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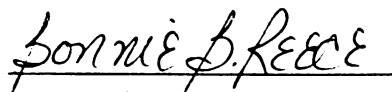
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CONSUMER LEARNING AND 3-D ECOMMERCE: THE EFFECTS OF  
SEQUENTIAL EXPOSURE OF A VIRTUAL EXPERIENCE RELATIVE TO  
INDIRECT AND DIRECT PRODUCT EXPERIENCE ON PRODUCT KNOWLEDGE,  
BRAND ATTITUDE AND PURCHASE INTENTION

presented by

Terry M. Daugherty

has been accepted towards fulfillment  
of the requirements for

Ph.D degree in Mass Media

  
Major professor

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By

Terry M. Daugherty

AN ABSTRACT OF A DISSERTATION

Submitted to  
Michigan State University  
in partial fulfillment of the requirements  
for the degree of

DOCTOR OF PHILOSOPHY

Mass Media Ph.D. Program

2001

Dr. Bonnie Reece



## ABSTRACT

### CONSUMER LEARNING AND 3-D ECOMMERCE: THE EFFECTS OF SEQUENTIAL EXPOSURE OF A VIRTUAL EXPERIENCE RELATIVE TO INDIRECT AND DIRECT PRODUCT EXPERIENCE ON PRODUCT KNOWLEDGE, BRAND ATTITUDE AND PURCHASE INTENTION

By

Terry M. Daugherty

The Internet has the ability to serve as a more powerful medium because consumers are able to interact with products in 3-D multimedia environments thus simulating a new form of experience – a virtual experience. However, very little research has explored the impact of this new type of experience especially in combination with indirect (advertising) and direct (product trial) experience. Therefore, in a laboratory experiment (n=166) this study empirically tested the sequential impact of consumer exposure to indirect, direct, and virtual experiences on brand attitude, product knowledge, and purchase intention when evaluating a digital video camcorder. The results indicate that exposure to a virtual experience preceding both indirect and direct product experience is more effective at influencing brand attitudes. However, direct experience preceding exposure to a virtual experience was found to have the greatest impact on product knowledge. Consumers exposed to an indirect experience preceding both virtual and direct product experience indicated they were significantly less likely to purchase the test product. Implications for business-to-consumer ecommerce and Internet marketing are discussed.

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## ACKNOWLEDGEMENTS

There are numerous individuals who gave their time, knowledge, and guidance to make this dissertation possible. For her unequivocal support, I would like to thank my advisor Dr. Bonnie Reece. For their critical analysis and helpful comments, I wish to thank each of my committee members, Dr. Frank Biocca, Dr. Hairong Li, and Dr. Steve Edwards.

I would also like to thank Dr. Matt Eastin, Carrie Trimble, and Harshavardhan Gangadharbatla for their invaluable help during the data collection. For the design of stimulus materials, I would like to thank the M.I.N.D. Lab at Michigan State University and especially Dae Yul Choi.

Finally, my deepest gratitude goes to my wife Julie and children Michelle, Ryan and Kelly for their unconditional emotional support and sacrifice throughout the course of this dissertation. While the completion of this degree is a significant accomplishment, the foremost honor that gives me the greatest joy and pride is the privilege of serving as a husband and father.

## TABLE OF CONTENTS

LIST OF TABLES .....	vii
LIST OF FIGURES.....	viii
CHAPTER ONE	
INTRODUCTION.....	1
CHAPTER TWO	
LITERATURE REVIEW .....	6
The Internet .....	6
Consumer Learning .....	9
Virtual Experience .....	16
Interactivity and Vividness .....	18
Presence .....	20
Virtual Affordances.....	22
Personal Relevance .....	24
CHAPTER THREE	
THEORETICAL FRAMEWORK .....	27
CHAPTER FOUR	
METHODOLOGY .....	38
Experiment Design .....	38
Participants .....	39
Independent Variables .....	39
Stimulus .....	40
Product.....	40
Materials .....	42
Procedure.....	43
Dependent Measures.....	45
Product Knowledge .....	45
Brand Attitude.....	46
Purchase Intention.....	46
Manipulation Checks .....	46
CHAPTER FIVE	
RESULTS .....	48
Data Analysis .....	48
Hypothesis Testing .....	49
Post Hoc Analysis.....	61

CHAPTER SIX	
SUMMARY AND CONCLUSIONS.....	63
Discussion .....	63
Limitations .....	69
Conclusions .....	69
LIST OF REFERENCES.....	72
APPENDIX A.....	82
APPENDIX B .....	85
APPENDIX C .....	92
APPENDIX D .....	96

## LIST OF TABLES

TABLE 1: . Sequences of Exposure .....	34
TABLE 2: . Summary of Hypotheses.....	37
TABLE 3: Mean, Standard Deviation, and Cronbach Alpha Coefficients ..... for Scales	49
TABLE 4: Dependent Variable Test of Normality.....	51
TABLE 5: Dependent Variable Descriptive Statistics for each Treatment ..... Condition	52
TABLE 6: Contrast Comparisons for Sequential Exposure Conditions for ..... H1 through H6	54
TABLE 7: Contrast Comparisons for Sequential Exposure Conditions for ..... H7 through H15	58
TABLE 8: Correlation Matrix of Dependent and Manipulation Check ..... Variables	61
TABLE 9: Sequential Order Effect for Indirect, Virtual and Direct Experience ....	62

## LIST OF FIGURES

FIGURE 1: Theoretical Spectrum of Consumer Learning .....	29
FIGURE 2: Integrated Information Response Model Incorporating Virtual ..... Experience	32
FIGURE 3: Product Knowledge, Brand Attitude and Purchase Intention..... Across Sequential Exposure Conditions	52

## CHAPTER 1

### INTRODUCTION

The development of computer technology and expansion of the Internet has resulted in a promising but challenging mass medium. Marketers have the ability to deliver highly targeted persuasive messages, strengthen customer relationships, and ultimately generate sales 24 hours a day (Tedesco, 1999). While the Internet has demonstrated a high capacity for disseminating information about products and services, it has fallen short of expectations when consumers want to “experience” a product. In fact, the way product information is presented in online stores is likely to reduce the impact of brand equity. For instance, online retail environments typically only display a list of brand names, model numbers, specifications and/or prices (Burke, 1997). As a result, consumers do not achieve as rich of an experience as they would in a conventional store, such as feeling the store atmosphere, interacting with a salesperson, and seeking sensory stimulation (Tauber, 1972). These weaknesses hinder consumer learning in computer-mediated environments and could impact future business-to-consumer ecommerce.

Research has documented that consumers learn about products through indirect experience, such as advertising, and via direct experience, such as product trial (Deighton, 1984; Hoch and Ha, 1986; Hoch and Deighton, 1989; Kempf and Smith, 1998; Smith and Swinyard, 1982; 1983). However, it has been speculated that the type of medium may limit the effect of advertising and a more powerful medium for



communicating the details and experiences of a product, such as the Internet, could have a stronger impact on consumer learning (Moore and Lutz, 2000).

Three-dimensional (3-D), multi-user, online environments constitute a new revolution of interactivity by creating a compelling online experience (Waller, 1997). It is the interactive nature of the Internet that offers marketers the greatest potential for building stronger relationships and provides a distinct advantage over traditional mass media (Upshaw, 1995). Furthermore, because of the interactive nature of the Internet, marketers have the ability to offer user-controlled product interactive experiences (Schlosser and Kanfer, 2001). Li, Daugherty and Biocca (2001a) recently conceptualized this new and challenging type of consumer experience as a virtual experience. While the term has been used in previous research (Hoffman and Novak, 1996; Klien, 1998), Li, Daugherty and Biocca (2001a) conceptually defined a virtual experience as a psychological and emotional state consumers undergo while interacting with 3-D visual products in a computer-mediated environment. McLuhan (1988) suggests that within any medium there is a connection between the human mind, the technology, and the environment that serves to immerse users. Consumers are able to experience psychological states because the medium creates a sense of interactivity and enjoyment resulting in increased learning, altered behaviors, and a perceived sense of control (Hoffman and Novak, 1996). Thus, it is plausible that experiences occurring while using the Internet are capable of creating psychological states that influence cognitive and affective behavior. This new type of experience is a simulation of a real or physical experience and can be construed to be located between direct experience and indirect experience within the spectrum of consumer learning.

Because advertisers are capable of exerting influence over the consumer learning process (Hoch and Deighton, 1989), a simulated virtual experience may extend product familiarity, affect motivation, and decrease product ambiguity, leading to elevated levels of arousal, enhanced shopping enjoyment, and heightened brand preference. By creating compelling online virtual experiences with products, marketers could potentially increase the value of product information presented, engage consumers in an active shopping experience, increase the number of unique and repeat traffic visitors for a site, and ultimately establish an online competitive advantage. Furthermore, the potential benefits of message framing and product customization a virtual experience provides could enhance how consumers learn by saving time and eliminating unnecessary information.

As consumers undergo psychological and emotional states while interacting with products incorporating 3-D visualization, a virtual experience should create a compelling online experience and facilitate consumer learning by improving decision making (Hoffman and Novak, 1996; Novak and Hoffman, 2000). In addition, the interactive and vivid nature of 3-D product visualization evokes mental imagery from past ideas, feelings, and sensations (Yuille and Catchpole, 1977). The implication is that a virtual experience is likely to have a positive impact on learning, encourage product evaluation, affect behavior, and provide sensory and emotional experiences that can substitute for consumption (MacInnis and Price, 1987). Li, Daugherty and Biocca (in press) emphasize that consumers are likely to perceive the examination of products in a virtual experience as being richer than indirect experience and closer to direct experience because of interactivity, vividness, mental imagery and the psychological sensation of presence.

Nevertheless, current research and theory have failed to explore completely the multi-media dimensions of computer-mediated communication (Soukup, 2000) and what little work has been done has not considered the influence of sequential exposure of a virtual experience paired with indirect or direct experiences. This is surprising considering marketing efforts do not typically rely on one method of exposure and that sequences of experience have been demonstrated to impact consumer learning (Berger and Mitchell, 1989; Kempf and Smith, 1998; Marks and Kamins, 1988; Smith, 1993; Smith and Swinyard, 1983). Theoretically, the Integrated Information Response Model emphasizes the sequence of exposure influencing consumer learning the most occurs when indirect experience precedes direct experience. The result is that the predisposition created by advertising is reinforced by product trial elevating consumer learning. To fully understand the impact of a virtual experience and the use of 3-D product visualization in consumer learning, the unique and distinctive characteristics that distinguish a virtual experience from indirect and direct experience must be empirically explored. The implications of such findings could potentially provide scholars with a better theoretical understanding of consumer psychological processes and behavior online as well as improve the prediction for effective persuasive Internet communication strategies. Therefore, the purpose of this study is to expand the theoretical knowledge of consumer learning by testing the impact of virtual experience on sequence of exposure relative to indirect and direct experience. This initial step is essential in order to isolate and determine the impact of a virtual experience in conjunction with indirect and direct experiences. In the proceeding sections I will establish the foundation of the study from a

literature review, propose a theoretical framework, provide a detailed methodology, and conclude with implications involving this emerging area of research.

## CHAPTER 2

### LITERATURE REVIEW

#### The Internet

At the most basic level, the Internet can be defined as simply a series of networks serving to interconnect thousands of computers across the world (Bauer, 1995). It originated in the 1960s when the Department of Defense's Advanced Research Projects Agency (ARPA) set out to link computers that were incompatible together so communication with one another would be possible. The result was the formation of the ARPANET. In 1988, the National Science Foundation (NSF) absorbed the ARPANET and funded the creation of a much faster network called the NSFNET (Peterson, Balasubramanian and Bronnenberg, 1997). It was also about this time that the NSFNET and affiliated parties began referring to this connection of computer networks as the Internet (Kahn, 1995). In 1992, the ANSNET, which was a backbone network privately owned and operated, superseded the NSFNET and the Internet became available for commercial ventures. Information then began to be organized using hypermedia as the World Wide Web emerged (Peterson, Balasubramanian and Bronnenberg, 1997).

The creation of any new form of media is a process that develops over time. However, in order for any new mass medium to emerge it generally must perform some function better than existing media. As it turns out, the Internet is the only medium of communication where a consumer can see a product, investigate a product in detail, and immediately purchase the product (Meeker, 1997). This ability serves as a form of two-way interaction, unlike the one-way exposure from traditional media (Cho, 1999;

Hoffman and Novak, 1996). Hence, the potential of the Internet is about building customer relationships, providing customer service, efficiently delivering targeted messages, and ultimately generating sales. The result is one of the fastest growing mass media in history. Not surprisingly, as the Internet continues to grow in the number of users, advertisers and marketers have taken notice and solidified the Internet as an important element in the media mix.

There are several methods for advertisers and marketers to communicate with consumers using the Internet. The most common are through e-mail, listservs, user discussion groups, and the Web (O'Guinn, Allen and Semenik, 1998). E-mail allows advertisers to communicate to consumers in much the same fashion as direct mail. An advertiser can acquire the e-mail address of numerous consumers and deliver a message to a specific targeted group. Nonetheless, this form of advertising has not yet taken hold due to the significant resistance in receiving these types of messages via e-mail (Bruno, 1996). Consumer perceptions remain unreceptive towards this form of persuasive Internet communication because e-mail accounts are perceived as private personal forms of communication. Furthermore, resistance also stems from the fact that consumers typically must pay for Internet access to receive e-mail and downloading e-mail from solicitors is perceived as wasting both the recipient's money and time.

In turn, listservs are electronic mailing lists that people join to receive information about a specific topic of interest. Yet, it is still considered bad taste to openly sell products via listservs especially when there is no connection between the mailing list's theme and the advertised product. Alternatively, user discussion groups, commonly referred to as usenet groups, are a collection of more than 17,000 discussion groups

connected over the Internet. These groups allow participants to read messages, post messages, and answer messages that all pertain to a specific topic. Like e-mail advertising an advertiser must be very careful when communicating a message in this manner because a backlash could provoke hate mail, resentment, and a damaged business reputation (O'Guinn et al., 1998). On the other hand, the Web is a graphical environment of information that makes navigation over the Internet simple and exciting. To advertisers and marketers, the Web holds the greatest potential because it provides the ability to deliver detailed in-depth messages utilizing both visual and behavioral simulations 24 hours a day (O'Guinn et al., 1998). In addition, this form of Internet advertising functions in much the same manner as traditional advertising (television, print, radio, etc.) resulting in higher acceptance among consumers. As in other media, ads are inserted into existing content with the consumer deciding whether to read or pay attention to the ad.

