °C water and timing began. Participants were asked to keep the arm in the water until the discomfort level rose to the time at which they would like to remove it from the water. Timing ceased when participants removed their arms from the water. There was a 10 min time limit.

Following this preliminary test, participants in the created self-efficacy group were told their tolerance times, and given a contrived comparison to a national average. Participants in the high self-efficacy group ( $n = 7$ ) were told they were in the 90th percentile for their performance on the test, and participants in the low self-efficacy group ( $n = 8$ ) were told they were in the 27th percentile. Participants in the high ( $n = 9$ ) and low ( $n = 7$ ) measured self-efficacy groups were simply told their tolerance times without any indication about how they might compare to peers.

All participants were next given a questionnaire to determine self-efficacy for the second cold pressor test. The questionnaire posed the question "On a scale from 1 - 7, how well do you think you will perform in the following cold pressor test?". The scale ranged from 1 (*worse than average*) to 7 (*better than average*). After completing the questionnaire, participants were again administered the cold pressor test, and tolerance times were recorded.

After participation in the experiment was completed, participants were told the purpose of the experiment, how deception

was used, and why it was necessary to use deception in this experiment. Questions were answered before participants left the room.

### Results

Pearson correlations were calculated between self-efficacy ratings taken before the second cold pressor test and tolerance times in the second cold pressor test, separately for participants in the measured and created self-efficacy groups. For the measured self-efficacy group,  $r(14) = .67, p < .01$ . For the created self-efficacy group, the correlation was not significant.

The results from a 2 x 2 (Origin of Self-Efficacy x Level of Self-Efficacy) ANOVA revealed no significant main effect was found for either origin or level of self-efficacy. However, there was a significant interaction between origin and levels of self-efficacy,  $F(1, 27) = 4.5, p < .05$  (see Figure 1). Among participants assigned to the measured self-efficacy group, those with high levels of self-efficacy showed higher tolerance times than those with low levels. In the created self-efficacy group, those with high levels of self-efficacy showed lower tolerance times than those with low levels.

Because of unequal sample sizes and small numbers of participants in each group, individual t-tests were used for post hoc analyses (Linton & Gallo, 1975). Table 1 contains the means and standard deviations for the groups. In the measured self-efficacy groups, tolerance

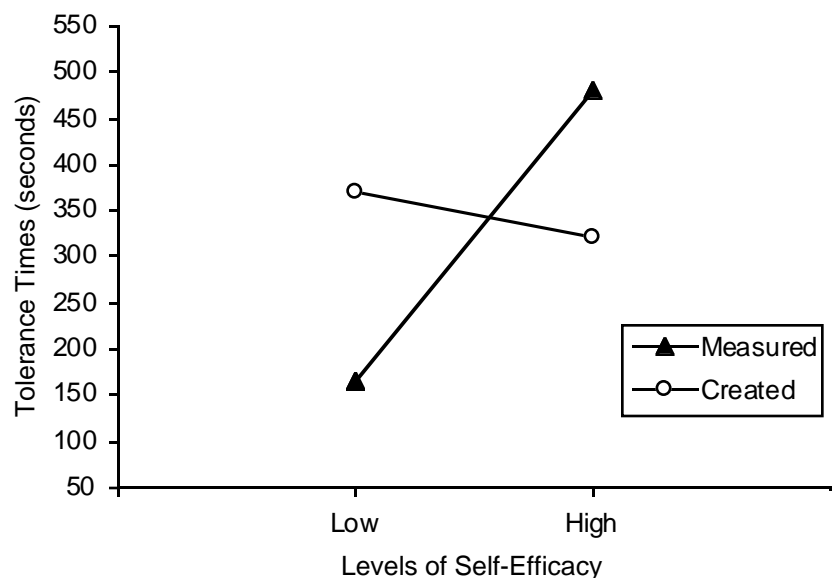


Figure 1. Interaction between origin and level of self-efficacy for tolerance times.

times were consistent with the hypothesized effect, and analysis revealed a significant difference between high and low groups,  $t(14) = 2.849$ ,  $p < .05$ . The high group had longer tolerance time. However, for created self-efficacies groups, tolerance times were not in the predicted effect, nor was there a significant difference between the groups.

Table 1  
*Means and Standard Deviations for Origin and Levels of Self-Efficacy Groups*

Origins of Self-Efficacy	Levels of Self-Efficacy	
	Low	High
<b>Measured Self-Efficacy</b>		
<i>M</i>	167	481
<i>SD</i>	193	236
<b>Created Self-Efficacy</b>		
<i>M</i>	371	322
<i>SD</i>	231	278

## Discussion

In this experiment, self-efficacy as a result of past experience more accurately predicted tolerance times than self-efficacy created by comparison to peers' performance in the cold-pressor test. The high correlation between self-efficacy estimates for pain tolerance and tolerance times in the measured group supports previous findings (e.g., Manning & Wright, 1983) that self-efficacy from personal experience strongly predicts tolerance time. As hypothesized, the correlation between self-efficacy estimates and tolerance times in the measured self-efficacy group was greater in the created self-efficacy group. The results are consistent with work by Bandura (1986), who said that performance attainments are one of the strongest sources for self-efficacy judgments. None of the participants had previously experienced a cold-pressor test, but as would be expected, their self-efficacies for pain tolerance in other situations (as measured by the preliminary questionnaire) predicted their pain tolerance in a cold pressor test.

The lack of a significant correlation in the created self-efficacy group may be because being assigned to the low created self-efficacy group might have conflicted

with participants' knowledge about their pain tolerance abilities. This discrepancy might have caused participants to rate their self-efficacy somewhat lower to correspond with the feedback, but because their self-efficacy as a result of past experience was a more powerful determinant of behavior, they performed at levels consistent with their experience.

The second hypothesis predicted that participants with high (vs. low) self-efficacy for pain tolerance, whether from past experience or created in the experiment, would show higher tolerance times in a cold pressor test received mixed support. The failure to find differences between high and low created self-efficacy groups suggests that attempting to manipulate the participants' self-efficacy was not effective.

This study's findings did not support those of Litt (1988), who reported that comparison to peer performance could affect both self-efficacy and tolerance times in a cold pressor test. This discrepancy between the two studies may reflect how the comparison to peer performance was presented. When participants completed the first test, they were told their tolerance time and the false percentile ranking. During a debriefing, one participant indicated that the percentile ranking had no significance to him, and he did not understand the comparison to the average performance. If that perspective were common among participants, the failure to find differences in tolerance times may have resulted from a failure to differentiate adequately between the high and low created self-efficacy groups.

Another explanation for the lack of differences in tolerance times between high and low created self-efficacy groups might be individual differences in the ways in which individuals cope with this type of information. Some people might try even harder when finding that they did poorly compared to the average tolerance time, whereas others might be more likely to acknowledge that they did poorly and exert less effort in subsequent tests. A combination of personality types within the created self-efficacy group may have caused a balancing effect, resulting in no overall change in pain tolerance.

Findings from this study indicate that self-efficacy for pain tolerance is not as easily manipulated as previous studies suggest. A one trial comparison of participants' performance to their peers' performance was not sufficient to exceed the influence of participants' accumulation of past painful experiences. This information suggests that people who are exposed to a painful situation (such as an injection or surgery) may require a series of



experiences to modify self-efficacy in a way to increase pain tolerance.

### References

- Baker, S. L., & Kirsch, I. (1991). Cognitive mediators of pain perception and tolerance. *Journal of Personality and Social Psychology, 61*, 504-510.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A., Cioffi, D., Taylor, C. B., & Brouillard, M. E. (1988). Perceived self-efficacy in coping with cognitive stressors and opioid activation. *Journal of Personality and Social Psychology, 55*, 479-488.
- Bandura, A., O'Leary, A., & Taylor, C. B. (1987). Perceived self-efficacy and pain control: Opioid and non-opioid mechanisms. *Journal of Personality and Social Psychology, 53*, 563-571.
- Brown, I., Jr., & Inouye, D. K. (1978). Learned helplessness through modeling: The role of perceived similarity in competence. *Journal of Personality and Social Psychology, 36*, 900-908.
- Devine, D. P., & Spanos, N. P. (1990). Effectiveness of maximally different cognitive strategies and expectancy in attenuation of reported pain. *Journal of Personality and Social Psychology, 58*, 672-678.
- Gilligan, R. M., Ascher, L. M., & Wolpar, J., & Bochachevsky, C. (1984). Comparison of three cognitive strategies in altering pain behaviors on a cold pressor task. *Perceptual and Motor Skills, 59*, 235-240.
- Holmes, J. D., Hekmat, H., & Mozingo, B. S. (1983). Cognitive and behavioral regulation of pain: The facilitative effects of analgesic suggestion. *The Psychological Record, 33*, 151-159.
- Linton, M. & Gallo, P. S. (1975). *The practical statistician: Simplified handbook of statistics*. Belmont, CA: Wadsworth Publishing Company
- Litt, M. D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. *Journal of Personality and Social Psychology, 54*, 149-160.
- Manning, M. M., & Wright, T. L. (1983). Self-efficacy expectancies, outcome expectancies, and the persistence of pain control in childbirth. *Journal of Personality and Social Psychology, 45*, 421-431.
- Marino, J., Gwynn, M. I., & Spanos, N. P. (1989). Cognitive mediators in the reduction of pain: The role of expectancy, strategy use and self presentation. *Journal of Abnormal Psychology, 98*, 256-262.
- Reese, L. B. (1983). *Coping with pain: The role of perceived self-efficacy*. Unpublished doctoral dissertation, Stanford University, Stanford.
- Stevens, M. J. (1992). Does self-efficacy moderate intensity of pain? *Perceptual and Motor Skills, 75*, 320-322.
- Stevens, M. J., & Rogers, R. M. (1990). Intensity vs. type of affect elicited by dissociative cognitions in moderating acute pain. *Psychological Reports, 67*, 747-751.
- Turk, D. C., Meichenbaum, D., & Genest, M. (1983). *Pain and behavioral medicine*. New York: Guilford Press
- Worthington, E. L., Shumate, M., & Martin, G. A. (1983). The effect of brief Lamaze training and social encouragement on pain endurance in a cold pressor tank. *Journal of Applied Social Psychology, 13*, 223-233.

