THE EFFECTS OF VIDEOGRAPHICS AND INFORMATION DELIVERY STYLE ON ATTENTION AND RECOGNITION IN DIRECT-TO-CONSUMER PRESCRIPTION DRUG ADVERTISING

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THE EFFECTS OF VIDEOGRAPHICS AND INFORMATION DELIVERY STYLE ON ATTENTION AND RECOGNITION IN DIRECT-TO-CONSUMER PRESCRIPTION DRUG ADVERTISING

Presented by Rebecca Norris,

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and hereby certify that, in their
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Dedications

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THE EFFECTS OF VIDEOGRAPHICS AND INFORMATION DELIVERY STYLE ON ATTENTION AND RECOGNITION IN DIRECT-TO-CONSUMER PRESCRIPTION DRUG ADVERTISING

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ABSTRACT

This study explores the effect of videographics and information delivery style on attention and recognition. The two levels of information delivery style included voiceover and direct address, in which actors speak directly into the camera. Using the Limited Capacity Model of Motivated Mediated Message Processing, it was hypothesized that ads utilizing voiceover delivery style will require more effort to encode than ads utilizing direct address delivery style, marked by a greater deceleration in heart rate. It was also predicted that of the two levels of videographics, low and high audio-video redundancy, recognition would be greater for high redundancy videographics than for low redundancy videographics. Employing a within-subjects repeated measures design, 14 prescription drug commercials that included 20 instances of the message features under investigation were shown to participants. Using repeated measures ANOVA to analyze each hypothesis, the results of this study suggest that while participants did not orient to videographics as expected, high redundancy videographics were remembered better than low redundancy videographics despite no significant difference in attention. Additionally, voiceover delivery style did not require more effort to encode than direct address delivery style, nor were there significant differences in recognition between the two levels.

Chapter 1: Introduction

The purpose of this thesis is to examine how videographics and the information delivery style of prescription drug attributes influence attention and recognition in direct-to-consumer (DTC) prescription drug ads. The goal is to identify specific production features in drug ads that convey a clear understanding of a particular drug's risks, purpose and use in order for messages to be crafted so that consumers can make more informed health decisions. In this thesis, a videographic is conceptualized as a moving graphic in a DTC drug ad that explains the drug's use and how it works, showing either the medication or parts of the body that are affected. The other production feature this thesis examines is the way drug risks are delivered.

The two information delivery styles this thesis addresses include voiceover and direct address. Voiceover is defined as a clip in a televised message in which an announcer's voice is heard through the audio track while video cuts and edits appear on the visual track. In this study, information stated in the audio during a voiceover does not mimic or relate to information shown through the video track. For example, an announcer may state a drug's risks on the audio channel, while simultaneously on screen a woman is shown happily walking her dog. Contrarily, direct address is a camera technique in which the "actor or endorser speaks directly to the viewer (the camera)" (Zhou, Zhou, & Xue, 2005).

This thesis will reveal to advertisers and policy makers particular attributes in DTC drug ads that increase resources allocated toward encoding (attention), and aid recognition. Studying this topic is crucial for two reasons. First, it's important to understand how people cognitively process drug ads because knowing a drug's function, use, benefits and risks will put consumers in a position to make well-informed health decisions.

Second, it's important to examine how effective production features are at engaging viewers, since certain tactics that may work in some types of messages may not work in others. For example, videographics have been used in educational programming to increase the likelihood that information is remembered (Thorson & Lang, 1992). Thorson and Lang (1992) found that videographics increased attention in televised lectures and additionally enhanced learning when the lecture content was familiar. However, there's no guarantee videographics will be processed the same way for drug ads given the differences in information being conveyed. While videographics aid learning in televised lectures, motivations and perceptions toward prescription drugs may or may not interfere with processing.

Studying DTC prescription drug advertising differs from other types of advertising due to its serious implications, which is why DTC advertising is under more legal scrutiny than other types of advertising. Unlike advertising in a more simple product category, prescription drugs treat diseases, they are expensive, they carry risks, and a physician must prescribe them. Therefore, crafting advertising messages designed to sell these drugs should be done in an extremely careful manner. The ultimate goal in developing DTC drug ads should be to inform consumers of drug options that are in their best health interests, while ensuring that advertising is both effective and truthful.

DTC prescription drug advertising is a relatively new phenomenon, and since it began, the fundamental debates between opponents and proponents have only become more heated. Knowing the history of DTC advertising sheds insight about public sentiments and how legislation is changing in this product category today.

DTC advertising began in the early 1980s, born during the end of the patients' rights movement but before the consumer rights movement advanced, at a time when marketers realized that gains could be made by targeting consumers rather than just physicians (Donohue, 2006). Some of the first DTC drug advertising campaigns included: Rufen, a prescription pain reliever advertised by Boots pharmaceuticals in 1981; Pneumovax, a pneumonia vaccine promoted by Merck and Dohme in 1982; and Oraflex, an anti-arthritic drug hyped by Eli Lilly and Company (Donohue, 2006). Oraflex, however, was inaccurately promoted as a drug that could "prevent the progression of arthritis," and Eli Lilly took the drug off the market five months later due to "a number of adverse drug events" (Donohue, 2006, p.675).

Since DTC advertising's inception, groups such as the American Medical Association (AMA) have opposed advertising drugs to the public. Opponents of DTC advertising feel that it harms the patient-physician relationship, promotes unneeded prescriptions, misinforms viewers of their treatment options and increases drug costs. Proponents, on the other hand, view DTC advertising as an educational and empowering source of information, enabling consumers to take an active role in making informed health decisions. In addition, supporters argue that DTC advertising encourages patients to get treated for diseases early, before the illness progresses into a more serious stage. Regardless of one's stance, systematically studying how consumers recognize and attend to specific drug information is vital to their ability to make educated health decisions.