Ducoffe (1996) conducted one of the first studies on Internet advertising in an attempt to assess consumer perception of this new medium. From a purposive sample of over 300 Web users, Internet advertising ranked near the bottom relative to traditional media such as television and newspapers in terms of value. Ducoffe (1996) stressed the benefits of this medium have not been realized with Internet advertising currently serving as simply a form of technological direct response advertising. However, Briggs and Hollis (1997) argue that most advertising does not evoke an immediate response and Internet advertising is as easily able to increase awareness and strengthen a product's brand image as traditional advertising. To test their belief, they conducted a field experiment with banner ads utilizing over 1,200 participants to measure attitude and

behavior. From one banner exposure, they reported a 50 percent increase in consumer loyalty and as high as a 200 percent increase in awareness. These findings lend support to the idea that Internet advertising can effectively increase consumer learning.

Hoffman and Novak (1996) emphasized the Internet's potential as an efficient channel for advertising, marketing, and product distribution stems from what they refer to as a many-to-many communication medium where consumers are able to interact with as well as create content. Hence, consumers are able to experience a psychological state identified as flow because the medium creates a sense of interactivity and enjoyment resulting in a loss of self-consciousness. The key consequences of this experience are increased learning, altered behaviors, and a perceived sense of control within the computer-mediated environment (Hoffman and Novak, 1996).

### Consumer Learning

Consumers learn about products through experience. An experience is more than simply the passive reception of external sensations or subjective mental interpretations of an event or situation. Rather, an experience is the result of an ongoing transaction that gains in quality, intensity, meaning, and value integrating both psychological and emotional conditions (Mathur, 1971). These conditions are ultimately accomplished via the generation of thoughts and/or sensations brought together creating the experience (Hirshman, 1984). Within any experience, psychologists have identified three common states involving mental imagery (cognitive), emotional responses (affective), and derived intentions (conation) (Richardson, 1984). At its simplest, an experience is an event or process that can occur spontaneously or voluntarily within everyday situations but always



involves the internal awareness of something taking place (Lundh, 1979). Conceptually, every experience stems from the interaction between an individual and an object or environment.

Researchers have delineated two main types of experience associated with consumer learning of products or services; indirect experience and direct experience (Deighton, 1984; Hoch and Deighton, 1989; Hoch and Ha, 1986; Kempf and Smith, 1998; Smith and Swinyard, 1982; Smith and Swinyard, 1983; Smith and Swinyard, 1988; Wright and Lynch, 1995). While indirect experience can occur from various sources (i.e., word of mouth, *Consumer Reports*, etc.), the most prevalent form explored in consumer learning is advertising. This form of experience can lend several advantages for both consumers and advertisers. First, advertising is a mediated experience where messages are framed to emphasize the most important product information. Second, advertising exposure can stimulate consumer awareness for unknown products. Third, exposure enables consumers to evaluate important information across multiple brands in a short amount of time. Of course, advertising is a biased form of communication that is often perceived as less credible than direct experience (Hoch and Ha, 1989). Direct experience is an unmediated interaction between a consumer and a brand in full sensory capacity and occurs from product sampling, trial, or purchase (Gibson, 1966). This multi-sensory interaction also leads to several consumer and advertiser advantages associated with direct experience. First, evidence in direct experience is self-generated and the most trustworthy for a consumer. Second, a consumer may manage the way a product is experienced by controlling the focus and pace of an inspection to maximize informational input. Third, direct experience promotes better memory because

information is more vivid and concrete (Hoch and Ha, 1989). Fourth, this form of learning is more likely to influence behavior because of internal attributions and motivation (Smith and Swinyard, 1982). However, strong implications for both indirect and direct forms of experiences have been reported under certain circumstances.

Direct experience from product trial has been found to influence higher order effects on consumer judgements (Fazio, Chen, McDonel and Sherman, 1982; Fazio and Zanna, 1977; Olson and Dover, 1979). Smith and Swinyard (1982) proposed an integrated information response model outlining the processes in which indirect and direct experiences affect consumer learning. The model implies that indirect experience offers little influence on consumer behavior because advertising is perceived as a biased source of information. Thus, advertising is unlikely to generate reliable attitudes resulting in low order beliefs possibly inducing product trial. One of the key features of this model is the distinction between trial and commitment within conation. Smith and Swinyard (1982) state that when the perceived purchase risk is low, the low order cognitive effects produced by advertising are more likely to result in trial or even purchase, which then serve as an information gathering technique for further evaluation. However, when consumers are seeking to reduce high levels of perceived risk, direct experience will generate more confidently held higher order beliefs because information acceptance from this type of experience is considered more favorable (Smith and Swinyard, 1982).

To test this proposition, Smith and Swinyard (1983) compared audience response measures after direct experience with a product versus indirect experience from advertising. The results revealed that direct experience is a strong source of information

for consumers and that advertising alone appears unlikely to accomplish the directional relationship from attitude to behavior. In addition, direct experience resulted in 65% of the subjects experiencing higher order effects compared to only 36% for advertising. Upon further analysis, only 8% of the indirect experience subjects formed positive higher order effects compared with 43% for direct experience. Direct experience was also found to explain three times the amount of variance ( $r^2=.36$ ) between attitude and behavior than indirect experience ( $r^2=.11$ ) (Smith and Swinyard, 1983).

Smith and Swinyard (1988) also replicated these findings while extending the integrated information-response model to measure expressed interest for additional information or what they refer to as curiosity. Once more, they found direct experience consistently produced higher order expectancies than indirect experience from advertising. However, because a small percentage of consumers exposed to advertising produced higher order expectancies combined with twice as many curiosity statements than direct experience, Smith and Swinyard (1988) concluded future research should explore how indirect experience can create cognitive levels similar with direct experience.

Deighton (1984) developed a two-step model of advertising effectiveness to test how advertising is able to initiate expectations, which are to be confirmed or rejected during direct experience. While in many instances beliefs about product attributes are often attributed as an outcome of advertising, the formation of beliefs by consumers may not depend on any communicated message but rather the confirmation of those beliefs through product knowledge from multiple sources of information. As a result, Deighton (1984) conducted a laboratory experiment asking participants to rate the reliability of six

automobile manufacturers from a combination of print ads and articles in *Consumer Reports*. The results indicate that reliability was not influenced by advertising alone nor were *Consumer Reports* able to affect the evaluation individually. When the advertisements were used in conjunction with the evidence presented in the *Consumer Reports*, however, product evaluations increased dramatically.

Hoch and Ha (1986) extended Deighton's (1984) original work by examining the conditions under which advertising can influence how and what consumers learn from direct experience. Through two separate experiments, Hoch and Ha (1986) investigated how consumers find and interpret information either to support existing beliefs about products or confirm expectations induced from advertising. Using a pre- and post-test design, participants were exposed to both test and control advertisements and allowed to inspect available brands. The results indicated that advertising is able to influence the assimilation of information during learning when consumers are faced with ambiguous evidence. For instance, when participants were exposed to a test ad preceding the corresponding brand, the advertisement extended the amount of time spent examining the product, resulting in increased product ratings. These findings are important evidence that the combination of advertising and direct experience can influence consumer learning.

Drawing on previous consumer learning research, Hoch and Deighton (1989) argued that learning strictly from direct experience is not a simple process and therefore is subject to influence. They proposed a four-stage model of consumer learning that is influenced by internal and external factors: hypothesizing – exposure – encoding – integration. The stages are neither independent from each other nor do they occur necessarily in a fixed linear sequence. Rather, they emphasize that learning is a process

influenced by factors such as topic familiarity, internal motivation, and the ambiguity of the environment. Furthermore, Hoch and Deighton (1989) emphasize that advertisers and marketers have the ability to exert influence over the consumer learning process by understanding how consumers learn from experience. Thus, effective advertising campaigns are capable of increasing familiarity, affecting motivation, and decreasing product ambiguity through information while influencing consumer learning along each stage. In a sense, an interaction between indirect and direct experience is more effective because marketers have the power to exert control over the learning process through brand building and consumer loyalty (Hoch and Deighton, 1989).

Wright and Lynch (1995) refined the theory of advertising effects by differentiating search from experience attributes of products. The foundation of their research was derived from Nelson's (1974) original distinction between search and experience product attributes. Search attributes are qualities that can easily be verified, such as a product's color or price; and this verification can take place prior to purchase. In contrast, experience attributes are characteristics that can only be verified by direct experience, such as how a car rides or the taste of a product (Nelson, 1974). They argued that consumers perceive search attributes as reliable before product use whereas experience attributes are perceived as less reliable before trial given certain types of products. The distinction is that direct experience is more effective than advertising (indirect) in presenting experience attribute information. However, advertising is more effective than direct experience in presenting search attribute information (Wright and Lynch, 1995). This proposition contradicted the emerging agreement that direct experience is always superior to indirect experience. In a laboratory experiment designed

to equate a balance between search and experience attributes, Wright and Lynch (1995) confirmed that direct experience was not generally superior to advertising for communicating product information; instead, direct experience was superior in communicating experience attributes and advertising was superior in communicating search attributes. Specifically, they found that belief confidence was greater for experience attributes in direct experience and higher for search attributes after exposure to advertising.

Moore and Lutz (2000) extended consumer learning to examine how indirect and direct experience interrelate to form brand perceptions and attitudes in children. Using a combination of positivist and interpretivist research methods, they found significant influences from both direct and indirect experiences. Consistent with prior research, direct experience from product trial led to greater cognitive and affective processing compared to advertising exposure. However, advertising was able to influence usage experience by shifting beliefs and attitudes of older children prior to product trial (Moore and Lutz, 2000). Nevertheless, it has been speculated that the type of medium may limit the effect of advertising and a more powerful medium for communicating the details and experiences of a product, such as the Internet, could have a stronger impact on consumer learning. For example, a print ad is traditionally limited by presenting images and text two dimensionally relying mostly on the visual senses. Television advertising is able to extend sensory perception by combining sight, sound and motion however consumer interaction remains passive. In contrast, the Internet is able to combine elements found in traditional forms of advertising with interactivity and user control to potentially produce a stronger experience.

## Virtual Experience

The Internet has the ability to serve as a more powerful medium than traditional print and broadcast media in the sense that consumers are able to interact with products in 3-D multimedia environments, thus simulating a new form of experience – virtual experience. The conceptualization of a virtual experience has emerged because technological developments indicate a movement toward more multi-sensory interactions incorporating high quality visuals, stereo sound, and 3-D imagery (Soukup, 2000). Information and graphics can now be presented in a mediated 3-D environment in which consumers can interact with images, animated graphics, video, and audio. Klein (1998) suggests the greatest value of a virtual experience is that it allows consumers to assess product performance prior to purchase, essentially turning experience goods into search goods. The consumer value of interactive media is that information is now more accessible, less costly, and more customizable. By transforming experience attributes into search attributes, a virtual experience could be perceived as being equivalent to a direct experience and thus reduce perceived risk prior to purchase (Klein, 1998). The premise is that experience goods have traditionally been suited for product trial and search goods for advertising with the best medium remaining the one that communicates the type of product information that is the most congruent (Wright and Lynch, 1995). Yet, a virtual experience can moderate direct and indirect experience enabling marketers to reap the benefits of both types of experiences (Li, Daugherty and Biocca, 2001a).

As the notion of virtual experience evolves, vivid and imagery-based associations are more likely to generate richer experiences and enjoy advantages of both direct and indirect experience. Like traditional ads, 3-D product visualization enables consumers to

form prior hypotheses by framing information presented. However, different from traditional forms of advertising, dynamic 3-D visualization of products is able to offer user control over the inspection of a product, even from inside out for certain types of products. This is an important advantage because high information control in ecommerce environments has been found to improve consumer decision quality and knowledge (Ariely, 2000). In fact, this type of control positions a virtual experience similarly to direct experience because consumers are able to inspect 3-D products from different perspectives at their own pace. This level of control is not simply a representation of an actual product but rather a simulation of the consumption experience. The result is a stronger impact for experience attributes compared to advertising and greater impact for search attributes relative to product trial. Nevertheless, a major disadvantage associated with virtual experience is the limited sensory input compared to direct experience. At present, consumers are not able to touch, smell or taste a product on the computer even though these actions will soon be likely with the invention of the “force-feedback” technology (Grossman, 2000).

In an exploratory study, Li, Daugherty and Biocca (in press) addressed what constitutes a virtual experience in order to identify key characteristics of this new type of experience. From a sample of 30 subjects, participants were asked to verbalize what they were thinking and feeling while interacting with 3-D products in an ecommerce environment. The results indicate that consumers undergo similar psychological processing when examining products in a virtual experience as in a direct experience. Furthermore, several characteristics associated with a virtual experience were classified,



such as interactive enjoyment, presence, virtual affordances, and personal relevance from interacting with 3-D visual products (Li, Daugherty and Biocca, in press).

### *Interactivity and Vividness*

Interactivity is a multidimensional construct that can refer to numerous methods in which users of a medium can influence the form or content of a mediated environment (Ariely, 2000; Haubl and Trifts, 2000; Heeter, 2000). In computer-mediated environments, interactivity has been described as both the ability to communicate with people (person interactivity) and access information (machine interactivity) (Hoffman and Novak, 1996). While interpersonal communication is an important advantage of the Internet compared to traditional media (i.e., e-mail, chatrooms, etc.), interface design and the manner in which information is accessed are most applicable in 3-D product visualization. In fact, the goal of many designed experiences in computer-mediated environments is to impact, involve, and/or enable human interaction as easy as possible (Heeter, 2000). Haubl and Trifts (2000) found that interactive design aids in ecommerce environments have a substantial influence on consumer decision making. While their study focused on breadth and comparisons of products in online shopping environments, they emphasized that their results should apply across various dimensions of interactivity, such as 3-D product visualization (Haubl and Trifts, 2000).

In turn, vividness refers to the clarity and ability of an image to produce a sensory rich mediated experience and is generally thought to be more persuasive. However, studies in this area have not produced consistent findings. Furthermore, a significant limitation in comparison to a virtual experience is that most research investigating

vividness is based on either semantics or passive imagery (Keller and Block, 1997). In a study specifically designed to test the effects of verbal product representations versus vivid computer realistic images, Vriens, Loosschilder, Rosbergen, and Wittink (1998) found that pictorial representations improved understanding of design attributes. However, they emphasized that a higher degree of realism is possible with 3-D rendered products and would probably result in a stronger impact. Dahan and Srinivasan (2000) set out to test this proposition in order to identify a low-cost alternative for new product testing. Using a portable bicycle pump as the product category, actual physical products were measured against static and animated Web representations to predict overall market share. Surprisingly, the static and animated Web representations produced nearly accurate market share rankings compared to direct product experience. While predicted levels of market share were lower than the physical interaction, virtual prototypes cost significantly less to build and allow more concepts to be tested (Dahan and Srinivasan, 2000).