# Effects of Music Videos and Age on Aggressive Word Recall

H. Todd Feaster  
Westminster College

---

Thirty-two participants, 16 adolescents and 16 adults, were tested on recall of a list of aggressive words after viewing either aggressive or non-aggressive music videos. Results indicated that aggressive music videos improved the recall of aggressive words for both adults and adolescents. A marginally significant finding ( $p < .10$ ) was that adolescents remembered more aggressive words than adults. The network model of semantic memory and the concepts of mood congruence and priming help explain the results.

---

The network model of semantic memory (Collins & Loftus, 1975) proposes that concepts are interconnected in a net-like organization. Each concept that a person encounters can be represented as a node, or a location, within the network. These nodes are organized and connected by links or pathways to other nodes that share a similar or related concept. The authors proposed that the most frequently used links develop greater strengths and, therefore, faster travel times between nodes. Each node thus becomes attached to a network of relations. This network of nodes explains individual differences in memory.

Collins and Quillian (1969) also explained how the semantic network worked by describing a process called the spread of activation. Coming in contact with a concept activates a node. The activation then spreads through the links from the activated node to other nodes to which it is connected. The activation continues to spread but becomes weaker at more remote nodes. For example, hearing the word "aggression," triggers the aggressive node, as well as the nodes of similar concepts connected with "aggression." The quickness with which aggressive-related concepts come to mind indicates the closeness of those concept nodes to the activated node. Figure 1 illustrates a small-scale example of one person's network by focusing on the concept "apple."

Priming is one activity that stimulates memory and aids in the spread of activation. Priming occurs when individuals encounter a stimulus word, such as "aggression" that facilitates lexical decisions regarding semantically similar words (Schwartz & Reisberg, 1991). There is evidence that spread of activation can be facilitated by

mood states as well as by related words. For example, in a study of mood congruence, Blaney (1986) found that depressed people tended to recall more negative material, whereas people who were not depressed tended to recall more positive material.

Researchers assume that both adolescents and adults have semantic networks and that both are influenced by priming and mood congruence. Unanswered, however, is the question about differences between the structure of the semantic network of adolescents and adults and about how such a difference could effect memory. According to some researchers (Hultsch, 1975; and Smith, 1977; Welford, 1966 as cited in Storandt & VandenBos, 1990), as persons approach middle adulthood, memory is reduced because of a lack of accessibility to stored information and/or the deterioration of stored information. Additionally, the longer people live, the more nodes they acquire and the more complex their networking becomes. This complexity results from being constantly bombarded by stimuli. One might expect poorer memory in adults

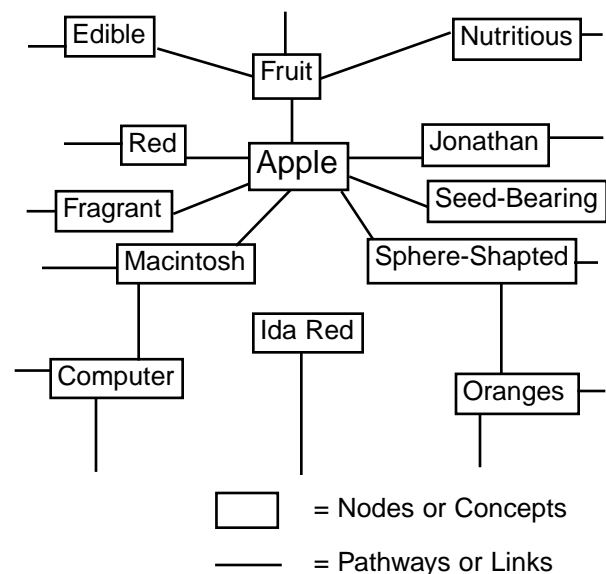


Figure 1. Small-scale example of a network model of semantic memory for the concept "apple."

Ted Jaeger from Westminster College was the faculty sponsor for this research project.

simply because of an overburdened and complex system that makes activation of appropriate nodes more difficult.

If the views above about memory and priming are correct, one can hypothesize that participants shown aggressive music videos will have better recall of aggression-related words than participants who view nonaggressive music videos. The expectation is that aggressive music videos will prime semantically-related material as well as produce a mood congruence effect that will enhance the recall of aggressive words. A further prediction is that adolescent participants will have better recall of aggressive words when compared to middle adulthood participants. The basis for this hypothesis is that an efficient semantic network, not yet overburdened with nodes and complicating interconnections for adolescents, makes retrieval easier.

## Method

### Participants

Thirty-two individuals were randomly chosen from school directories based on their age. Half of those chosen were 13- and 14-year-old eighth grade Fulton Middle School students, and half were 35- to 50-year-old adults from the Westminster College staff. Permission for the eighth grade participants was granted by the school principal as well as by parental consent. There was an equal number ( $n = 16$ ) of male and female participants in each of the younger and older age groups.



Figure 2. Aggressive word recall as a function of age and music video style.

### Materials

Eight Music Television (MTV) videos were used as visual stimuli. Four music videos were aggressive in lyrics and music styles and four were nonaggressive in lyrics and style. Three undergraduate students and one professor evaluated and selected the videos. A television and a videocassette recorder were used to play the videotapes.

An audio tape recorder was used to record 15 aggressive words, one every 3 s. The panel of students and a professor selected the aggressive words with the restriction that five words contain one syllable, five words contain two syllables, and five words contain three syllables.

Appendix A lists all of the music videos titles and words. Finally, a pen and paper were used to record participants' recall of the aggressive words; a stopwatch was used to time the recall period.

### Procedure

The experiment used a 2 x 2 factorial design with Age (adolescents and adults) and Content of Music Video (aggressive and nonaggressive) as the independent variables. Subjects were randomly assigned to the aggressive or nonaggressive video conditions with the stipulation that an equal number of male and female participants view each type of video.

Participants viewed the music videos as a group. Following the presentation of the videos, participants listened to the audiotape of the 15 aggressive words. After listening to the words, the experimenter passed out pieces of paper and pens. Participants were told to write their name, age, and sex in the upper right-hand corner. One minute was the average time allotted to pass out paper and pens and to give instructions so that long term memory could be tested. Finally, participants were allowed 45 s to list the words presented on the audiotape. The number of words correctly recalled was the dependent variable. Following the written recall,

participants were debriefed about the experiment and questions were answered.

## Results

The data were analyzed using a two-factor ANOVA. Results from the ANOVA showed that there was a significant difference between music video groups,  $F(1, 28) = 6.09, p < .01$ , but there was only a marginally significant difference in recall between the age groups,  $F(1, 28) = 3.11, p < .10$ . There was no significant interaction. Figure 2 shows that the adolescents had consistently greater amounts of recall than the adults. Figure 2 also shows consistently greater recall of aggressive words for those who listened to aggressive music videos, although the difference was significant at an unconventional 1% level.

## Discussion

The results of the present study showed that the content of the music videos affected the recall of aggressive words. One interpretation of the results is that music provided a priming effect that facilitated recall. An elaboration on that interpretation is that the aggressive music videos placed participants in a more aggressive mood that, in turn, further primed them to recall the aggressive words. These results are consistent with Blaney's (1986) findings that hostile people tend to recall more negative material. The content and mood of the nonaggressive videos may have placed participants in a nonaggressive mood, thus hindering recall of aggressive words.

The results also showed that regardless of the type of videos shown, adolescents tended to have better recall of the aggressive words, although that difference was only marginally significant. The current literature offers several explanations for the findings regarding age groups. Schonfield and Robertson (as cited in Birren & Schaie, 1985) found that poor retrieval from storage is a major cause of memory deficits among older people. Salthouse (1992) also studied age differences in cognitive recall and found that older individuals were less able to deal with greater demands for concurrent storage and processing. Finally, Zaretsky and Halberstam (as cited in Birren & Schaie, 1985) found that older subjects had the least recall when working with materials of low associative strength. In the present study, one could expect adolescents to have higher recall for aggressive words because of their greater familiarity with aggressive music videos and themes, as well as their having fewer nodes and a less complex semantic network.

Because of the marginally significant difference between the age groups, future research should re-examine the question about whether adolescents more readily recall aggressive words. Future research should also explore the use of a nonaggressive words. Use of nonaggressive words could serve as a control group to justify and explain the results in the present study. Finally, investigators should explore the range of effects of aggressive music videos. Such videos might generate aggressive attitudes and prime people for acts of violence, both foreboding possibilities given the large role that music videos play in the lives of adolescents.

## References

- Birren, J. E., & Schaie, K. W. (Eds.). 1985. *Handbook of the psychology of aging* (2nd ed.). New York: Van Nostrand Reinhold.
- Blaney, P. H. (1986). Affect and memory: A review. *Psychological Bulletin*, 99, 229-246.
- Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review*, 82, 407-428.
- Collins, A. M., & Quillian, M. R. (1969). Retrieval time from semantic memory. *Journal of Verbal Learning and Verbal Behavior*, 8, 240-247.
- Hultsch, D. F. (1975). Adult age differences in retrieval: Trace-dependent and cue-dependent forgetting. *Developmental Psychology*, 11, 197-201.
- Matlin, M. W. (1989). *Cognition* (2nd ed.). New York: Holt, Rinehart and Winston.
- Salthouse, T. (1992). Why do adult age differences increase with task complexity? *Developmental Psychology*, 28, 905-918.
- Schwartz, B., & Reisberg, D. (1991). *Learning and memory*. New York: W.W. Norton.
- Storandt, M., & VandenBos, G. R. (Eds.). 1990. *The adult years: Continuity and change*. Washington, DC: American Psychological Association.

## Appendix

### Aggressive Word List

crush	massacre
slaughter	kick
violence	destroy
slam	agony
torment	shoot
collision	puncture
kill	mutilate
torture	

## Aggressive Music Videos

*Freedom* by Rage Against the Machine  
*Shades of Grey* by Biohazard  
*Through and Through* by Life of Agony  
*Cowboys From Hell* by Pantera

## Nonaggressive Music Videos

*Tears in Heaven* by Eric Clapton  
*So Much in Love* by All 4 One  
*Love is the Seventh Wave* by Sting  
*Pink Houses* by John Mellencamp

# Personality Variables, Stressors, and Sociocultural Influences Affecting Premenstrual Syndrome

Heather Sabo

Creighton University

---

*Several factors have been hypothesized as potential causes for premenstrual syndrome (PMS). Moving away from more traditional biological explanations, this article describes psychological interpretations of PMS. Personality variables, stressors, and sociocultural influences and their effects on the severity and duration of PMS were described. Inconsistencies in the literature were also addressed, as well as problematic data collection procedures and suggestions for future research.*

---

Premenstrual syndrome (PMS) is the term authorities use to describe a wide range of symptoms experienced from about 7-10 days before menstruation. These symptoms include tension, depression, irritability, abdominal pain, breast tenderness, and headache are common for many and disabling for some. The prevalence of PMS within the United States ranges from 25% to 90% (Burrage & Schomer, 1993). Three to five percent of women suffering from PMS report severe or disabling symptoms (Kendler, et al., 1992).

