



8-2010

An Examination of Potential Mediating Factors on the Seductive Details Effect in Learning from Text

Emily Kay Rowland Bryant

University of Tennessee, Knoxville, erowlan5@utk.edu

Follow this and additional works at: https://trace.tennessee.edu/utk_graddiss



Part of the [Educational Psychology Commons](#), and the [Psychology Commons](#)

Recommended Citation

Bryant, Emily Kay Rowland, "An Examination of Potential Mediating Factors on the Seductive Details Effect in Learning from Text. " PhD diss., University of Tennessee, 2010.
https://trace.tennessee.edu/utk_graddiss/780

This Dissertation is brought to you for free and open access by the Graduate School at TRACE: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of TRACE: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

To the Graduate Council:

I am submitting herewith a dissertation written by Emily Kay Rowland Bryant entitled "An Examination of Potential Mediating Factors on the Seductive Details Effect in Learning from Text." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in School Psychology.

Christopher H. Skinner, Major Professor

We have read this dissertation and recommend its acceptance:

Sherry Bain, Richard Saudargas, Amy Skinner

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Emily Rowland Bryant entitled “An Examination of Potential Mediating Factors on the Seductive Details Effect in Learning from Text.” I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in School Psychology.

Christopher Skinner , Major Professor

We have read this dissertation
and recommend its acceptance:

Sherry Bain

Richard Saudargas

Amy Skinner

Accepted for the Council:

Carolyn R. Hodges
Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

An Examination of Potential Mediating Factors on the Seductive Details
Effect in Learning from Text

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Emily Rowland Bryant
August 2010

Copyright © 2009 by Emily Kay Rowland

All rights reserved.

DEDICATION

This document is dedicated to my family and friends who have supported me throughout my education. Beginning in grade school, I have always been encouraged to pursue my dreams through education. I owe a special dedication to my parents, Terry and Debra Rowland, who have been steadfast in their love and support for as long as I can remember, and to my husband, Jason Bryant, who has been patient and forgiving for all the hours spent at the “dissertation.” Thank you for always believing in me.

ACKNOWLEDGEMENTS

I want to thank the chair of my dissertation committee, Dr. Christopher H. Skinner. I truly appreciate the time, effort, and guidance he has invested in this project since I began this line of research four years ago. I also want to thank the other members of my dissertation committee, Dr. Sherry Bain, Dr. Richard Saudargas, and Dr. Amy Skinner, whose feedback and insight was extremely valuable. Thank you to Mike O’Neal, the statistics consultant, who met with me many times to analyze data. I appreciate the time that each one devoted to helping me complete this dissertation project.

Lee Saecker, my program mentor, deserves thanks for fielding innumerable questions about the program and dissertation process throughout the years. Emily Kirk and Kai Davis assisted in data collection, which made the process go so much smoother than had I had to do it on my own. I send much love to my cheerleaders who have kept me going with encouraging texts, phone calls, and emails. I am very appreciative of the time that all of these people devoted to helping me to the finish line.

ABSTRACT

Seductive details (SDs) are interesting, but not necessarily relevant, information that may be included in text to capture students' attention. Unfortunately, including such details often hinders learning. Schraw (1998) differentiated between context-independent (i.e., interesting without surrounding context) and context-dependent (i.e., interesting only in light of surrounding context) SDs.

In the first study, 388 undergraduate students read six paragraphs describing Sigmund Freud's psychosexual stages (i.e., target material). Participants in four groups also read one of two biographical paragraphs. The biographical paragraphs contained SDs about Freud that were either context-dependent or -independent to the target material and presented before (primacy) or after (recency) the target-material paragraphs or not at all (Control). After reading, students took a quiz. Quiz performance was not influenced by the type of SDs but rather its placement relative to the target text. Students in the primacy conditions performed worse than students in the recency and control conditions. Thus, both types of SDs reduced learning when they were presented at the beginning of the text.

Study 2 examined a potential interaction between SDs and a graphic organizer (GO). GOs are designed to help learners make connections among ideas in the text by visually representing the concepts to be learned (Ausubel, 1960; Robinson & Kiewra, 1995). In Study 2, 207 undergraduate students read the same target material from Study 1. Depending on condition, the participants also read the context-dependent biographical paragraph (SD only), read a GO that linked the SDs to the target material (GO only), read both (GO + SD), or only read the target material (Control). After reading, students took a quiz. Participants in the GO only group and the

Control group performed significantly better on the quiz items than participants in the SD only group. There was no significant difference between the Control group and the GO + SD group. Results from both studies suggest that the GO mitigated the seductive details effect but did not reverse it. There is evidence for both the diversion hypothesis (priming inappropriate schema) and the distraction hypothesis (focusing the reader's attention on the SDs as opposed to the target material).

TABLE OF CONTENTS

CHAPTER I	1
Seductive Details	1
Mode of Delivery	2
Assessment	2
Content	3
Context	3
Placement	3
Graphic Organizers	5
Placement	8
Type	8
Organization of Target Text	10
Qualities of the Learner	13
Content	14
Assessment	14
Relationship Between Seductive Details and Graphic Organizers	16
CHAPTER II	17
Study 1	17
Purpose and Hypothesis	17
Method	19
Participants and Setting	19
Materials	19
Design	21
Procedures	21
Results	22
Discussion	24
Summary	26
CHAPTER III	28
Study 2	28
Purpose and Hypothesis	29
Method	30
Participants and Setting	30
Materials	31
Design	34
Procedures	35
Results	35
Discussion	40
Summary	42
CHAPTER IV	44
General Discussion	44
Summary of the Two Studies	44
Theoretical Implications	45
Applied Implications	47

Limitations and Future Research	48
Conclusion	49
LIST OF REFERENCES	51
APPENDICES	56
Appendix A: Study 1—Target Material in Passages	57
Appendix B: Study 1—Context-Dependent SDs in Passages	58
Appendix C: Study 1—Context-Independent SDs in Passages.....	59
Appendix D: Study 1—Target Material Quiz Items.....	60
Appendix E: Study 1—Context-Dependent Material Quiz Items	62
Appendix F: Study 1—Context-Independent Material Quiz Items.....	63
Appendix G: Study 2—Additional Target Material Quiz Items	64
Appendix H: Study 2—Additional Context-Dependent Material Quiz Items	65
Appendix I: Study 2—Procedural Script	66
Appendix J: Study 2—Packet for GO + SD condition	68
Appendix K: Study 2—Packet for GO only condition	74
Appendix L: Study 2—Packet for SD only condition	80
Appendix M: Study 2—Packet for control condition.....	86
VITA.....	92

LIST OF TABLES

Table 1. Study 1—Mean quiz scores of experimental conditions.....	23
Table 2. Study 2—Average recall accuracy on 13 target material items across groups...	37
Table 3. Study 2—Average recall accuracy on 7 SD items across groups.....	39

LIST OF FIGURES

Figure 1. Study 1—Directional hypotheses for performance on target material items	18
Figure 2. Study 1—Mean quiz scores of experimental conditions.....	23
Figure 3. Study 2—Hypotheses for performance on target material items.....	30
Figure 4. Study 2—Packet materials by condition	32
Figure 5. Study 2—Matrix GO used in packets	33
Figure 6. Study 2—Average recall accuracy on 13 target material items across groups .	37
Figure 7. Study 2—Average recall accuracy on 7 SD items across groups.....	39

CHAPTER I

This dissertation is comprised of two studies. The first investigates the role of seductive details on learning from text. The second study examines the interaction between seductive details and graphic organizers. Each line of research will be discussed and then integrated.

Seductive Details

One of the biggest challenges for educators is to keep the attention of learners (Evertson, Emmer, & Worsham, 2003). A common solution is to include interesting, but not always relevant, details in lectures and texts. Certain topics, such as danger, power, and sex, are almost universally interesting (Hidi & Baird, 1988). Such details are sometime referred to as *seductive details* (SDs; Garner, Brown, Sanders, & Menke, 1992; Garner, Gillingham, & White, 1989; Harp & Maslich, 2005; Harp & Mayer, 1997, 1998; Schraw, 1998; Wade, Schraw, Buxton, & Hayes, 1993). Readers tend to recall details that they rate as interesting better than details they rate as important (Schraw, 1998; Wade et al., 1993).

Although adding SDs may enhance interest and capture students' attention, these details may not make other material (i.e., target material that students are expected to learn) more interesting (Dewey, 1913). To the contrary, adding SDs may actually hinder the learning of target material (Harp & Maslich, 2005; Harp & Mayer, 1998; Mayer, Heiser, & Lonn, 2001; Mayer & Jackson, 2005).

Cognitive hypotheses posited to explain why adding SDs may hinder learning include distraction, disruption, and diversion (Harp & Mayer, 1998). The distraction hypothesis suggests that SDs may cause students to focus their selective attention away from important material. The disruption hypothesis suggests SDs interfere with learners' construction of an organized mental

model of the material. Finally, the diversion hypothesis suggests that SDs may interfere with learning because they activate inappropriate prior knowledge that they use to interpret the target material (Garner et al., 1989; Garner et al., 1992; Sweller & Chandler, 1991).

Despite an extensive body of research on the topic, there is no consensus on the mitigating factor(s) that determine whether or not SDs are helpful or harmful to learning the target material in texts, lectures, or multimedia presentations. Possible mitigating factors include: 1) mode of delivery; 2) assessment; 3) content; 4) context; and 5) placement. Each of these factors will be described in detail below.

Mode of Delivery

Most of the research on SDs has been conducted using text as the mode of delivery. There are several studies regarding the effects of SDs on learning from lectures (e.g., Mathis & Skinner, in press; Saecker, 2008). Maintaining procedural integrity (i.e., keeping absolute consistency across conditions to prevent confounds) make studying lectures much more difficult than studying texts. Discussion here will focus on the effect of SDs in texts.

Assessment

Mixed findings across studies on SDs may be contradictory because of the different assessment methods used to measure learning. These include: 1) multiple-choice quizzes and tests (e.g., Mathis & Skinner, in press); 2) free-recall and essay tests (e.g., Garner, Gillingham, & White, 1989; Hidi & Baird, 1988; Mayer & Jackson, 2005; Sanchez & Wiley, 2006; Schraw, 1998; Wade, Schraw, Buxton, & Hayes, 1993); and 3) problem-solving tasks (e.g., Harp & Mayer, 1998; Kalyuga, Chandler, & Sweller, 1999; Mayer & Jackson, 2005). Different

assessment procedures may measure different types of learning (Harp & Mayer, 1997). It is possible that SDs affect some kinds of learning more than others.

Content

The content of SDs is varied. Lecturers often “spice up” the material by including highly interesting information, such as anecdotes of scandal or violence as well as descriptions of personal experience. Multimedia presentations may use music or video clips or animated computer demonstrations (e.g., the formation of lightning; Mayer, Heiser, & Lonn, 2001). Textual SDs, like lectures, may involve highly salient anecdotes. Other common content of textual SDs are graphs, charts, pictures, or photographs (Harp & Mayer, 1997, 1998; Mayer & Jackson, 2005).

Context

In his study of context-independent and context-dependent SDs, Schraw (1998) found additional evidence for the cognitive diversion hypothesis. Certain details are deemed interesting, regardless of the context. Schraw referred to these details as *context-independent SDs*. Other details need surrounding context and referential points to be deemed interesting. These are *context-dependent SDs*. Schraw found that students require more time to process context-dependent SDs relative to target ideas. One explanation for this finding is that readers were expending effort to make referential coherence of the context-dependent SDs.

Placement

Researchers investigating the placement of SDs within lectures have found support for the diversion hypothesis. Harp and Maslich (2005) showed recorded lectures to students and then

tested them on the target material. Students who watched the lecture without SDs performed better on the learning assessment than those who watched with the SDs. The placement of SDs may also affect the degree of interference with text learning. Harp and Mayer (1998) found that placing SDs at the beginning of text interfered with learning but not when they were placed at the end of text. These results support other findings that suggest that placement of SDs in the beginning of a text or lecture is most harmful to learning (Garner et al., 1989; Harp & Mayer 1998; Mayer & Jackson, 2005).

The cognitive diversion hypothesis (Sweller & Chandler, 1991) has been used to explain why the placement of SDs prior to the important target material is especially harmful to learning the target material. When students focus their attention on SDs, they may activate schema that are appropriate for learning the SDs but inappropriate for learning the important material (Garner et al., 1989; Harp & Mayer, 1998; Mayer et al., 2001; Mayer & Jackson, 2005).

Not all research suggests that SDs presented prior to target material hinder learning. For example, Mayer et al. (2001) did not find a placement effect of SDs within a multimedia presentation. Students were shown an animation with concurrent narration on lightning formation. Interesting but irrelevant video clips were added, which served as the SDs. The researchers measured students' learning in four conditions: 1) no video; 2) video interspersed; 3) video after; and 4) video before. They found that the placement of the videos had no effect on the performance of the students on tests of retention and transference. Schraw (1998) also found no difference on recall of target material when SDs were included. Additionally, researchers examining the placement of concrete examples, which may or may not be seductive, have found

evidence that placing them prior to the target ideas can enhance, as opposed to hinder, learning (Beishuizen, Asscher, Prinsen, & Elshout-Mohr, 2003).