Theoretically, the interactive and vivid nature of 3-D product visualization stimulates mental imagery within consumers in a virtual experience. Fundamentally, imagery is evoked from the sensory experiences in memory from past ideas, feelings, and sensations (Yuille and Catchpole, 1977). The implication from a virtual experience context is that imagery processing is likely to have a positive impact on learning, encourage product evaluation, affect behavior, and provide sensory and emotional experiences that can substitute for consumption (MacInnis and Price, 1987). The result is heightened perception from the experience serving as a simulation heuristic generated from the imagery created (Schlosser and Kanfer, 2001). Thus, the more interactive and

vivid a 3-D product experience the richer mental imagery generated. As a result, Interactive advertising in 3-D visualization is potentially superior over those in 2-D graphics, a main form of advertising on the Web at present. Compared to traditional advertising, advertising utilizing 2-D graphics common in banner ads and Web sites is interactive in the sense that consumers may click to find whatever information they need about products in real time. However, 2-D graphics are limited in terms of the degree of interactivity because they do not allow consumers to experience a product by inspecting it from different viewpoints. This limitation is overcome in 3-D product visualization, where consumers are able to examine products freely just as they would in a conventional store. In fact, the possibility to examine and modify the viewpoint in a virtual environment creates a sense of control and has been found to increase the sense of presence (Schubert, Regenrecht and Friedmann, 2000).

### *Presence*

The combination of vividness, interactivity, and sensory stimuli combine to create a sense of presence in virtual experience. Presence, also known as telepresence, is the experience of “being there” in the virtual environment. This perceived sense is generated from sensory input, mental processes, and past experiences assimilated together in a current state (Gibson, 1966). Steuer (1992) described presence as the extent to which one feels present in a mediated environment. All media and telecommunication systems generate a sense of being in another place by bringing the experience and objects closer to us, allowing us indirectly to meet and experience other objects, other people, and the experiences of others. A medium functions the best when it delivers not only information

but also a mediated experience. Although presence is the design goal of virtual reality, few media theorists would argue that the sense of presence is suddenly emerging with the debut of virtual reality, which consists of both immersive and non-immersive 3-D visualization (Biocca, Kim and Levy, 1995). Rather, researchers see the illusion of presence as a product of all media (Reeves and Nass, 1996), and virtual reality is a medium that can generate the most compelling sense of presence (Biocca, 1997).

According to Biocca (1997),

When we experience our everyday sense of presence in the physical world, we automatically generate a mental model of an external space from patterns of energy on the sensory organs. In virtual environments, patterns of energy that stimulate the structure to those experienced in the physical environment are used to activate the same automatic perceptual processes that generate our stable perception of the physical world.

Presence can be generated in a shopper when she is interacting with either a virtual product or a virtual environment. For instance, when a shopper surfs through the aisles of a virtual store she may feel as if she is walking in a conventional store. Further, a shopper who picks up a brand from a virtual shelf has the ability to take a closer look by zooming-in or rotating the product much as if she was examining a brand in a real store. Shoppers are likely to gain a unique experience when they feel physically present in such an environment. Consumer interaction with products in a virtual environment is only one aspect of virtual experience. Tauber (1972) distinguished three activities in the area of consumer behavior: shopping, buying, and consuming. In a conventional mall, shoppers may view window displays, chat with a friend or a salesperson, and see other shoppers in addition to inspecting individual products and trying out some features of a product. A virtual ecommerce environment is able to simulate much of these same experiences with presence mediating the persuasive impact.

By manipulating the sensory saturation of a consumer's visual perception, Kim and Biocca (1997) were able to detect significant differences in confidence levels regarding brand preference. More specifically, the sense of presence resulted in a stronger experience with subjects becoming more confident in their attitudes toward the product information presented. Kim and Biocca (1997) concluded that the virtual experience created by presence simulated a direct experience resulting in increased persuasion. This finding supports previous research that indicates the sense of presence created in a mediated environment will cause a user to believe the experience occurred first hand, resulting in the same effect as direct experience (Lombard, 1995).

### *Virtual Affordances*

Consumers inspect products in the conventional store following norms. When they select a computer, they may turn it on to see the color of the monitor screen or launch a program; however, they normally do not request to open the case to see what is inside. When consumers select chairs, they are likely to sit on them but less likely to stand on them. This type of expected interaction between consumers and products is referred to as affordances (Schuemie and Mast, 1999). The affordances of any product represent the perceptual cues that influence how consumers expect to interact during direct experience. Norman (1998) explained, when we assess our immediate environment, we are aware of some of the affordances each object offers. For instance, chairs are to sit on, doors to open or close, and lights to illuminate. An affordance is not a property of an object as much as it is a relationship between an object and the organism that is acting on the object. Heeter (2000) further noted, "In the design of experiences,

real affordances are not nearly so important as perceived ones; it is perceived affordances that tell the user what actions can be performed on an object and, to some extent, how to do them.”

There are various affordances common to product inspection in conventional stores that come from the ability of the senses and motor systems to interact with products. The ability to visually inspect a product contains some of the most common types of affordances. Consumers learn about the shapes, texture, and perceived functions of a product by moving their bodies or the product to visually inspect it from different angles. This type of information and interaction can be simulated vividly within a 3-D environment, where consumers can freely examine, zoom-in or zoom-out, and rotate a product based on virtual product affordances. The perceived virtual affordances created in 3-D product visualization are what distinguish virtual experience from an indirect experience commonly found in traditional advertising (Li, Daugherty and Biocca, in press).

The examination of how consumers interact with products in 3-D visualization also suggests several basic ways of interaction called interfaces. These properties are what help generate the affordances needed to establish a virtual experience with a product in a virtual environment. Common in human-computer interaction literature, the success in designing effective interfaces stems from creating appropriate affordances a user expects in new multi-sensory computer-mediated environments (Karat, Karat, and Ukelson, 2000). Previous communication research has addressed the role of certain interfaces in the cognitive process. For instance, Reeves and Nass (1996) note that larger images likely are more arousing, better remembered, and better liked than small images.

This finding implies the potential impact of zooming-in for inspection of 3-D visual products. Hoffman and Novak's (1996) elaboration of the flow theory indicates the cognitive impact of seamless sequence of responses facilitated by interactivity with the computer and self-reinforcement, which lends support for the effect of the navigating interface. Li, Daugherty, and Biocca (2001b) recently examined the impact of virtual affordances and found consumer learning is enhanced when visual affordances associated with a virtual experience enhance a consumer's ability to acquire knowledge, form attitudes, and influence behavior over tactile and behavioral affordances. These studies and others (Biocca, 1997, Lombard and Dittion, 1997; Steuer, 1992,) have justified the potential impact of interfaces in 3-D visualization in ecommerce.

### *Personal Relevance*

In order for any consumer to perceive and evaluate a product actively, it must hold some form of personal relevance. Krugman (1965) referred to this as a type of involvement. The construct of involvement has been heavily explored by advertising researchers resulting in a diverse number of conceptual approaches (Andrews, Akhter, Durvasula and Muehling, 1992). Studies have defined, examined, measured, and tested involvement using both a theoretical and practical context to examine products, messages, decisions, situations, and psychological states (Muehling, Lacznia and Andrews, 1993). Hence, involvement continues to remain a significant influence in the processing of information (Bettman, 1979).

In examining the effects of advertising on involvement, the majority of research has focused on situational manipulations of the construct (Lacznia, Kempf and

Muehling, 1999). However, recent research suggests that this traditional method may result in inconsistent conclusions, with more permanent influences, such as product class involvement, likely to produce stronger effects (Laczniak and Muehling, 1993; Andrews et al., 1992; Celsi and Olson, 1988). In an attempt to understand the influence of these different manipulations, Laczniak, Kempf and Muehling (1999) conducted a laboratory experiment investigating the impact of product class, product knowledge, and situational involvement on advertising. The results support the assertion that situational manipulations of involvement levels may not be successful, and more enduring product class involvement measures should be used in testing advertising experiments.

Cho (1999) recognized the importance of involvement in an Internet advertising study designed to explore the influence on information processing. The purpose of the investigation was to test a modified version of Petty and Cacioppo's (1981) Elaboration Likelihood Model developed for the Internet. The Elaboration Likelihood Model (ELM) specifies conditions under which persuasion is mediated by messages and postulates that central and peripheral routes influence persuasion. Elaboration refers to the extent in which consumers process persuasive communication. For instance, when motivation is high elaboration likelihood is said to be high and consumers follow the central route of persuasion and influenced by argument-based messages. When motivation is low then elaboration likelihood is low and consumers are influenced by the peripheral route of persuasion, such as source attractiveness and heuristic cues (Petty and Cacioppo, 1981). The results of Cho's (1999) interpretation using ELM indicate that subjects are more likely to initiate a behavioral response for high involvement products than low involvement on the Internet.



Furthermore, in a virtual experience, personal engagement is activated when examining 3-D visual products with various levels of cognitive processing stimulating involvement. As a result, consumers tend to perceive 3-D products as being realistic enough to evaluate the potential benefits and utility for others (Li, Daugherty and Biocca, in press).

## CHAPTER 3

### THEORETICAL FRAMEWORK

Smith and Swinyard (1982) developed an Integrated Information Response Model of advertising response sequence detailing how indirect and direct experiences interact to influence cognitive, affective, and conative effects in consumer learning. The model illustrates exposure to advertising typically generates lower order beliefs leading to awareness and trial. This is based on the premise that consumers do not have direct contact or experience with a product from inspecting an advertisement. The result is low order beliefs formed from the initial awareness are generated. When trial is induced from lower order beliefs it represents an attempt by the consumer to move toward higher order beliefs via direct experience. This is common for low involvement inexpensive purchases where the risk is minimal and trial before commitment offers the best means for acquiring information (1982). In contrast, when consumers seek to reduce uncertainty for high risk involving type products, higher order beliefs are formed primarily from direct experience. The higher order beliefs result from direct experience because physical trial serves to reduce uncertainty and risk. The distinction between high and low order beliefs depends on the level of involvement and personal relevance with the product.

The model also indicates that under certain circumstances indirect experience from advertising can lead to higher order beliefs (1982). Previous research has detailed that higher order beliefs are generated from advertising for products high in search attributes relying less on direct experience (Wright and Lynch, 1995). Numerous findings

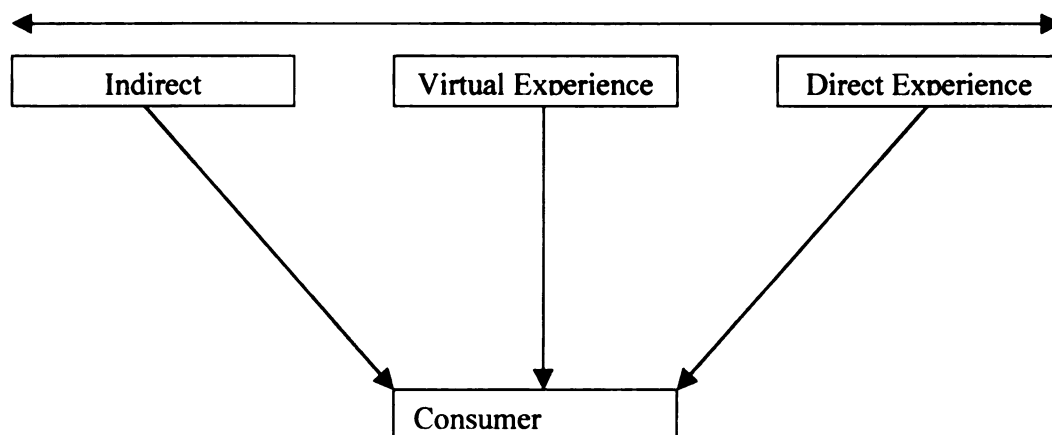
have supported this model (Marks and Kamins, 1988; Moore and Lutz, 2000; Smith and Swinyard, 1983; Smith, 1993; Wright and Lynch, 1995).

Theoretically, virtual experience is a vivid, involving, active, and affective psychological state consumers encounter when interacting with 3-D products in a computer-mediated environment (Li, Daugherty and Biocca, in press). Since virtual experience incorporates elements of both indirect and direct experience, it intervenes these constructs along the spectrum of consumer learning (see Figure 1). For instance, both indirect and virtual experiences are mediated occurrences that provide marketers the ability to deliver persuasive forms of communication. In most instances however, interactive advertising, such as 3-D product visualization, provides richer experiences than indirect experience, including traditional advertising. Similarly, virtual experience is also able to resemble direct experience since both provide elements of interactivity with products. For example, the ability to visually inspect a product from all angles is easily simulated in a 3-D environment. In addition, like direct product experience, 3-D virtual experiences allow consumers to examine products from varying distances by zooming-in or out during inspection (Li, Daugherty and Biocca, 2001a; 2001b).

Previous research has demonstrated that consumers are generally more confident about evaluations when examining experiential products from direct experience and search products from indirect experience (Wright and Lynch, 1995). However, a virtual 3-D product experience has the ability to moderate these differences and simulate elements of both search and experience products. This occurs because virtual experience incorporates elements of both indirect and direct experiences exceeding the limits of each by allowing advertisers to frame product messages, provide visual simulations using

movement and animation, and alter products via customization. For instance, automobile consumers browsing online can receive detailed information about engine specifications by moving the mouse over a component, simulate the opening and closing of compartments, and even change the color of a 3-D interactive automobile. Furthermore, virtual experience has the ability to display all relevant information while arranging for consumers to hear the sound of the road as they examine the tire specifications or listen to their favorite song as they evaluate the CD player. The key for generating confidently held higher order beliefs in virtual experience is for perceived affordances of 3-D visualizations to match or exceed physical affordances from direct experience (Li, Daugherty and Biocca, 2001b). Thus, a virtual experience is able to incorporate benefits of both indirect and direct experiences in consumer learning, which is perhaps the strongest advantage (see Figure 2).