Both physical and psychological symptoms are associated with PMS. For example, 65% of the symptoms reported in a study by Burrage and Schomer (1993) were of a psychological or behavioral nature with only 35% being physical in nature. This finding illustrates the obvious biological contributions to PMS but also suggests the need to go beyond the biological understanding and grasp more fully the psychological implications of premenstrual syndrome. The purpose of this literature review was to identify and describe the role that personality factors, stressors, and sociocultural influences play in the experience of menstrual cycle symptomology. Initially, I will briefly describe the biological components with regard to the affect of diet on the severity of PMS. In reviewing the role of personality variables, I will examine the role of introversion-extroversion and A-B personality types. I will also discuss the influence of stressors on PMS severity. Finally, I will address the relevance of sociocultural influences for PMS, including religion, family life, and social support.

## Biological Contributors

Nutritionally poor diets have been found to instigate more severe premenstrual symptoms. More specifically, Frickel (1987) found significantly lower levels of magnesium in the red blood cells of 26 PMS patients compared to 9 control participants. Moreover, the investigator reported that women who had severe anxiety-related PMS symptoms consumed five times more dairy products and three times more refined sugar than non-sufferers. Dairy products and calcium interfere with magnesium absorption and excretion in human cells, causing magnesium deficiency in the body. Insufficient magnesium in the body causes a depletion of brain dopamine, which is used as a type of mood hormone to induce relaxation and mental alertness. Magnesium deficiency, therefore, may be related to more irritability and less alertness in PMS sufferers. The popular belief that women crave chocolate during the premenstrual cycle is supported by these findings. Chocolate is rich in magnesium and phenylethylamine, a dopamine-like substance, which the body needs during premenstrual tensions. Therefore, altering dairy product intake for PMS sufferers could lessen the affect of PMS severity. This research illustrates one way in which biology plays a role in PMS and has a psychological, mood altering, outcome. In the remainder of this article, I will concentrate on psychologically related factors associated with PMS.

## Personality Characteristics

### *Extroversion and Introversion*

The personality characteristics of extroversion and introversion play a substantial role in determining how women perceive menstruation and react to the premenstrual symptoms. Extroversion encompasses the characteristics of sociability, activeness, and dominance whereas introversion characteristics are focused more inwardly. Extroverts have the tendency to react to levels of high anxiety with more bodily complaints, such as breast tenderness, bloating or edema, headache or vascular changes, allergic or skin disorders, decreased coordina-

---

Mark E. Ware from Creighton University was the faculty sponsor for this research project.

tion, and accident proneness. Professionals define introverts as being socially withdrawn, emotionally reserved, and self-absorbed. Introverts tend to report more psychic symptoms such as depression, irritability, dysphoria, and anxiety or tension (Nagel-Murray, 1986). Introverts have also been found to have lower pain thresholds than extroverts, as well as symptoms that tend to be more emotional in nature (Nagel-Murray, 1986). Therefore, introverts report more traumatic psychological symptoms during PMS as well as more painful menstruation because their inner focus results in being more in tune to their bodies.

### *A and B Personality Types*

Type A personalities consist of a cluster of traits that include a high need for power, an underlying streak of hostility and potential for aggression, and a high degree of impatience and time urgency. PMS sufferers have also been found to score highly on Type A personality tests (Marinari & Fee, as cited in Frickel, 1987). Moreover, Hicks, Olsen, and Smith-Robinson (1986) found that Type A women experienced 50% more premenstrual symptoms than Type B women. People identified as Type A personalities perceive stress as more control-threatening and may be more reactive and susceptible to stressors (Glass, as cited in Frickel, 1987). Cyclical psychological changes throughout the menstrual cycle are also perceived more negatively by Type A personalities because of the perceived lowering of control over body and environment. As a result of heightened stress during menstruation, Type A women may be less likely to exert effective coping strategies. Ineffective coping in and of itself is a major source of stress that accumulates with already present stress, thereby increasing the severity of premenstrual symptoms (Sampson, as cited in Frickel, 1987).

Stress is one of the major factors discussed as affecting Type A behavior. Because stress is also a factor in the etiology of PMS, I will discuss the implications of psychological stress.

### *Stressors*

Some women may be more vulnerable to stressors at different times in their menstrual cycle, specifically premenstrually. Popular belief and professional opinion also assert that women suffering from self-reported PMS have a decreased ability to handle stress. Yet several researchers have failed to demonstrate any differences in coping efficacy throughout the menstrual cycle (Ussher and Wilding, 1992).

Women who experience severe premenstrual symptoms appear to be more internally oriented, show more Type A behavior, and have heart and respiration rates suggesting that they suffer constant stress throughout the menstrual cycle (Gold, 1985). Women experiencing heavier flow during the menstrual cycle have also been found to report more menstrual distress.

Burrage and Schomer (1993) found a positive correlation between PMS and stress, whereas they found a negative correlation between PMS and coping efficacy. The authors also reported that high-stress women experienced more severe behavioral and physical changes premenstrually than low-stress women. Coinciding further with Type A behavior patterns, high stress women were more distressed with psychological and behavioral symptoms than with physical ones. The increase in psychological and behavioral symptom stress could be caused by feelings of being out of control, and feelings of being out of control generally result in a loss of self-esteem. Low self-esteem causes even greater emotional changes when compounded with high levels of stress (Burrage & Schomer, 1993).

### *Sociocultural Influence*

In the early part of this century, many people viewed PMS as a trademark of women's weakness. A common belief was that women were frail and needed protection. Women were taught to view their menstruation with shame (Olesen & Woods, 1986). An extension of these ideas continues in subtle cultural dimensions of our society. According to Olesen and Woods (1986), "Painful menstruation often reflects the unhealthy attitude toward femininity that is so predominant in our society" (p. 187). The authors' study of 100 hospitalized women, who indicated a lesser acceptance of a female role, reported a significantly higher number of premenstrual symptoms. The traditional female role in this study consisted of women's satisfaction with bearing children, raising them, and taking care of the house and husband rather than entering the work-force. Restrictions on careers, common with more feminine occupations, caused the women to be more dependent on men and increased chronic and acute stress (Olesen & Woods, 1986).

### *Religion*

A study of 102 married women that included 56 Protestants, 18 Catholics, and 13 Jews indicated that differences in religion were associated with major differences in attitudes toward menstruation (Nagel-Murray, 1986). These attitudes stemmed from the dependency of

the women on the religious institution. Women enmeshed in religious institutions with high group cohesion and more negative attitudes about menstruation resulted in the women experiencing more debilitating symptoms. Negative attitudes within groups contributed to women developing negative attitudes about their own menstruation. Negative attitudes and anticipation of menstruation promoted stress and symptoms the women perceived as more painful.

### *Social Support*

Some social environments can cause stressful situations; other social environments may provide a protective element. Experimental evidence indicates that social support can reduce individuals' susceptibility to physiological stress responses brought on by psychosocial stimuli (Taylor & Bledsoe, 1986). The difference between an unhealthy and healthy social system depends on the attitudes held by the group. Social support may also allow women a chance to have contact with a group and acknowledge that other women have the same problems and that the symptoms they are experiencing are not negative or unhealthy. Contact with certain groups of women may change PMS sufferers' perceptions about stressors and thereby reduce the severity of premenstrual symptoms (Taylor & Bledsoe, 1986).

### **Conclusions**

Several inconsistencies were found in the literature. Ussher and Wilding (1992) found no significant differences between PMS and non-PMS sufferers' reaction to an external stressor, whereas other researchers have found significant differences between the groups (Gold, 1985; Burrage and Schomer, 1993). Ussher and Wilding (1992) also found that Type A individuals reported fewer symptoms and perceived themselves as healthier than Type B women. This finding contradicts reports by Hicks et al. (1986) that Type A personalities perceive stress as more control threatening and are more reactive to stressors. Ussher and Wilding (1992) also found that negative attitudes towards menstruation had no effect on menstruation severity, whereas Nagel-Murray (1986) found that women belonging to religious groups holding negative attitudes toward menstruation were more likely to hold similar negative attitudes themselves. These negative attitudes were found to greatly affect the severity of premenstrual tensions and psychological consequences. These significant inconsistencies in the literature suggest the need for additional research to determine more precisely the role of personality variables and coping strategies on the severity of premenstrual symptoms.

Another important consideration is the validity and reliability of self report data. Because PMS encompasses a large number of psychological symptoms, and because women may be highly sensitive to their bodies, the possibility exists that many women are not PMS sufferers.

The causes of PMS are unclear. What authorities once thought was a biologically determined phenomena is now viewed as influenced by personality, stress-related, and sociocultural variables. The psychological implications for PMS require more psychologically-oriented health care for women experiencing PMS. Nutritional intervention, stress-reduction programs, group therapy, and training in coping skills can help many women.

The inconsistencies in the literature may also reflect ambiguity in what constitutes PMS. PMS is a condition that has not been clearly defined and currently encompasses a wide variety of symptoms. This uncertainty in definition may be reflected in the variability of self-reporting, ranging from 25-90% in some studies (Burrage & Schomer, 1993) to as few as 5% in others (Tavris, 1992). Before widespread implementation of those strategies identified in the preceding paragraph, further research is needed to arrive at a more precise operational definition for PMS.