Graphic Organizers

Graphic organizers (GOs) are learning tools that have long been incorporated into textbooks and lesson plans. Also known as advance organizers (Ausubel, 1960) and structured overviews (Robinson & Kiewra, 1995), GOs help learners make connections among the ideas in the text by visually representing the concepts to be learned.

Results from research on advance organizers have been inconsistent (Kloster & Winne, 1989). Part of this is due to a lack of clear operational definitions for the various types of advance organizers. Another factor that may account for mixed findings across studies is that few of the researchers actually instructed participants to utilize the advance organizer (Kloster & Winne). These researchers attempted to address these shortcomings by examining specific types of advance organizers and the actual usage of the advance organizer on learning outcomes.

Kloster and Winne (1989) posited two theoretical explanations describing the cognitive processes involved in advance organizers. The first theoretical explanation is that advance organizers cue the learner to make connections between the new information and more general, abstract information already known by the learner. The second explanation is grounded in the assumption that the advance organizer provides a new cognitive structure to the learner. Both interpretations emphasize the role of cognitive hierarchical structure in the effectiveness of advance organizers.

In addition to the theoretical explanations proposed by Kloster and Winne (1989), other researchers developed different theoretical explanations as to why GOs can be effective learning

tools (e.g., Ausubel, 1960, 1982; Mayer, 1978). Ausubel (1960) was one of the first researchers to examine the role of advance organizers in learning. Because he believed cognitive structure to be hierarchically organized, Ausubel predicted that unfamiliar verbal material could be learned and retained better with an advance introduction of the outline of the lecture. Ausubel reasoned that new meaningful material would be remembered more if the learner could “file” the information under the correct concept in the hierarchical long-term memory. He hypothesized that if “appropriate and relevant subsuming concepts” (p. 267) are introduced prior to the learning of unfamiliar information (through the use of advance organizers), students will perform better on retention tests than if they did not receive the advance organizer.

To test his hypothesis, Ausubel (1960) developed a 2,500-word passage about properties of carbon steel. The first paragraph in the passage differed depending on condition. The introductory paragraph for the experimental text gave a broad introduction about the topic and was much more abstract and conceptual than the actual passage itself. The introductory paragraph for the control text provided “historically relevant background material” (p. 268) that concerned the general topic but did not provide an overarching structure for the following material. After reading the passage, participants completed a multiple-choice exam. Results revealed that students in the experimental group performed better on the exam than students in the control group. Ausubel explained the effect of the advance organizer as a result of two processes. First, the advance organizer highlights whatever relevant concepts already exist in the learner’s long-term memory (i.e., the “selective mobilization of the most relevant existing concepts;” p. 271). As a result, the new information seems more familiar and meaningful and the information becomes integrated into preexisting cognitive structure. Second, Ausubel suggests

that advance organizers provide “optimal anchorage” (p. 270) that encourages integration in the beginning and, later, resistance to forgetting. This reasoning is the basis for Ausubel’s assimilation theory (Ausubel, 1982).

Mayer (1978) investigated three theories which could potentially account for the facilitative effect of advance organizers on learning from technical and unfamiliar text: 1) assimilation encoding theory; 2) addition theory; and 3) reception theory. According to the assimilation encoding theory, advance organizers facilitate learning by providing a cognitive anchor (i.e., a meaningful context) for new information. Because learning involves integrating and assimilating new information into existing cognitive structures, the participant should perform better on learning measures after viewing an advance organizer. However, highly technical details are likely to become “lost” in the integrating process, and so “this theory predicts that retention of specific details may be hindered” (p. 881).

The second theory examined by Mayer (1978) is the addition theory. According to this theory, the more cognitive anchors present in text, the better the learning outcome. An advance organizer would provide additional anchors for “hooking up incoming ideas” (p. 881) and thus the advance organizer group would perform better on all types of questions. Finally, according to reception theory, information is only learned if it was presented and received by the learner. If the learning test was strictly measuring information presented in the target text (and not the more abstract subsuming concepts included in the advance organizer), then the presence of an advance organizer should have no effect on test performance. Results supported the predictions of the assimilation encoding theory, suggesting that advance organizers can facilitate learning of target ideas but not specific facts.

As with SDs, there are several variables that may influence the effectiveness of GOs: 1) placement; 2) type; 3) organization of the target text; 4) qualities of the learner; 5) content; and 6) assessment. Next, each of these factors will be described in further detail.

Placement

Ausubel (1960) believed that organizers should be presented at the very beginning of the material to be learned (hence his term “advance organizers”). If advance organizers are available to the reader from the beginning, “their integrative properties are much more salient than when introduced concurrently with the learning material” (p. 271). Luiten, Ames, and Ackerson (1980) also concluded that an advance organizer is effective for facilitating both learning and retention. The main focus of Luiten, Ames, and Ackerson’s meta-analysis was the size of the effect of the advance organizer’s influence on learning and retention. While the effect sizes in all the studies varied, advance organizers always had a positive effect on learning and retention.

Mayer (1978) measured the learning of college students from text about basic computer programming. Depending on condition, the students, who were categorized into low- and high-ability, received an advance organizer either before or after the target material. Results suggested that, for low-ability students, placing the advance organizer before the target material was much more beneficial than after the target material. Interestingly, there was no effect of placement for high-ability participants.

Type

The term “graphic organizer” can be applied to a wide variety of visual adjuncts presented in texts or multimedia presentations. As a result, research on GOs is fairly convoluted

as precise operational definitions are lacking (Kloster & Winne, 1989). Nevertheless, there is agreement on the definitions of a few specific types of commonly used GOs. Advance organizers, outlines, and matrices are all different types of GOs and are described in further detail. Other types of GOs include tree diagrams and knowledge maps (Robinson & Kiewra, 1995; Robinson & Skinner, 1996).

Advance organizers. Advance organizers are presented before the target material, such as in the beginning of the chapter, and use linear prose. The purpose of this type of GO is to introduce the reader to the topic and provide structure so that the reader can more easily organize and integrate new information (Robinson & Kiewra, 1995; Ausubel, 1960).

Ausubel (1960) was one of the first researchers to investigate the use of advance organizers in verbal learning. Based on his assumption that cognition is hierarchically organized, he reasoned that new material can be made meaningful so long as it is subsumed under existing concepts/categories. He hypothesized that the learning and memory of verbal material may be aided by introducing the relevant subsuming concepts in advance. These concepts he termed *organizers*, and they serve as “anchoring foci” (p. 270) for the new material.

Outlines. Outlines are a popular type of GO that use only essential text information to create hierarchy among concepts. It is “a systematic listing of a concept with its subordinate concepts and their attribute values” (Robinson & Kiewra, 1995, p. 455). This type of GO is considered unidimensional because it can only be understood by viewing the contents in one direction (Robinson, Corliss, Bush, Bera, & Toberlin, 2003). Though it is an effective text adjunct for identifying within-concepts relations, its linear format may make it difficult to identify important among-concepts relations. For example, an outline for the concept of “Dog”

may list three subordinate concepts (Pug, Labrador, and Golden Retriever) and their attribute values (coat, shedding, and grooming). A reader would find it easy to identify relations within each concept (e.g., comprehending the three attributes for a Pug) but would have difficulty comparing among-concepts relations (e.g., comparing coats across the three breeds).

Matrix organizers. A matrix organizer uses rows and columns to represent concept relationships. This type of GO uses spatial relationships to emphasize the connections between concepts in the text while minimizing extraneous information, such as column identifiers. While row labels are still used, the lack of column identifiers is the distinguishing characteristic between matrix organizers and other GOs. Robinson and Skinner (1996) suggested that the lack of column identifiers is what makes the matrix organizer so effective because identifiers may interfere with “the discriminability of related concepts by drawing attention away from them and to the labels themselves” (p. 168). A matrix facilitates the selection of important categories (which are identified via the row headings) and also facilitates the extraction of the information (because the information is not spread out like it is in text).

Organization of Target Text

Another factor that influences the effectiveness of a GO is the organization of the target text. Even in cases where the text is organized from lesser to greater differentiation, it will not be as effective as having organizers “available from the very beginning of the learning task, and their integrative properties are also much more salient than when introduced concurrently with the learning material” (Ausubel, 1960, p. 271).

Mayer (1978) focused on the effects of advance organizers on disorganized text. According to the assimilation theory, advance organizers should improve performance only

when the learning material is disorganized. When the material is disorganized, the advance organizer can serve as a cognitive anchor to integrate and hold together the incoming material. If the material is organized, however, the advance organizer is redundant because the learner can integrate the material by himself or herself. The addition theory predicts that the advance organizer will be beneficial when the learning materials are both organized and disorganized. Reception theory predicts that advance organizers would not have any effect at all on posttest performance because the test content does not directly assess advance organizer content.

Mayer (1978) developed a series of two experiments to test the effects of advance organizers on learning from poorly organized text. In the first experiment, college students read a sequence of note cards about computer programming. The cards had headings or not. For the experimental group, a 500-word advance organizer was typed on a sheet of paper. This advance organizer was presented to the participants before any of the informational note cards were. The advance organizer consisted of an outline of the note card information to follow as well as a comparison of a computer to familiar items (e.g., ticket window). Learning was assessed with an 18-item test. The questions varied by type (e.g., generating a program vs. interpreting a program) and length (e.g., how much computer program “looping” was required to answer a particular problem).

Results of Mayer’s (1978) first experiment supported the assimilation encoding theory. There were no main effects for advance organizer or logical organization of the text. However, there was an interaction effect between these two variables. These findings support the assimilation encoding theory, which predicts that advance organizers should have no noticeable benefit for well-organized text but should facilitate learning from poorly organized text. The

advance organizer group performed better than the no-advance organizer group when the text was poorly organized; however, the opposite pattern was seen when the text was well organized.

Another significant interaction was between advance organizer and type of question. Interpretation questions were more often answered correctly for the group that had the advance organizer. However, the questions that simply required “generation” (i.e., rote recall) were more often answered correctly for the group that did not have the advance organizer.

Mayer (1978) then developed a second experiment to extend the results of his first experiment. This time he varied text organization by attribute (“attribute-organization” text) or by name of country (“name-organization” text). The independent variable of placement of the advance organizer (before or after) was introduced as well. Four tests of learning were developed: 1) recall-name test; 2) recall-attribution test; 3) inference-name test; and 4) inference-attribution test. In addition to the tests, Mayer recorded each participant’s reading and solution times. Participants were permitted to view the advance organizer for 60 seconds with the instructions, “Some subjects have found that this system makes your task easier; you may study it for 1 minute and then I will take it away.”

The attribute-organization groups required much more reading time than the name-organization groups. Mayer (1978) suggests the reason for this finding is that, at least in the context of academic material, organization by name is a much more natural method and is consistent with how the participants typically organize incoming material. Participants who viewed the advance organizer prior to reading the target material required less reading time as well, though this pattern did not reach statistical significance. Learners who read the attribute-organized text performed better on the tests than the learners who read the name-organized text.

Although attribute-organized text took much longer for the participants to read, Mayer suggests that this extra time and effort actually benefited the learner by resulting in higher test scores. Low-ability participants benefited much more from the advance organizer than high-ability participants, supporting the common notion that high-ability participants are adept at creating their own integrating system and do not need the additional structure imposed by an advance organizer. Furthermore, low-ability participants benefited much more from reading the advance organizer prior to the target text when compared to reading it after the target text. The impact of placement of advance organizer was not significant for high-ability learners. Thus, Mayer's (1978) two-experiment study on the effects of advance organizers lends support to the assimilation encoding theory; GOs apparently facilitate the learning of technical, unfamiliar, and poorly organized materials because they serve two functions: availability and activation.

Qualities of the Learner

The effectiveness of GOs is often influenced by qualities of the learner. Ausubel (1960, 1962) established that the background knowledge, mastery of previous material, and verbal ability all play an interactive role in the effectiveness of an advance organizer on learning and retention of material. Grade level and individual ability are also influential factors (Luiten, Ames, & Ackerson, 1980).

A meta-analysis of the effectiveness of advance organizers, conducted by Luiten, Ames, and Ackerson (1980), revealed that the grade level of the learner was a mediating factor. Interestingly, while grade level impacted the effect sizes for both learning and retention results, the effect sizes had opposite trends for the age groups. College students (as well as special education students) benefited more from the use of advance organizers, as evidenced by larger

effect sizes on learning measures than those seen in elementary and secondary school students. However, effects of advance organizers on retention showed an opposite pattern, with younger students benefiting most from advance organizers and college students benefiting the least (in fact, for this population, the advance organizer had a nonexistent effect on retention). Thus, grade level is an influencing variable in the effect of advance organizers, and the influence of grade level interacts with the presentation mode of the advance organizer.

Luiten, Ames, and Ackerson (1980) also examined the interaction of an advance organizer with individual ability. Against popular opinion, data indicate that advance organizers were most effective for students with high ability. Of course, comparisons across studies were limited because there isn't a consistent operational definition for high, middle, and low ability.