Figure 1. Theoretical Spectrum of Consumer Learning



Helping consumers learn has proven to be an efficient marketing communication objective and has led to the long-term profit performance of many firms (Wernerfelt, 1996). As a result, measuring the effects of consumer learning should be the ultimate goal for identifying consequences associated with interactive 3-D forms of product advertising. In fact, greater perceptual product salience via the use of color, three dimensions, and sound (Hutchinson and Alba, 1991) as well as interactive and vivid content on the Internet have been linked to increased learning (Hoffman and Novak, 1997; Hoffman and Novak, 1996). Traditionally, effective consumer learning is assumed to be a critical mediator of consumption and ascertained from cognitive, affective, and/or conative dimensions (Hutchinson and Alba, 1991; Lutz, 1975; Wright and Rip, 1980). Likewise, numerous techniques for measuring advertising effectiveness are intended to examine components of an ad from the same domains (Beerli and Santana, 1999; Ehrenberg, 1974; Lavidge and Steiner, 1961; MacInnis and Jarworski, 1989; Petty and Cacioppo, 1981).

Cognitive measures are used to determine the ability of an advertisement, physical product, or other marketing stimulus to attract attention and ultimately transfer information to memory. This element is fundamental in generating awareness, establishing product knowledge, and increasing comprehension of the brand name of any product. In addition, research has demonstrated that marketing communications are able to influence cognitive experiences associated with consumer learning (Braun, 1999; Hoch and Ha, 1986; Smith, 1993). Similarly, forms of interactive marketing communication that allow control over the flow of information, such as the 3-D visualization of products,

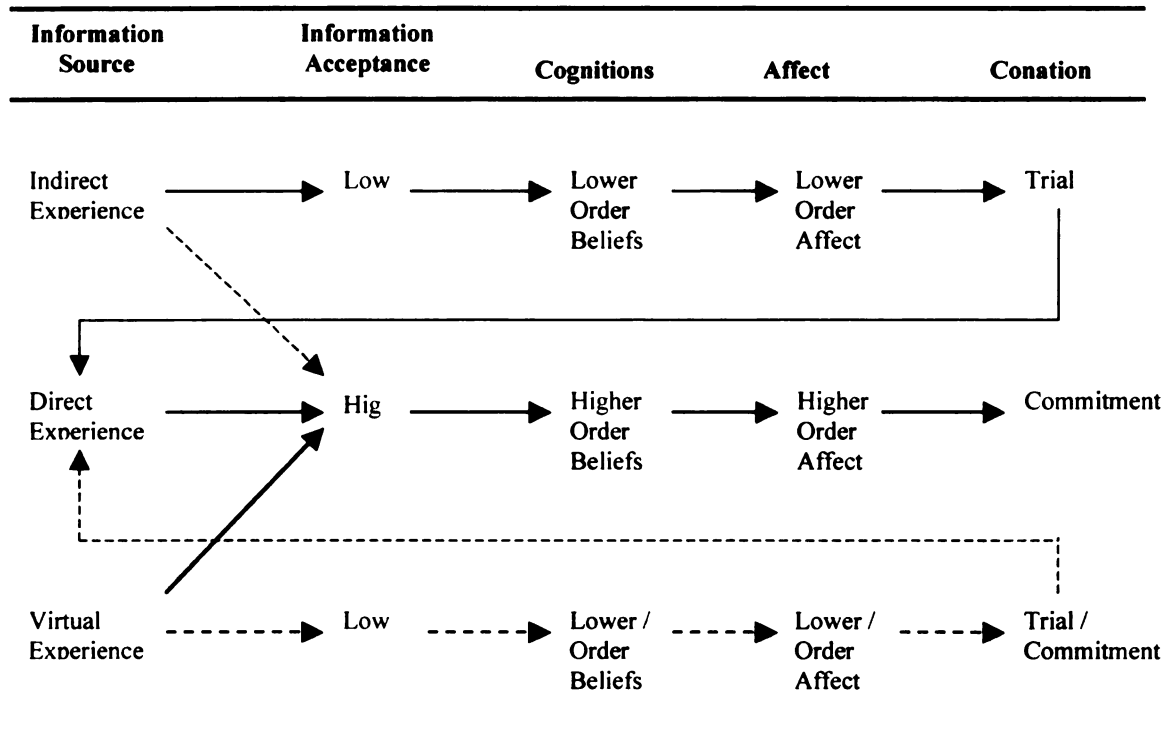
increase a consumer's cognitive ability to integrate, retain, and understand the information presented (Ariely, 2000; Hoffman and Novak, 1997).

Affective measures are used to identify either established and/or created attitudes from a marketing stimulus and/or direct product experience. The premise behind this measure is that advertisements and experiences which are the most pleasing and informative produce a positive transfer effect, and are better received among consumers (Mehta, 2000). Research has shown that consumer learning styles are influenced by attitudes (Mantel and Kardes, 1999) with attitude towards the brand serving as a commonly used effectiveness measure in advertising (Gardner, 1985; Lutz, 1985; Batra and Ray, 1986; Fazio, Powell and Williams, 1989; MacKenzie and Lutz, 1989). The assumption is often that attribute based comparisons between products are what influence consumer attitudes and decisions. However, in many instances an overall attitude-based evaluation involving intuitions, heuristics, and general impressions about a product or brand are made and relied upon in consumer decision making (Mantel and Kardes, 1999). Furthermore, the importance of attitudes and the relevant measures have been linked to evaluating the effectiveness of ecommerce sites (Chen and Wells, 1999).

Conative measures are used to anticipate a behavioral response resulting from a marketing stimulus and/or product experience. Within consumer learning, conative measures generally involve some type of behavioral intention, such as searching for additional information, or purchase (Brucks, 1985; Hoch and Ha, 1986; Levin and Gaeth, 1988). This method commonly involves asking subjects to evaluate stimulus material and then indicate a behavioral response. The most widely used conative measure in

advertising effectiveness research is intention to purchase (Beerli and Santanal, 1999; Andrews et. al., 1992).

Figure 2. Integrated Information Response Model Incorporating Virtual Experience



Li, Daugherty and Biocca (2001b) empirically tested the impact of consumer learning on 3-D interactive advertising in an ecommerce environment and found that consumer learning, measured from the cognitive, affective, and conative domains, is enhanced when visual and behavioral affordances are appropriately simulated for the right product. As a result, these characteristics of 3-D product visualization are likely to further promote consumer learning. Biocca, Daugherty, and Li (2001) extended these findings and verified that a virtual experience increases the sense of presence compared

to indirect experience. Furthermore, the results support the overall proposition that a positive relationship exists between presence and the cognitive, affective, and conative effectiveness measures.

While comparing the individual differences between indirect, virtual and direct experience is an important first step, previous research on 3-D product visualization and virtual experience has failed to consider the influence of sequential exposure relative to indirect experience and direct experience. Nevertheless, the sequence of exposure for product experience has been shown to impact consumer learning (Marks and Kamins, 1988; Kempf and Smith, 1998; Smith, 1993; Smith and Swinyard, 1983). More specifically, indirect experience preceding direct experience is more influential than if direct experience precedes indirect experience (Marks and Kamins, 1988; Moore and Lutz, 2000; Smith and Swinyard, 1983; Smith, 1993). Essentially, the predisposition created by advertising is reinforced by product trial elevating consumer learning. However, when product trial precedes advertising the confidently held higher order beliefs formed from direct experience overshadow the indirect experience, limiting the overall evaluation. From an advertising perspective, the theoretical sequence of exposure enhancing consumer learning the most occurs when indirect experience precedes direct experience, and as a result this sequence of exposure will serve as the basis of comparison for this research.

- H1: Exposure to an indirect→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a direct→indirect experience sequence.

The purpose of this study is to expand the theoretical knowledge of consumer learning by testing the impact of virtual experience on sequence of exposure relative to



indirect and direct experience. Obviously, there are other factors that mediate this relationship, such as the type of advertising message (positive/negative), yet this initial step is to introduce virtual experience and measure the impact on consumer learning before manipulating additional variables.

Table 1 illustrates all of the possible paired combinations when supplementing virtual experience with indirect and direct experience. Furthermore, the diagonal cells 1, 5, and 9 symbolize sequences of exposure theoretically irrelevant for this study because they represent frequency of exposure of the same experience rather than the sequential interaction between indirect, direct and virtual experiences, which will not be manipulated.

Table 1. Sequences of Exposure

	Indirect Experience	Virtual Experience	Direct Experience
Indirect Experience	$I \rightarrow I^1$	$I \rightarrow V^2$	$I \rightarrow D^3$
Virtual Experience	$V \rightarrow I^4$	$V \rightarrow V^5$	$V \rightarrow D^6$
Direct Experience	$D \rightarrow I^7$	$D \rightarrow V^8$	$D \rightarrow D^9$

Assuming personal preferences are held constant, consumers are likely to perceive the examination of products in a virtual experience richer than indirect experience and closer to direct experience because of interactivity, vividness, involvement, presence and virtual affordances (Biocca, Li and Daugherty, 2001; Li,

Daugherty and Biocca, 2001a; 2001b; in press). Therefore, the impact of virtual experience on sequence of exposure will emulate the influence expected from a direct experience resulting in the following hypotheses.

- H2: Exposure to an indirect→direct experience sequence will result in no difference (a) in product knowledge, (b) brand attitude, and (c) purchase intent than exposure to an indirect→virtual experience sequence.
- H3: Exposure to a direct→indirect experience sequence will result in no difference (a) in product knowledge, (b) brand attitude, and (c) purchase intent than exposure to a virtual→indirect experience sequence.
- H4: Exposure to an indirect→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a virtual→indirect experience sequence.
- H5: Exposure to an indirect→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a direct→indirect experience sequence.
- H6: Exposure to an indirect→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a virtual→indirect experience sequence.

There has been a considerable amount of research supporting the proposition that cognitive, affective, and conative measures are influenced by repeated exposure from both direct experience and indirect experience (Batra and Ray, 1986; Cacioppo and Petty, 1979; Fazio et al., 1982; Mitchell and Olsen, 1977). For instance, Fazio et al. (1982) found that attitudes based on direct experience are more accessible from memory and more predictive of behavior when exposure is repeated. Research investigating the influence of advertising has also demonstrated positive influences associated with frequency of exposure (Berger and Mitchell, 1989; Sawyer, 1981). The overall

proposition is that repeated exposure in evaluative terms allows individuals to process more information thus influencing consumer learning. Berger and Mitchell (1989) demonstrated that exposure to a single direct experience resulted in more confidently held beliefs compared to a single indirect experience. Since virtual experience is theoretically closer to direct experience, any sequential exposure involving virtual and direct experience will increase consumer learning over sequences containing indirect experience because virtual experience emulates more closely a direct product experience, thus repeating exposure (see Table 2 for a complete summary of the hypotheses).

- H7: Exposure to a virtual→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a direct→indirect experience sequence.
- H8: Exposure to a direct→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a direct→indirect experience sequence.
- H9: Exposure to a virtual→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to an indirect→direct experience sequence.
- H10: Exposure to a direct→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to an indirect→direct experience sequence.
- H11: Exposure to a virtual→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a virtual→indirect experience sequence.
- H12: Exposure to a direct→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a virtual→indirect experience sequence.
- H13: Exposure to a virtual→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to an indirect→virtual experience sequence.

H14: Exposure to a direct→virtual experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to an indirect→virtual experience sequence.

H15: Exposure to a virtual→direct experience sequence will result in (a) greater product knowledge, (b) a more favorable brand attitude, and (c) elevated purchase intent than exposure to a direct→virtual experience sequence.

Table 2. Summary of Hypotheses

H	Sequences of Exposure	H	Sequences of Exposure	H	Sequences of Exposure
H1	$I \rightarrow D > D \rightarrow I$	H6	$I \rightarrow V > V \rightarrow I$	H11	$V \rightarrow D > V \rightarrow I$
H3	$I \rightarrow D \neq I \rightarrow V$	H7	$V \rightarrow D > D \rightarrow I$	H12	$D \rightarrow V > V \rightarrow I$
H4	$D \rightarrow I \neq V \rightarrow I$	H8	$D \rightarrow V > D \rightarrow I$	H13	$V \rightarrow D > I \rightarrow V$
H2	$I \rightarrow D > V \rightarrow I$	H9	$V \rightarrow D > I \rightarrow D$	H14	$D \rightarrow V > I \rightarrow V$
H5	$I \rightarrow V > D \rightarrow I$	H10	$D \rightarrow V > I \rightarrow D$	H15	$V \rightarrow D > D \rightarrow V$

## CHAPTER 4

### METHODOLOGY

In order to investigate the implications of virtual experience within the framework of consumer learning, the impact of sequence of exposure will be explored on the cognitive, affective, and conative domains. The study extends the existing knowledge of consumer learning by expanding on sequence of exposure to include the impact of virtual experience relatively paired with indirect and direct product experiences.

#### Experiment Design

To test the hypotheses, a between-subjects design was used with the type of product evaluation experience (indirect, direct and virtual) paired together and sequentially alternated resulting in six test conditions. Traditional advertising effectiveness measures corresponding with the affective, cognitive and conative domains, such as product knowledge, brand attitude, and purchase intent served as the dependent variables (Beerli and Santana, 1999; Ehrenberg, 1974; Lavidge and Steiner, 1961; MacInnis and Jarworski, 1989; Petty and Cacioppo, 1981).

An experimental design was selected for this study because the foremost goal is to test theoretical propositions while expanding the body of knowledge through theory construction. Therefore, the deductive and inductive testing of research hypotheses using an experimental design provides the greatest amount of control and explicative power. In addition, a between-subjects design was selected because it permits the manipulation of more than one independent variable while calculating the influence of each independent

variable separately. As a result, this type of analysis easily indicates the presence or absence of treatment effects within a single assessment.

### Participants

A total of 166 undergraduate students enrolled at a major Midwestern university participated in the experiment. The use of a student sample was deemed acceptable given the nature of the study and product. For instance, to test the effects of a virtual experience utilizing a 3-D product, participants were required to have prior computer knowledge and an understanding of Internet principles. Power analysis using the Pearson-Hartley charts indicates the sample size was adequate to detect significant effects at the .05 level with a power of .90 (Keppel, 1991, p.76).

### Independent Variables

The independent variables were manipulated as sequence of exposure involving a paired combination of indirect experience (mediated traditional print advertising), virtual experience (mediated interactive 3-D advertising), and direct experience (unmediated product trial). The paired combination of two out of the three types of experiences was essential to isolate and determine the impact of a virtual experience relative to indirect and direct product experiences. Furthermore, this method allows for comparisons across previous research testing the sequential impact of indirect and direct product experiences. The sequence of exposure was easily manipulated by alternating the order in which participants were exposed to the stimulus material. For instance, in the virtual experience participants evaluated the test product via two conditions: virtual-direct sequential

exposure or virtual-indirect sequential exposure. For the direct experience, participants also evaluated the test product via two conditions: direct-virtual sequential exposure or direct-indirect sequential exposure. In turn, participants evaluated the test product in the indirect experience condition via two methods: indirect-direct sequential exposure or indirect-virtual sequential exposure.