### **References**

- Burrage, J., & Schomer, H. (1993). The premenstrual syndrome: Perceived stress and coping efficacy. *South African Journal of Psychology*, 23, 111-115.
- Frickel, R. (1987). *A comparison of attitudes, dietary habits and lifestyles of women with PMS verses women without PMS*. Unpublished master's thesis, University of Nebraska, Omaha.
- Gold, J. (Ed.). (1985). *Psychiatric implications of menstruation*. Washington, DC: American Psychiatric Press Inc.
- Hicks, R., Olsen, C., & Smith-Robison, D. (1986). Type A-B behavior and the premenstrual syndrome. *Psychological Reports*, 59, 353-354.
- Kendler, K., Silberg, J., Neale, M., Kessler, R., Heath, A., & Faves, L. (1992). Genetic and environmental factors in the etiology of menstrual, premenstrual and neurotic symptoms: A population-based twin study. *Psychological Medicine*, 22, 85-100.
- Nagel-Murray, K. (1986). *Neuroticism, introversion-extroversion and the menstrual cycle*. Unpublished master's thesis, University of Nebraska, Omaha.



Olesen, V., & Woods, N. (1986). *Culture, society, and menstruation*. Washington, DC: Hemisphere Publishing Corp.

Tavris, C. (1992). *The mismeasure of woman*. New York: Simon & Schuster.

Taylor, D., & Bledsoe, L. (1986). *Peer support, PMS, and stress: A pilot study*. Washington, DC: Hemisphere Publishing Corp.

Ussher, J., & Wilding, J. (1992). Interactions between stress and performance during the menstrual cycle in relation to the premenstrual syndrome. *Journal of Reproductive and Infant Psychology*, 10, 83-100.

# The Influential Life and Career of Eleanor Emmons Maccoby

Rachael Robinson

Nebraska Wesleyan University

---

*A close examination of the field of social psychology and gender studies reveals a profound influence by Eleanor Emmons Maccoby. The purpose of this article was to document factors associated with her early personal and professional years. The article also highlights her leadership and influential positions as well as reviews several of her most recognized publications. Maccoby's impact consists of serving as a positive female role model, advancing the area of gender studies, and contributing to a greater understanding of human behavior.*

---

Considered one of the most influential and prominent psychologists in developmental and social psychology, Eleanor Emmons Maccoby has had a most productive career, spanning more than 50 years. In the first part of the article, I will describe Maccoby's life by focusing on her family life, personal influences, education, and selective experiences at Harvard and Stanford. In the second part of the article, I will discuss her leadership and influential positions, summarize some of her most recognized publications, and provide a brief analysis of her most recognized and controversial books.

## Biographical Information

### Childhood Years

Born on the 15th of May in 1917, Eleanor Emmons was the second of four daughters growing up in Tacoma, Washington. Eleanor's father, Eugene, owned a small millwork business. Her mother, Viva, was a musician and singer (O'Connell, 1990). Eleanor was a very active child who quickly received the nickname "Bobby" because of her tomboy behaviors such as climbing trees and playing marbles. On several occasions, Eleanor pretended she was a boy so she could caddy for her father at the local golf course (Hall, 1987).

As members of the Theosophical Society, Eleanor and her family held strong beliefs in spiritualism and extrasensory perception, and they believed strongly in acting on their principles. Eleanor began to question the Theosophical Society doctrines as a high school student and decided to put them to an experimental test. She attempted to recreate extrasensory perception experi-

ments similar to those conducted by J. B. Rine at Duke University (O'Connell, 1990). When Eleanor's experiments obtained negative results, her "convictions were considerable shaken" (Stevens & Gardner, 1982, p. 218).

### Undergraduate Years

In the fall of 1934, Eleanor attended Reed College in Portland, Oregon on a one-year scholarship. Upon returning to Reed for her sophomore year, Eleanor was ready to find a new direction when she took her first psychology course. The course was taught by William Griffith, a former student of Edwin Guthrie, and proved to be a turning point for her. Through Griffith's class, she became familiar with Guthrie's stimulus-response contiguity theory of learning and became thoroughly convinced that conditioning explained all learning (Hall, 1987; O'Connell, 1990). Eleanor was so impressed with the psychological perspectives presented by Griffith that during her junior and senior years she transferred to the University of Washington where she studied with Edwin Guthrie.

During the fall of her senior year in 1938, Eleanor married Nathan Maccoby, a graduate student in social psychology, whom she met a year earlier. In 1939, Eleanor received a bachelor's degree and was elected to Phi Beta Kappa (Stevens & Gardner, 1982).

### Work Experiences

Eleanor followed Nathan to Washington, DC in 1940, where he took a job at the United States Civil Service Commission. She worked for the State Technical Advisory Service of the Social Security Board where she wrote test items. She also worked with Rensis Likert's Division of Program Surveys of the Department of Agriculture. Beginning as an assistant, she was later promoted to study director and was responsible for organizing and carrying out large-scale studies in field settings.

Nathan moved to the University of Michigan-Ann Arbor to work for the Survey Research Center in 1946 because of Likert's decision to move his organization

---

Mary Beth Ahlum from Nebraska Wesleyan University was the faculty sponsor for this research project.

there. Eleanor remained in Washington to continue Likert's work until the organization's move was complete (O'Connell, 1990).

### *Graduate College Years*

Eleanor joined Nathan in 1947 and began graduate study at the University of Michigan-Ann Arbor specializing in learning theory, social psychology, and personality. By the fall of 1949, Nathan had earned his PhD and accepted an offer from Boston University. Eleanor accompanied Nathan to Boston and worked on her dissertation research; she had already completed doctoral courses. She began exploring some of B. F. Skinner's hypotheses about partial reinforcement. Skinner offered Eleanor space in his laboratory at Harvard University, where she completed her experimental work (O'Connell, 1990).

Before Eleanor could accept a full-time position in Boston, she was recruited by Robert R. Sears for a Harvard study. She collaborated with Sears and Levin to learn how parents' child rearing practices affect the development of their children's personalities. Eleanor was in charge of supervising the field work for the study (Hall, 1987).

In 1950, before the study was complete, Sears left Harvard to accept a position at Stanford University. Nevertheless, the research continued, and the collaboration eventually produced the book *Patterns of Child Rearing* (Hall, 1987). With Sears' departure, Eleanor took responsibility for teaching his course on child psychology at Harvard.

Eleanor stayed at Harvard for eight years and remained very active in research, writing, and teaching. However Harvard's style of gender discrimination left Eleanor very unhappy. Women were not allowed to enter the Faculty Club by the front door or even borrow books from the undergraduate library. Gender discrimination at Harvard also contributed to her failure to advance above the rank of lecturer during her eight year tenure.

During their time at Harvard, Eleanor and Nathan adopted two children. In 1952, they adopted 10-year-old Janice, and in 1956, they adopted seven-month-old Sarah. After Sarah's arrival, Eleanor worked only part-time at Harvard.

### *Stanford Years and Beyond*

Sears invited both Eleanor and Nathan to Stanford in 1958 to work on a research project for one year, but following the project, both were offered faculty positions. Eleanor joined the Psychology Department, whereas Nathan joined the Communications Department. After their first year at Stanford, the Maccoby's adopted their third and final child, a seven-month-old boy, Mark (O'Connell, 1990).

Eleanor worked part-time and taught courses in child psychology; she also conducted research and wrote, but she had difficulty staying focused. Guthrie's stimulus-response theory was too narrow of a theoretical framework for Eleanor. She decided that she needed a new way of thinking and a different research program.

Eleanor's new direction of thinking was influenced by John Flavell, the Piagetian scholar. Eleanor shifted to a cognitive development view believing that describing, explaining, and understanding sequences of cognition and their variations in development were important. She began a series of studies about the developmental changes in the selective attention of children (O'Connell, 1990).

In 1962, Eleanor became a member of the Social Sciences Research Council Committee on Socialization. This affiliation led her to review and organize work about moral development. In 1966, she was promoted to the rank of professor at Stanford University, and eventually selected for departmental chair of the Psychology Department (O'Connell, 1990).

During the 1960s, Eleanor edited the book, *The Development of Sex Differences* (Maccoby, 1966). While editing the book, she found that there was very little evidence to support the several perspectives about sex differences (Hall, 1987). This finding was the driving force behind Eleanor's work on her monumental book with Carol Jacklin, *The Psychology of Sex Differences* (Maccoby & Jacklin, 1974). Immediately controversial, the book played a huge role in shaping the field of gender studies.

Subsequently, Eleanor turned her attention to a longitudinal study of gender differences in children from birth to six years of age. She used these studies for her next book, *Social Development* (Maccoby, 1980). She also made reference to those studies in her presidential address to the Society for Research in Child Development in 1984. Since 1984, Maccoby has ana-

lyzed the results of a longitudinal study that she launched with Stanford law professor Robert H. Mnookin and social psychologist Charlene Depner on the effects of divorce and child custody (O'Connell, 1990).

## Contributions to Psychology

Most scholars have difficulty reading a book or journal article about gender differences without detecting Maccoby's influence. (In this part of the article, instead of the more informal reference, Eleanor, I will use the more formal, Maccoby. In the following paragraphs, I will highlight some of her contributions.

### *Leadership and Recognition*

During her career, Maccoby was president of three psychological organizations; The Society for Research in Child Development (1981-1983), APA's Division on Development Psychology (1971-1972), and the Western Psychological Association (1974-1975). She was also the first woman to serve as chair of the Psychology Department at Stanford University (1973-1976). Finally, during the late 1970s and early 1980s, she served as vice chair of the Committee on Child Development and Public Policy of the National Research Council. These positions were the result of Maccoby's dedication and hard work in the field of psychology. These leadership positions are testimony to Maccoby's credibility and high respect among her colleagues.

### *Highly Recognized Publications*

With over 100 publications to her credit, Maccoby influenced many psychologists. I will briefly review several of her publications beginning with those having greater relevance to social psychology before describing those having a profound impact on the area of gender studies.

*Readings in Social Psychology.* Maccoby served as chief editor for several books, including, *Readings in Social Psychology* (Maccoby, Newcomb, & Hartley, 1958), that collection of articles covering subjects from language and stereotypes to perception, memory, and motivation. Originally prepared for the Committee on the Teaching of Social Psychology of The Society for the Psychological Study of Social Issues, the book's intended use was for general courses in social psychology. Maccoby and her colleagues compiled this particular collection of articles with students in mind, selecting articles that were less technical and easier to understand.

*Experiments in Primary Education.* The authors' initial goal was to compare educational theories and values, but instead they shifted their focus to the federally funded intervention program, Project Follow-Through (Maccoby & Zellner, 1970). Some of the program's tasks consisted of bringing technology into the general classroom and changing educational processes according to values, race, and minority cultures. Although Maccoby and Zellner did not evaluate Project Follow-Through, they addressed the problems that arise when experimental programs are introduced to intact schools.