Content

In their meta-analysis, Luiten, Ames, and Ackerson (1980) examined the effect sizes of an advance organizer on the learning of different subject areas (i.e., mathematics, physical science, biological sciences, and social sciences). The effect of the advance organizer was positive on learning and retention measures in every instance, although there were different effect sizes depending on whether the study measured learning or retention. In learning studies, advance organizers had a greater effect size when the subject area was in the social sciences. In retention studies, the greater effect size was seen in physical sciences.

Assessment

While trying to account for the inconsistent research results on advance organizers, Kloster and Winne (1989) indicate that GOs do not show effects “when measures of general or

overall learning are used” (p. 9). In fact, advance organizers may actually impede recall of specific details (Mayer, 1978). However, research on advance organizers *has* consistently shown that they facilitate qualitative aspects of learning such as retention of concepts rather than facts and problem solving involving transfer.

It is also essential to consider *when* the assessment was given. Luiten, Ames, and Ackerson (1980) found that the effect size of advance organizers on learning (i.e., assessments administered within 24 hours of completion of reading or viewing target material) was consistently smaller than the effect size on measures of retention (i.e., assessments administered after 24 hours). Advance organizers, therefore, have “a permanent advantage ... rather than a short-term ‘wake-up’ effect” (p. 216). This suggests that the small but positive effect of an advance organizer on learning and retention may be artificially low because most studies examine only short-term benefits.

In most of the studies examined in Luiten, Ames, and Ackerson’s (1980) meta-analysis, learning was assessed immediately after the participant read the material to be learned. If the assessment occurred after 24 hours of reading the target material the assessment was considered to be a measure of retention. Results from the meta-analysis show that advance organizers increase both learning and retention. Experimental group participants consistently performed better than control group participants, with estimates ranging from 58 to 75 percent of experimental group participants outperforming control group participants.

Ausubel (1960) assessed students’ performance on a retention test covering a text passage about steel. On two occasions, 48 hours before and also immediately before reading the target text, the students were allowed to study a 500-word introductory paragraph. This paragraph

either served as an advance organizer (for the experimental group) or interesting historical information. Retention of the learning material was tested 3 days later. Results indicate that advance organizers promote optimal performance on retention tests, at least when those tests are delayed.

Relationship Between Seductive Details and Graphic Organizers

The purpose of Study 1 was to investigate the main effects and interaction effect between placement of SDs and the type of SDs. Because SDs tend to be learned better than the target material (Harp & Maslich, 2005; Harp & Mayer, 1998; Mayer, Heiser, & Lonn, 2001; Mayer & Jackson, 2005), it was hypothesized that linking context-dependent SDs to the target material would facilitate learning of the target material.

Results from Study 1 revealed that what were considered to be context-dependent SDs still hindered learning, suggesting that the learner did not make the connections between the SDs and the target material. Therefore, in Study 2, a GO was used to make the links between the context-dependent SDs and target material clearer.

CHAPTER II

Study 1

Placement of Seductive Details: Primacy Effect on Text Recall

Although seductive details (SDs) presented prior to target material may prove useful in capturing students' attention, some researchers have found that this strategy may have a detrimental effect on students' learning. Schraw (1998) found that some types of SDs (e.g., context-dependent) may increase cognitive effort and Beishuizen et al. (2003) found evidence that presenting concrete examples (which may be SDs) prior to expository, abstract content material may actually enhance, as opposed to hinder learning. These studies suggest that it may be possible to deliver some types of SDs early to capture students' attention without hindering (and possibly even enhancing) learning. However, researchers have not investigated the interactive effects of SDs placement and type.

Purpose and Hypothesis

The purpose of this study was to extend the research on SDs by examining both the interactive and combined effects of type of SDs and their placement within the text. See Figure 1 for directional hypotheses. It was hypothesized that participants who received context-independent SDs, regardless of placement, would have the poorest recall of the target material in the text, as measured by a multiple-choice quiz. It was also predicted that students who received the context-dependent SDs prior to the target material would perform the best on target material quiz items and that students receiving the context-dependent SDs after the target material would

rank second among the experimental conditions. Students who did not receive the SDs at all were expected to provide a baseline for recall of target material.

	Context-independent SDs	Context-dependent SDs
Presented prior to the target material	Primacy/Context-independent condition 3 rd (tied for lowest)	Primacy/Context-dependent condition 1 st (highest)
Presented after the target material	Recency/Context-dependent condition 3 rd (tied for lowest)	Recency/Context-dependent condition 2 nd (middle)
Control group	Provides baseline for recall of target material	

Figure 1. Study 1—Directional hypotheses for performance on target material items

Method

Participants and Setting

Participants were 388 undergraduates enrolled in an introductory psychology class at a large public university. Students received extra credit for participating in this study. Students participated in one of four experimental sessions that was administered in a large lecture hall. The sessions were held early in the semester to ensure that the material covered in the passage had not yet been presented in class or course readings. Students signed up to participate in this study through the website established by the Psychology Department (<http://hpr.msu.edu/UTK/>).

The sample consisted of 232 women and 156 men whose ages ranged from 17 to 27 years ($M = 18.68$, $SD = 1.12$). The majority of these students were in their first year of college ($n = 295$; 76%). Roughly 5% of the sample identified themselves as African-American ($n = 20$), 4% as Asian ($n = 16$), 89% as Caucasian ($n = 345$), 0.6% as Hispanic ($n = 3$), and 1% as “Other” ($n = 4$).

Materials

Participants received one of five packets (i.e., primacy/context-dependent, primacy/context-independent, recency/context-dependent, recency/context-independent, or control). With the exception of the control-group packets, each packet consisted of the first sheet, which included the target text and SDs. The control group received the target text without SDs. This sheet was followed by a page of 10 2-digit by 2-digit multiplication problems used as an interpolated task (e.g., 26×14 ; see Schraw, 1998), and a 20-item multiple-choice quiz. Researchers investigating the effects of interpolated tasks on short-term memory have shown that

such tasks interrupt memorization and increase the likelihood of forgetting (e.g., Lowe & Merikle, 1971; Manning, 1978; Petrusic & Jamieson, 1978). The interpolated task was included to prevent students from spending time memorizing the material as well as to keep the procedure similar to Schraw's (1998) study on context-dependent and context-independent SDs.

The target text consisted of a 350-word description of Sigmund Freud's psychosexual stages. This text was divided into six paragraphs (an introduction and one paragraph for each psychosexual stage; see Appendix A) and a 145-word biographical paragraph. This biography included context-independent SDs (context-independent conditions) or context-dependent SDs (context-dependent conditions). The biographical paragraph was either placed prior to or after the six target material paragraphs. See Appendices B and C for the full biographical paragraphs (both context-dependent and -independent, respectively).

The biographies were developed by a team of graduate students with advanced training in psychology, including a graduate level history of psychology course. To develop SDs that were both context-dependent and context-independent, some SDs in the biographies were fabricated. Researchers selected Freud and his psychosexual stages because the material was relevant to the introductory psychology course, but not yet covered. Because much has been written about Freud, both accurate and inaccurate, researchers posited that few, if any, undergraduate students in an introductory psychology course could detect fabrications. Immediately after participants took the quiz they were informed that some of the biographical details were fabricated and as they exited the lecture the primary researcher handed them an accurate biography of Freud.

The quiz consisted of 20 multiple-choice items. Each item addressed facts and included four response options. Ten of these items covered the target material (details in the text that were

not SDs; see Appendix D. Five items assessed students' learning of the biographical details included in the two context-dependent conditions (see Appendix E); the remaining five items assessed learning of the biographical details included in the two context-independent conditions (see Appendix F). All participants received the same quiz even though they had different passages. Thus, a participant who received a context-dependent passage still answered questions about details only presented in the context-independent passage and vice versa.

Design

A between-subjects, post-test only design was used with random assignment of participants to one of five conditions (primacy/context-dependent, primacy/context-independent, recency/context-dependent, recency/context-independent, or control). A two context (context-dependent vs. context-independent) by two placement (primacy vs. recency) between-subjects analysis of variance (ANOVA) was conducted on the 10 target-material items from the quiz. For the fifth condition where the control students simply read the text without the SDs passage, two one-way ANOVAs were conducted for both placement and context simply to determine if a seductive details effect was present. Tests of the assumptions of normality (Kolmogorov-Smirnov's) and homogeneity of variance (Levene's) were supported ($F_s > .05$). All statistical tests were conducted using an alpha level of .05.

Procedures

After the students were seated, the primary experimenter gave the students instructions that were to be followed once the packets were distributed. Students were instructed to read the passage on the first page, rip it off the packet, crumple it up, and put it on the floor. This was to

prevent participants from referring back to the passage while completing the quiz. Participants were instructed to finish each math problem on the second page, and then complete the quiz on the following three pages. After these instructions were provided, packets were handed out to students in counterbalanced order. As students worked on their packets, two experimenters moved around the room to ensure students followed instructions (e.g., completed the math problems before the quiz). There was no time limit.

The quizzes were scored anonymously by the primary researcher. Additionally, a second experimenter independently scored 23% of the quizzes. Percent interscorer agreement, calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Kazdin, 1982), was 99% (i.e., disagreed on only three items).

Results

Table 1 displays the average target material recall accuracy across groups. Using only the four treatment groups, an ANOVA revealed a statistically significant main effect for placement, $F(1, 308) = 9.87, MSE = 3.81, p < .01$. The effect size, Cohen's (1977) $f = 0.16$, was between a small and medium effect. Students who read the SDs passage after the target text ($M = 7.30$) comprehended more target material than those students who read it before the target text ($M = 6.60$). Neither the main effect of context [$F(1, 308) = .01$] nor the interaction effect of placement by context [$F(1, 308) = .54$] were statistically significant.

Table 1. Study 1—Mean quiz scores of experimental conditions

Placement	Context	<i>n</i>	<i>M</i>	<i>SD</i>
Primacy	Dependent	79	6.57	1.97
Primacy	Independent	79	6.67	2.12
Recency	Dependent	77	7.39	1.77
Recency	Independent	79	7.20	1.91
Control		74	7.36	1.84

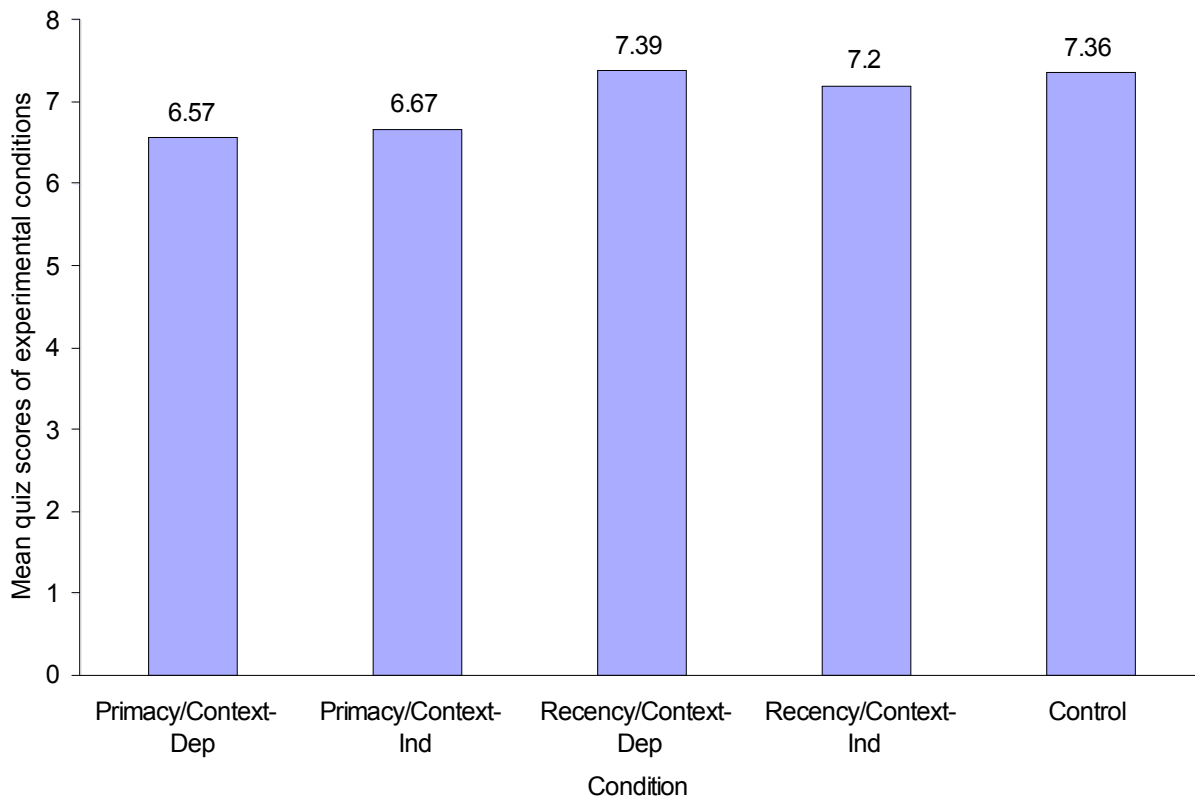


Figure 2. Study 1—Mean quiz scores of experimental conditions

To determine whether the SDs effect was present at all one-way ANOVAs were conducted on both the placement and context factors with the control students as the third condition. The placement effect was statistically significant, $F(2, 388) = 6.21, MSE = 3.71, p < .01$, Cohen's $f = 0.13$, a small effect. A Fisher LSD test confirmed that the students who read the SDs passage before the target text performed worse than both the students who read it after the target text and those who did not read the passage at all ($M = 7.36$). The addition of the control condition did not change the previous failure to find a statistically significant context effect, $F(2, 386) = 1.40, MSE = 3.81, p = .25$.