### Stimulus

#### *Product*

To investigate the sequential exposure of a virtual experience paired with either an indirect or direct product experience, the test product needed (1) to be effectively represented in each type of experience, (2) require participants to engage in information processing, (3) contain both search and experience attributes (3) and represent an impartial brand of interest. The first parameter stems from the need to minimize the differences between the stimulus materials in order to properly isolate the type of experience as the influencing variable. Thus, the presentation of the product needed to be as identical as possible throughout all of the conditions, with the only differences stemming from the inherent features of each experience.

The second parameter was necessary to engage the participants in active processing for evaluation of the test product. This is commonly achieved in consumer behavior research by manipulating product class or situational levels of involvement (Laczniak, Kempf and Muehling, 1999). Previous research investigating the impact of experience in consumer learning has indicated a higher level of involvement should produce more evaluative processes (Marks and Kamins, 1988; Smith and Swinyard,

1982). High involvement is defined as any product requiring extensive information gathering and problem solving from a consumer to make a purchase decision (Schiffman and Kanuk, 1997). Therefore, the key is to successfully identify a product requiring extensive cognitive processing.

The third requirement was important in order to balance the expected evaluation criteria to prevent biasing one type of experience over another. Numerous products were evaluated and considered (i.e., ring, watch, bedding material, computer, cellular telephone, headphones, cereal, etc.) prior to the selection of a digital video camera as the test product. A digital video camera was judge appropriate because it represents a high involvement purchase item that can be evaluated using both experience attributes (i.e., weight, size, visual clarity, etc.) and search attributes (i.e. price, warranty, special effect features, etc.). The fourth requirement was essential in order to minimize any preconceived response bias.

A pretest (n=76) identified a digital video camcorder as a suitable test product for the experiment. Using a six-item seven-point scale constructed from successfully tested items for determining levels of involvement (Zaichkowsky, 1985), participants were asked to rate the decision if they were going to purchase a digital video camcorder (unimportant/important, of no concern, of concern to me, irrelevant/relevant, means a lot to me/means nothing, doesn't matter/matters to me, insignificant/significant to me) (see Appendix A). The results indicated that participants overall felt a digital video camcorder is slightly above-average in product purchase involvement ( $\bar{M} = 4.11$ ,  $SD = 1.11$ ) ( $\alpha = .90$ ). To increase the legitimacy of the study, a reputable digital video camcorder company (Panasonic) was selected and tested for preference against four



additional leading manufacturers (Sony, JVC, Canon, and Sharp). Participants were asked to rate the perceived quality of each of the aforementioned digital video camcorder brands using a seven-point scale (low quality/high quality). Pretest results showed that Sony ( $M = 6.04$ ,  $SD = 1.03$ ) and Canon ( $M = 5.16$ ,  $SD = 1.06$ ) were perceived as the two highest quality brands of digital video camcorders presented with Panasonic ( $M = 4.88$ ,  $SD = 1.18$ ) rated slightly ahead of Sharp ( $M = 4.59$ ,  $SD = 1.40$ ) and JVC ( $M = 4.33$ ,  $SD = 1.41$ ).

### *Materials*

The first step in developing the stimulus materials was to identify salient product attributes using a free-elicitation technique recommended by Fishbein and Ajzen (1975) and common in consumer learning research (Kempf and Smith, 1998; Smith, 1993). During the pretest, participants were asked to write down the most important product attributes they would consider when buying a digital video camcorder. A total of 27 different attributes were listed with an average of 5.18 per participant. Price was the most salient attribute listed (70%) followed by size and weight (66%), special effects such as zoom (47%), quality (43%), ease of use (41%), brand name (38%), warranty (38%), video clarity (36%), and battery length (24%).

The results of the free-elicitation technique were used to design the virtual, indirect, and direct experience stimulus materials. Because the purpose of the study was to isolate each experience and investigate the sequential impact of exposure, the message content served as a control with the information held constant across each experience. Furthermore, the message appeal was positively framed, using phrases such as “crystal

clear detail” and “easy to use functionality,” and combined with an informative approach derived from the pretest of salient attributes. In addition, the Panasonic logo, slogan and graphic image of the product were placed in identical locations throughout the stimuli.

However, there are inherent differences associated with each experience that distinguish the stimuli. The 3-D product Web site, representing the virtual experience, provided the ability to rotate and control product movement from all angles, allowed users to zoom-in and out for detailed inspection, used animation to simulate movement of the LCD display, and identified each component as the mouse moved over the product. Each of these interactive features was identified from previous research as creating an effective virtual experience (Li, Daugherty and Biocca 2001a; 2001b, in press).

For the indirect experience, a professionally produced two-page full spread four-color print advertisement identical in layout and content as the Web site was constructed. The full spread format was used because it allowed for the most accurate layout and ratio of space between the text and visual elements of the virtual and indirect stimulus material. Finally, the direct experience allowed the full sensory inspection of the digital video camcorder. In order to remain consistent across stimuli, the physical product was presented along with the exact information as each of the previous experiences using the magazine ad (minus the product image) as a point-of-purchase display.

### Procedure

The study was conducted in a laboratory setting with participants randomly assigned to one of the six experimental conditions: (1) indirect-direct sequence, (2) indirect-virtual sequence, (3) direct-indirect sequence, (4) direct-virtual sequence, (5)

virtual-indirect sequence, and (6) virtual-direct sequence. In addition, a strict protocol was scripted and followed to minimize external influence and ensure consistency (see Appendix B). The study began with the administration of a short survey designed to collect background information on each participant (see Appendix C). Once the survey was completed, participants were escorted by a research assistant into a large laboratory and seated in an area designed for the appropriate experience corresponding to their assigned condition. For illustrative purposes, only the virtual-direct experience sequence condition is described in detail. Participants were instructed that the purpose of the study was to record their evaluation of the product and to thoroughly examine the web site for the video camcorder in order to determine how they think and feel about the product. In addition, brief navigation instructions were given to explain how to interact with the product. While participants were isolated and could not view alternative experiences, they could view a second participant in the same experience but were instructed not to communicate with one another. In order to minimize overexposure of one type of experience yet provide enough duration not to hinder the inherent advantages associated with direct and virtual experiences, examination times were restricted to five minutes. Following the virtual experience, research assistants escorted participants to the second experience station depending on their condition, which is direct experience in this example. Approximately two to three minutes elapsed between the time a participant exited the first experience until beginning the second experience. Participants were again instructed to take the next five minutes to thoroughly examine the video camcorder to determine how they think and feel about the product. In addition, they were told that upon completion of their examination they would be asked to complete a survey to record

their evaluation. This served to prime participants to engage in cognitive processing and is consistent with previous indirect-direct experience studies (Kempf and Smith, 1998). After the five-minute examination time, participants were asked to complete a questionnaire containing the dependent measures (see Appendix D). This procedure was followed identically for all of the remaining sequential exposure conditions.

### Dependent Measures

The dependent variables of the study (product knowledge, brand attitude, and purchase intention) were measured using a self-reported questionnaire including both seven-point semantic differential and Likert-type items. Furthermore, additional exploratory items were included but not analyzed in this study.

#### *Product Knowledge*

An established three-item scale was used to assess participants' self-reported product knowledge (Smith and Park, 1992). More specifically, participants were asked to indicate their agreement (Strongly Disagree/Strongly Agree) regarding how knowledgeable they felt about the product, the amount of additional information they would need to make a purchase decision, and a quality judgment of the product using seven-point Likert-type items. While Smith and Park's (1992) original scale included a fourth item, previous research indicated low reliability resulting in exclusion of the item in this study (Li, Daugherty and Biocca, 2001b; Biocca, Daugherty and Li, 2001).

### *Brand Attitude*

Overall brand attitude was assessed using a reliably proven and valid six-item scale common in advertising effectiveness measurement (Bruner, 1998). Participants were asked to indicate how they feel about the product using seven-point semantic differential items (bad/good, unappealing/appealing, unpleasant/pleasant, unattractive/attractive, boring/interesting, dislike/like).

### *Purchase Intention*

Purchase intent is a common effectiveness measure and often used to anticipate a response behavior. In fact, the method of asking participants to evaluate an advertisement or product and then indicate an intention is prevalent throughout the literature (Andrews et al., 1992; Cho, 1999; Beerli and Santana, 1999; Petty, Cacioppo and Schumann, 1983). Thus, an established four-tem seven-point semantic differential scale (unlikely/likely, improbable/probable uncertain/certain, definitely/definitely not) was used to measure the likelihood that participants would purchase the evaluated product (Bearden, Lichtenstein and Teel, 1984).

### Manipulation Checks

Prior to exposure to the stimulus materials, the first questionnaire administered was also designed to measure participant involvement with the product and prior brand preference. Using the same six-item seven-point product involvement scale as in the pretest, participants were asked to evaluate the personal relevance of the product (unimportant/important, of no concern/of concern to me, irrelevant/relevant, means a lot

to me/means nothing, doesn't matter/matters to me, insignificant/significant to me). In order to determine if any personal preferences existed for the product, a seven-point Likert-type item was used to assess the perceived quality of the product (low quality/high quality). As a result, participants were asked to rate the perceived quality of the test brand and four additional leading digital video camcorder brands (Sony, JVC, Panasonic, Canon and Sharp). Because the pretest indicated price as the most salient attribute, a three-item scale designed to measure the perceived value of the test product was included along with the dependent variables. Participants were asked to rate their level of agreement (strongly disagree/strongly agree) towards positive statements indicating the product was a fair price, worth the money and a great deal (Urbany, Bearden and Weilbaker, 1988).

## CHAPTER 5

### RESULTS

#### Data Analysis

Participants ( $n=166$ ) were recruited from introductory communication courses at a large Midwestern university and included a diverse number of academic majors. The sample consisted of 84 women (50.6%) and 82 men (49.4%) with an average age of 21.8 ( $SD = 2.35$ ). In addition, the majority of participants were upper classmen including 108 seniors (65.1%), 43 juniors (25.9%), 12 sophomores (7.2%) and 3 freshmen (1.8%).

Results of the involvement measure indicated that participants overall felt the digital video camcorder was personally relevant and a moderately involving product ( $M = 4.12$ ,  $SD = 1.12$ ) ( $\alpha = .93$ ). Consistent with the pretest, Sony ( $M = 6.09$ ,  $SD = .98$ ) and Canon ( $M = 5.33$ ,  $SD = 1.28$ ) were perceived as the two highest quality digital video camcorder brands with Panasonic ( $M = 5.10$ ,  $SD = 1.16$ ) rated slightly ahead of Sharp ( $M = 4.72$ ,  $SD = 1.30$ ) and JVC ( $M = 4.60$ ,  $SD = 1.12$ ).

All of the scales were tested for internal consistency and a specified factor structure based on theory-driven indicators using confirmatory factor analysis and found to be unidimensional (CFA) (Hunter and Gerbing, 1982). Furthermore, reliability assessment was conducted using Cronbach's Alpha with each scale exceeding the generally accepted guideline of .70 (Hair, Anderson, Tatham and Black, 1998, p.118) (see Table 3). Composite measures for each of the scales were then constructed to represent the multiple items and used in the subsequent analysis to reduce measurement error.

In order for the univariate test procedures to be valid, the dependent variables must meet several criteria: (1) all observations must be independent, (2) the variables must be normally distributed and (3) the variances of all conditions must be equal (Keppel, 1991, p.95). The independence assumption was met through random assignment of each participant into one of the six treatment conditions. As a result, cells were adequately balanced with I→D and D→I sequential exposure conditions containing 27 participants each followed by 28 each in the I→V, V→I, V→D, and D→V conditions. Visual examination of Q-Q plots for the dependent variables of each condition as well as the Kolmogorov-Smirnov statistical test indicated normality of the data is a reasonable assumption (see Table 4). In turn, results of the Levene test for homoscedasticity confirm there are no significant differences of variance for brand attitude ( $F(5,160) = .95, p > .05$ ), product knowledge ( $F(5,160) = 1.86, p > .05$ ), and purchase intention ( $F(5,160) = 1.19, p > .05$ ), across conditions.

Table 3. Mean, Standard Deviation, and Cronbach Alpha Coefficients for Scales

Variable	Mean	Std. Dev.	$\alpha$
Product Involvement	4.12	1.12	.93
Product Knowledge	4.25	1.18	.74
Brand Attitude	4.81	1.27	.94
Purchase Intention	3.13	1.25	.87

### Hypothesis Testing

The results show significant main effects for product knowledge,  $F(5,165) = 3.04, p < .05, \eta^2 = .09$ , brand attitude,  $F(5,165) = 16.52, p < .01, \eta^2 = .34$ , and purchase



intention,  $F(5,165) = 2.66, p < .05, \eta^2 = .08$ , suggesting the dependent measures were affected differently across the treatment conditions. Furthermore, participants indicated the highest level of product knowledge when exposed to a direct experience preceding a virtual experience ( $M = 4.63, SD = 1.24$ ) (see Table 5). However, exposure to a virtual experience preceding both indirect ( $M = 5.48, SD = .92$ ) and direct ( $M = 5.55, SD = .97$ ) experiences accounted for the strongest impact on brand attitude. Subsequently, participants exposed to a virtual experience preceding an indirect experience ( $M = 3.58, SD = 1.36$ ) indicated they were more likely to purchase the test product (see Figure 3).

Univariate contrast comparisons were conducted to test the proposed hypotheses. The first set of planned contrasts tested the effect of a virtual experience when replacing an indirect or direct product experience on each of the dependent variables. Previous research has established that the theoretical sequence of exposure enhancing consumer learning the most occurs when indirect experience precedes direct experience (Marks and Kamins, 1988; Moore and Lutz, 2000; Smith and Swinyard, 1983; Smith, 1993). Therefore, the first set of hypotheses simply predicted this relationship.

The results presented in Table 6 show that participants felt more knowledgeable and brand attitude was more favorable when exposed to an indirect→direct sequence rather than a direct→indirect sequence, supporting H1a and H1b. However, H1c was rejected as participants indicated they were significantly more likely to purchase the product after exposure to a direct→indirect sequence than the hypothesized indirect→direct sequence.