*Social Development.* The impetus for *Social Development* (Maccoby, 1980) grew out of the lack of suitable reading material in the areas of social and personality development. Maccoby wrote the book to fill that void and to create the ideal textbook for her own child development class at Stanford. The book also proved suitable for courses in social development, socialization, and family interaction. Topics in the book included attachment, aggression, sex typing, moral development, and parent-child development. Maccoby wanted to address the different viewpoints and contradictory findings about these subjects without obscuring the substantial agreements that existed.

*The Development of Sex Differences.* Another of Maccoby's editing projects was *The Development of Sex Differences* (Maccoby, 1966). This book grew out of group discussions about sex differences held at Stanford University during the early 1960s. Among the participants were Roberta Oetzel, Irvn DeVore, Erik E. Erikson, and Nevitt Sanford. The conclusion from these discussions was the basis for the final book. Some of the issues were sex hormones, social learning, and cognitive development. Maccoby also contributed the chapter, "Sex Differences in Intellectual Functioning." More importantly, the editing of this book focused Maccoby's attention on the lack of objectivity in research about gender-related studies. This discovery inspired the eventual publication of Maccoby's most noted book, *The Psychology of Sex Differences* (Maccoby & Jacklin, 1974).

*The Psychology of Sex Differences.* Considered a landmark book within the field of gender psychology, the publication of *The Psychology of Sex Differences* (Maccoby & Jacklin, 1974) quickly established Maccoby as the nation's leading authority on sex differences. By examining approximately 1,600 studies about gender differences, the authors found that the opposite sex was not as opposite as many thought (Hall, 1987).

From among these studies, there was convincing evi-

dence of sex differences with regard to only four variables. Those differences were that (a) girls showed greater verbal abilities, (b) boys excelled at visual-spatial abilities, (c) boys excelled in mathematical abilities, and (d) boys showed more aggressive behavior. Hundreds of other studies found no gender differences at all. Many researchers and professional colleagues criticized the research and charged that there were too many differences. Other researchers charged that not enough differences were reported (O'Connell, 1990). The authors also addressed the major theories about how psychological sex differentiation occur. They concluded that social learning could not explain the differences and suggested that a biological component might underlie sex differentiation.

Some critics accused Maccoby and Jacklin of emphasizing biology too much. Many feminists denounced the book and accused the authors of overemphasizing genetic differences (Stevens & Gardner, 1982). Finally, the book was criticized for its assumptions, methodology, and conclusions (O'Connell, 1990).

By contrast, most developmental psychologists praised the book's contents. They agreed that the book was instrumental in generating new ground-breaking hypotheses and moving the study of sex differentiation to new levels of scientific investigation (O'Connell, 1990).

When *The Psychology of Sex Differences* was first published, many researchers failed to recognize the significance of the discovery that children socialize themselves into their particular sex roles by first developing the concept of what is male or female and then organizing their attitudes and behaviors around that concept. Only seven years later did Sandra Bem (Hall, 1987) propose a similar conceptualization called "gender schemas."

Overall, *The Psychology of Sex Differences* was very influential in shaping current views in the field of gender studies. That publication challenged and modified barriers to the study of sex differences. When asked if she would change anything about her book, Maccoby said that she would be more explicit in stating that neither biological predisposition, socialization, nor self-regulated cognition alone can account for gender differences. She

also agreed that the time was right for another review of the enormous new literature on sex differences (Hall, 1987).

## Conclusions

Eleanor Emmons Maccoby has had a most productive career spanning over 50 years. She worked as researcher, editor, author, teacher, and mentor in the field of developmental psychology. Pushing the boundaries on every project she undertook, Maccoby is credited with making gender studies what they are. Perhaps more impressive is her influential personal life. Maccoby broke new ground as a woman in psychology, overcoming gender discrimination. She is a positive model of a woman who sought excellence in her career along with the enjoyment of marriage and family. She added to the knowledge in the field of psychology and will be remembered as a driving force in the quest for understanding human behavior.

## References

- Hall, E. (1987). All in the family. *Psychology Today*, 21, 54-58.
- Maccoby, E. E. (1966). *The development of sex differences*. Stanford, CA: Stanford University Press.
- Maccoby, E. E. (1980). *Social development: Psychological growth and the parent-child relationship*. New York: Harcourt Brace Jovanovich.
- Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences*. Stanford, CA: Stanford University Press.
- Maccoby, E. E., Newcomb, T. M., & Hartley, E. L. (Eds.). (1958). *Readings in social psychology*. New York: Holt, Reinhart and Winston Inc.
- Maccoby, E. E., & Zellner, M. (1970). *Experiments in primary education*. New York: Harcourt Brace Jovanovich.
- O'Connell, A. N. (1990). Eleanor Emmons Maccoby. In A. N. O'Connell & N. F. Russo (Eds.), *Women in psychology: A bio-bibliographic sourcebook*. (pp. 230-237). New York: Greenwood Press.
- Stevens, G., & Gardner, S. (1982). *The women in psychology: Volume 2: Expansion and refinement*. Cambridge, MA: Schenkman Publishing Company.

# William James on Free Will and Determinism

Tania D. Maggart

Missouri Western State College

---

*William James' book, The Principles of Psychology, written in 1890, significantly influenced the field of psychology. James' theory of free will and determinism appears contradictory to some readers because of James' conflicting perspectives as a scientist and a philosopher. I will trace the theory's historical evolution from its origin to the present. The purpose of this article was to describe how several individuals influenced James and to help readers understand James' theory and the principles on which it was founded.*

---

Many historians consider William James' book, *The Principles of Psychology* (1890/1952), the most important book ever written about psychology. In this two-volume work, James linked physiology and philosophy to create an original view of the mind and behavior. With his assortment of theories, James sought to explain such topics as the physiology of the brain, habits, automation, the mind/body position, memory, self, sensation, imagination, and attention. Initially, I will describe both the individuals and the writings that had the greatest impact on James. I will also examine James' theory of free will and determinism and scrutinize the processes involved with each concept. Finally, I will briefly describe a contemporary psychologist whose writing has been influenced by James' views.

To understand James' theory of free will and determinism fully, one must examine his background and those who influenced him. William James' grandfather, William James of Albany, New York, came to the United States from Ireland in 1789. One historian estimated that the elder James built a \$3 million fortune as a tobacco merchant and real estate investor (Feinstein, 1984). Thus, when he died, James' father, Henry James, Sr., inherited the fortune, and the James family was able to live comfortably. Henry James, Sr. wanted his sons to have opportunities for goal-directed careers. He wanted them to work in a wide variety of disciplines. Therefore, William and his younger brother Henry, obtained education in such places as London, Paris, Boulogne-sur-Mer, Geneva, and Bonn (James, 1890/1952).

The constant pressure to be successful and the opportunity for an extensive education were both benefi-

cial and detrimental to William James. First, the experiences benefited James by providing exposure to a large number of disciplines. However, the experiences were detrimental in that James initially wanted to be an artist, an occupation that his father did not accept. Thus, James abandoned his aspirations to become an artist and earned a medical degree at Harvard in 1869 (James, 1890/1952).

A clue to understanding James comes from a lecture he gave at Harvard University to a group of students 20 years after his father convinced him to cease painting. James stated that if individuals gave up something they really loved, then eventually they would wonder if the self-denied alternative might have been a better one than the one they chose (James, 1890/1952), seemingly in reference to the time when his father made him give up his dream to be an artist for a life of religious and philosophical studies. Henry James, Sr. was James' earliest philosophical mentor, and he was also a nonconformist who possessed unfavorable opinions about certain issues. Henry James, Sr. believed the highest form of knowledge was philosophy that contained religious understanding, and this knowledge was to be communicated to others. He tried to raise his children according to his own convictions. He nurtured James' critical thinking talents through conversation and correspondence; he made philosophizing seem a vital task even as he continued to prod his son toward a scientific career (Feinstein, 1984). Philosophy and science pulled James in two directions at once and forced him to try to integrate the two. Although his father emphasized philosophy and religion, James leaned toward science as the truth of all truths.

The French philosopher, Charles Renouvier, inspired William James to accept the concept of free will. This inspiration occurred during a time in James' life when he experienced severe mental depression. Renouvier's discussion of free will delivered James from the deterministic universe of Mill, Bain, and Spencer (James, 1890/1952). Bjork (1983) stated that an 1870 entry in James' diary about Renouvier's essay on free will marked the triumphant end of his depression-induced despair. Previously, James viewed free will as an illusion that

---

Phillip Wann from Missouri Western State College was the faculty sponsor for this research project.

deceives by producing a false or misleading impression of reality. While reflecting upon Renouvier's essay, James saw no reason why his definition of free will, as the sustaining of thought because one chooses when one might have other thoughts, should be considered the definition of an illusion. James stated that his first act of free will was to believe in free will, and for the remainder of the year, he voluntarily cultivate the feeling of moral freedom by reading books favorable to free will, as well as by acting in accord with this principle. James' discovery of Renouvier's free will concept and use of it in a philosophy of willful action proved to be the exact opposite of his former views of a self-destructive introspection (James, 1890/1952).

Another element in his gradual recovery from depression came from his reading of the British philosopher-psychologist, Alexander Bain, on the subject of habit. In his 1859 book, *The Emotions and the Will*, Bain stressed the importance of voluntary repetition of morally desirable actions in order for these actions to become habitual and automatic. Bain's advice, combined with Renouvier's views about free will helped James to think more optimistic and less oppressive thoughts (Fancher, 1990), thereby acquiring a more positive outlook on life.

James found this advice quite useful because it revealed to him what he loved and who he was. James' integration of these views was an intellectual awakening, a metaphysical breakthrough that revealed the true self trying to emerge in him. Renouvier's concept of free will allowed James to realize his life goals and gave him a unique perspective that allowed him to incorporate the basic principle of free will into his other views. This revelation influenced James' thinking about functional psychology, which was based on the contention that consciousness and behavior must serve some function and have a purpose (James, 1890/1952). Functional psychology gave many people in the United States an alternative to structural psychology. Bjork (1983) stated that James thought functional psychology could incorporate more real life experiences into psychology versus structural psychology's focus on scientific principles.