Student performance on the items addressing context-dependent and context-independent bibliographic details (i.e., the SDs) was also analyzed. Regardless of the passage the participant read, all participants completed the same quiz; thus, students were required to answer questions about details that may not have been in their passage. Those students who read passages with the context-dependent details scored statistically significantly higher on those five items than those students who did not read the context-dependent details, $t(387) = 24.86, p < .001$, Cohen's (1977) $d = 2.73$, a large effect. The opposite was also true; those students who read passages with context-independent SDs scored statistically significantly higher on those five items than those students whose passages did not contain context-independent details, $t(387) = 14.01, p < .001$, Cohen's $d = 1.54$, a large effect. These results indicate that students did read the passages.

Discussion

Some researchers have suggested that SDs presented prior to the target material almost always hinder learning (e.g., Garner et al., 1989). Others have suggested that such details may enhance learning if these details are interesting only when considered in context of target

material (e.g., Beishuizen et al., 2003; Schraw, 1998). Results from the current study revealed a statistically significant effect for placement, with students in the primacy group scoring lower on our assessment of the target material than those students in both the recency group and the control group, but no statistically significant effect for the type of details (i.e., context-dependent vs. context-independent). These results are consistent with previous researchers who showed that placement of SDs prior to the target material interferes with learning of the target material (Garner et al., 1989; Harp & Mayer 1998; Mayer et al., 2001; Mayer & Jackson, 2005). In the current study, even when SDs were related to the target material (i.e., context-dependent SDs), providing these details first reduced target-material learning. These findings suggest that SDs should either be placed at the end of text (recency condition) or withheld completely (control condition).

From a theoretical perspective, the current study supports some elements of the cognitive diversion hypothesis as early presentation of SDs produced less learning of target material than later presentation. However, the current study did not support the hypothesis (see Figure 1) that early presentation of SDs, which are related to the target material, may enhance learning by activating appropriate and broader schema. Thus, the distinction between context-dependent and context-independent SDs may be less important than placement. Perhaps the effects of reading interesting, unnecessary details are the same regardless of whether or not they are related to the target text.

A significant limitation to this study is that although the SDs were developed to be either context-dependent and context-independent, currently there are no scientific procedures for assessing the level of context-dependency. Perhaps our context-dependent details were

interesting in and of themselves (see Appendices B and C). SDs research may be enhanced by developing independent, valid, and reliable procedures for assessing levels of dependency and comparing the effects of extremely irrelevant details (e.g., the author's or lecturer's personal stories) to the effects of moderately irrelevant details (e.g., the context-independent details used in the current study).

In the current study all SDs were placed either before or after the target material. However, each piece of the context-dependent SDs was interesting in that it was related to discrete details provided in the six-paragraph target-material text. Perhaps this chunked initial placement of the SDs made it difficult for readers to relate the discrete context-dependent SDs to the specific target material. Thus, researchers should further examine placement effects by interspersing context-dependent SDs immediately before and after the end of each section of related target-material text. Perhaps placement of context-dependent details immediately preceding or following the linked details would enhance target-material learning. Additionally, researchers should determine if using other procedures (e.g., graphic organizers; see Robinson and Skinner, 1996 for a review) designed to link the context-dependent SDs to the target material may enhance learning when SDs are presented immediately before the target material.

Summary

Some educators may want to include SDs prior to target material in order to capture students' attention. From an applied perspective, it was hoped that providing context-dependent SDs prior to the material would have enhanced learning or, at the very least, would have had no effect on learning of material. Unfortunately, the current study showed that both types of SDs presented prior to the target material hindered students' learning of the target material. Thus,

educators should use caution when considering placing interesting information before target material to garner student's attention. Based on the present findings, it is this placement that appears to be detrimental to text learning.

CHAPTER III

Study 2

Can a Graphic Organizer Mitigate the Seductive Details Effect?

In Study 1 the researcher investigated whether or not the context and placement of seductive details (SDs) causes the seductive details effect (i.e., learning the SDs but not the target material). Context-dependent and context-independent SDs were included in a passage about Freud's psychosexual stage theory. Results on a multiple-choice test did not indicate a context effect.

However, results from Study 1 did indicate a placement effect. Both types of details (i.e., context-dependent and context-independent) hindered the learning of target material when placed before the target material. When placed after the target material, participants' quiz performance was not significantly different from the control group. If the SDs were truly context-dependent, then the participants in the context-dependent conditions would have performed better than those participants in the context-independent conditions (Schraw, 1998). According to Schraw, when connected to the target text, the context-dependent SDs should have facilitated the assimilation of target material to conceptual anchors already in long-term memory.

Analysis from Study 1 showed that there wasn't a significant difference between the effects of context-dependent and context-independent SDs on test performance. This suggests that including the context-dependent SDs prior to presented target material did not enhance the students' ability to assimilate target material.

Researchers investigating graphic organizers have found that presenting GOs prior to target material can enhance learning (e.g., Ausubel, 1960). As with context-dependent SDs, GOs are thought to enhance learning by facilitating students' abilities to assimilate and connect target material (e.g., Ausubel, 1960; Ausubel & Fitzgerald, 1962; Robinson, Corliss, Bush, Bera, & Tomberlin, 2003). Therefore, presenting GOs prior to context-dependent SDs may enhance learners' ability to connect the SDs with the target material, thereby enhancing learning.

Purpose and Hypothesis

The purpose of Study 2 was to replicate and extend Study 1 in two ways: 1) by replicating the seductive details effect found in Study 1 when the context-dependent material was presented prior to the target text; and 2) by extending research by including GO prior to the presentation of the SD.

Figure 3 provides a summary of hypothesized outcomes based on previous research. First, based on Study 1, students who received the SDs without the aid of a GO were expected to score lowest on target material items. If the GO enhances learning then the GO only group was expected to perform better than both the control group and the SD only group. Finally, if the GO made the SDs more context-dependent, then the students who received both the GO and the SDs were expected to perform better than all other groups.

	GO	No GO
SDs	GO + SD condition 1 st (highest)	SD only condition 4 th (lowest)
No SDs	GO only condition 2 nd	Control condition 3 rd

Figure 3. Study 2—Hypotheses for performance on target material items

Method

Participants and Setting

Participants were 207 undergraduate students enrolled in an introductory psychology class at the University of Tennessee, Knoxville. Students received course credit for participating in this study. Students who did not consent to participate were offered an alternative written assignment in lieu of experiment participation. Students signed up to participate in this study through the website established by the Psychology Department (<http://hpr.msu.edu/UTK/>).

Participants signed up to attend one of four 1-hour sessions. For each session, participants were randomly assigned to conditions. Specifically, the four packets were placed in counterbalanced order before being distributed to students after they entered the classroom. The sessions took place in a large lecture hall on weekday evenings. The sessions were held early in the semester to ensure that the material covered in the passage had not been presented in class or in course readings.

The sample consisted of 113 women and 93 men and one unknown. One participant did not complete the demographic questionnaire and therefore his or her demographic information is not reported here. The majority of these students were 18 ($n = 85$; 41%) or 19 years old ($n = 85$; 41%). Most students were in their first year of college ($n = 146$; 71%). For most of the participants ($n = 147$; 71%), the introductory psychology course in which they were currently enrolled was the first Psychology course they had ever taken. About 6% ($n = 12$) of the participants expected to major in Psychology. Roughly 6.3% of the sample identified themselves as African-American ($n = 13$), 6.3% as Asian ($n = 13$), 83.1% as Caucasian ($n = 172$), 1% as Hispanic/Latino ($n = 2$), and 2.9% as “Other” ($n = 6$).

Materials

Four different packets were prepared according to condition. The conditions were: 1) GO + SD; 2) GO only; 3) SD only; and 4) Control. (The packets for each condition are in Appendices J, K, L, and M, respectively.) Each packet had six pages: 1) a page instructing the participants not to turn the page until instructed to do so; 2) a brief demographic questionnaire; 3) a page with space to provide signatures, identification numbers, and email addresses (necessary for recording attendance); 4) a GO *or* multiplication problems (depending on condition); 5) the text (which may or may not include a paragraph containing SDs prior to the target material, depending on condition); and 6) multiplication problems. Refer to Figure 4 for a description of the conditions and corresponding packet materials.

	GO	No GO
SD	<p>GO + SD condition</p> <p>Packet contains a GO (page 4) and text containing both SDs and target material (page 5)</p>	<p>SD only condition</p> <p>Packet contains multiplication problems instead of GO (page 4) and text containing both SDs and target material (page 5)</p>
No SD	<p>GO only condition</p> <p>Packet contains a GO (page 4) and text containing only target material (page 5)</p>	<p>Control condition</p> <p>Packet contains multiplication problems instead of GO (page 4) and text containing only target material (page 5)</p>

Figure 4. Study 2—Packet materials by condition

Figure 5 is the GO that was used in these packets. The matrix type of GO was chosen because it was found to be the more time-efficient and effective in promoting learning than outlines or text (Robinson & Skinner, 1996). The purpose of the GO in this study was to connect the SDs with target material in the text passage. It was hypothesized that participants who viewed the GO would learn more because the SDs would increase interest. Since SDs are usually remembered more than the target material, and the GO links the SDs to the target material, it was predicted that participants who viewed the GO would perform better on the learning assessment.

<i>Psychosexual stage:</i>	Oral	Anal	Phallic	Latency	Genital
<i>Primary conflict:</i>	Weaning	Toilet training	Romantic feelings for parent	Schoolwork, friendships	Romantic relationships
<i>Freud's life:</i>	Smoked cigars	Chronic bed-wetter	Said wife was inferior to mother	Enjoyed soccer with friends	Divorced, never remarried

Figure 5. Study 2—Matrix GO used in packets

The purpose of the multiplication problems on page 4 of the SD only and Control conditions was to keep the time required to complete the packet consistent with the time required in the GO + SD and GO only conditions. The participants spent 1 minute on page 3, 2 minutes on page 4, and 1 minute on page 6. The purpose of the multiplication problems on page 6 was to serve as an interpolated task. These are the same problems that were used in Study 1. The multiplication problems on pages 4 and 6 were not identical but were all two by two (e.g., 23 x 41) problems.

The text was identical to the text used in the context-dependent/primacy condition (for the GO + SD and SD only conditions) and control condition (for the GO only and Control conditions) in Study 1. Most of the quiz items were identical to those used in Study 1. The items that assessed learning of context-independent SDs were removed since the only SDs used in Study 2 were context-dependent. Thus, 15 items were identical to those used in Study 1 (10 covered target material and five covered the context-dependent SDs). Five additional items were constructed, three of which assessed the target material and two of which assessed the SDs. (See Appendixes G and H, respectively.) This was to ensure that the quizzes were the same length as in Study 1. Participants recorded their answers on a scantron form.

Design

A between-subjects, post-test only design was used with random assignment of participants to one of four conditions. A pre-test condition was excluded to avoid testing effects. Random assignment to condition was used to control for prior knowledge and interest. The dependent variables were the number correct of the 13 target material quiz items and the number correct on the 7 SD quiz items. Two one-way between-subjects ANOVAs were conducted for

each of the dependent variables (i.e., presence of the GO and presence of the SDs) to test for significant differences. All statistical tests were conducted using an alpha level of .05.

Procedures

After the students were seated, the Principal Investigator (PI) distributed a scantron form and a packet to each participant and gave the participants verbal instructions. See Appendix I for the detailed procedural script. The PI guided the participants through the demographic questions in the packet (on pages two and three). Then the PI instructed the participants to turn to page four and either review the GO or complete the math problems (depending on condition) until instructed to stop. After 1 minute the PI told the participants to turn to page five and read the passage until instructed to stop. After 2 minutes the PI told the participants to turn to page six and complete the math problems until instructed to stop. After 1 minute the PI told the participants to stop and pass their packets to the aisle to be collected.

Once all packets were collected, the quizzes were distributed to participants. They were instructed to complete the quiz and wait quietly until further instruction. When all participants were finished with the quiz, the PI instructed participants to pass quizzes and scantron forms to the aisle to be collected. Later the quizzes were scored by computer using the scantron system.

Results

Table 2 and Figure 6 display the average target material recall accuracy across groups. Using the four experimental conditions, a one-way ANOVA revealed a statistically significant main effect for condition, $F(3, 203) = 5.15, p < .01$. Post hoc analysis of all possible paired comparisons (with a Bonferroni correction) revealed two statistically significant differences

among the conditions. Students in the GO only group answered significantly more target material questions correctly ($M = 9.75$) than students in the SD only condition ($M = 7.80$), Cohen's (1977) $d = .71$, a medium effect. Students in the Control group also outperformed students in the SD only condition ($M = 9.20$ compared to $M = 7.80$, respectively), Cohen's $d = .49$, in between a small and medium effect (Thalheimer & Cook, 2002).