Table 4. Dependent Variable Test of Normality

Variable Condition	Statistic	df	p <
<b>Product</b>			
<b>Knowledge</b>			
I→D	.153	27	.11
D→I	.153	27	.11
I→V	.155	28	.08
V→I	.128	28	.20
V→D	.124	28	.20
D→V	.119	28	.20
<b>Brand</b>			
<b>Attitude</b>			
I→D	.097	27	.20
D→I	.145	27	.16
I→V	.148	28	.12
V→I	.114	28	.20
V→D	.121	28	.20
D→V	.154	28	.09
<b>Purchase</b>			
<b>Intention</b>			
I→D	.092	27	.20
D→I	.134	27	.20
I→V	.102	28	.20
V→I	.117	28	.20
V→D	.114	28	.20
D→V	.128	28	.20

Figure 3. Product Knowledge, Brand Attitude and Purchase Intention across Sequential Exposure Conditions

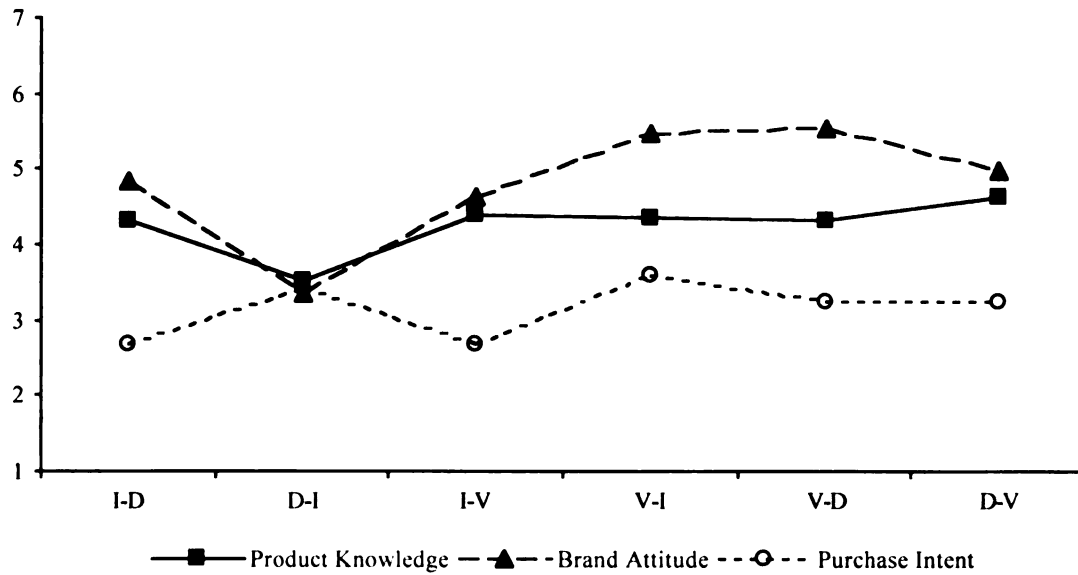


Table 5. Dependent Variable Descriptive Statistics for each Treatment Condition

	Sequential Exposure					
	I→D	D→I	I→V	V→I	V→D	D→V
<b>Product Knowledge</b>						
Mean	4.31	3.51	4.38	4.36	4.31	4.63
St. Deviation	1.25	1.26	1.12	1.18	.75	1.24
<b>Brand Attitude</b>						
Mean	4.83	3.31	4.64	5.48	5.55	4.97
St. Deviation	1.19	1.09	1.04	.92	.97	1.04
<b>Purchase Intention</b>						
Mean	2.67	3.39	2.67	3.58	3.23	3.22
St. Deviation	1.05	1.24	1.21	1.36	1.04	1.38

Based on the proposition that a virtual experience will function more closely as a direct experience, the second set of hypotheses predicted an indirect→direct exposure sequence should result in no differences in product knowledge, brand attitude, or purchase intention than an indirect→virtual exposure sequence. The results indicate that there were no significant differences detected for the dependent variables supporting H2a, H2b and H2c.

Similarly, hypothesis set three states there should be no differences in product knowledge, brand attitude, or purchase intention when participants experience a direct→indirect exposure sequence versus a virtual→indirect exposure sequence. However, the results show that participants indicated significantly greater product knowledge and more favorable brand attitudes when examining the product in a virtual→indirect sequence compared to a direct→indirect sequence causing H3a and H3b to be rejected. The findings indicate no significant differences between a direct→indirect exposure sequence and a virtual→indirect exposure sequence for purchase intention supporting H3c.

Maintaining the assumption that a virtual experience emulates the influence expected from direct experience, the impact on the dependent variables for an indirect→direct sequence and an indirect→virtual sequence should be stronger than a virtual→indirect sequence and direct→indirect sequence. For the fourth set of hypotheses, the results demonstrate the opposite of the predicted relationships. Participants indicated they felt marginally more knowledgeable after exposure to the virtual→indirect sequence relative to the indirect→direct sequence. Furthermore, brand attitude and purchase intention were significantly greater when participants experienced

the virtual→indirect sequence compared to the indirect→direct sequence. Thus, H4a, H4b, and H4c were rejected.

Table 6. Contrast Comparisons for Sequential Exposure Conditions for H1 through H6

	Independent Variables							
	I→D	D→I	I→V	V→I	V→D	D→V	F	p <
Product Knowledge								
H1a	4.31	3.51	-	-	-	-	6.6	.02
H2a	4.31	-	4.38	-	-	-	.05	.86
H3a	-	3.51	-	4.36	-	-	7.5	.00
H4a	4.31	-	-	4.36	-	-	.02	.88
H5a	-	3.51	4.38	-	-	-	8.0	.00
H6a	-	-	4.38	4.36	-	-	.00	.94
Brand Attitude								
H1b	4.83	3.31	-	-	-	-	28.	.00
H2b	4.83	-	4.64	-	-	-	.42	.51
H3b	-	3.31	-	5.48	-	-	59.	.00
H4b	4.83	-	-	5.48	-	-	5.4	.03
H5b	-	3.31	4.64	-	-	-	22.	.00
H6b	-	-	4.64	5.48	-	-	9.0	.00
Purchase Intention								
H1c	2.67	3.39	-	-	-	-	4.7	.04
H2c	2.67	-	2.67	-	-	-	.00	.99
H3c	-	3.39	-	3.58	-	-	.33	.56
H4c	2.67	-	-	3.58	-	-	7.6	.00
H5c	-	3.39	2.67	-	-	-	4.7	.04
H6c	-	-	2.67	3.58	-	-	7.7	.00

The results of the fifth set of hypotheses show that product knowledge and brand attitude were greater when participants were exposed to an indirect→virtual exposure sequence compared to a direct→indirect sequence, supporting H5a and H5b. However, hypothesis H5c was rejected because participants indicated they were significantly more likely to purchase the product after exposure to a direct→indirect sequence than the hypothesized indirect→virtual sequence.

Hypothesis set six predicted that an indirect→virtual exposure sequence would have a stronger positive impact on the dependent variables than a virtual→indirect exposure sequence. The results indicate that participants perceived no significant differences for product knowledge across the indirect→virtual sequence compared to the virtual→indirect with only marginal directional support. In contrast, significant differences for brand attitude and purchase intention were detected in the opposite direction meaning participants perceived the test product as more favorable and indicated they were more likely to purchase after a virtual→indirect exposure sequence rather than an indirect→virtual exposure sequence. Hence, H6a, H6b, and H6c were rejected.

The next set of hypotheses are based on the proposition that sequential exposure involving the combination of a virtual and direct experience will increase consumer learning because virtual experience behaves more like product trial, and repeated exposure in evaluative terms allows individuals to process more information (Berger and Mitchell, 1989; Fazio et al., 1982). Hypothesis set seven states that a virtual→direct exposure sequence will result in greater product knowledge, more favorable brand attitudes, and elevated purchase intent over a direct→indirect exposure sequence. The results verify that product knowledge and brand attitude were higher for participants in

the virtual→direct sequence than in the direct→indirect exposure sequence supporting H7a and H7b (see Table 7). However, H7c was rejected because the mean scores were opposite the predicted direction for purchase intention, with participants indicating they were marginally more likely to purchase after exposure to a direct→indirect rather than a virtual→direct sequence. No statistical significance differences were detected.

For hypothesis set eight, exposure to a direct→virtual sequential experience was predicted to have a greater impact on product knowledge, brand attitude and purchase intention than a direct→indirect sequence. The combination of a virtual with direct experience resulted in participants reporting increased product knowledge and more favorable brand attitudes over a virtual→indirect sequence supporting H8a and H8b. However, H8c was again rejected because the mean values were opposite the predicted direction as participants indicated they were more likely to purchase the product after a virtual→indirect sequence than a direct→virtual exposure.

The next set of hypotheses state that exposure to a virtual→direct experience sequence will increase product knowledge, brand attitude and purchase intention above an indirect→direct sequence. Contrast comparisons support the prediction for brand attitude (H9b), as well as provide marginal support for purchase intention (H9c), with a virtual→direct sequence positively influencing participants over an indirect→direct sequence. Yet, participants literally reported no differences between the two conditions pertaining to how knowledgeable they felt about the product and H9a was rejected.

By simply reversing the sequential exposure combination of virtual and direct experiences, the tenth set of hypotheses assert that a direct→virtual experience sequence will result in greater product knowledge, more favorable brand attitudes and elevated

purchase intention than an indirect→direct sequence. While product knowledge and brand attitude did not statistically differ across the treatment conditions, the means were in the hypothesized direction. Nevertheless, statistical analysis indicates that only purchase intention is marginally elevated after a direct→virtual experience relative to an indirect→direct experience. Therefore, H10a, H10b, and H10c are rejected.

Exposure to a virtual→direct experience sequence was predicted by hypotheses set eleven to increase product knowledge, brand attitude, and purchase intent over a virtual→indirect sequence. Again, the premise is that the combinations of virtual and direct experiences together serve as repeated exposures since a virtual experience follows more closely with product trial. The findings reveal that no significant differences were detected between a virtual→direct sequence and a virtual→indirect sequence for any of the dependent measures, leading to the rejection of H11a, H11b, and H11c. While the observed mean values for purchase intention were in the hypothesized direction, surprisingly the direction reversed with participants indicating higher levels of product knowledge and brand attitude after exposure to the virtual→indirect sequence.



Table 7. Contrast Comparisons for Sequential Exposure Conditions for H7 through H15

	Independent Variables							
	I→D	D→I	I→V	V→I	V→D	D→V	F	p<
Product Knowledge								
H7a	-	3.51	-	-	4.31	-	6.7	.01
H8a	-	3.51	-	-	-	4.63	13.	.01
H9a	4.31	-	-	-	4.31	-	.00	.99
H10a	4.31	-	-	-	-	4.63	1.0	.30
H11a	-	-	-	4.36	4.31	-	.02	.88
H12a	-	-	-	4.36	-	4.63	.79	.37
H13a	-	-	4.38	-	4.31	-	.05	.82
H14a	-	-	4.38	-	-	4.63	.66	.42
H15a	-	-	-	-	4.31	4.63	1.1	.30
Brand Attitude								
H7b	-	3.31	-	-	5.55	-	65.	.00
H8b	-	3.31	-	-	-	4.97	34.	.00
H9b	4.82	-	-	-	5.55	-	6.6	.02
H10b	4.82	-	-	-	-	4.97	.25	.61
H11b	-	-	-	5.48	5.55	-	.06	.80
H12b	-	-	-	5.48	-	4.97	3.3	.06
H13b	-	-	4.64	-	5.55	-	10.	.00
H14b	-	-	4.64	-	-	4.97	1.3	.24
H15b	-	-	-	-	5.55	4.97	4.3	.04
Purchase Intention								
H7c	-	3.39	-	-	3.23	-	.22	.64
H8c	-	3.39	-	-	-	3.22	.25	.62
H9c	2.67	-	-	-	3.23	-	2.9	.08
H10c	2.67	-	-	-	-	3.22	2.8	.09
H11c	-	-	-	2.67	3.23	-	1.1	.29
H12c	-	-	-	2.67	-	3.22	1.1	.28
H13c	-	-	3.58	-	3.23	-	2.9	.08
H14c	-	-	3.58	-	-	3.22	2.8	.09
H15c	-	-	-	-	3.23	3.22	.00	.99

To test the twelfth set of hypotheses, product knowledge, brand attitude and purchase intention comparisons were made between participants exposed to a direct→virtual exposure sequence and a virtual→indirect sequence. While the mean values for product knowledge and purchase intention are in the predicted direction, no significant differences were detected between evaluations made following a direct→virtual exposure sequence versus a virtual→indirect sequence. Surprisingly, a moderately significant difference was detected for brand attitude except the direction supported the virtual→indirect exposure sequence rather than the predicted direct→virtual sequence. Thus, H12a, H12b, and H12c were rejected.

Hypothesis set thirteen predicts that a virtual→direct experience sequence will result in elevated product knowledge, more favorable brand attitude, and increased purchase intention among participants than when exposure to an indirect→virtual sequence. However, participants indicated they felt slightly more knowledgeable after the indirect→virtual sequence rather than the hypothesized virtual→direct exposure sequence. While the difference in direction should be noted for rejecting H13a, the value is marginal resulting in a lack of significance. Participants on the hand reported significantly higher levels of brand attitude for the virtual→direct experience exposure sequence than the indirect→virtual sequence supporting H13b. Possibly a more interesting finding is the marginal significance for increased purchase intention after exposure to an indirect→virtual exposure sequence rather than the proposed virtual→direct sequence. Thus, H13c was rejected.

The fourteenth set of hypotheses reversed the combination of direct and virtual experiences to predict that a direct→virtual experience sequence would positively impact

product knowledge, brand attitude and purchase intention over the indirect→virtual sequence. The data however failed to support H14a, H14b, or H14c. The effect on product knowledge and brand attitude, as indicated by the mean values, was in the hypothesized direction yet not statistically strong enough to be considered significant. In contrast, marginal support was detected in the opposite direction for participants indicating they are more likely to purchase the test product after exposure to an indirect→virtual experience sequence rather than the hypothesized direct→virtual sequence.

Finally, the fifteenth set of hypotheses state that a virtual→direct experience sequence heighten product knowledge, increase brand attitude and elevate purchase intention above a direct→virtual experience sequence. While both include the benefit of repeated exposure from the combination of virtual and direct experiences, the predisposition created by the exposure of a virtual experience first should be reinforced by the direct experience increasing the evaluation. The results provide partial support for the set of hypotheses. Higher levels of product knowledge were reported for the direct→virtual exposure sequence rather than the virtual→direct sequence, which is opposite the predicted direction resulting in the rejection of H15a. However, participants reported higher levels of brand attitude after evaluating the test product in the virtual→direct exposure sequence contrasted to the direct→virtual sequence, supporting H15b. Hypothesis 15c was rejected because there were essentially no reported differences in levels of purchase intention across the two treatment conditions.