James' beliefs were also greatly influenced by Charles Darwin's evolutionary theory. James (1890/1952) stated that many evolutionary ideas are brought about by special interactions between the outer order and the order of consciousness. In other words, relationships between the environment and the self give rise to evolutionary ideas. By stating the importance of studying mental functions that help individuals adapt and

survive in the environment, James gave functional psychology its subject matter (James, 1890/1952).

After accepting Renouvier's views about free will, James attempted to explain free will and determinism. In his theory about free will and determinism, James stated that as a scientist he practiced a deterministic approach, believing everything to be determined by prior events and controlled by natural causes. However, he pointed out that in his personal life, he practiced free will and believed he possessed the freedom to control his own destiny. Because of this apparent duality, James' beliefs seemed contradictory. Advocates for free will and determinism made convincing arguments; however, determinism had been the standard perspective in science, and James identified with that view. He reconciled the contradiction by stating that free will needed to be investigated further before drawing major conclusions (James, 1890/1952).

According to James (1890/1952), in order to understand the concept of free will, one must first examine the psychology of volition. By definition, volition is the point to which one's will is directly applied. James asserted that the psychological process in volition is always an idea. He stated that the only resistance possible for one's will is resistance produced by attention given to such an idea. When a person has directed his/her attention to a stimulus, he/she has performed the only inward volitional act possible (James, 1890/1952). Additionally, James thought that volitional behavior was a combination of attention and effort, a point he elaborated when speaking about voluntary body movements and activities of nerve centers (Robinson, 1982).

James argued that certain facets of these processes must be evaluated. To begin, James stated voluntary movements must be secondary, not primary, functions of organisms (James, 1890/1952). He used the terms, "secondary functions," to refer to desired and intended movements done with full knowledge of the outcome. Reflex, instinctive, and emotional movements are all primary performances. The nerve centers are so organized that certain stimuli activate certain explosive parts, and a creature experiencing one of these reactions for the first time undergoes an entirely novel experience (James, 1890/1952).

James suggested three states of mind to understand the physiological origins of free will. One is the desire to feel, to have, or to do things that are not felt, had, or done. The second state is to wish. If a sense of attainment that

accompanies a desire is not possible, then we simply wish. In contrast, if we believe the end is in our power, we will the desired feeling, having, or doing shall be real.

Either immediately upon the willing, which is the third state of mind, or after certain preliminaries have been fulfilled, the desired feeling, having, or doing becomes real (James, 1890/1952). The only direct outward effects of our will are bodily movements. Thus, by willing an action, our brain produces voluntary bodily movements. Fancher (1990) stated that James thought the most essential achievement of the will, or when it is most "voluntary," is to attend to a difficult object and hold it fast before the mind. Thus, effort of attention is the essential phenomenon of will.

After establishing attention as the key to free will, James asked whether the subjective sense of effortful attention was a completely mechanistically-determined consequence of the thought process, or if that subjective sense introduced certain non-mechanistic and nonpredictable influences of its own (Fancher, 1990). Modern psychology's most impressive gains had occurred because of the assumptions of mechanism and determinism. As long as he was writing as a psychologist and a scientist, James accepted determinism and defended its assumptions. However, when he was functioning as a moral philosopher or simply as a feeling, willing, and socially responsive human being, he adopted a belief in free will (Fancher, 1990).

Because of his dual perspectives, some authorities find James' theory about free will and determinism contradictory. James (1890/1952) stated that when an individual decides to act, the brain initiates a voluntary action that is followed by an outcome. By deciding, we will the action to occur. However, if the action were already determined by some preexisting force, then one did not have to will the action; it would have occurred anyway. One explanation, although extremely mechanistic, stated that we are preprogrammed biological machines. Many determinists propose the mechanistic explanation. Many free will advocates offer an explanation based on individual differences that causes a person to will a specific action.

Kallen (1953) stated that when you have added knowledge or a genetic part of yourself to the human race, even if no one knows who you are, you have affected the lives of others and those lives have affected still others. James thought that by one individual's actions, others' lives were changed; our predecessors, even apart from the physical link of generations, have made us what

we are. James elaborated by saying that every thought, act, and intention owes its origin to the acts of your dead and living brothers (Kallen, 1953).

Darwin's concept about the origin of species and evolution of humans can be linked to free will and individual differences. James' philosophic concept about the zone of the individual differences and of the social "twists" are pertinent to Darwin's concepts. Kallen (1953) noted that the zone of individual differences is the theater for all we do not take for granted, and however narrow its scope, it is roomy enough to lodge the whole range of human passions. There is a link between James' philosophy on this issue and the evolution of humans and free will. By evolving, humans have passed on traits from generation to generation. Through individual differences, the desires people have willed to each generation vary according to the situation. Thus, one can say certain willed actions might eventually become preexisting factors that affect human behavior according to the commonality of the willed actions.

James (1905) discussed his theory of free will and determinism in a lecture to a group of university students in 1896. He dissected determinism by stating old fashioned determinism was hard determinism. Hard determinism included such qualities as fatality, bondage of the will, and necessitation. However, he argued that such a view had been replaced by indeterminism, or free will, which repudiates fatality, necessity, and even predetermination. Indeterminism is closely related to freedom. James, the scientist, went on to state that the real issue of fact, determinism, had been smothered under such freedom. No matter what indeterminists mean by free will, whether they meant acting without external constraint or the body silently complying with the mind, according to James, sometimes we are free and sometimes we are not (James, 1905).

James characterized determinism and indeterminism. Determinism refers to those parts of the universe already predetermined or assigned by God with what the other parts shall be. Another characteristic is that future has no ambiguous possibilities hidden in its content. The part of the content we call the present is compatible with only one totality. In other words, there are no such things as surprises because everything is predetermined. Any other future than the one fixed since eternity is impossible. The whole universe is in every part of the environment and integrates every aspect into absolute unity, which results in a permanently fixed destiny (James, 1905).



One characteristic of indeterminism is that the parts have a certain amount of space between them. The laying down of one part of them does not necessarily determine what the others shall be. In other words, the parts do not have to be organized a certain way. Indeterminism also denies a world of one unbending unit of fact. Because everyone and everything are not exactly the same, individual differences are a large part of indeterminism. Finally, James stated that somewhere such possibilities about these facts exist and form a part of truth. In determinism, they exist nowhere, and necessity and impossibility are the sole categories of the real (James, 1905). Determinists see possibilities that fail to become realized as pure illusions and impossibilities.

Determinists and indeterminists agree that a volition has occurred, which means there is a definite point where the will is directly applied. Advocates on both sides think there is an outward motion that occurs, but they disagree about how this motion originated. The indeterminists assert another volition might have occurred in its place, whereas the determinists contend nothing could possibly have occurred in its place (James, 1905). For determinists, everything is either black or white; indeterminists think there are gray areas. James, the scientist, insisted that science professes to draw no conclusions but those that are based on matters of fact. He asserted that only facts can be proven by other facts. With possibilities that are not facts, facts have no concern (James, 1905).

Johnson and Henley (1990) pointed out that James recognized that he must repudiate moral philosophy to maintain his integrity as a psychologist. He realized that free will had no place in science, but he depended on chance to offer a possible explanation. James also knew chance was a poor solution. In 1905, he defined chance as a purely negative and relative term that was disconnected from something else not controlled, secured, or necessitated by other things in advance of its own actual presence. James thought this situation provided some proof for free will. Johnson and Henley (1990) stated this solution was not one of James' great achievements. James refused to say psychology must face its own limitations by denying the possibility of the existence of free will in this universe.

In 1905, James stated his deterministic monism position. This monistic position refers to the notion that there is only one causal factor in history. James' (1902) belief in one God as creator and ruler of the universe showed a tendency to become monistic and to consider the world as one unit of fact. James (1902) proposed the only escape from this paradox was to disavow the monistic assump-

tion altogether. Hence, the world existed from its origin in pluralistic form, as a mixture of higher and lower things and principles, rather than an absolutely unitary fact. However, this obvious solution represented the easy way out. James wrote a letter to G. H. Howison saying that determinism is monism and a monism, like this world, cannot be an object of pure optimistic contemplation (James, 1920). Perhaps James was asserting that one could more easily choose to believe in free will, however, the cold hard facts of determinism could not be ignored. For this latter reason, James kept returning to the deterministic argument. In the determinists' theory, everything is predetermined. There is a reason for occurrences and an explanation for them. James' intellectual struggle came when he tried to integrate philosophy and science.

Donnelly (1992) concluded that James' approach was more Lockean and expressed British Empiricism more than continental philosophy. James typically depicted humans as intentional organisms. James (1902) referred to his notion of the world as appearing as one flawless unit of fact. He went on to state that such a unit is an individual, and in it, the worst parts must be as essential as the best. The good parts, as well as the bad parts, are necessary to make the individual who he or she is. Therefore, if any part of an individual were to vanish or change, that person would no longer be the same individual (James, 1902). Simply put, we all have many actions that may be predetermined or willed. However, we all have unique actions that make us different from each other and combine to form our complete self.

Jamesian theory, of course, did not resolve the argument of free will versus determinism. His thinking was responsible, however, for having a great impact on the scientific community. He showed the world that each side of the argument is legitimate and worthy of study. Currently, other psychologists follow in James' tradition. One psychologist who has been directly influenced by William James' theory of free will is George Howard. He has referred to James as the founder of the scientist-practitioner model. James has not been formally recognized as such by the scientific community because the supportive evidence comes from those parts of James' writings with which psychologists are least familiar (Howard, 1993). Howard has published numerous articles which include such topics as varieties of free will, free will in human nature, and steps toward a science of free will. His articles feature informative research that will help carry the Jamesian tradition into the twenty-first century.

James found a common ground between philosophy, established by Aristotelian empiricism and Platonic rationalism, and the purely scientific aspect of human physiology that was the focus of the medical field. He tried to bridge the gap between the mental functioning and physical outcomes of that functioning by establishing functional psychology. While mapping out the course for psychology, James seems to have created a unique personality for his discipline. He accomplished this goal by trying to identify the limits of science and accepting the proposition that science is not necessarily the truth of all truths.