Table 2. Study 2—Average recall accuracy on 13 target material items across groups

Condition	<i>n</i>	<i>M</i>	<i>SD</i>
GO only	51	9.75	2.38
Control	50	9.20	2.64
GO + SD	52	8.83	2.32
SD only	54	7.80	3.08

* Significant differences: GO only vs. SD only; and SD only vs. Control.

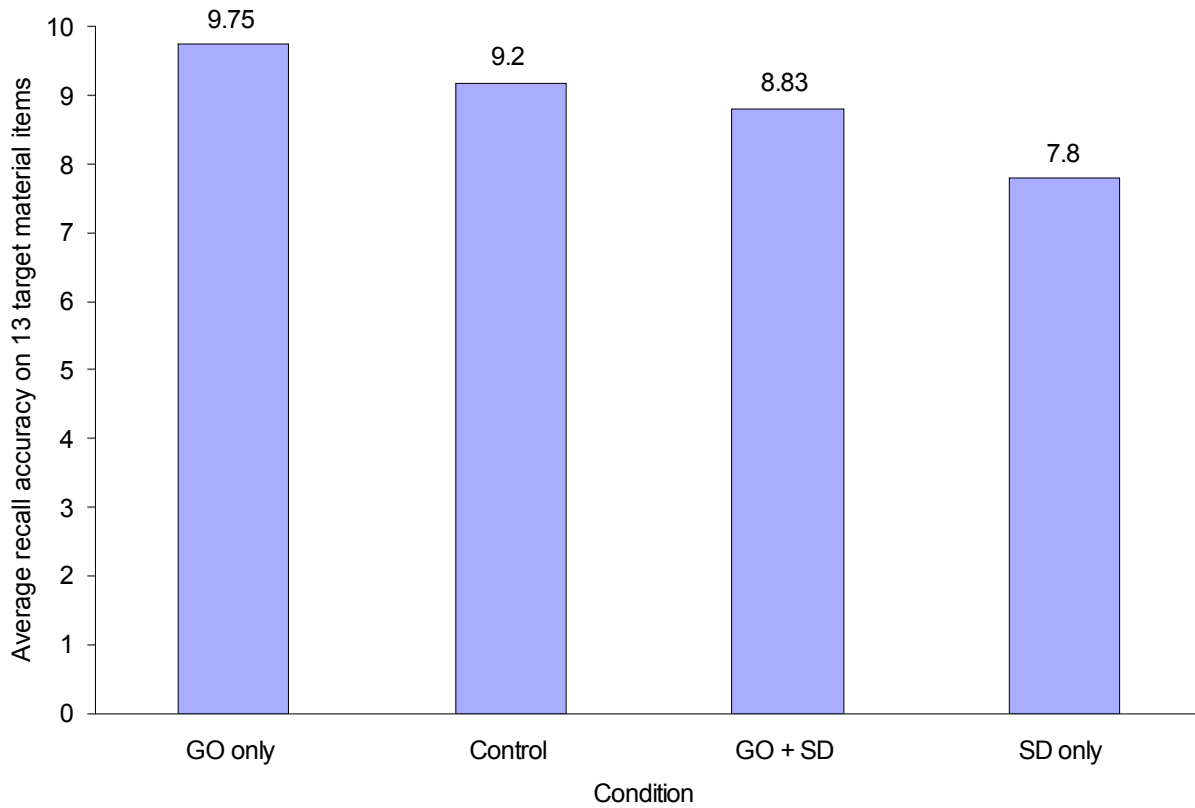


Figure 6. Study 2—Average recall accuracy on 13 target material items across groups

Table 3 and Figure 7 display the average SD recall accuracy across groups. The purpose of this analysis was to confirm the assumption that students needed the SDs to correctly answer the SD items. Using the four experimental conditions, a one-way ANOVA revealed a statistically significant main effect for condition, $F(3, 203) = 86.55, p < .001$. Post hoc pairwise comparisons revealed that students in the GO + SD group and the SD only group performed about equally ($M = 8.83$ and $M = 7.80$, respectively), which was significantly better than the GO only and Control groups. Students in the Control condition performed significantly worse on these quiz items ($M = 2.52$) than any other condition, supporting the assumption that students needed the SDs to correctly answer the SD items.

Table 3. Study 2—Average recall accuracy on 7 SD items across groups

Condition	<i>n</i>	<i>M</i>	<i>SD</i>
GO only	51	4.78	1.38
Control	50	2.52	1.16
GO + SD	52	6.00	.93
SD only	54	5.69	1.30

*Significant differences: GO + SD vs. GO only; GO + SD vs. Control; GO only vs. SD only; GO only vs. Control; and SD only vs. Control.

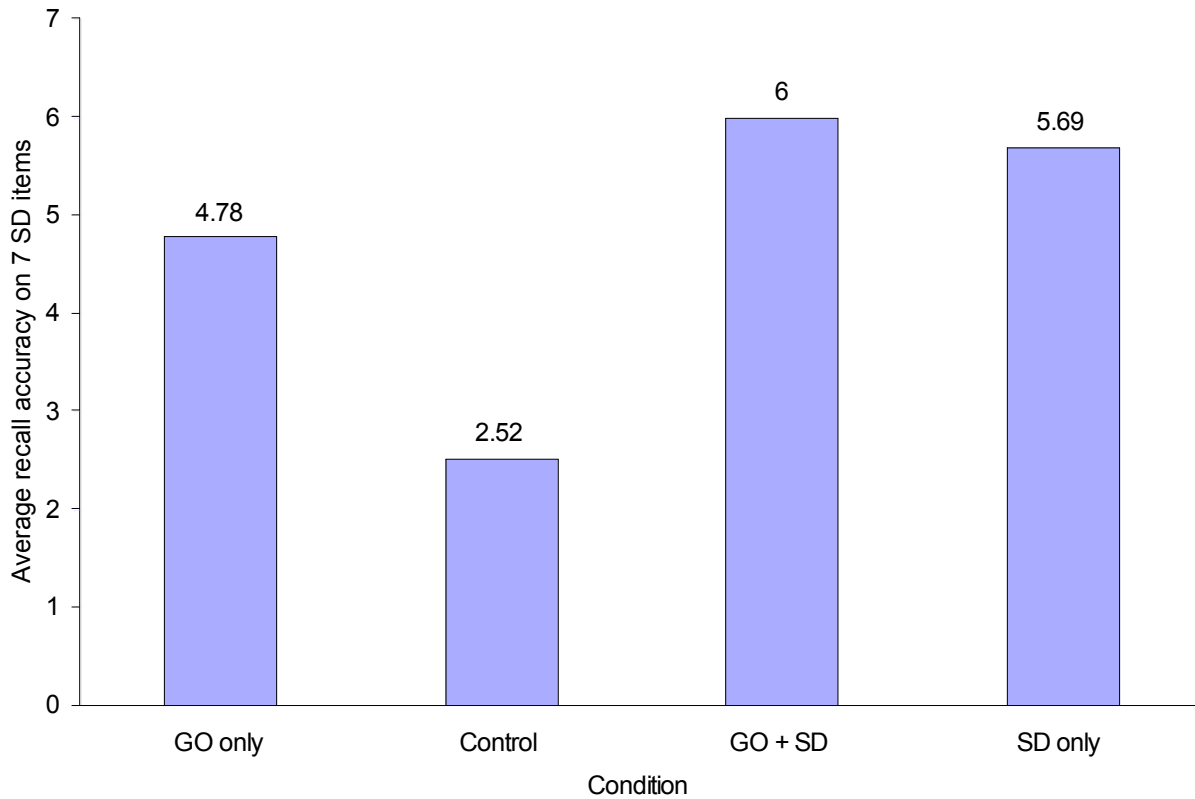


Figure 7. Study 2—Average recall accuracy on 7 SD items across groups

Discussion

Study 2 was designed to replicate and extend Study 1. The students in the Control group performed significantly better than students in the SD only group on the target material quiz items. These results replicate results from Study 1 and provide evidence for the presence of the seductive details effect (i.e., including the context-dependent SDs prior to target material impeded learning of target material).

Researchers have posited that providing a GO prior to target material can facilitate the learner's understanding of the information by introducing the new information and providing an overall picture with how the information is connected and interrelated (Ausubel, 1960; Ausubel & Fitzgerald, 1962; Kloster & Winne, 1989). The GO in the current study was developed to introduce the content (both the target material and the context-dependent SDs) to the learner and demonstrate how it was interconnected. Thus, the primary purpose of Study 2 was to investigate the interaction between context-dependent SDs and a GO designed to make the connections between the SDs and target material more explicit.

Results showed that students in the GO + SD condition did not learn significantly more or less than those in the other conditions. The failure to find a significant difference on target material item accuracy between the GO + SD and the Control condition suggests that the GO did not activate appropriate schemas and provide a conceptual anchor (Ausubel, 1960, 1982) that enhanced learning.

Although no evidence was found that combining the GO and SDs enhanced target-material learning over a passage without SDs or a GO (i.e., the Control passage), some evidence was found suggesting that including the GO may have mitigated the seductive details effect.

Specifically, while participants in the SD only condition demonstrated significantly less learning of target material than participants in the Control condition, target material learning was not significantly different across the GO + SD condition and the Control condition. However, because the differences between the SD only and GO + SD groups also were not significant, additional studies will have to be conducted before any conclusions regarding mitigating effects of GOs are drawn.

Perhaps the most interesting findings are related to how the SDs were presented. Students performed worse under the two conditions where the SDs were presented in the text (i.e., SD only and GO + SD). However, the SDs were also briefly presented in the GO only condition and students in the GO only condition had the highest scores on target material quiz items.

Researchers should investigate several variables that may account for these findings. First, it is possible that students in the GO only condition merely had more time to read and study the target material (1 minute to review the GO and 2 minutes to read the text that did not contain the SDs). Alternatively, providing the GO without the SDs in the text may have caused students to ignore the SDs, as they were not presented in the text, and use the GO to form a better overall picture of the target material (Ausubel, 1960). Second, the inclusion of the SDs in the GO, but not in the text, may have primed the students to actively form their own connections between the SDs and the target material. Conducting studies with three different GOs (target material only, SD only, and a combination of both) and two different passages (target material only, SD and target material) may allow researchers to test these hypotheses.

Before concluding that SDs and GOs that link SDs to target material do not enhance learning, additional studies are needed. Mayer (1978) concluded that advance organizers may be

unnecessary when the text is well organized. The passage used in this study was well organized: there was an introductory paragraph followed by one paragraph of each psychosexual stage in sequential order. Also, GOs may have little impact unless students use them effectively (Kloster & Winne, 1989). Future researchers should determine if GOs can significantly moderate the seductive details effect and perhaps even enhance learning when target material text is less organized and students are instructed on how to use the GO to enhance learning.

In the current study the students were presented with the GO and the SDs before the target material. Perhaps the GO would have a greater moderating effect on the seductive details effect if it were presented after the SDs were presented in the text. In addition, making the GO accessible throughout the reading task, such as by leaving it on a screen in the front of the room, might make it easier for students to identify the main ideas in the text and sort them hierarchically. Future research should investigate whether or not these changes can more effectively minimize the seductive details effect.

There is research evidence suggesting that GOs are more effective for unskilled readers (Mayer, 1978). Because the participants of the current study were college students, and therefore can be assumed to have good reading skills, future research should investigate the impact of a GO on the seductive details effect in populations with poorer reading skills.

Summary

Results from this study indicate that a GO designed to link context-dependent SDs with the corresponding target material did not reverse the seductive details effect and enhance, as opposed to hinder, target-material learning. Rather, results suggest that the GO moderated the negative impact of including SDs in text on student learning. Therefore, until additional studies

are conducted, the current results suggest that if educators want to use SDs to enhance students' attention and motivation to learn, including a GO may moderate the seductive details effect.

CHAPTER IV

General Discussion

Summary of the Two Studies

The purpose of Study 1 and Study 2 was to examine mediating factors on the seductive details effect. In Study 1, the researcher examined the effects of the placement of the seductive details (SDs) and the type of SDs on learning from text. Participants who received the SDs prior to the target material answered significantly fewer quiz items correctly than participants who received the SDs after the target material or not at all. Results did not reveal a main effect for type of SDS (i.e., context-dependent or context-independent) nor an interaction effect between type and placement. These findings support previous researchers who found that placing the SDs prior to the target material, regardless of whether or not they are dependent on the target material context, was most harmful to learning (Garner et al., 1989; Harp & Mayer 1998; Mayer et al., 2001; Mayer & Jackson, 2005).

In Study 2, the researcher investigated whether or not a graphic organizer (GO) could minimize or even reverse the seductive details effect on learning from text. Participants who viewed a GO that linked SDs to the target material performed significantly better on target material quiz items than participants who read the SDs in the text but did not receive the GO. In addition, participants who did not view the GO or read the SDs in the text (i.e., those in the Control group) performed significantly better on target material quiz items than participants in the SD only condition. Therefore, the GO moderated the seductive details effect but did not

improve learning to the point that students who viewed the GO outperformed students in the Control group.