In 2006, U.S. DTC ad spending reached over $4.8 billion (IMS, 2006), six times more than the $800 million spent in 1996 (The Henry J. Kaiser Family Foundation, 2003). DTC ad spending increased dramatically as a result of the Food and Drug Administration (FDA) loosening restrictions on DTC drug advertising in 1997, eliminating the requirement that drugs ads must include a "brief summary" of the drug's risk information (Sinnott, 2001). The modified guidelines by the FDA require that DTC ads portray a "fair balance" of the drug's risks and benefits (Sheehan, 2007a, p. 123). The Federal Trade Commission (FTC) regulations for DTC ads require that drug risks and benefits be "clear and conspicuous" (Sheehan, 2007a, p. 123). This change in regulation not only increased the amount of DTC drug ads aired on national television and other media, but also allowed advertisers to more easily omit important information about a drug's adverse effects and alternative non-drug treatment options.

Due to the drastic increase in DTC advertising over the last decade, pharmaceutical companies have received criticism by the AMA, the Senate and the House of Representatives for a number of reasons. As previously mentioned, opponents of DTC advertising believe it results in higher prescription drug costs, damages the patient-physician relationship, and results in more prescriptions than necessary (Sheehan, 2007b). For years, the U.S. government and the AMA have been putting pressure on pharmaceutical companies to agree to a moratorium on all recently approved drugs to enable physicians to have enough time to learn about the drugs before patients ask for prescriptions (Sheehan, 2007b). In June 2008, Congress proposed a two-year moratorium on new drugs (Ehrlich, 2008). Pfizer, Schering-Plough, Merck, and Johnson & Johnson voluntarily agreed to a six-month moratorium (Ehrlich, 2008). Additionally, both Senator Bill Frist and the AMA have asked that empirical research be conducted on the effects of DTC advertising (Sheehan, 2007b). Because this thesis seeks to understand production features that may increase recognition and resources allocated toward encoding in DTC ads, which ultimately will enable consumers to better understand a drug's uses, risks and benefits, both the AMA and Senate may find research in this area useful.

It is necessary to understand the history of DTC advertising because it explains the hesitant nature of the public, the viewers of these ads, in trusting pharmaceutical companies. Whether it was Oraflex, which was taken off the market by Eli Lilly in the early 80s, or Vioxx, the arthritis drug manufactured by Merck and withdrawn in 2004 after being associated with heart attacks, these events have harbored skepticism (Donohue, 2006, p.675; Reuters, 2006). The significance in pointing out this sentiment towards pharmaceutical companies is that it affects the way consumers view DTC drug commercials. Because of an underlying public mistrust, lengthy and convincing benefit statements aren't as likely to persuade viewers. Further, even if viewers believe that the advertised drug may cure their medical condition, they may be dissuaded by the drug's risks. Therefore, incorporating production features such as direct address or videographics, which may increase the likelihood a piece of information is remembered, could give consumers a better picture of a drug's purpose and why it's important to treat a given medical condition before it gets more serious.

Despite the changes in DTC drug advertising regulations since 1997 and the substantial increase in ad spending, there is a void in current research that addresses how viewers remember and attend to DTC ads. Ongoing, systematic research on a product like prescription drugs that has serious health effects, that pharmaceutical companies spend billions of dollars per year promoting, and that are purchased by millions of Americans is vital. The importance of studying this topic is not to reveal to pharmaceutical companies the best strategy to sell more drugs, but rather to uncover which advertising production features most accurately educate consumers about a drug's function, risks and benefits. Increased attention is a necessary but not sufficient condition for more accurate recognition of information. Further, better recognition contributes to an individual's knowledge about a drug or illness, which then affects the next steps taken in pursuing medical advice. Understanding this process at a deeper level is essential in order to discover how to most effectively present drug information in consumers' best interests.

On a theoretical level, studying how individuals process videographics, voiceovers and direct address messages contributes to the larger body of cognitive processing research. Learning whether videographics increase resources allocated toward encoding and boost recognition is important not just in that it tells advertisers the best way to produce their message, but because it shows that viewers may learn better when the audio and video are redundant than when information is only delivered via one information channel.

While previous research indicates that processing visuals requires fewer resources than processing audio, this thesis expands on knowledge in the area of multiple channel processing (Lang, et al., 1999; Lang, 2005). For example, in simultaneously processing text, video and audio, knowing whether or not text on a screen enhances or hinders comprehension during a videographic will build upon former audio-video (A/V) redundancy research. This thesis contributes additional knowledge about how text, video, and audio interact with each other, and offers further explanation about the resources required to process varying A/V redundancy levels of videographics.

Studying direct address furthers knowledge about delivery styles by learning whether viewers are able to develop a parasocial relationship with a television actor in as short as a 60-second drug ad. Learning drug information from a character speaking directly to the viewer (direct address) may reach the viewer in a different manner than watching unrelated slice-of-life clips shown through the video track while an announcer states drug information (voiceover). However, if findings show no difference in recognition between voiceover and direct address yet greater allocation of resources toward encoding in voiceover, this might signify that voiceovers capture attention better without compromising recognition. This thesis attempts to answer these theoretical questions regarding the impact videographics and information delivery style have on attending to and remembering media messages.

Chapter 2: Literature Review

Theoretical Framework: LC4MP, Attention and Recognition

This thesis is theoretically grounded in Annie Lang's Limited Capacity Model of Motivated Mediated Message Processing (LC4MP), which examines how individuals cognitively process mediated messages. This study utilizes LC4MP as an outline to test hypotheses and eventually arrive at insights by analyzing experimental data. These insights can then be used to design messages that enable viewers to process essential parts of a message (Lang, 2006). The theory posits that human beings have a limited amount of cognitive resources, and that structural and content elements of messages affect how these cognitive resources are allocated.