### Post Hoc Analysis

Further analysis of the data reaffirms the unexpected results regarding purchase intention. In addition, the finding of no relationship for purchase intention between product knowledge or brand attitude signifies an unforeseen discrepancy considering all three are highly correlated with product value (see Table 8). While the value of any product can depend on a number of factors, the most salient product attribute indicated from the pretest was price. Since the product value scale used in the data collection primarily focused on price (fair price/worth the money/great deal), analysis of covariance was conducted controlling for participants' perceived product value.  $F(5,165) = 5.85$ ,  $p < .05$ ,  $\eta^2 = .18$ .

Finally, a virtual experience appears to be driving a first order effect. Table 9 demonstrates that the average scores for the dependent variables are higher when a virtual experience precedes either an indirect or direct experience compared to when an indirect or direct experience sequence is examined first. In contrast, the average scores are slightly higher when a direct experience follows either an indirect or virtual experience.

Table 8. Correlation Matrix of Dependent and Manipulation Check Variables

	Brand Attitude	Purchase Intention	Product Involv.	Brand Pref.	Product Value
Product Knowledge	.37**	-.006	.32**	-.20*	.19*
Brand Attitude		.14	.06	-.01	.49**
Purchase Intention			.32**	.23*	.34**
Product Involvement				-.02	.17*
Brand Preference					.06

\*\*  $p < .05$  \*  $p < .01$

Table 9. Sequential Order Effect for Indirect, Virtual and Direct Experience

Order	Sequence	Product Knowledge	Brand Attitude	Purchase Intention	Mean
First	I → D	4.31	4.83	2.67	3.93
	I → V	4.38	4.64	2.67	3.89
	V → I	4.36	5.48	3.58	4.47
	V → D	4.31	5.55	3.23	4.37
	D → I	3.51	3.31	3.39	3.40
	D → V	4.63	4.97	3.22	4.27
	D → I	3.51	3.31	3.39	3.40
	V → I	4.36	5.48	3.58	4.47
Second	I → V	4.38	4.64	2.67	3.89
	D → V	4.63	4.97	3.22	4.27
	I → D	4.31	4.83	2.67	3.93
	V → D	4.31	5.55	3.23	4.37
	D → I	3.51	3.31	3.39	3.40
	V → I	4.36	5.48	3.58	4.47

## CHAPTER 6

### SUMMARY AND CONCLUSIONS

#### Discussion

The purpose of this study was to expand the theoretical knowledge of consumer learning by testing the sequential impact of a virtual experience when paired with a direct or indirect experience. Rather than provide absolute evidence in support of a virtual product experience, this study extends our understanding of the cognitive, affective, and conative outcomes traditionally associated with consumer learning to include the combination of this new type of consumer experience.

Previous research has documented the theoretical sequential effect of indirect and direct product experience on consumer learning (Marks and Kamins, 1988; Moore and Lutz, 2000; Smith and Swinyard, 1983; Smith, 1993). The Integrated Information Response Model illustrates that exposure to forms of advertising generates lower order beliefs, which are then validated from positive trial resulting in higher order beliefs. Consumer knowledge, attitudes, and behavioral intentions formed through indirect experience are essentially reinforced by product trial elevating the previously formed lower order beliefs. However, when a positive direct experience via product trial precedes advertising, the beliefs formed from the trial diminish the impact of the indirect experience generated by advertising. As a result, the sequential impact of an indirect→direct experience on cognitive, affective, and conative measures is greater than the effect of a direct→indirect sequence. The results of this study largely support the

model for product knowledge and brand attitude yet fall short for predicting purchase intention.

As evident from the results presented in the preceding chapter, participants evaluating the test product attained higher order cognitive and affective beliefs from the indirect→direct sequential exposure combination than from the direct→indirect sequence. The positive information presented in the magazine ad prior to product trial served to increase participants' reported level of product knowledge and brand attitude. In contrast, when product trial preceded exposure to the magazine ad, product knowledge and brand attitude beliefs were significantly lower. These results support Smith and Swinyard's (1982) Information Integration Response Model of consumer learning. However, higher order cognitive and affective beliefs did not lead to conation as the model predicts. In fact, the findings were the exact opposite with higher levels of reported commitment occurring for the direct→indirect sequential exposure than indirect→direct exposure. Specifically, participants indicated they were significantly more likely to purchase the test product when the initial exposure was product trial rather than the magazine ad.

One possible explanation for this occurrence could be that the test product was perceived primarily as an experiential good. Previous research in consumer learning has indicated that product trial is more effective at influencing consumer behavior for experiential products with advertising serving as a more effective influence for search or information products (Wright and Lynch, 1995). However, this explanation seems unlikely when considering the results of the cognitive and affective measures.

A more plausible explanation is that the price of the test product exceeded the maximum cost participants were willing to pay for the product. Research investigating the impact of price on perceived product value has documented the importance of plausible reference prices in consumer behavior (Urbany, Bearden, and Weilbaker, 1988). While college students represent a more technologically inclined population familiar with digital video cameras, the perceived value of the test product more than likely exceed the reference price they were willing to pay, especially when you consider the most salient attribute reported in the pretest was price. The results of the post hoc analysis offer some support for this rationale yet additional research testing a reduced price for the test product is needed to confirm the explanation.

The principal purpose of the study was to expand the theoretical knowledge of consumer learning by testing the impact of virtual experience on sequence of exposure relative to indirect and direct experience. One proposition is that 3-D product evaluation in a virtual experience will be richer than indirect experience and closer to direct experience because of interactivity, vividness, involvement, presence and virtual affordances (Biocca, Li and Daugherty, 2001; Li, Daugherty and Biocca, 2001a; 2001b; in press). Therefore, a virtual experience was expected to emulate the behavior of direct experience resulting in the reinforcement of cognitive, affective, and conative measures for an indirect→virtual exposure sequence.

As previously reported, the results largely support the proposed model for product knowledge and brand attitude when participants were exposed to an indirect experience followed by a virtual experience compared to a direct→indirect sequence yet contradicts the expected hypothesized effect for purchase intention. This is evident since an



indirect→virtual exposure sequence resulted in higher levels of product knowledge and brand attitude compared to a direct→indirect sequence, with no significant differences compared to an indirect→direct exposure sequence. However, when a virtual experience preceded indirect experience, there were surprisingly no significant differences for reported product knowledge when compared to an indirect→direct sequence and brand attitude was actually significantly higher for the virtual→indirect sequence. The expected effect would result in an indirect→direct exposure sequence elevating product knowledge, increasing brand attitude, and influencing purchase intention over a virtual→indirect sequence yet this did not occur.

One possible explanation is that because a virtual experience incorporates elements of both indirect and direct experience, the combination of information cues and the simulation of sensory experience reinforce advertising effectiveness. Evidence of this effect could also be construed from the result that an indirect→virtual exposure sequence did not significantly increase product knowledge and brand attitude over a virtual→indirect sequence. While the means values were marginally higher in the hypothesized direction for product knowledge, reported brand attitude was actually significantly higher for the virtual→indirect sequence. Yet, because this effect was not seen for product knowledge more research is needed to confirm this finding.

There has been a considerable amount of research supporting the proposition that repeated exposure in evaluative terms allows individuals to process more information resulting in increases in cognitive, affective and conative measures (Berger and Mitchell, 1989; Mitchell and Olsen, 1977; Sawyer, 1981). The recurrent exposure involving direct experience is enhanced even stronger and more predictive of behavior over indirect

experience (Fazio et al., 1982). Therefore, because a virtual experience is theoretically closer to direct experience, any sequential exposure involving the combination of virtual and direct experiences together (i.e.  $V \rightarrow D$  or  $D \rightarrow V$ ) would increase consumer learning over all other sequential exposures. The study findings indicate partial support for this proposition. For instance, in terms of increasing product knowledge, a virtual  $\rightarrow$  direct sequence and a direct  $\rightarrow$  virtual sequence were only found to be significantly greater than a direct  $\rightarrow$  indirect exposure sequence. Since previous research has documented the value of advertising when evaluating search information oriented products (Wright and Lynch, 1995), perhaps increases in product knowledge would be greater for a virtual  $\rightarrow$  direct sequence when testing a more experientially driven product. However, in terms of increasing brand attitude, the strongest impact resulted primarily from the virtual  $\rightarrow$  direct exposure sequence. As one might expect, both the virtual  $\rightarrow$  direct sequence and direct  $\rightarrow$  virtual sequence resulted in more favorable brand attitudes than the direct  $\rightarrow$  indirect sequence. When compared with the indirect  $\rightarrow$  direct exposure sequence, a virtual  $\rightarrow$  direct sequence was perceived as increasing higher order brand attitude beliefs. While there were no significant differences for the direct  $\rightarrow$  virtual sequence compared to the indirect  $\rightarrow$  direct, the mean values were in the hypothesized direction. As expected, similar results were detected when comparing the virtual  $\rightarrow$  direct sequence and direct  $\rightarrow$  virtual sequence with the virtual  $\rightarrow$  indirect exposure sequence. A surprising finding though continues to be the comparison of treatment conditions with the virtual  $\rightarrow$  indirect experience. For instance, there were no significant differences detected between the virtual  $\rightarrow$  direct sequence and the virtual  $\rightarrow$  indirect sequence. Yet, when compared to the direct  $\rightarrow$  virtual exposure sequence a marginally significant finding was

detected but in the opposite direction with participants indicating more favorable brand attitudes for the virtual→indirect exposure sequence. The implications of these results strongly suggest a virtual experience combined with advertising could be considered as an alternative to product sampling for increasing brand attitudes but further research is needed to reaffirm these results. Of course, this could potentially represent some type of novelty or enjoyment effect. For purchase intention, there were marginally significant differences when comparing virtual→direct and direct→virtual sequences against an indirect→direct sequence. Furthermore, the indirect→virtual exposure sequence resulted in elevated purchase intentions compared to the virtual→direct and direct→virtual sequences; however these results should be interpreted with caution considering the aforementioned concerns regarding the price of the test product.

Fundamentally, the results of this study have established a virtual experience as an alternative consumer experience previously unexplored in consumer learning research. The data suggests that this new type of experience resembles more closely a direct product experience than a traditional indirect experience, such as a print advertisement. Theoretically, the increased visual sensory immersion and perceived control from examining a 3-D interactive product simulates the same sensory input expected when evaluating a physical product, under these test conditions. An important and interesting finding is that the sequential combination of a virtual experience exceeded the expected combination of indirect and direct experiences.

## Limitations

Inherent within any study are limitations that affect the overall validity and reliability of the results. With regard to this study, there are obvious limitations that should be considered when interpreting the research findings. One limitation is the use of a student sample in combination with conducting a laboratory experiment. This type of experiment restricts the external validity and should be kept in mind when interpreting the results. While strong consideration and planning took part in the selection of an appropriate test product, the use of a student sample combined with an expensive brand of digital camcorder more than likely influenced the behavior measure. Furthermore, the product category was selected because it matched the necessary virtual affordances as well as combined various experience attributes. However, the selection of different product categories incorporating more heavily search or experience attributes could impact the results. As a result, these findings are certainly not generalizable to all products and situations.

Another limitation is that Internet access and computer performance was controlled in this study with participants not exposed to the effects of slow download times or poor computer performance. Ordinary consumers using slower connections from a home computer may not spend as much time examining the product as subjects did in the lab. This could have an impact in reducing product learning and brand attitude.

## Conclusions

Taking into account the exploratory nature of this study, the primary purpose was not simply to provide absolute evidence in support of one type of sequential exposure

over another but rather to expand the body of knowledge and position virtual experience within consumer learning. The results provide moderate support for the proposition that consumers are able to learn from examining 3-D visual products in online ecommerce environments. Because marketers are capable of exerting influence over the consumer learning process (Hoch and Deighton, 1989), a virtual experience may extend product knowledge, affect brand attitude, and influence purchase by enhancing the online shopping experience. Furthermore, the verified relationship between cognitive, affective and conative effectiveness measures reinforces the need for marketers to consider the impact of indirect and direct sequential exposure to include a virtual product experience.

Consideration of these findings suggests that a virtual experience in combination with indirect or direct experience is capable of increasing product knowledge and influencing brand attitude over the direct→indirect sequence. While the impact of an indirect→direct sequence was not always statistically different than a virtual experience, this fact does not mean a sequential exposure involving a virtual experience is less effective. Based on this study, the results indicate that for product knowledge there were no differences between the indirect→direct exposure sequence with increases in brand attitude that show encouraging results. As a result, it is realistic to conclude that under these experimental conditions a virtual experience emulated the expected outcome from a direct product experience while exceeding it in some instances.

The ability to establish a virtual experience is not beyond the capabilities of ecommerce environments and technological conditions are almost ripe for advertisers and marketers to take advantage of this unique experience. Through continued research, the key is to fully develop and explore the psychological and emotional states created in a

virtual experience. By creating 3-D interactive products, marketers are able to provide consumers with a unique experience transcending traditional direct product inspection and surpassing in some instances inspection from traditional advertising. The underlying reason is that virtual experiences allow for vicarious learning because consumers are actively engaged in the inspection and control of a 3-D product rather than a passive observer common to more traditional forms of advertising.

To fully understand the impact of utilizing 3-D products in consumer learning, more theoretical research is needed designed to explore the unique and distinctive characteristics that separate virtual experience from other types of experiences. In addition, research designed to explore the impact of message content appeals, low involvement products, and alternative types of sensory immersion (auditory) are essential to fully understand the potential impact a virtual experience offers marketers. Finally, this study represents a single laboratory experiment into a new and relatively unexplored area. Therefore replications and extensions of this work are needed to verify and validate the results.

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## APPENDIX A

## APPENDIX A

### Pretest Survey

Completion of the survey will take approximately 15 minutes and your responses will remain anonymous. While you may refuse to participate at any time, you are indicating your voluntary agreement to participate by completing and returning this questionnaire. If you have any question about the survey and study please contact Terry Daugherty at (517) 355-8371, fax (517) 432-2589, [daughe13@msu.edu](mailto:daughe13@msu.edu). In addition, if you have questions about your rights and the use of human subjects in research please contact David Wright, phone (517) 355-2180, fax (517) 353-2976, [ucrihs@msu.edu](mailto:ucrihs@msu.edu). Thank you for your assistance!