Theoretical Implications

SDs are interesting, but not necessarily relevant, details that are commonly included in texts to keep students engaged with the assumption that, in doing so, students will learn more (e.g., Schraw, 1998; Wade et al., 1993). Unfortunately, including SDs in texts often does not achieve the desired outcome of increased learning and may actually hinder the learning of target material (Harp & Maslich, 2005; Harp & Mayer, 1998; Mayer, Heiser, & Lonn, 2001; Mayer & Jackson, 2005). When the inclusion of SDs interferes with the learning of target material (i.e., the information that students are intended to learn), this is called the seductive details effect.

Many researchers have presented cognitive hypotheses about why the seductive details effect occurs (e.g., Harp & Mayer, 1998; Garner et al., 1989; Sweller & Chandler, 1991). These include the distraction, disruption, and diversion hypotheses. According to the distraction hypothesis, the seductive details effect occurs because the reader focuses his or her selective attention away from important material. According to the disruption hypothesis, the seductive details effect occurs because the SDs prevent the reader from creating a coherent, structured mental model of the information. The diversion hypothesis states that SDs activate inappropriate prior knowledge, resulting in the seductive details effect.

The cognitive diversion hypothesis is often used to explain why the placement of SDs within text is so important (Sweller & Chandler, 1991). If SDs are presented prior to the target material, the reader may activate schema that are related to the SDs and not the target material, thus resulting in poorer learning of the target material. If the SDs are presented after the target

material, they do not pose such a threat to learning the target material since the appropriate target-material schema were already activated. Results from Study 1 revealed a placement effect for the impact of SDs on target material learning, providing support for the cognitive diversion hypothesis.

The purpose of Study 2 was to investigate whether or not a GO could mediate the harmful effects of SDs on learning. A GO is an effective learning tool because it provides a hierarchical structure for the new information. If the GO provides a meaningful context (e.g., cognitive anchor) for the target material, then the incoming information should be more easily assimilated into existing cognitive structures. According to Ausubel (1960), new material will be more meaningful, and thus more remembered, if the learner can “file” it under the correct concept in hierarchical long-term memory (assimilation encoding theory).

If the seductive details effect found in Study 1 was caused by failure to prime appropriate schema that allowed the reader to link the SDs with the target material, then the cognitive diversion hypothesis suggests that introducing a GO before a passage with SDs will improve learning because appropriate schemas will be activated to aid in the interpretation of the target material. Results from Study 2 showed that including the GO mitigated the effects of the SDs (i.e., there were no significant differences in learning across the GO + SD and control). This provides some evidence for the cognitive diversion hypothesis. However, adding the GO to the passage with the SDs did not enhance learning over the control condition, which suggests that the cognitive diversion hypothesis may not fully account for the SDs effect.

These findings suggest that the seductive details effect is partially (but not fully) caused by the activation of inappropriate schema, which prevents the “filing” of the target material

under the correct concept in long-term memory (i.e., the cognitive diversion hypothesis). In Study 2 the students who were exposed to the SDs in the GO (and not in the actual body of text) learned more than those who had the SDs presented in both the GO and text. This suggests that the inclusion of SDs in the text hinders learning, even when attempts were made to link the SDs with the target material with a GO. This finding supports the distraction hypothesis, as including SDs in the text may have caused readers to focus too much of their selective attention on the SDs. These findings suggest that rather than attempting to isolate a single variable that causes the seductive details effect, researchers should investigate the interaction of several variables, theories and hypotheses (e.g., cognitive distraction and cognitive diversion hypotheses).

Applied Implications

Results from Study 1 revealed a placement effect for SDs. The seductive details effect occurred when the SDs were presented prior to the target material. When the SDs were presented after the target material, there wasn't a significant effect on learning. A main effect for context of the SDs was not found. Regardless of whether the SDs were deemed to be context-dependent or context-independent, if presented before the target material, the SDs impeded learning of target material. These results suggest that including SDS in text prior to target material hinders learning. Therefore, if SDs are included, they should be at the end of the target material to prevent diverting the reader's selective attention away from the target material.

In Study 2 a GO was presented prior to the text. The GO was designed to link the target material and the SD. Students who received the GO without the SDs in the text and students who did not receive the GO or the SDs at all (i.e., Control group) performed better than students who received the SDs without the GO. This suggests that the seductive details effect can be

moderated if the SDs are presented via a GO that links the SDs to the target material. If authors include SDs before the target material text, then they should also include a GO. Additionally, these results suggest that including the SDs in a GO, but not in the text, may result in even stronger learning.

Limitations and Future Research

One limitation of these studies is that scientific procedures to assess the level of context-dependency are not currently available. Researchers should develop sound procedures for determining the context-dependency of SDs. In addition, the SDs in both studies were lumped together in the beginning or the end. Perhaps an interaction effect between context-dependency of the SDs and the GO would be greater if the SDs were interspersed throughout the target material or if the GO were available for reference throughout the reading task (such as by projecting the GO on a screen in the front of the room).

Participants in the current studies were undergraduate students and presumably good readers. There is evidence to suggest that the effects of SDs and GOs on learning is dependent on reading skill (Luiten, Ames, & Ackerson, 1980). Future research should investigate SDs and GOs with other populations, such as new and struggling readers.

The text used for the target material in the current studies was well organized, with one introductory paragraph and a paragraph for each of the five psychosexual stages. Mayer (1978) found that advance organizers have different effects on learning from disorganized texts and Luiten et al. (1980) found that advance organizers have different effects on learning depending on the subject matter. More research is needed that investigates the interaction between SDs and

GOs when the text is poorly organized and is of a different nature (e.g., narrative, fictional, biographical).

In the current studies, students answered multiple-choice quiz items less than 10 minutes after completing their reading. Future researchers should investigate the effects of a GO on long-term learning (i.e., maintenance). Other types of learning assessments other than multiple-choice quiz items should be used to determine if a GO has different effects on different types of learning measures, such as free recall, short answer, and applied items (Kloster & Winne, 1989; Luiten, Ames, & Ackerson, 1980; Mayer, 1978).

Finally, there are numerous types of GOs that have potential to impact the seductive details effect in learning from text (Robinson & Skinner, 1996). Researchers should investigate the impact of different types of GOs on learning, such as advance organizers, outlines, tree diagrams, and knowledge maps.

Conclusion

The current studies investigated potential mediating factors on the seductive details effect on learning from text. Study 1 examined the effects of placement and context of the SDs and Study 2 examined the effects of a GO on mediating the seductive details effect. Results of the two studies suggest that both the cognitive diversion hypothesis and the distraction hypothesis may explain why SDs hinder learning. Thus, future research is needed to gain a better understanding of how SDs influence learning. Until this causal mechanism is elucidated, authors should avoid including SDs with the target material text. However, if they do, the SDs should be presented at the end, after the target material, to avoid diverting the reader's attention and exhausting limited cognitive resources. Alternatively, the SDs should be included in a GO but

perhaps not in the actual body of text, as Study 2 showed including the SDs in both the GO and text weakens the mitigating effects of the GO.

LIST OF REFERENCES

- Ausubel, D. P. (1960). The use of advance organizers in the learning and retention of meaningful verbal material. *Journal of Educational Psychology, 51*, 267-272.
- Ausubel, D. P. (1982). Schemata, advance organizers, and anchoring ideas: A reply to Anderson, Spiro, and Anderson. *Journal of Structural Learning, 7*, 63-73.
- Ausubel, D. P., & Fitzgerald, D. (1962). Organizer, general background, and antecedent learning variables in sequential verbal learning. *Journal of Educational Psychology, 53*, 243-249.
- Beishuizen, J., Asscher, J., Prinsen, F., & Elshout-Mohr, M. (2003). Presence and place of main ideas and examples in study texts. *British Journal of Educational Psychology, 73*, 291-316.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press.
- Dewey, J. (1913). *Interest and effort in education*. Cambridge, MA: Houghton Mifflin.
- Evertson, C., Emmer, E., & Worsham, M. (2003). *Classroom management for elementary teachers* (6th ed.). Boston, MA: Allyn and Bacon.
- Garner, R., Brown, R., Sanders, S., & Menke, D. (1992). "Seductive details" and learning from text. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 239-254). Hillsdale, NJ: Erlbaum.
- Garner, R., Gillingham, M. G., & White, C. S. (1989). Effects of "seductive details" on macroprocessing and microprocessing in adults and children. *Cognition and Instruction, 6*, 41-57.
- Harp, S. F., & Maslich, A. A. (2005). The consequences of including seductive details during lecture. *Teaching of Psychology, 32*, 100-103.

- Harp, S. F., & Mayer, R. E. (1997). The role of interest in learning from scientific text and illustrations: On the distinction between emotional interest and cognitive interest. *Journal of Educational Psychology, 89*, 92-102.
- Harp, S. F., & Mayer, R. E. (1998). How seductive details do their damage: A theory of cognitive interest in science learning. *Journal of Educational Psychology, 90*, 414-434.
- Hidi, S., & Baird, W. (1988). Strategies for increasing text-based interest and students' recall of expository texts. *Reading Research Quarterly, 23*, 464-483.
- Kalyuga, S., Chandler, P., & Sweller, J. (2004). When redundant on-screen text in multimedia technical instruction can interfere with learning. *Human Factors, 46*, 567-582.
- Kazdin, A. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York: Oxford University Press.
- Kloster, A. M., & Winne, P. H. (1989). The effects of different types of organizers on students' learning from text. *Journal of Educational Psychology, 81*, 9-15.
- Lowe, D., & Merikle, P. (1971). Interpolation effects in short-term memory [Abstract]. *Psychonomic Science, 22*(2), 89-91.
- Luiten, J., Ames, W., & Ackerson, G. (1980). A meta-analysis of the effects of advance organizers on learning and retention. *American Educational Research Journal, 17*, 211-218.
- Manning, S. (1978). The effects of interpolated interference on tactual and visual short-term memory. *American Journal of Psychology, 91*, 445-459.
- Mathis, J., & Skinner, A. L. (in press). Critical thinking and bipolar disorder content learning using two curricular presentation styles. *Inquiry: Critical Thinking Across Disciplines*.

- Mayer, R. E. (1978). Advance organizers that compensate for the organization of text. *Journal of Educational Psychology, 70*, 880-886.
- Mayer, R. E., Heiser, J., & Lonn, S. (2001). Cognitive constraints on multimedia learning: When presenting more material results in less understanding. *Journal of Educational Psychology, 93*, 187-198.
- Mayer, R. E., & Jackson, J. (2005). The case for coherence in scientific explanations: Quantitative details can hurt qualitative understanding. *Journal of Experimental Psychology: Applied, 11*, 13-18.
- Petrusic, W., & Jamieson, D. (1978). Differential interpolation effects in free recall. *Journal of Experimental Psychology: Human Learning and Memory, 4*, 101-109.
- Robinson, D. H., Corliss, S. B., Bush, A. M., Bera, S. J., & Tomberlin, T. (2003). Optimal presentation of graphic organizers and text: A case for large bites? *Educational Technology Research and Development, 51*(4), 25-41.
- Robinson, D. H., & Kiewra, K. A. (1995). Visual argument: Graphic organizers are superior to outlines in improving learning from text. *Journal of Educational Psychology, 87*, 455-467.
- Robinson, D. H., & Skinner, C. H. (1996). Why graphic organizers facilitate search processes: Fewer words or computationally efficient indexing? *Contemporary Educational Psychology, 21*, 166-180.
- Saecker, L. (2008). *The effects of descriptions of personal experiences on students' learning and behavioral intentions toward peers with Attention Deficit/Hyperactivity Disorder*. Unpublished doctoral dissertation, University of Tennessee, Knoxville.

- Sanchez, C., & Wiley, J. (2006). An examination of the seductive details effect in terms of working memory capacity. *Memory and Cognition*, 34, 344-355.
- Schraw, G. (1998). Processing and recall differences among seductive details. *Journal of Educational Psychology*, 90, 3-12.
- Sweller, J., & Chandler, P. (1991). Evidence for cognitive load theory. *Cognition and Instruction*, 8, 351-362.
- Thalheimer, W., & Cook, S. (2002, August). *How to calculate effect sizes from published research articles: A simplified methodology*. Retrieved April 14, 2009 from http://work-learning.com/effect_sizes.htm.
- Wade, S. E., Schraw, G., Buxton, W. M., & Hayes, M. T. (1993). Seduction of the strategic reader: Effects of interest on strategies and recall. *Reading Research Quarterly*, 28, 93-114.

APPENDICES

Appendix A: Study 1—Target Material in Passages

Sigmund Freud proposed that each individual passes through five different developmental stages on his/her path to adulthood. Successful completion of a stage results in healthy emotional development. Unsuccessful completion results in abnormal and dysfunctional development. Freud proposed that as a child matures, the sex instinct (the libido) shifts from one part of the body to another. The libido shifts in order to satisfy the child's biological needs. This brief article summarizes Freud's theory of psychosexual stages.

From birth until a child is one year old is the oral stage. The libido is focused on the mouth as a source of pleasure. It is critical that the child receives oral gratification through his/her mother in order to pass through the stage successfully. Unsuccessful oral gratification results in a life-long fixation on obtaining oral gratification. This may occur through smoking, overeating, or talking too much.