LC4MP has been widely utilized in empirical research studies across a broad range of mediated messages to explore attention and memory. The theory has been used as a model in studies analyzing television and radio messages, and movies (Bolls, Lang, & Potter, 2001; Grabe, Lang, & Zhao, 2003; Lang, et al., 2005; Lang, 2006; Lang, Park, Sanders-Jackson, Miller, 2006; Wilson & Wang, 2007). For example, Lang found that production pacing and story length in local newscasts had a greater effect on younger viewers compared to older viewers (Lang, et al., 2005). Miller (2006) used the theory as a framework in examining the effect that live, breaking and traditional news stories have on the automatic allocation of cognitive resources. In 2000, Lang and colleagues discovered that increasing the rate of edits in television messages caused physiological arousal, recognition and self-reported arousal to increase (Lang, Zhou, Schwartz, Bolls, & Potter, 2000). The stimuli used in their study included talk shows, comedies, science fiction, cartoons, information shows, self-help shows, commercials and sports. Bolls, Lang and Potter (2001) studied listener arousal and the validity of facial electromyography (EMG) as an indicator of the valence (positive or negative tone) of participants' emotional responses to 60-second radio advertisements. Because LC4MP has been utilized in a wide range of studies about how individuals cognitively process media messages, the theory was used in this thesis to guide inferences made as to how viewers process specific production features in DTC prescription drug advertising.

Most past research on DTC advertising has examined these messages before or after exposure. Such topics involving DTC advertising have included: its effects on purchase intention, the patient-physician relationship, consumers' opinions regarding DTC advertising utility, and the influence of information sources on reactions to DTC advertising. (DeLorme et al., 2006; Deshpande et al., 2004; Lee et al., 2007; Reast & Carson, 2000). This thesis studies cognitive processing of drug commercials both during and after exposure, using LC4MP as a framework to explain why certain segments in a message require more or less cognitive resources depending on what message features are present. LC4MP also guides the interpretation of fluctuations in resource allocation toward encoding and recognition, and how well information delivery style and drug attribute delivery style was encoded into short-term memory.

In processing media messages from a LC4MP perspective, three sub-processes (encoding, storage and retrieval) are continuously and simultaneously at work. When cognitive resources allocated to one of the three independent subprocesses increase, fewer resources are left to perform the other two subprocesses (Lang, 2006). Because there are limited cognitive resources to divide among these three sub-processes, when a message requires more resources than there are available, cognitive overload occurs and memory suffers (Lang, 2006). Cognitive overload can be indexed by a decrease in recognition. For example, cognitive overload may happen if one were watching a DTC drug commercial that included complex medical jargon in the audio, fast production pacing characterized by second-long cuts and edits in the video, and additional text on the screen (brand logos, warnings at the bottom of the screen, phone numbers etc.) that's replaced by new text every three seconds. In this instance, the combined resources required to fully process the message for each information channel is likely greater than the cognitive resources available.

LC4MP splits cognitive resources that are allocated toward encoding, storage and retrieval into two attentional processes: automatic and controlled (Lang, 2006; Ravaja, 2004). Because of the copious amounts of constant attentional demands in the environment, certain stimuli elicit automatic responses. Automatic allocation of cognitive resources occurs involuntarily, requires fewer cognitive resources, and happens on a much less conscious level than controlled allocation (Ravaja, 2004). One way automatic elicitation occurs is through an orienting response (OR). Specific production features such as audio sound effects, videographics or camera cuts can evoke ORs (Lang, 2006). For example, if an individual is listening to the radio and the listener hears a loud car crash sound effect for an insurance ad, the listener will involuntarily attend to the message for at least a few seconds.

ORs can be evoked by either novel or signal stimuli (Lang, 2006). Novel stimuli are characterized as new or unexpected environmental stimuli, while signal stimuli are words or sounds that are conditioned to have personal meaning, such as someone's name (Ohman, Hamm, & Hugdahl, 2000; Thorson & Lang, 1992). "Novel stimuli are the same for all people; signal stimuli differ for different individuals" (Lang, 2006, p. S60). Physiologically, an OR is marked by a short-term deceleration in heart rate, indicating an increase in attention (Thorson & Lang, 1992). The significance of analyzing ORs is that they have been found to increase the likelihood of a piece of information being encoded and stored in long-term memory (Ravaja, 2004). ORs are centrally processed, meaning that they can be stored in long-term memory, and they are responded to depending on the OR's significance and amount of resources it requires to process (Thorson & Lang, 1992).

Alternatively, controlled processes are more of a deliberate effort to attend to a message and depend on an individual's personal interests and goals (Lang, 2006). Controlled allocation of cognitive resources occurs voluntarily, and requires more cognitive resources to attend to a message (Ravaja, 2004).

Research by Lang, Potter and Bolls (1999) found that as arousing content and production pacing increased, which requires more cognitive resources, performance on verbal recognition was detrimentally affected, while visual recognition was unaffected. This led to the conclusion that visual encoding occurs as an automatic process, while verbal encoding is a more controlled process (Lang, et al., 1999).

As posited in LC4MP, continuously and simultaneously throughout processing media, viewers utilize three sub-processes: encoding, storage and retrieval. Encoding is conceptualized as “the act of creating a mental representation of a stimulus” and is measured via recognition (Lang, 2006, 59). Because during recognition, viewers are given cues from the message to aid in their ability to recognize whether or not the information was seen, such as a visual or audio clip from the message, recognition is the most sensitive measure of the three (Lang, 1995). If processing resources are not allocated towards a stimulus, the information will not be encoded into short-term memory.

Storage, the second sub-process discussed in the theory, refers to the connections made between new information that has been encoded and information already stored (Lang, 2006). An active mental representation forms when new information is encoded and old information is retrieved at the same time, creating an associative memory link. Not surprisingly, as more links are formed between a new piece of information and stored information, the more accessible new information will be and the better it is stored in long-term memory (Roskos-Ewoldsen, 2002). In addition, frequency of information activation influences how easily a piece of information can be retrieved or accessed from memory (Roskos-Ewoldsen, 2002). Memory for a particular piece of stored information will strengthen the more often it is retrieved (Roskos-Ewoldsen, 2002). An important caveat worth noting is that just because a piece of information is encoded, it does not necessarily mean information was stored (Lang, Bolls, Potter, & Kawahara, 1999). Some information that is encoded is not completely stored because there are not enough resources to allocate toward storage or the individual decides the information is not important to thoroughly store in long-term memory. The degree to which a piece of information has been stored in long-term memory is measured in LC4MP via cued recall. During cued recall, rather than a message clip being presented as in recognition, only one cue is delivered in an attempt to partially aid the participant at retrieving information (Lang, 1995).