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1. If you were planning on purchasing a digital video camcorder, how would you rate the evaluation of this product to you personally? As:

Unimportant	1	2	3	4	5	6	7	Important
Of no concern	1	2	3	4	5	6	7	Of concern to me
Irrelevant	1	2	3	4	5	6	7	Relevant
Means a lot	1	2	3	4	5	6	7	Means nothing
Doesn't matter	1	2	3	4	5	6	7	Matters to me
Insignificant	1	2	3	4	5	6	7	Significant to me

2. Please rate your perceived quality of the following digital video camcorder brands.

	Low Quality						High Quality
Sony	1	2	3	4	5	6	7
JVC	1	2	3	4	5	6	7
Canon	1	2	3	4	5	6	7
Panasonic	1	2	3	4	5	6	7
Sharp	1	2	3	4	5	6	7

## APPENDIX A - CONTINUED

3. Now imagine you are going to purchase a new digital video camcorder from a reputable company. This will be a significant purchase because you will be able to record all of the meaningful things in your life and because you expect the product to cost at least \$1,000. As a result of this purchase, please list the most important product attributes you would consider and evaluate in making your decision.

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## APPENDIX B

## APPENDIX B

### Experiment Protocol

1. Ask each participant to sign-in
2. Ask each participant to read and sign consent form
3. Assign subject to experimental condition (check appropriate ID number)

<u>Condition Code</u>	<u>ID #</u>	<u>Condition Code</u>	<u>ID #</u>
D-I	200, 201, etc.	D-V	600, 601, etc.
I-V	300, 301, etc.	I-D	100, 101, etc
V-D	500, 501, etc	V-I	400, 401, etc.

4. Read introduction and administer Survey A
5. Collect Survey A when all scheduled participants are finished and escort all participants together into the laboratory and corresponding starting condition.
6. Read instructions and begin experiment
7. After 5 minutes, ask participants if they have any questions and then proceed to the next experience appropriate for their condition.
8. After 5 minutes, ask participants if they have any questions. Then read instructions and administer Survey B.
9. Once everyone is finished with Survey B debrief participants and thank them for their participation.

## APPENDIX B - CONTINUED

### I-D Condition

The purpose of this study is to record your evaluation of the product in the Full Spread Magazine Advertisement (meaning two full pages)– a video camcorder. Please take the next few minutes to thoroughly examine the ad in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin

### D - I Condition

The purpose of this study is to record your evaluation of the product – a video camcorder. Please take the next few minutes to thoroughly examine the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the Full Spread Magazine Advertisement (meaning two full pages) for the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin

## APPENDIX B - CONTINUED

### I - V Condition

The purpose of this study is to record your evaluation of the product in the Full Spread Magazine Advertisement (meaning two full pages)– a video camcorder. Please take the next few minutes to thoroughly examine the ad in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the web site for the video camcorder in order to determine how you think and feel about the product.

### Navigation Instructions

There are three special features at your disposal to examine the product:

- (1) To rotate the camcorder click and hold down the left mouse button while moving the mouse in any desired direction.
- (2) To zoom in or out click and hold down the right mouse button while either pulling the mouse towards you or pushing the mouse further away from your body.
- (3) There are also information cues that tell you the components of the camera when you move the mouse over them and you can even open the LCD display on the side of the camera by clicking on it.

You may also open the LCD display on the side of the camcorder by clicking on it.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin

## APPENDIX B - CONTINUED

### V-I Condition

The purpose of this study is to record your evaluation of the product in web site—a video camcorder. Please take the next few minutes to thoroughly examine the web site for the video camcorder in order to determine how you think and feel about the product.

### Navigation Instructions

There are three special features at your disposal to examine the product:

- (1) To rotate the camcorder click and hold down the left mouse button while moving the mouse in any desired direction.
- (2) To zoom in or out click and hold down the right mouse button while either pulling the mouse towards you or pushing the mouse further away from your body.
- (3) There are also information cues that tell you the components of the camera when you move the mouse over them and you can even open the LCD display on the side of the camera by clicking on it.

You may also open the LCD display on the side of the camcorder by clicking on it.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the Full Spread Magazine Advertisement (meaning two full pages) for the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin



## APPENDIX B - CONTINUED

### V-D Condition

The purpose of this study is to record your evaluation of the product in web site—a video camcorder. Please take the next few minutes to thoroughly examine the web site for the video camcorder in order to determine how you think and feel about the product.

### Navigation Instructions

There are three special features at your disposal to examine the product:

- (1) To rotate the camcorder click and hold down the left mouse button while moving the mouse in any desired direction.
- (2) To zoom in or out click and hold down the right mouse button while either pulling the mouse towards you or pushing the mouse further away from your body.
- (3) There are also information cues that tell you the components of the camera when you move the mouse over them and you can even open the LCD display on the side of the camera by clicking on it.

You may also open the LCD display on the side of the camcorder by clicking on it.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin.

## APPENDIX B - CONTINUED

### D-V Condition

The purpose of this study is to record your evaluation of the product – a video camcorder. Please take the next few minutes to thoroughly examine the video camcorder in order to determine how you think and feel about the product.

Do you have any questions?

I will be back in five minutes to give you additional instruction-begin.

(After five minutes ask participants to proceed to the next condition)

Now please take the next five minutes to thoroughly examine the web site for the video camcorder in order to determine how you think and feel about the product.

### Navigation Instructions

There are three special features at your disposal to examine the product:

(1) To rotate the camcorder click and hold down the left mouse button while moving the mouse in any desired direction.

(2) To zoom in or out click and hold down the right mouse button while either pulling the mouse towards you or pushing the mouse further away from your body.

(3) There are also information cues that tell you the components of the camera when you move the mouse over them and you can even open the LCD display on the side of the camera by clicking on it.

You may also open the LCD display on the side of the camcorder by clicking on it.

Do you have any questions?

I will be back in five minutes to administer a survey designed to record your evaluation-begin.

## APPENDIX C

## APPENDIX C

### Survey A

The purpose of this questionnaire is to record background and preference information. Completion of the survey will take approximately 10 minutes and your responses will remain anonymous.

Thank you for your assistance!

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1. Please tell us about yourself:

Gender:                    ☐ female                    ☐ male

How old are you?       

What class are you?    ☐ freshman                    ☐ senior

☐ sophomore                    ☐ graduate student

☐ junior

2. Please indicate your level of agreement with the following statements about yourself.

	1	2	3	4	5	6	7
	Strongly Disagree					Strongly Agree	
When I feel happy, it is a strong type of exuberance.	1	2	3	4	5	6	7
I would prefer complex to simple problems.	1	2	3	4	5	6	7
My emotions tend to be more intense than those of most people.	1	2	3	4	5	6	7
I like to have the responsibility of handling a situation that requires a lot of thinking.	1	2	3	4	5	6	7
I get overly enthusiastic.	1	2	3	4	5	6	7
Thinking is not my idea of fun.	1	2	3	4	5	6	7
Sad movies deeply touch me.	1	2	3	4	5	6	7
I would rather do something that requires little thought than something that is sure to challenge my thinking.	1	2	3	4	5	6	7
When something good happens, I am usually much more jubilant than others.	1	2	3	4	5	6	7

## APPENDIX C - CONTINUED

	Strongly Disagree				Strongly Agree			
I try to anticipate and avoid situations where There is a likely chance I will have to think in depth.	1	2	3	4	5	6	7	
When I'm happy, I feel very energetic.	1	2	3	4	5	6	7	
I find satisfaction in deliberating hard and for long hours.	1	2	3	4	5	6	7	
When I succeed at something, my reaction is calm contentment.	1	2	3	4	5	6	7	
I only think as hard as I have to.	1	2	3	4	5	6	7	
When I do feel anxiety, it is normally very strong.	1	2	3	4	5	6	7	
I prefer to think about small, daily projects to long-term ones.	1	2	3	4	5	6	7	
When I am excited over something, I want to share my feelings with everyone.	1	2	3	4	5	6	7	
I like tasks that require little thought once I have learned them.	1	2	3	4	5	6	7	
My heart races at the anticipation of some exciting event.	1	2	3	4	5	6	7	
The idea of relying on thought to make my way to the top appeals to me.	1	2	3	4	5	6	7	
When I know I have done something very well, I feel relaxed and content rather than excited or elated.	1	2	3	4	5	6	7	
I really enjoy a task that involves coming up with new solutions to problems.	1	2	3	4	5	6	7	
When I'm happy, I bubble over with energy.	1	2	3	4	5	6	7	
Learning new ways to think doesn't excite me very much.	1	2	3	4	5	6	7	
When I accomplish something difficult, I feel delighted or elated.	1	2	3	4	5	6	7	

## APPENDIX C - CONTINUED

	Strongly Disagree					Strongly Agree	
I prefer my life to be filled with puzzles that I must solve.	1	2	3	4	5	6	7
Seeing a picture of some violent car accident in a newspaper makes me feel sick to my stomach.	1	2	3	4	5	6	7
The notion of thinking abstractly is appealing to me.	1	2	3	4	5	6	7
My negative moods are mild in intensity.	1	2	3	4	5	6	7
I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.	1	2	3	4	5	6	7
When I do something wrong I have strong feelings of shame and guilt.	1	2	3	4	5	6	7
I feel relief rather than satisfaction after completing a task that required a lot of mental effort.	1	2	3	4	5	6	7
When things are going good, I feel "on top of the world."	1	2	3	4	5	6	7
I usually end up deliberating about issues even when they do not affect me personally.	1	2	3	4	5	6	7

3. Please rate your perceived quality of the following video camcorder brands:

	Low Quality					High Quality	
Sony	1	2	3	4	5	6	7
JVC	1	2	3	4	5	6	7
Panasonic	1	2	3	4	5	6	7
Canon	1	2	3	4	5	6	7
Sharp	1	2	3	4	5	6	7

4. Rate your level of computer experience:

None						Expert
1	2	3	4	5	6	7

## APPENDIX D

## APPENDIX D

### Survey B

The purpose of this questionnaire is to record your evaluation of the product and experience you have just had. Completion of the survey will take approximately 10 minutes and your responses will remain anonymous.

Thank you for your assistance!

---

1. Your mood. Please reflect how you currently feel by marking an X on the most appropriate number.

Sad	:_____:	_____:	_____:	_____:	_____:	_____:	_____:	Happy
	1	2	3	4	5	6	7	
Bad mood	:_____:	_____:	_____:	_____:	_____:	_____:	_____:	Good mood
	1	2	3	4	5	6	7	
Irritable	:_____:	_____:	_____:	_____:	_____:	_____:	_____:	Pleased
	1	2	3	4	5	6	7	
Depressed	:_____:	_____:	_____:	_____:	_____:	_____:	_____:	Cheerful
	1	2	3	4	5	6	7	

2. Product knowledge. Indicate your level of agreement with the following statements by circling the most appropriate number.

	Strongly <u>Disagree</u>						Strongly <u>Agree</u>
I feel very knowledgeable about the product I just examined. ....	1	2	3	4	5	6	7
If I had to purchase the product today, I would need to gather very little information in order to make a wise decision. ....	1	2	3	4	5	6	7
I feel very confident about my ability to judge the quality of this product. ....	1	2	3	4	5	6	7



## APPENDIX D - CONTINUED

3. Product value. Indicate your level of agreement with the following statements by circling the most appropriate number.

	<u>Strongly Disagree</u>				<u>Strongly Agree</u>		
The product offer represents an extremely fair price. ....	1	2	3	4	5	6	7
At the price, this product is probably worth the money. ....	1	2	3	4	5	6	7
This product appears to be a great deal. ....	1	2	3	4	5	6	7

4. Product evaluation. For each of the items below, circle the number that best describes your overall feelings about the product you have evaluated.

Bad	1	2	3	4	5	6	7	Good
Unappealing	1	2	3	4	5	6	7	Appealing
Unpleasant	1	2	3	4	5	6	7	Pleasant
Unattractive	1	2	3	4	5	6	7	Attractive
Boring	1	2	3	4	5	6	7	Interesting
Dislike	1	2	3	4	5	6	7	Like

5. Certainty of your responses. How certain are you of the accuracy of the responses you gave in the previous question regarding your feelings toward the product?

Confident	: _____ : _____ : _____ : _____ : _____ : _____ : _____ :	Not confident
	1      2      3      4      5      6      7	
Not sure	: _____ : _____ : _____ : _____ : _____ : _____ : _____ :	Sure
	1      2      3      4      5      6      7	
Uncertain	: _____ : _____ : _____ : _____ : _____ : _____ : _____ :	Certain
	1      2      3      4      5      6      7	

## APPENDIX D - CONTINUED

**6. Product involvement.** How would you evaluate the relationship of this product to you?

Unimportant	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Important
		1		2		3		4		5		6		7						
Of no concern to me	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Of concern to me
		1		2		3		4		5		6		7						
Irrelevant	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Relevant
		1		2		3		4		5		6		7						
Means a lot to me	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Means nothing to me
		1		2		3		4		5		6		7						
Doesn't matter:	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Matters to me
		1		2		3		4		5		6		7						
Insignificant me	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	<u>      </u>	:	Significant to me
		1		2		3		4		5		6		7						

7. Purchase intention. How likely would you purchase this product?

Unlikely	1	2	3	4	5	6	7	Likely
Improbably	1	2	3	4	5	6	7	Probable
Uncertain	1	2	3	4	5	6	7	Certain
Definitely	1	2	3	4	5	6	7	Definitely Not

## APPENDIX D - CONTINUED

8. Imagery in your mind. How would you describe the imagery that occurred while examining the materials?

	<u>Strongly Disagree</u>					<u>Strongly Agree</u>	
The imagery was very _____							
Clear	1	2	3	4	5	6	7
Vivid	1	2	3	4	5	6	7
Intense	1	2	3	4	5	6	7
Lifelike	1	2	3	4	5	6	7
Sharp	1	2	3	4	5	6	7
Well-defined	1	2	3	4	5	6	7

9. Viewing experience. Please indicate how you felt during your viewing session placing an X in the most appropriate space.

Stimulated	: _____ : 1      2      3      4      5      6      7	Relaxed
Excited	: _____ : 1      2      3      4      5      6      7	Calm
Frenzied	: _____ : 1      2      3      4      5      6      7	Sluggish
Jittery	: _____ : 1      2      3      4      5      6      7	Dull
Wide-awake	: _____ : 1      2      3      4      5      6      7	Sleepy
Aroused	: _____ : 1      2      3      4      5      6      7	Unaroused

APPENDIX D - CONTINUED

10. Your confidence. Finally, please indicate your overall level of confidence in the ratings that you have given during this evaluation.

Uncertain	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	Certain
		1		2		3		4		5		6		7		
Not sure	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	Sure
		1		2		3		4		5		6		7		
Not confident	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	Confident
		1		2		3		4		5		6		7		

Thank you again!

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