The second stage is called the anal stage. The libido is focused on the anus from the ages of one to three years old. Toilet training is the main conflict in this time. The child must learn to control his/her biological urges in order to comply with societal demands. Unsuccessful completion of this stage may result in an anal-retentive or an anal-expulsive personality. Anal-retentive personalities hold on to biological urges too much and have a hard time relaxing. Anal-expulsive personalities refuse to control biological urges and have problems with self-discipline.

The phallic stage, the third psychosexual stage, occurs from ages three through six years old. The libido is focused on the genitals. The child develops romantic feelings for his/her opposite sex parent. Successful completion of this stage requires a resolution of these incestuous feelings. Unsuccessful completion may result in a lack of moral development.

The fourth stage is the latency period. Between the ages of six and twelve children's libido is latent, or quiet. Children can focus on schoolwork and developing same-sex friendships.

Finally, the genital stage begins at adolescence and continues for the remainder of a person's life. As children reach puberty, they must learn to develop healthy romantic relationships.

Appendix B: Study 1—Context-Dependent SDs in Passages

Some people speculate that Freud's stage theory is based on his own life experiences. Freud was well-known for his habit of smoking cigars. He became very defensive when a student suggested this habit was a result of his mother not breastfeeding him long enough. Freud's anal-expulsive personality was reflected in the fact that he suffered from enuresis (chronic bed-wetting) until his twelfth birthday. Perhaps Freud never resolved his inappropriate romantic feelings for his mother. Freud's own marriage dissolved because of continual arguments with his wife, in which he claimed she was inferior to his mother. It appears that Freud enjoyed a successful latency period as he was an active participant in sporting events with his neighborhood friends. Freud particularly enjoyed soccer games. Freud never learned how to engage in meaningful relationships. After his divorce, Freud never had a romantic relationship again.

Appendix C: Study 1—Context-Independent SDs in Passages

Some people question the validity of Freud’s psychosexual stage theory. Freud often stayed out late playing cards with his friends. His wife didn’t like it when he returned smelling like cigar smoke. As a child, Freud was punished severely for wetting the bed. As a punishment, he was not allowed to change the sheets and had to sleep on the urine for days after the incident. Freud’s mother affectionately called him “my little Siggy” but his father was very abusive. Until he moved out of his parents’ home his arms were covered in bruises. Freud was terrible at sports. In neighborhood games with his friends he was the last person picked to play on a team. In adulthood, the women in Freud’s circle of acquaintances often warned each other not to date Freud. The women thought he was too unstable and volatile to be a good husband.

Appendix D: Study 1—Target Material Quiz Items

1. Abnormal and dysfunctional development results from:
 - a. Childhood sexual abuse, particularly by the same-sex parent
 - b. Unsuccessful completion of a stage
 - c. An anal-retentive personality
 - d. An anal-expulsive personality

2. The anal stage begins around age ____ and ends around age ____.
 - a. 0, 1
 - b. 0, 2
 - c. 1, 2
 - d. 1, 3

3. Which of the following is NOT a manifestation of an oral fixation?
 - a. Lack of moral development
 - b. Smoking
 - c. Talking too much
 - d. Overeating

4. Same-sex friendships are formed in the _____.
 - a. Oral stage
 - b. Anal stage
 - c. Phallic stage
 - d. Latency period

5. Between the ages of 6 and 12 the child's libido is:
 - a. Focused on the anus
 - b. Quiet
 - c. In conflict with his/her parents' wishes
 - d. Focused on the mouth

6. From 3 to 6 years old a child is in the _____ stage.
 - a. Phallic
 - b. Anal
 - c. Oral
 - d. Genital

7. During the _____ stage, the child must learn to control his/her biological urges in order to comply with societal demands.

- a. Oral
- b. Anal
- c. Phallic
- d. Genital

8. According to Freud, smoking is a habit caused by unresolved conflict during the _____ stage.

- a. Phallic
- b. Anal
- c. Oral
- d. Genital

9. During the latency period, children can focus on:

- a. Family relationships
- b. Religion and personal philosophies
- c. Schoolwork
- d. Apprenticeships with local artisans

10. A child must cope with romantic feelings toward his/her same-sex parent during the _____.

- a. Latency period
- b. Genital stage
- c. Phallic stage
- d. Oral stage

Appendix E: Study 1—Context-Dependent Material Quiz Items

1. What was the issue in Freud's arguments with his wife?
 - a. Her constant criticism about his weight
 - b. His constant criticism about her weight
 - c. Her inability to measure up to his mother
 - d. His inability to measure up to her father

2. Freud's wife disliked his habit of:
 - a. Playing cards
 - b. Drinking too much
 - c. Sleeping late
 - d. Smoking cigars

3. After his divorce, Freud:
 - a. Never had a meaningful romantic relationship again
 - b. Was frequently seen out on the town with his beautiful assistant Marie
 - c. Hired one of his students to psychoanalyze him
 - d. Began his habit of writing daily in his journal

4. Freud suffered from enuresis (chronic bed-wetting) until his _____ birthday.
 - a. Tenth
 - b. Twelfth
 - c. Fourteenth
 - d. Sixteenth

5. During neighborhood games with his friends, Freud:
 - a. Was forced to stay indoors and study English
 - b. Insisted on playing soccer
 - c. Watched from the sidelines
 - d. Was an active participant

Appendix F: Study 1—Context-Independent Material Quiz Items

1. What nickname did Freud's mother call her son?
 - a. "My little cabbage head"
 - b. "My little prince"
 - c. "My little Mundy"
 - d. "My little Siggy"

2. Freud's student suggested that Freud's habit of _____ resulted from his mother not breastfeeding him long enough.
 - a. Playing cards
 - b. Smoking cigars
 - c. Drinking too much
 - d. Sleeping late

3. Because of his abusive father, Freud's _____ was/were usually covered in bruises as a boy.
 - a. Back
 - b. Shoulders
 - c. Shins
 - d. Arms

4. Freud's punishment for his chronic bed-wetting was:
 - a. Laundering the sheets of every member in the Freud household
 - b. Being physically abused by his father
 - c. Sleeping on the spoiled sheets for several days after the incident
 - d. Not receiving dessert after dinner

5. In neighborhood games with his friends, Freud:
 - a. Was picked last
 - b. Was usually captain and got to choose his team members
 - c. Was picked first
 - d. Was a spectator

Appendix G: Study 2—Additional Target Material Quiz Items

1. _____ personalities have problems with self-discipline.
 - a. Anal-expulsive
 - b. Anal-retentive
 - c. Oral-expulsive
 - d. Oral-retentive

2. In the first stage, oral gratification comes through:
 - a. Thumb-sucking
 - b. Eating
 - c. Drinking
 - d. His/her mother

3. As a child matures, the libido shifts from one part of the body to another in order to:
 - a. Satisfy the child's biological needs
 - b. Present the child with opportunities for growth
 - c. Prevent overemphasis on one part of the body
 - d. Promote responsible citizenship

Appendix H: Study 2—Additional Context-Dependent Material Quiz Items

1. Freud's stage theory may be based on:
 - a. Psychodynamic research of the time
 - b. His own life experiences
 - c. Observations of his schizophrenic patients
 - d. Collaborations with his graduate students

2. Freud particularly enjoyed:
 - a. Soccer
 - b. Football
 - c. Tennis
 - d. Polo

Appendix I: Study 2—Procedural Script

1. “Can I have your attention please? My name is Emily Rowland and I am running this study. Before we begin I need to get your consent to participate in this study. We will be passing informed consent forms down the rows. Take one and pass the rest on. I’m going to read this aloud and make sure no one has any questions. [Reads informed consent form.] ... Are there any questions? If you do consent to participate, please sign the form. If not, you may go now without penalty and will still receive your points. Once you have signed it, please pass your consent forms to this side of the room. I will keep them on file so if you would like a copy please contact me.”
2. “Please follow my instructions carefully. Make sure your cell phone is off. We’re going to pass out packets and scantrons. We’ll start on this side of the room and pass them down the row. Take one of each. Please do not open the packets until you are instructed to do so. You will need a #2 pencil. Does everyone have a pencil? Are there any questions?”
3. Pass out scantrons. Say, “Please turn to the side of the scantron that says “Student Enrollment Sheet” at the top. Please write in your instructor’s name, the name of the class (Psychology 110), and the time your section of the class meets. If you do not remember your instructor’s name, that’s okay. Just make sure you write the hour/day your class meets. Once you have finished that, bubble in your student ID number and your name. ... Has everyone finished? Turn the scantron to the other side. When I pass out the packets, there will be a letter in the upper-left corner. Under “test form” at the top of your scantron, please bubble in that letter.”
4. Pass out packets. Cover page says: “Thank you for participating in this research study. Please do not turn the page until instructed to do so.”
5. “Does everyone have a packet?... Great. Let’s get started. We are going to walk through this packet together so follow my instructions carefully and do not look ahead in your packet. You may turn to the next page in your packet.”
6. Second page in packet has demographic questions. “This page has a few questions to provide us with some demographic information. You will fill in the answers on your scantron. Do not turn the page when you are done. [Read demographic questions as they complete the items.] Are there any questions?”
7. “Turn to page 3. Please fill out the information. Do not turn the page when you are done. [Read items aloud as they complete the items.] Does anyone have any questions?”

8. "Please turn to the next page. Either read and study the information on the page or complete the math problems in order, depending on what you see. Do not look at any other page in the packet. I will tell you when to stop."
9. After one minute say: "Stop. Now please turn the page. Read and study this passage. Do not look at any other page in the packet. I will tell you when to stop."
10. After two minutes say: "Stop. Now please turn the page. Complete these math problems in order. Do not look at any other page in the packet. I will tell you when to stop."
11. After one minute say: "Stop. Now please close your packet. Pass them to this side of the room. Make sure to hold on to your scantron. An assistant will collect your packets. Please do not talk during this time."
12. Once all packets are collected say: "We will now pass a quiz down the rows. Please do not write on the quiz. Fill in your answers clearly on the scantron sheet. Note that items numbers begin at 7 on the quiz because the first 6 items on your scantron were for the demographic information. When you have finished please turn your quiz and scantron face down and wait quietly for further instructions."
13. Once everyone is done say: "Please pass your quizzes and scantron sheets to this side of the room. An assistant will collect them. Please do not talk during this time."
14. Once all quizzes are collected say: "Thanks again for your participation in this study. As you may know, one obligation of all researchers is to debrief the participants after the study is over. We will pass debriefing information down the rows now and I will review it with you. [Review debriefing sheet.] When you leave, please take your debriefing sheet. Remember not to share this information with anyone else who will be participating in other sections of this study until after the last session on January 29, 2009. Thanks for your participation and you're free to go."

Appendix J: Study 2—Packet for GO + SD condition

A

Thank you for participating in this research study.

Please do not turn this page until instructed to do so.

A

Demographic information

Please fill in the answers on your scantron.

1. What is your age in years?
 - a. 17 or younger
 - b. 18
 - c. 19
 - d. 20
 - e. 21 or older

2. What is your gender?
 - a. Male
 - b. Female

3. What is your major? If you have not yet declared your major, please answer this question according to what you anticipate majoring in.
 - a. Psychology
 - b. Other Arts and Sciences major (such as Sociology or Political Science)
 - c. Business major
 - d. Education major
 - e. Other

4. What is your year in school? If you are between years, choose the best one.
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. 5th year senior

5. How many psychology courses have you taken before this one? Include any courses you may have taken in high school.
 - a. 0 – this is my first psychology course ever
 - b. 1
 - c. 2
 - d. 3
 - e. 4 or more

6. What is your race/ethnicity? Please choose only one.
 - a. African American
 - b. Asian
 - c. Caucasian
 - d. Hispanic/Latino
 - e. Other

A

Please complete the following items.

Name (print): _____

Signature: _____

Date: _____

Student ID number: _____

Email: _____

A

Read and study this page until instructed to stop. Do not look at any other page in the packet.

<i>Psychosexual stage:</i>	Oral	Anal	Phallic	Latency	Genital
<i>Primary conflict:</i>	Weaning	Toilet training	Romantic feelings for parent	Schoolwork, friendships	Romantic relationships
<i>Freud's life:</i>	Smoked cigars	Chronic bed-wetter	Said wife was inferior to mother	Enjoyed soccer with friends	Divorced, never remarried

A

Read and study this page until instructed to stop. Do not look at any other page in the packet.

Some people speculate that Freud's stage theory is based on his own life experiences. Freud was well-known for his habit of smoking cigars. He became very defensive when a student suggested this habit was a result of his mother not breastfeeding him long enough. Freud's anal-expulsive personality was reflected in the fact that he suffered from enuresis (chronic bed-wetting) until his twelfth birthday. Perhaps Freud never resolved his inappropriate romantic feelings for his mother. Freud's own marriage dissolved because of continual arguments with his wife, in which he claimed she was inferior to his mother. It appears that Freud enjoyed a successful latency period as he was an active participant in sporting events with his neighborhood friends. Freud particularly enjoyed soccer games. Freud never learned how to engage in meaningful relationships. After his divorce, Freud never had a romantic relationship again.