### References

- Bain, A. (1859). *Emotions and the will*. Westport, CT: Greenwood Publishing Group.
- Bjork, D. W. (1983). *The compromised scientist: William James in the development of American psychology*. New York: Columbia University Press.
- Donnelly, M. E. (1992). *Reinterpreting the legacy of William James*. Washington, DC: American Psychological Association.
- Fancher, R. E. (1990). *Pioneers of psychology*. New York: W. W. Norton and Company.
- Feinstein, H. M. (1984). *Becoming William James*. New York: Cornell University Press.
- Howard, G. S. (1993). Why William James might be considered the founder of the scientist-practitioner model. *The Counseling Psychologist*, 21, 118-135.
- James, H. (1920). *The letters of William James*. Boston: The Atlantic Monthly Press.
- James, W. (1902). *The varieties of religious experience a study in human nature*. New York: Random House, Inc.
- James, W. (1905). *The will to believe and other essays in popular philosophy*. New York: Longmans Green and Co.
- James, W. (1952). The principles of psychology. In R. M. Hutchins (Ed.), *Great books of the Western world* (Vol. 53). Chicago: Encyclopedia Britannica, Inc. (Original work published 1890)
- Johnson, M. G., & Henley, T. B. (1990). *Reflections on the principles of psychology William James after a century*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Kallen, H. M. (1953). *The philosophy of William James*. New York: Random House's The Modern Library.
- Robinson, D. N. (1982). *Toward a science of human nature*. New York: Columbia University Press.

# Writing is Revision: Will I Ever Really be Done with this Paper?

Richard L. Miller

*University of Nebraska at Kearney*

---

*This article provides an overview for what to expect when having a manuscript reviewed by this journal, including suggestions for how to prepare your manuscript. Also discussed are the roles for a faculty mentor, the managing editor, reviewers, and editor. There is particular emphasis on typical editorial problems encountered in each section of an empirical study, along with examples of how to correct those problems. Finally, readers will find suggestions for revising and resubmitting manuscripts.*

---

Because you are reading this article, you have in your hand a copy of the *Journal of Psychological Inquiry (JPI)*, and you might be asking yourself, "Can I publish an article in this journal?" Your chances for getting an article published are better if you understand the review process. The purpose of this Special Features article is to provide you with that understanding.

## Preparing the Manuscript for Submission

The first step in publishing a manuscript in *JPI* is to read the "Instructions for Contributors" on page 4 of this issue and determine your eligibility; note particularly items 1-3. Also read about the types of manuscripts that are appropriate, item 5. Next, prepare a rough draft describing your research. This step places you firmly on the road to frequent revision. A rough draft is and should be rough, that is preliminary, incomplete, perhaps, even contradictory. Frequently, the first draft consists of spewing out all the relevant points as they tumble from your mind. Resist the urge to rewrite as you go along. More important than format, at this stage, is fleshing out the outline you developed. Of course, for most papers in psychology, the outline follows a specified format that helps you to organize your thoughts.

Once you have completed a rough draft, the next step is to let the paper sit for at least a day so that the rewriting process begins with a fresh view. Rewriting may include generating new or additional ideas, filling in missing information, or reviewing the grammar in the rough draft. One way to approach rewriting is to prepare

a "reverse outline" that lists what has already been written so as to guide you in filling the gaps.

After completing a series of successive approximations and creating a draft that represents your best effort, including careful attention to those things that are easy to correct, such as spelling and grammar, the time arrives to recognize that writing is not a solitary endeavor. With your carefully revised paper in hand, you should approach a faculty mentor who can help by reviewing your manuscript and suggesting changes. Your mentor should be able to help you prepare your paper for submission to *JPI*, but do not expect quick results. You may need to incorporate further revisions suggested by your mentor. Sometimes you might wonder why mentors do not just list all of the things wrong after their first reading. Part of the answer is that some changes suggest others not noticed before implementing the first changes.

In summary, I am suggesting that the process of preparing a paper for submission to a journal is a process extending over time. The process begins by getting your preliminary ideas on paper, letting those ideas germinate for a time, rewriting as best you can, and ultimately, with the help of a faculty mentor, deciding that you are finished and that the paper is as good as you can reasonably make it. Some seasoned writers have suggested a 95% rule, which recommends that when you perceive that your manuscript is 95% toward what you consider a perfect paper, put it in the mail.

## The Review Process

When your manuscript is received by the managing editor, he will assign it to one of the editors who will solicit assistance from three reviewers who are qualified to evaluate your work. Each reviewer receives a copy of your paper and is asked to provide constructive criticism on a timely basis. In evaluating your paper, reviewers use formal criteria and a four point rating scale: *Outstanding*, *Good*, *Satisfactory*, and *Unsatisfactory*.

---

Richard Miller is editor of this journal's Special Features section. Jean Mason granted permission to reprint portions of her original manuscript.

Table 1  
*Reviewer Criteria for Empirical Papers*

- 
- (a) abstract (100-120 words)
  - (b) introduction to the area
  - (c) literature review
  - (d) statement of purpose or hypothesis
  - (e) description of subjects, materials, procedures, and research design
  - (f) description and appropriateness of statistical procedures
  - (g) description of results
  - (h) relationship of the results to the hypothesis and theory
  - (i) comments on shortcomings of the study without dwelling or speculating on flaws
  - (j) practical applications, if appropriate
  - (k) ideas for future research
  - (l) adherence to APA format
  - (m) writing style
- 

Tables 1 and 2 list the criteria reviewers use when evaluating manuscripts. Quite a list! But, perhaps, the list is already familiar to you if you have presented an earlier version of your paper at a students' psychology convention.

After completing their evaluations, reviewers make one of the following recommendations: *Accept*, which means that the article is accepted as is and is immediately placed into the publication queue; *Accept Pending Revision*, which means that following appropriate revisions, the article will be scheduled for publication; *Reject with Encouragement to Resubmit*, which does not commit the journal to publishing the article, but permits eventual acceptance if the revisions adequately address reviewers' concerns; or *Reject*, which means that *JPI* will not publish your manuscript.

Lastly, but of greatest importance to you, reviewers make specific comments either on the manuscript itself, on a separate sheet, or both. The substance of the review is contained in the reviewers' comments, which can actually guide the revision process.

Reviewers usually return their comments to the editor within 30 days. The editor reads all of the comments and does four things. First, he or she adds his or her own comments about the paper. Second, the editor summarizes the major comments of the reviewers. Third, he or she indicates which of the reviewers' comments should be taken most seriously in your revision. Fourth, the editor decides, based on the reviewers' recommendations

Table 2  
*Reviewer Criteria for Literature Reviews or Historical Studies*

- 
- (a) abstract (75-100 words)
  - (b) background or contextual literature
  - (c) statement of purpose and/or questions
  - (d) description of the author's general premise
  - (e) review of the supporting literature
  - (f) review of the opposing literature
  - (g) identification of relations, contradictions, and gaps in the literature
  - (h) conclusions
  - (i) practical applications, if appropriate
  - (j) ideas for future research
  - (k) adherence to APA format
  - (l) writing style
- 

and his or her own reading, whether to *Accept*, *Accept Pending Revision*, *Reject with Encouragement to Resubmit*, or *Reject* the manuscript.

### Receiving Reviewers' Comments

In the package of returned materials, you will find a letter from the editor, the reviewer's rating sheets and comments, and copies of your manuscript annotated with various suggestions from reviewers and the editor. The editor will also tell you his or her decision regarding the manuscript. In the highly unlikely event that your paper is accepted outright, do not rejoice too quickly because you have the responsibility to be sure that your manuscript is written in such a way as to make you proud when your life's work is reviewed by the Nobel Committee 20 years hence! The difference between *Accept Pending Revision* and *Reject with Encouragement to Resubmit* is often simply a matter of degree, and papers that were originally classified into both of these categories have been published in *JPI*.

While examining reviewers' comments, you are likely to feel an initial wave of frustration and disappointment at the number and variety of flaws they have identified. The editorial staff **strongly** encourages you to return to your faculty mentor, who may share his or her experiences with editors and reviewers. One important and common theme is that revision and resubmission is not simply something that happens to students. Most psychologists have experienced the need to revise most of the manuscripts they have submitted for publication. Hopefully, from a discussion with your faculty mentor will come helpful clarification and a commitment to

“show them” that you can do it. And, if you have been invited to resubmit, there is no doubt. **YOU CAN!**

Apply a step-by-step, focused, problem-solving strategy to planning the revision: (a) evaluate the seriousness of each question and issue the editor raises, (b) weigh how you might address these questions in the revision, and (c) if revision seems a reasonable approach, develop a plan for rewriting your manuscript that includes a time frame for completion. Take the editorial comments seriously, but remember that reviewers do not reside on Mount Olympus, and they may, on occasion, provide comments that miss the mark. However, you must address points made by more than one reviewer and/or repeated by the editor. You are not required to make every change suggested by a reviewer, but you will be expected to explain in a letter to the editor how you dealt with each criticism, or why you did not make a suggested change.

Although the particular points requiring revision in a given manuscript will, of course, vary, there are some problems that frequently occur. The next section of this article will review some of the most common problems encountered while reviewing empirical research papers.

### Revising an Empirical Paper

In this issue of *JPI*, you will find Jean Mason’s study entitled, “Stroop Effect in Long Term Memory”. The editor’s initial judgment was to *Accept Pending Revision*, although one reviewer recommended *Rejection with Encouragement to Resubmit*. Using examples from Ms. Mason’s original manuscript and the reviewer’s comments that led to her successful revision, I will describe some of the most frequently noted problems with each section of the manuscript and illustrate the path from initial submission to acceptable revision.

#### *Revising the Introduction*

The Introduction consists of three principal parts; a statement of the research problem, a literature review, and an elaboration of a basic theoretical framework. Failure to address any one of these issues can cause reviewers concern. Problems often encountered in an introduction consist of (a) failing to inform readers why the study was conducted, (b) describing research that is only tangentially related to the topic, (c) failing to cite relevant references, (d) ignoring the theoretical framework underlying the research, and (e) omitting a clear statement of purpose for the research.

#### Earlier Draft

Because you must let readers know why the study was conducted, you should communicate a statement of the problem early in the paper. The following illustrates a failure to follow this guideline. “The Stroop phenomenon is an interference effect between conflicting visual stimuli. More specifically, it is a delay in making an ink-color naming response to a stimulus word that spells the name of a color different from the ink in which the color name is printed when compared to the time for an ink-color naming response to a stimulus word which is not a color (Stroop as cited by Head & Pedoe, 1990).”