Lastly, retrieval refers to recovering older information that already has been stored and is indexed using free recall. During free recall, the participant is asked to retrieve information from a message without any cues, in an effort to determine whether individuals have fully processed a message (Lang, 1995). How well information is encoded, stored and retrieved depends on the amount of resources independently allocated toward each sub-process. In addition, message relevance, complexity, content, structure, and an individual's previous experiences and goals also influence the amount of resources allocated toward each sub-process (Lang, 2006).

Ultimately, LC4MP conceptualizes memory as having multiple levels (encoding, storage and retrieval), with each level corresponding to a different measure (recognition, cued recall and free recall). The degree to which an individual fully processes a message is a function of whether a piece of information was originally encoded, how well the encoded information was stored, and finally, how accessible the piece of information is to retrieve. The more resources a message requires, the less likely enough resources will remain to attend to, rehearse, store, and retrieve message information.

While message processing involves encoding, storage and retrieval, this thesis primarily focuses on encoding, which is indexed via recognition. It is argued that depending on the way messages are designed, encoding takes priority over the other two sub-processes due to automatic attentional responses to certain production features in messages (Lang, 1995). During this time, resources being used to store and retrieve information are instead allocated toward encoding.

As mentioned previously when discussing automatic and controlled attentional processes, one means of eliciting the automatic allocation of resources is through an OR. However, stimuli seen as motivationally relevant to individuals is another way that cognitive resources can be automatically allocated. Motivated processing has been the latest addition to LC4MP, which has evolved over recent years to include human emotion due to the inseparable link between emotion and motivation. The model states that certain stimuli seen as motivating to an individual, such as the survival functions of eating, procreating and safety, can elicit the automatic allocation of cognitive resources towards processing stimuli. Automatic processing can also occur when other stimuli in the environment are treated as symbols for primary instinct stimuli, as a result of associative learning (Lang, 2006). In relation to DTC drug advertising, a drug ad, for example, that uses fear appeal to make health-related threats in order to ultimately justify the need to use a medication, may automatically elicit the allocation of resources. Another instance of stimuli that may trigger the automatic allocation of resources is an ad for the medical condition of erectile dysfunction (ED), where the ad may include sexual overtones. Both health-related threats and sexual innuendos are associated with survival, indicating their candidacy as stimuli that can elicit the automatic allocation of resources.

LC4MP also describes how emotional content may automatically activate two independent motivational systems: the appetitive and aversive systems (Cacioppo & Berntson, 1994; Cacioppo, Gardner & Berntson, 1997). From an evolutionary perspective the appetitive system functions as the hunting and gathering instinct, giving humans the desire and curiosity to approach and explore surroundings. The aversive system, on the other hand, is how humans react in a defensive situation when danger is present (Lang, 2006). These independent activation systems can both process information simultaneously, however, the amount of information being processed in each system varies as a function of how emotional the message is perceived (Lang, 2006). Because the appetitive system usually operates in a non-threatening environment and deals with the functions of daily life, the appetitive system is more highly active than the aversive system (Cacioppo, Tassinary, & Berntson, 2000; Cacioppo & Gardner, 1999). This phenomenon is known as positivity offset (Lang, 2006). Negativity bias, however, is the notion that in perilous situations when an individual needs to act fast, the aversive system kicks in immediately in order to guard from danger. Thus, positivity offset refers to the appetitive system's higher activation in non-threatening conditions, while negativity bias means that the aversive system responds more quickly.

The relevance of these two systems in media is found in the notion that information presented in media is processed as real-world stimuli (Reeves & Nass, 1996). In this thesis, for example, the appetitive motivational system may be activated more easily during segments of an ad that discuss the uses and benefits of a drug since the appetitive system is concerned with curiosity in a non-threatening environment. However, if an ad is using a negative approach such as fear appeal in discussing either symptoms of a condition or medication risks, the aversive system may activate, signaling a more dangerous situation.

Every message has a goal, whether it is awareness, persuasion, or change in behavior, and these message goals according to LC4MP affect resource allocation (Lang, 2006). Different message goals are accompanied by differences in the way viewers process and enjoy the message, as well as which sections of a message are encoded, stored and retrieved. Depending on the goal to be achieved, messages should be created uniquely to have the desired effect. For example, if the purpose of the message is to increase knowledge, the message should lead to high storage. While if the message goal is awareness, the message should be most concerned with the viewer encoding information. Lang (2006) suggests,

> "If the goal is behavior change, then the behavior to be changed, the reasons to change, and how to change must all be encoded and stored and the appropriate level of motivational activation should be associated with each of these elements (i.e., appetitive activation with how to change and aversive activation with the reasons to change)" (p. S63).

Despite a decrease in performance in one to all subprocesses during cognitive overload, some message goals can still be accomplished. This is the case because encoding suffers the least during cognitive overload respective to storage and retrieval (Lang, 2006). Thus, ads with the purpose of increasing awareness can still be effective despite the viewer reaching cognitive overload. In addition, viewers tend to feel positive and have high purchase intent towards ads that produce cognitive overload (Lang, 2006). Therefore, if a message's central purpose is to persuade, cognitive overload might not be a negative incidence during the viewing of an ad (Lang, 2006; Yoon, Bolls, & Lang, 1998).

In creating messages specifically for television, there are a number of variables to take into consideration to maximize attention and memory. Creators of television messages must make conscious decisions of what production features to use in a message, keeping in mind the target audience and the difficulty of the information being disseminated. For example, if the information in a message lacks complexity, the message should be sure to include appropriate structural features, such as sound effects that will elicit automatic attention and ensure encoding to maintain interest in the viewer (Lang, 2006). If the information is more complicated, on the other hand, additional structural features will only hinder attention and memory (Lang, 2006).