Sigmund Freud proposed that each individual passes through five different developmental stages on his/her path to adulthood. Successful completion of a stage results in healthy emotional development. Unsuccessful completion results in abnormal and dysfunctional development. Freud proposed that as a child matures, the sex instinct (the libido) shifts from one part of the body to another. The libido shifts in order to satisfy the child's biological needs. This brief article summarizes Freud's theory of psychosexual stages.

From birth until a child is one year old is the oral stage. The libido is focused on the mouth as a source of pleasure. It is critical that the child receives oral gratification through his/her mother in order to pass through the stage successfully. Unsuccessful oral gratification results in a life-long fixation on obtaining oral gratification. This may occur through smoking, overeating, or talking too much.

The second stage is called the anal stage. The libido is focused on the anus from the ages of one to three years old. Toilet training is the main conflict in this time. The child must learn to control his/her biological urges in order to comply with societal demands. Unsuccessful completion of this stage may result in an anal-retentive or an anal-expulsive personality. Anal-retentive personalities hold on to biological urges too much and have a hard time relaxing. Anal-expulsive personalities refuse to control biological urges and have problems with self-discipline.

The phallic stage, the third psychosexual stage, occurs from ages three through six years old. The libido is focused on the genitals. The child develops romantic feelings for his/her opposite sex parent. Successful completion of this stage requires a resolution of these incestuous feelings. Unsuccessful completion may result in a lack of moral development.

The fourth stage is the latency period. Between the ages of six and twelve children's libido is latent, or quiet. Children can focus on schoolwork and developing same-sex friendships.

Finally, the genital stage begins at adolescence and continues for the remainder of a person's life. As children reach puberty, they must learn to develop healthy romantic relationships.

A

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 24 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 59 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ \times 14 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 44 \\ \hline \end{array}$$

Appendix K: Study 2—Packet for GO only condition

B

Thank you for participating in this research study.

Please do not turn this page until instructed to do so.

B

Demographic information

Please fill in the answers on your scantron.

1. What is your age in years?
 - a. 17 or younger
 - b. 18
 - c. 19
 - d. 20
 - e. 21 or older

2. What is your gender?
 - a. Male
 - b. Female

3. What is your major? If you have not yet declared your major, please answer this question according to what you anticipate majoring in.
 - a. Psychology
 - b. Other Arts and Sciences major (such as Sociology or Political Science)
 - c. Business major
 - d. Education major
 - e. Other

4. What is your year in school? If you are between years, choose the best one.
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. 5th year senior

5. How many psychology courses have you taken before this one? Include any courses you may have taken in high school.
 - a. 0 – this is my first psychology course ever
 - b. 1
 - c. 2
 - d. 3
 - e. 4 or more

6. What is your race/ethnicity? Please choose only one.
 - a. African American
 - b. Asian
 - c. Caucasian
 - d. Hispanic/Latino
 - e. Other

B

Please complete the following items.

Name (print): _____

Signature: _____

Date: _____

Student ID number: _____

Email: _____

B

Read and study this page until instructed to stop. Do not look at any other page in the packet.

<i>Psychosexual stage:</i>	Oral	Anal	Phallic	Latency	Genital
<i>Primary conflict:</i>	Weaning	Toilet training	Romantic feelings for parent	Schoolwork, friendships	Romantic relationships
<i>Freud's life:</i>	Smoked cigars	Chronic bed-wetter	Said wife was inferior to mother	Enjoyed soccer with friends	Divorced, never remarried

B

Read and study this page until instructed to stop. Do not look at any other page in the packet.

Sigmund Freud proposed that each individual passes through five different developmental stages on his/her path to adulthood. Successful completion of a stage results in healthy emotional development. Unsuccessful completion results in abnormal and dysfunctional development. Freud proposed that as a child matures, the sex instinct (the libido) shifts from one part of the body to another. The libido shifts in order to satisfy the child's biological needs. This brief article summarizes Freud's theory of psychosexual stages.

From birth until a child is one year old is the oral stage. The libido is focused on the mouth as a source of pleasure. It is critical that the child receives oral gratification through his/her mother in order to pass through the stage successfully. Unsuccessful oral gratification results in a life-long fixation on obtaining oral gratification. This may occur through smoking, overeating, or talking too much.

The second stage is called the anal stage. The libido is focused on the anus from the ages of one to three years old. Toilet training is the main conflict in this time. The child must learn to control his/her biological urges in order to comply with societal demands. Unsuccessful completion of this stage may result in an anal-retentive or an anal-expulsive personality. Anal-retentive personalities hold on to biological urges too much and have a hard time relaxing. Anal-expulsive personalities refuse to control biological urges and have problems with self-discipline.

The phallic stage, the third psychosexual stage, occurs from ages three through six years old. The libido is focused on the genitals. The child develops romantic feelings for his/her opposite sex parent. Successful completion of this stage requires a resolution of these incestuous feelings. Unsuccessful completion may result in a lack of moral development.

The fourth stage is the latency period. Between the ages of six and twelve children's libido is latent, or quiet. Children can focus on schoolwork and developing same-sex friendships.

Finally, the genital stage begins at adolescence and continues for the remainder of a person's life. As children reach puberty, they must learn to develop healthy romantic relationships.

B

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 24 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 59 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ \times 14 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 44 \\ \hline \end{array}$$

Appendix L: Study 2—Packet for SD only condition

C

Thank you for participating in this research study.

Please do not turn this page until instructed to do so.

C

Demographic information

Please fill in the answers on your scantron.

1. What is your age in years?
 - a. 17 or younger
 - b. 18
 - c. 19
 - d. 20
 - e. 21 or older

2. What is your gender?
 - a. Male
 - b. Female

3. What is your major? If you have not yet declared your major, please answer this question according to what you anticipate majoring in.
 - a. Psychology
 - b. Other Arts and Sciences major (such as Sociology or Political Science)
 - c. Business major
 - d. Education major
 - e. Other

4. What is your year in school? If you are between years, choose the best one.
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. 5th year senior

5. How many psychology courses have you taken before this one? Include any courses you may have taken in high school.
 - a. 0 – this is my first psychology course ever
 - b. 1
 - c. 2
 - d. 3
 - e. 4 or more

6. What is your race/ethnicity? Please choose only one.
 - a. African American
 - b. Asian
 - c. Caucasian
 - d. Hispanic/Latino
 - e. Other

C

Please complete the following items.

Name (print): _____

Signature: _____

Date: _____

Student ID number: _____

Email: _____

C

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 33 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 13 \\ \hline \end{array}$$

$$\begin{array}{r} 51 \\ \times 42 \\ \hline \end{array}$$

$$\begin{array}{r} 89 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 64 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ \times 77 \\ \hline \end{array}$$

$$\begin{array}{r} 69 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 34 \\ \times 27 \\ \hline \end{array}$$

C

Read and study this page until instructed to stop. Do not look at any other page in the packet.

Some people speculate that Freud's stage theory is based on his own life experiences. Freud was well-known for his habit of smoking cigars. He became very defensive when a student suggested this habit was a result of his mother not breastfeeding him long enough. Freud's anal-expulsive personality was reflected in the fact that he suffered from enuresis (chronic bed-wetting) until his twelfth birthday. Perhaps Freud never resolved his inappropriate romantic feelings for his mother. Freud's own marriage dissolved because of continual arguments with his wife, in which he claimed she was inferior to his mother. It appears that Freud enjoyed a successful latency period as he was an active participant in sporting events with his neighborhood friends. Freud particularly enjoyed soccer games. Freud never learned how to engage in meaningful relationships. After his divorce, Freud never had a romantic relationship again.

Sigmund Freud proposed that each individual passes through five different developmental stages on his/her path to adulthood. Successful completion of a stage results in healthy emotional development. Unsuccessful completion results in abnormal and dysfunctional development. Freud proposed that as a child matures, the sex instinct (the libido) shifts from one part of the body to another. The libido shifts in order to satisfy the child's biological needs. This brief article summarizes Freud's theory of psychosexual stages.

From birth until a child is one year old is the oral stage. The libido is focused on the mouth as a source of pleasure. It is critical that the child receives oral gratification through his/her mother in order to pass through the stage successfully. Unsuccessful oral gratification results in a life-long fixation on obtaining oral gratification. This may occur through smoking, overeating, or talking too much.

The second stage is called the anal stage. The libido is focused on the anus from the ages of one to three years old. Toilet training is the main conflict in this time. The child must learn to control his/her biological urges in order to comply with societal demands. Unsuccessful completion of this stage may result in an anal-retentive or an anal-expulsive personality. Anal-retentive personalities hold on to biological urges too much and have a hard time relaxing. Anal-expulsive personalities refuse to control biological urges and have problems with self-discipline.

The phallic stage, the third psychosexual stage, occurs from ages three through six years old. The libido is focused on the genitals. The child develops romantic feelings for his/her opposite sex parent. Successful completion of this stage requires a resolution of these incestuous feelings. Unsuccessful completion may result in a lack of moral development.

The fourth stage is the latency period. Between the ages of six and twelve children's libido is latent, or quiet. Children can focus on schoolwork and developing same-sex friendships.

Finally, the genital stage begins at adolescence and continues for the remainder of a person's life. As children reach puberty, they must learn to develop healthy romantic relationships.

C

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 24 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 59 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ \times 14 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 44 \\ \hline \end{array}$$

Appendix M: Study 2—Packet for control condition

D

Thank you for participating in this research study.

Please do not turn this page until instructed to do so.

D

Demographic information

Please fill in the answers on your scantron.

1. What is your age in years?
 - a. 17 or younger
 - b. 18
 - c. 19
 - d. 20
 - e. 21 or older

2. What is your gender?
 - a. Male
 - b. Female

3. What is your major? If you have not yet declared your major, please answer this question according to what you anticipate majoring in.
 - a. Psychology
 - b. Other Arts and Sciences major (such as Sociology or Political Science)
 - c. Business major
 - d. Education major
 - e. Other

4. What is your year in school? If you are between years, choose the best one.
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. 5th year senior

5. How many psychology courses have you taken before this one? Include any courses you may have taken in high school.
 - a. 0 – this is my first psychology course ever
 - b. 1
 - c. 2
 - d. 3
 - e. 4 or more

6. What is your race/ethnicity? Please choose only one.
 - a. African American
 - b. Asian
 - c. Caucasian
 - d. Hispanic/Latino
 - e. Other

D

Please complete the following items.

Name (print): _____

Signature: _____

Date: _____

Student ID number: _____

Email: _____

D

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 33 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 13 \\ \hline \end{array}$$

$$\begin{array}{r} 51 \\ \times 42 \\ \hline \end{array}$$

$$\begin{array}{r} 89 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 64 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ \times 77 \\ \hline \end{array}$$

$$\begin{array}{r} 69 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 34 \\ \times 27 \\ \hline \end{array}$$

D

Read and study this page until instructed to stop. Do not look at any other page in the packet.

Sigmund Freud proposed that each individual passes through five different developmental stages on his/her path to adulthood. Successful completion of a stage results in healthy emotional development. Unsuccessful completion results in abnormal and dysfunctional development. Freud proposed that as a child matures, the sex instinct (the libido) shifts from one part of the body to another. The libido shifts in order to satisfy the child's biological needs. This brief article summarizes Freud's theory of psychosexual stages.

From birth until a child is one year old is the oral stage. The libido is focused on the mouth as a source of pleasure. It is critical that the child receives oral gratification through his/her mother in order to pass through the stage successfully. Unsuccessful oral gratification results in a life-long fixation on obtaining oral gratification. This may occur through smoking, overeating, or talking too much.

The second stage is called the anal stage. The libido is focused on the anus from the ages of one to three years old. Toilet training is the main conflict in this time. The child must learn to control his/her biological urges in order to comply with societal demands. Unsuccessful completion of this stage may result in an anal-retentive or an anal-expulsive personality. Anal-retentive personalities hold on to biological urges too much and have a hard time relaxing. Anal-expulsive personalities refuse to control biological urges and have problems with self-discipline.

The phallic stage, the third psychosexual stage, occurs from ages three through six years old. The libido is focused on the genitals. The child develops romantic feelings for his/her opposite sex parent. Successful completion of this stage requires a resolution of these incestuous feelings. Unsuccessful completion may result in a lack of moral development.

The fourth stage is the latency period. Between the ages of six and twelve children's libido is latent, or quiet. Children can focus on schoolwork and developing same-sex friendships.

Finally, the genital stage begins at adolescence and continues for the remainder of a person's life. As children reach puberty, they must learn to develop healthy romantic relationships.

D

Complete these math problems in order until instructed to stop. Do not look at any other page in the packet.

$$\begin{array}{r} 24 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 59 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ \times 14 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 44 \\ \hline \end{array}$$

VITA

Emily Kay Rowland was raised in a suburb of Washington, D.C. She graduated from James W. Robinson, Jr. Secondary School in Fairfax, VA in 2001, and continued her education at the College of William and Mary in Williamsburg. In May 2005, she received a B.A. in Psychology with a minor in Sociology from William and Mary. She immediately went to the University of Tennessee, Knoxville to pursue her Ph.D. in School Psychology. In December 2008, she received an M.S. degree in Applied Educational Psychology. Her final year in the doctorate program consisted of a year-long internship with Henrico County Public Schools in Richmond, Virginia. She completed her Ph.D. in August 2010.