#### Reviewer Comment

Noting the lack of a clear statement of purpose, one reviewer stated, “The beginning of the article would better orient the reader to the question being investigated if a general statement of the research question were made within the first paragraph. Also, the second sentence is awkward and there is a secondary citation. The original Stroop article is JEP, 1935, Vol 18, 643-662.”

#### Revision

The revised paragraph clearly notes the purpose of the research and reads as follows, “The Stroop phenomenon is an interference effect between conflicting visual stimuli. More specifically, naming speed is slowed when a word that spells the name of one color is printed using a different color of ink (Stroop, 1935). Most explanations of the Stroop phenomenon hypothesize attentional difficulties at the sensory or short-term memory level (MacLeod, 1991). However, attentional interference might extend to encoding and other long-term memory processes. Previous studies have not examined the Stroop phenomenon using long term memory.”

A second major purpose of the Introduction is to provide a thorough, but limited, literature review. Literature reviews should stay focused on the research problem and provide readers with a sense of the current state of knowledge about the problem.

Although a reviewer may occasionally recommend eliminating unnecessary references or adding needed ones, the more typical situation with a literature review is

making the case for why a certain study is relevant. Thus, a reviewer's comment, "elaborate on a basic theoretical framework," intends to provide a guide for the research. Never make reviewers guess why you are citing one or another study in the literature review. Explain the relevance of cited articles and help readers understand how the previous research has led to the study you undertook.

### *Revising the Method Section*

The most serious problems in the Method section usually involve design flaws or problems with the execution of a study. If such a problem arises with your study, rewriting the manuscript may not suffice. On the other hand, many reviewers' concerns have to do with clarity of expression. In a well-designed and well-reported study, matters such as the participant sample, study design, measures used, and procedures must be clearly stated and linked to the overall goals of the research. Readers of such a study should be nodding their heads as they read the manuscript, finding confirmation about what they expected from reading the Introduction.

#### Earlier Draft

Most of the difficulties encountered in this section of the manuscript arise because of insufficient information. For example, in her original manuscript, Ms. Mason described the participants in the usual manner; number, gender, and student status, all of which would have been sufficient for most studies. Because of the nature of Ms. Mason's research, she needed to address another participant characteristic.

#### Reviewer Comment

As noted by one of the reviewers, "Were the participants screened for visual acuity and/or color blindness? This could be especially important considering the short exposure times in your study."

#### Revision

A potential design flaw was easily remedied by simply reporting what had been done but not mentioned in the first draft. The final version included the sentence, "Only participants with self-reported accurate color vision were used in this study."

#### Reviewer Comment and Revision

Another reviewer expressed concern that the use of the term, "time delay," although technically correct, needed to be defined the first time it was used to inform readers that this term referred to the length of stimulus presentation.

#### Reviewer Comment and Earlier Draft

In Ms. Mason's original manuscript, reviewers found the following sentence confusing. "When ready to begin, subjects pressed a key and 8 color names were presented at a 2 second time delay for the first condition, and a half second time delay for the second."

#### Revision

The revision makes the situation much clearer. "When they were ready to begin, participants pressed a key, and eight color names in incongruent text print colors were presented, one at a time. Half the participants had a half second stimulus presentation, whereas the other half had a two second stimulus presentation."

### *Revising the Results Section*

One of the tricks to an effective Results section is to balance the need to provide readers with everything you analyzed and the need to make a clear and compelling case for what your study revealed about the research problem. The proper focus will be neither too detailed nor too general.

A second trick has to do with the order in which you present the findings. In general, the order of presenting results should follow the order established in the Introduction so that readers' expectations are confirmed.

Remember, too, that you must explain what the results mean; do not require readers to interpret the findings. Many individuals believe that the interpretation of the results is left to the Discussion section. Sternberg (1992) pointed out that the Discussion section is a place for speculation and relating your ideas to those of others. His advice is to explain the findings in the Results section.

tion, while people can still remember them. For example, stating that you obtained a significant three-way interaction without describing the nature of the interaction, by reporting the differences between the means, is simply not very reader-friendly.

#### Earlier Draft

In her original submission, Ms. Mason's opening paragraph of the Results section read, "Analysis of variance of the reaction time data yielded a significant main effect for color status,  $F(2, 152) = 22.08, p < .05$ . The distracter color words had a significantly longer reaction time ( $M = 1.27$  seconds) than the other two conditions: text print words ( $M = 1.11$  seconds) and color words ( $M = 1.06$  seconds) did not significantly differ from one another."

#### Reviewer Comment

A reviewer asked, "Were any post ANOVA analyses carried out? If not, how can you make the statement that there was a significant difference with three levels of a variable? If a post-hoc test was carried out, it should be identified."

#### Revision

For the revision, Ms. Mason included the results from an appropriate post-hoc comparison, clarified what differences were significant and how, and noted which differences were not significant. The revision was much clearer and read, "The results of ANOVA calculation on the reaction time data yielded a significant main effect for color status,  $F(2, 152) = 22.08, p < .001$ . Simple effects analyses showed that the distracter color names' condition caused a significantly longer reaction time ( $M = 1.27$  s) than the text print colors' condition ( $M = 1.11$  s),  $t(79) = 5.80, p < .001$ , or the color names' condition ( $M = 1.06$  s),  $t(79) = 4.67, p < .001$ . Reaction times for the text print colors' condition and the color names' condition were not significantly different,  $t(79) = 1.45, p = .15$ . There were no significant differences in reaction times for gender, stimulus presentation time, nor the interaction between the two."

### Revising the Discussion Section

Because the Discussion section can be difficult for students to write, many reviewers find authors' meaning difficult to understand. Reviewers expect ideas and findings to blend, and they do not expect to struggle to discover closure. A well written Discussion section gives authors the opportunity to unravel the major themes in their research and to articulate the implications of the findings for theory and others' research. One can elaborate on conclusions and identify the study's methodological strengths and limitations.

When describing the study's implications, do not minimize the impact of the findings, but do not try to apply the results to solving the full range of world problems. Stay focused and help readers understand why they bothered to wade through detailed analyses in the Results section.

#### Reviewer Comment

The opening sentence of the Discussion section is especially important. For example, in reviewing Ms. Mason's paper, one reviewer noted, "The first sentence in the discussion section is a bit awkward and would benefit from rewording."

#### Earlier Draft

The original sentence that the reviewer found awkward read, "The hypothesis that reaction time would be greater for color names actually used in stimulus presentation and names of text print colors than for distracter color names was not supported."

#### Revision

That sentence was replaced with, "The results did not support the hypothesis that reaction time would be longer for color names and names of text print colors actually used in stimulus presentation than for distracter color names."

#### Reviewer Comment

Another perennial problem when writing Discussion sections is informing readers about what is worth remembering. In reviewing Ms. Mason's attempt to interpret a non-significant effect, one

reviewer objected to the phrase, “was partially supported,” and pointed out that because conclusions are usually supported or not supported, the author should be more specific.

#### Earlier Draft

The original sentence read, “The final hypothesis that subjects who were presented the stimulus with the two second delay would have increased accuracy over the subjects who were presented stimulus in the half second delay was partially supported.”

#### Revision

That sentence was replaced with, “The findings did not support the final hypothesis that participants who were presented the stimulus for 2.0 s would have increased accuracy compared to participants who experienced the 0.5 s presentation.”

Further explanation of the finding noted, “The lack of a significant difference between the two presentation times might be, in part, because a large number of participants had near perfect recognition. Because there were only eight color names to remember, ceiling effects may have contributed to the failure to find differences in performance.” Thus, the author not only accurately informed readers but also guided them to understanding why the results might have been as they were.

### Resubmission of the Manuscript

After making all of the suggested revisions, or at least all of those you think need to be made, and after making the additional revisions that have occurred to you and your faculty mentor in the process of examining your manuscript, you are ready to resubmit. Four copies of the revised manuscript, along with any copies of the draft that reviewers marked, should be sent directly to the editor. You should also accompany these materials with a detailed letter that explains how you addressed each of the editor’s concerns. You should also comment on any of his or her concerns that you chose not to address and why you chose to ignore them.

In closing, I will make three points. First, like it or not, your revised manuscript is considerably better than the one you originally submitted. You can be quite

pleased with the revision. Hard work makes a very real difference in the final product.

Second, in undertaking a revision, you are engaging in a learning process that is intense, extremely valuable, and available only to a few. Most undergraduate students in the country will never have such an opportunity to develop their thinking and writing skills.

Finally, as you may have noticed on each page of this article, I believe that writing is revision. All of the advice I have ever received suggests that words worth reading are impossible to create without several drafts. Despite the universality of this advice, drafting successive but imperfect versions of a manuscript is not in the standard repertoire of most students. Take advantage of this opportunity and revise, revise, revise!

I want to conclude by paraphrasing Sternberg (1987) who said that when you publish an article, you have made a unique contribution and, as a good scientist, you have shared it. For such an accomplishment, your pride and satisfaction are justified.

### Recommended Reading

For additional information about the editorial and review process, as well as suggestions about preparing your manuscript for publication, examine the following resources.

- Fiske, D. W., & Fogg, L. (1990). But the reviewers are making different criticisms of my paper! Diversity and uniqueness in reviewer comments. *American Psychologist*, 45, 591-598.
- Nagata, D. K., & Trierweiler, S. J. (1996). Revising a research manuscript. In F. T. L. Leong & J. T. Austin (Eds.), *The psychology research handbook* (pp. 291-300). Newbury Park, CA: Sage.
- Nation, J. R. (1997). The publication process. In J. R. Nation (Ed.), *Research methods* (pp. 365-380). Upper Saddle River, NJ: Prentice-Hall.
- Roediger, H. L., III. (1987). The role of journal editors in the scientific process. In D. N. Jackson & J. P. Rushton (Eds.), *Scientific excellence: Origins and assessment* (pp. 222-252). Newbury Park, CA: Sage.
- Sternberg, R. J. (1987). *The psychologist's companion: A guide to scientific writing for students and researchers* (2nd ed.). New York: Cambridge University Press.
- Sternberg, R. J. (1992). How to win acceptances by psychology journals: 21 tips for better writing. *American Psychological Society Observer*, 5 (5), 12.