In a DTC prescription drug ad, for instance, most viewers are unfamiliar with a drug's specific risks and the terminology used in the risk statements tends to be more complex than that of colloquial language. Thus, ad creators, should maintain engagement by adding features, which elicit an OR so that important copy points are remembered. Yet creatives should avoid being too entertaining, which leads to message complexity interfering with fully processing the message. In attempting to do this, one feature Lang suggests is to "maximize audio/visual redundancy in order to increase storage" (Lang, 2006, S68). Specific details on A/V redundancy will be discussed in the upcoming parts of this chapter.

This section will address attention in relation to LC4MP and this thesis. Attention is generally split into two categories, selection and effort. Selective attention is the act of choosing specific information in the environment that resources should be allocated to for subsequent processing (Miller, 2006) and it is associated with a short-term, or phasic, component of attention (Ravaja, 2004). Contrarily, attention categorized as effort is defined as the degree to which an individual processes stimuli already chosen for attention and is related to a long-term measure of attention, called tonic (Posner & Petersen, 1990; Ravaja, 2004). Additionally, effort refers to the fluctuating amount of cognitive resources allocated toward a message depending on an individual's available capacity (Miller, 2006). Throughout cognitive processing, attention is a combination of both phasic and tonic activation (Ravaja, 2004).

For example, if an individual wants to watch television, selective attention is involved in the first step of selecting specific "information that will be available for subsequent processing" (Miller, 2006). Once the individual determines the information to be processed, attentional effort towards the message begins. Effort changes as a function of the amount of resources required to process the message and an individual's available resources. In relation to prescription drug advertising, if a viewer who has osteoporosis sees an osteoporosis ad and chooses to watch it, selective attention occurred. If the individual continues to attend to the message, attentional effort is at work, with the amount of cognitive resources required and allocated fluctuating as the audio and video in the commercial changes.

As mentioned previously, the varying allocation of resources happens through both automatic and controlled processes. In Lang's (2006) "Parsing the Resource Pie," she distinguishes between four sections that make up the cognitive resource pie: 1) *resources required* by the task, 2) *resources allocated* to the task 3) *resources remaining* in the system during task performance, and 4) *available resources* (Lang, Bradley, Park, Shin & Chung, 2006, p.371). Lang explains the fluctuation of resources while viewing mediated messages in terms of the following two equations:

Resources remaining = total resources – resources allocated

Available resources = resources allocated – resources required

The resource pie in relation to this thesis will be discussed in further detail in the upcoming sections on videographics and information delivery style.

Using LC4MP provides a theoretical framework for specifically exploring the impact of videographics and information delivery style on resources allocated toward encoding and recognition. The theory helps generate hypotheses, interpret the data, offer explanations, and produce constructive conclusions. Ultimately, this thesis contributes additional knowledge to research done in the fields of DTC advertising, videographics, direct address, voiceover, recognition and attention. The upcoming sections discuss both DTC advertising and various production techniques, and how these features affect resource allocation based on LC4MP.

DTC Prescription Drug Advertising

The body of scholarly research on DTC advertising has been growing rapidly in the last decade due to the increasing rate of these ads appearing in mainstream media. DTC advertising research has analyzed a number of issues: the patient-physician relationship (Reast & Carson, 2000), factors influencing consumers' opinions of the utility of DTC advertising for health care decision making (Deshpande et al., 2004), the impact of information sources on consumer reactions to DTC advertising (Lee, Salmon, & Paek, 2007), and behavior after exposure to DTC advertising (DeLorme, Huh, & Reid, 2006). Discussed below are the results from DTC advertising studies in an attempt to illustrate that while quite a bit of systematic research has been conducted in this area, there is a void in research addressing how specific production features in DTC ads affect attention and recognition.

DeLorme and colleagues (2006) conducted a study revealing how age differences affect the way consumers behave after DTC advertising exposure and whether or not demographic factors contribute to behavior. The article discusses DTC advertising in relation to previous research on persuasive communication, older consumers, marketing communication and the patient-physician relationship (DeLorme, et al., 2006). The results indicate that DTC ads are no more effective at influencing behavior in any of the age brackets investigated in this study. This thesis used students as participants, which makes this finding significant because it illustrates that even younger viewers are affected by DTC ads. One might assume that only older adults are affected by DTC ads since they are the target audience, however, all ages are affected making students viable candidates as participants.

While the results from 264 questionnaires report that all consumers, regardless of age are motivated to act by DTC advertising, the specific behavior of each group differs (DeLorme, et al., 2006). The study indicates that DTC ads lead young consumers to discuss drug-related topics with relatives and friends, mature consumers to converse with a doctor, and older consumers to talk with pharmacists (DeLorme, et al., 2006). DeLorme et al (2006) stated that previous research has found factors such as prescription drug use, attitude toward DTC advertising, and health condition to have an influence on viewers' cognition, evaluation and behavior. Because this thesis examines how consumers process specific features of DTC drug ads, it is valuable knowing that all of the aforementioned variables may have an influence on how viewers process the ads.

Knowing consumers' perceptions of DTC advertising is important because these perceptions are associated with viewers' motivations to attend to a message. If a consumer resents pharmaceutical companies and holds a negative position toward DTC advertising, they are less likely to be motivated to allocate controlled attention toward the message.

Additionally, DeLorme's study looks at how consumers behave after DTC advertising exposure, while this thesis looks at cognitive processing during and after exposure. The ability to measure a participant's physiological responses *during* an ad, in this case resources allocated toward encoding, and analyze the results in conjunction with recognition, is useful because it uncovers insight regarding which segments of the ad were attended to, the amount of resource allocation, and whether or not information was remembered.

While DTC advertising opponents argue that advertisers promote prescription drugs in a manner that creates hypochondria in viewers, proponents of DTC advertising claim that prescription drug ads offer valuable health information. Frosch, Krueger, Hornik, Cronholm, & Barg (2007) refute the latter perspective, claiming that DTC ads have limited educational value and they do not inform viewers about the causes of a disease or the population at risk to the extent needed to be sincerely helpful. The results from a content analysis conducted by Frosch et al. (2007) of 38 prescription drugs ads indicate that only 26 per cent of ads explained condition causes, 25 per cent described prevalence, and many ads (58 per cent) portray characters losing control over their lives without the medication. The study also reported that emotional appeal was present in 95 per cent of the ads. Findings from this content analysis illustrate the partial nature of current DTC advertising campaigns. While a pharmaceutical company's allegiance will always lie in marketing their brand, the aforementioned statistics illuminate the reasons why these companies face criticism for misleading consumers.

In a separate content analysis of 23 DTC prescription drug advertisements aired in 2001, the article focuses on specific ad features that may aid or hinder viewers' comprehension during risk and benefit statements, while additionally examining how limited-literacy influences comprehension (Kaphingst, Dejong, Rudd, & Daltroy, 2004). Considering the U.S. Food and Drug Administration (FDA) requires DTC drug ads to give a "fair balance" of both drug risks and benefits, the content analysis reported that the ads allocated more time towards drug benefits than risks (Kaphingst, et al., 2004). Moreover, only positive or neutral visual images were accompanied during the risk statement segment, calling into question the effect that contradictory visual and audio messages have on the "fair balance" requirement, attention and recognition. The study found that there was more of a balance in ads that did not include features such as speed, tone, or volume, which are used to increase the complexity in cognitively processing risk statements (Kaphingst, et al., 2004). Overall, the article stressed the importance for consumers to comprehend both the benefits and risks of a drug, especially considering the continuing rise of DTC prescription drug advertising.

Frosch's and Kaphingst's studies were useful in that they provide statistics that allow for a bigger-picture look at DTC advertising features. However, content analyses cannot make inferences about exposure to content or how participants cognitively process drug ads. Contrarily, since this thesis is an experiment, it can provide explanations about the informative effects of drug ads, identify the amount of resource allocation during any given segment of an ad, and assess which features in drug ads increase recognition.

Videographics and Audio-Video Redundancy

This thesis addresses two primary research interests regarding videographics: a) whether or not the absence or presence of videographics aids in resource allocated toward encoding and recognition, and b) whether videographics high in audio-video redundancy increase or decrease recognition and resource allocation as compared to videographics low in A/V redundancy. A/V redundancy in this thesis is operationally defined as the extent to which the audio, video and text on screen correspond and relate to each other. More specifically, high A/V redundancy videographics display at least one word or more of text on screen that is also announced over the audio, in addition to the audio and visual being semantically related. Low A/V redundancy videographics do not show redundant text on the screen, but are redundant in that the audio and video are semantically related. The following figures illustrate low and high A/V redundancy:

Figure 1. *High audio-video redundancy videographic.*
Audio: "Zetia works in the digestive tract like some other medicines."

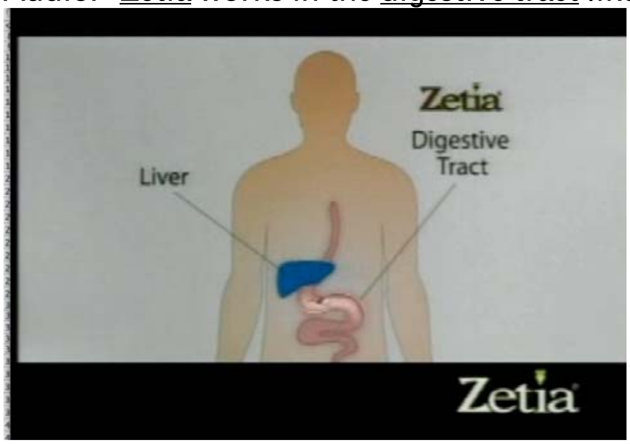


Figure 2. *Low audio-video redundancy videographic.*
Audio: "...by helping keep blood platelets from sticking together and forming clots."

A study conducted on video supers supports the perspective that videographics aid comprehension (Murray, Manrai, & Manrai, 1998). The study defines video supers as "superimposed visual presentations of verbal information" in commercials, such as the conditions for a car lease agreement written as text on screen (Murray, et al., 1998, p. 24). The objective of the study was to test video super efficacy and comprehension in an experiment of 200 commercials containing video supers with 20 treatment groups in order to identify which features are most effective. The experiment makes the distinction between video supers with only one visual code, identified as a single-modality video super, and video supers with both a visual and acoustic code, dual-modality supers. Results from the experiment report that dual-modality supers increase comprehension more so than single-modality video supers.

Research conducted by Morris, Mazis, and Brinbere (1989) found similar results; viewers comprehended the dual-modality mode better than the single-modality mode in disclosure information in prescription drug ads created by the experimenters. In fact, the FTC in 1979 actually recommended the use of dual-modality video supers to aid advertisers in meeting its “clear and conspicuous” requirement (Murray, et al., 1998).

As mentioned, the results from Murray’s (1998) and Morris’s (1989) studies found that video supers, specifically the dual-modality mode, increased comprehension. Theoretically, these results uphold construct validity since it is logical that when a participant sees the same thing they are hearing, they comprehend information better than less redundant single-modality video supers. A video super in Murray’s study is defined the same as a videographic in this thesis. Therefore, this research suggests that videographics have a positive effect on comprehension.

Much of the research on A/V redundancy has produced contrary results. Half the studies conducted on A/V redundancy suggest that redundancy enhances memory, whereas the other half claims redundancy hinders memory (Basil, 1992). Lang (1995) states the disagreement is due to 4 areas that have been inconsistent across studies: “the overall theoretical perspective guiding the research, the conceptual definition of audio/video redundancy, the operational definition of audio/video redundancy, and the operational definitions of memory” (p. 87). A/V redundancy has been conceptually defined in three distinct ways in prior research: as occurring in multiple channels versus one channel, as a perfect alignment in content between both channels, and as having congruence in regards to semantic meaning (Lang, 1995). Lang suggests that these definitions would be better represented in a redundancy continuum ranging from no redundancy to high redundancy. Single-channel messages fall furthest on the side of no redundancy, followed by messages with conflicting audio and video information (Lang, 1995). Messages with a considerable amount of shared information fall closer toward the high redundancy end, while exactly synced audio and video messages sit furthest on the high redundancy end of the continuum (Lang, 1995).

In an attempt to understand A/V redundancy’s influence on memory in television messages, Lang (1995) utilized a limited-capacity information processing angle to operationally define A/V redundancy in four categories: single-channel, multiple-channel redundant, audio-video conflicting, and talking heads, defined as an on-screen character delivering the message. Lang (1995) suggests that familiarity, structural complexity, difficulty, and interestingness play a role in the amount of cognitive resources need to fully process a message. From an information processing standpoint, the following message manipulations and their relative complexity are stated:

> “Audio with text screen is probably more complex (and requires more capacity) than audio with still pictures; audio with redundant stills is less complex than audio with conflicting stills; audio with either kind of stills is less complex than audio with moving pictures; and that audio with redundant moving pictures is probably less complex than audio with conflicting moving pictures” (Lang, 1995, p. 92).

Thus, requiring the least resources are single-channel messages because they contain less information and have lower complexity than two-channel messages (Lang, 1995). Following single-channel messages are talking head messages and then multiple-channel redundant messages (Lang, 1995). Lastly, A/V conflicting messages require the most resources due to their high complexity nature and the amount of information being delivered (Lang, 1995). Table 1 below shows 24 operational comparisons based on the four groups of operational definitions from Lang’s (1995) “Defining audio/video redundancy from a limited-capacity information processing perspective.

Table 1. *Operational Redundancy Comparisons.*

Comparison Between	
A Less Redundant Stimulus	A More Redundant Stimulus
Audio only	Visual only
Audio only	A picture book
Audio only	Text on screen
Audio only	Audio with redundant text on screen
Audio only	Audio with redundant video stills
Audio only	Audio with conflicting video stills
Audio only	Talking head
Audio only	Audio with less redundant video
Audio only	Audio with conflicting video
Audio only	Audio with redundant video
Visual only	Audio with redundant text on screen
Visual only	Audio with redundant video stills
Visual only	Audio with redundant video
Visual only	Audio with conflicting video
Text only	Audio with redundant video stills
Text only	Audio with conflicting video stills
Audio with redundant text on screen	Audio with redundant video stills
Audio with redundant text on screen	Audio with conflicting video stills
Talking head	Audio with redundant video stills
Talking head	Audio with redundant video
Talking head	Audio with conflicting video
Audio with redundant video stills	Audio with redundant video
Audio with less redundant video	Audio with redundant video
Audio with less redundant video	Audio with conflicting video
Audio with redundant video	Video with conflicting video

In creating a message, the specific text chosen to appear in the video track greatly influences processing capacity. If the words appearing on screen correspond simultaneously to the words in the audio track, there is high A/V redundancy and the text on screen should make processing the message less difficult (Lang, 2006). However, if the words appearing on the screen contradict what is being said in the audio track, the viewer will likely lack the resources to process both simultaneously.

Reese (1984) studied how pictorial and verbal redundancy in television news stories and the presence or absence of printed information that syncs with the audio channel affects learning. In Reese's experiment, redundancy was conceptually defined as, “shared information, such that there are facilitative and not contradictory relationships between words and pictures,” and learning was indexed by recall (1984, p. 80). Findings suggest that picture and audio redundancy result in better learning than in stories that were not redundant, due to in-sync visuals enhancing the script. Stories that additionally added captions with text to the picture and audio found no significant relationship. In one story, however, redundant print caption had a negative effect on learning.

Various studies have reported that audio processing requires more effort than processing through the visual track. Audio processing requires more resources than visual processing, which happens almost automatically and pictures increase visual attention (Lang, et al., 1999; Lang, 2005). Additionally, low redundancy messages have a more negative effect on memory for audio information than visual information (Lang, 2005). This phenomenon of visual processing occurring virtually automatically is known as both the visual superiority effect and picture memory superiority (Lang, 1995).

Previous research by Gunter (1983) suggests that in watching television news, the audio tends to deliver more dominant information than the visual, and attention is allocated toward the audio (Drew & Cadwell, 1985). This finding can be applied to DTC drug ads since both televised news and drug commercials are delivered through the same medium, television. Therefore, in watching high A/V redundancy DTC drug ads, viewers likely attend to both the audio and visual but allocate more resources towards the audio. However, when there is less redundancy between the audio and visual, viewers sacrifice the audio for the visual since pictures (visuals) are processed more easily than the audio. Findings from a study on A/V redundancy indicate that audio recall was higher in news stories that had high A/V redundancy than in stories with low A/V redundancy (Drew & Grimes, 1987). As the audio and visual become more out of sync, viewers lack the cognitive capacity to attend to both the audio and visual and because the visual is easier to process, viewers attend to the visual.

Further research conducted by Woodall, David and Sahin (1981) suggests that visuals enhance comprehension due to their complementary assistance as long as the information is not inconsistent. Findahl (1981) also reported increased recall in television news stories that included pictures and graphics. Based on research reporting that the presence of visuals increases recall (Lang, 2005), recognition should also be positively affected by videographics. Based on these previous findings by Murray on video supers, Woodall and Lang on visuals, and Findahl on pictures and graphics, the following hypothesis is posed:

H1: Recognition of advertised drug attributes will be more accurate for televised ads containing a videographic compared to ads without a videographic.

Specific structural features of messages, including the onset of videographics, camera changes, scene changes, unexpected motions toward the camera, and loud noises can elicit an orienting response (OR) (Lang, 2000; Lang, 2006). Thorson and Lang (1992) also found that videographics elicited ORs, in researching videographics and information familiarity and its effect on viewers' attention and memory. 60 participants watched six lectures on television, each lecture comprised of two levels of familiarity and two levels of videographic complexity (Thorson & Lang, 1992). The results indicated that memory was higher for information shown after the onset of a videographic in familiar lectures, yet lower for information shown after a videographic in unfamiliar lectures. The following hypotheses were supported: videographics elicit ORs, message difficulty affects OR size, and an interaction exists between message difficulty and structural complexity of videographics on memory (Thorson & Lang, 1992). Based on Lang's (2000) and Thorson and Lang's (1992) findings, videographics in prescription drug ads should produce ORs, which are indexed by a phasic deceleration in heart rate. The following hypothesis is posed based on the aforementioned literature:

H2: The onset of a videographic in televised DTC prescription drug ads will evoke an orienting response.

ORs are an indicator of increased phasic attention, and an increase in attention is a necessary but not sufficient condition for more accurate recognition. Because of this, it'll be especially interesting to see if H1 and H2 are supported. If this were the case, improved recognition for videographics would likely be due to videographics evoking an OR. Beyond hypothesizing about the overall effectiveness of videographics on memory, this thesis differentiates between two types of videographics: low A/V redundancy and high A/V redundancy.

Lang (1995) notes that single-channel messages (just audio, video, picture or text) are less complex than multiple-channel messages, and redundant messages are less complex than conflicting messages. As message complexity increases, the amount of resources required to process a message also increases. Therefore, in determining the influence that differing videographic levels have on resources allocated toward encoding and recognition, two factors must be taken into account: a) the degree to which a message is redundant and b) the number of channels it requires to process a message.

The text, graphic and announcer, which make up three channels in high A/V redundancy videographics, are more redundant in comparison to the two channels in low A/V redundancy videographics consisting of an announcer speaking over a graphic. This is important in this thesis because while high A/V redundancy videographics have three information channels, requiring more resources than the two channels than low has, the text (the additional channel in the high level) only consists of a few words at most. The minimal text makes the use of words on the screen complementary to comprehension as opposed to interfering with processing if the text were sentences. Thus, the higher redundancy in high compared to low A/V redundancy videographics is a greater difference than the additional channel in high A/V redundancy videographics.

High A/V redundancy videographics should have better recognition than the low level because less resources are required to process the message, making cognitive overload less likely than in the low level, and resulting in greater available resources. Furthermore, because there are more resources remaining in the high level, individuals over-allocate resources, resulting in better recognition.

Contrarily, low A/V redundancy videographics should require greater resources than high A/V redundancy videographics. While there are only two channels of information (pictures on the screen and information announced through the audio track), which is less complex than the high level, there is also less redundancy. Therefore, the decrease in redundancy should require more resources, marked by greater phasic cardiac deceleration (a stronger OR). Because individuals only have a limited capacity of resources, if the message requires more resources than there are available, cognitive overload may occur, and recognition will suffer.

Therefore, an increase in resources allocated toward encoding does not automatically translate to an increase in recognition. Using LC4MP and the Lang's (2006) resource pie as a model, the following inferences are posed:

H3: Recognition will be greater for high A/V redundancy videographics than for low A/V redundancy videographics.

H4: Low A/V redundancy videographics will evoke a stronger orienting response (OR) than high A/V redundancy videographics.

Information Delivery Style

This thesis focuses on two ways that a drug's risks and benefits are delivered: voiceover and direct address. An abundance of research exists on the use of voiceover as a production technique; however, there is a paucity of research specifically on direct address.

A DTC advertising content analysis revealed the frequency that voiceovers occur in DTC commercials. 100 per cent of the 23 ads examined used a voiceover at some point during the ad and an anonymous voiceover announcer was used most often as the source of information about the drug's features (Kaphingst, Dejong, Rudd, & Daltroy, 2004). The study points out that further research should be conducted to determine the most effective way to state information about prescription drugs. Results reported that very few ads used narrative to state drug information but the study suggests that additional research could determine whether the more personable approach of using narrative would lead to higher comprehension among viewers of drug information.

Voiceovers specifically in television news stories have been discussed in previous research due to the high frequency of voiceovers in news stories (Zhou, 2004). Because the footage used in the visual track is recorded separately from the audio track, it is common for the audio and video track to conflict, having low redundancy (Zhou, 2004). Drew and Cadwell (1985) used multiple manipulations of voiceovers, some with dramatic jumpcuts in the video, in television news stories in an effort to distinguish whether viewers focused more on the audio or video track. Results indicated that viewers focused more on the audio than video because participants only noticed the jumpcuts when viewing the video without audio (Drew & Cadwell, 1985). Drew and Grimes (1987) examined how A/V redundancy influences recall in news stories using voiceover. Findings from their study indicate that participants performed higher on audio recall in news stories that had high A/V redundancy than in stories with low A/V redundancy (Drew & Grimes, 1987). Contrarily, visual recall scores were higher in low redundancy news stories. As the audio and visual become more out of sync, viewers lack the cognitive capacity to attend to both the audio and visual and because the visual is easier to process, viewers attend to the visual.

Viewers' performance on memory in voiceovers is in part dependant on production pacing. A study conducted by Lang and colleagues (1999) examined how production pacing affects recognition. Among low, medium and high-paced messages, they found that participants performed higher on recognition for medium-paced messages than fast-paced messages. The decrease in recognition for fast-paced messages suggests the viewer had reached cognitive overload. Thus, in relation to this thesis, if voiceover ads increase resources allocated toward encoding but decrease recognition compared to direct address ads, cognitive overload may have occurred.

The second information delivery style this thesis examines is direct address. While research specifically on direct address is limited, research on parasocial interaction is vast, and relates to the effects that direct address may create. Similar to the original definition of parasocial interaction by Horton and Wohl (1956), Auter (1992) conceptualized the phenomenon as "an apparent face-to-face interaction between media characters and audience members" (p. 174). Comparably, Giles (2002) defines parasocial interaction as, "the interaction between users of mass media and representations of humans appearing in the media ('media figures,' such as presenters, actors, and celebrities)" (p. 279). Giles (2002) indicates that there are three levels of parasocial interaction, the first being the level concerned with direct address, defined as, "the media figure addresses the user directly, for example a talk show host facing the camera and greeting the viewer" (Giles, 2002, p. 294).

In the early 1970s, McQuail studied parasocial interaction examining British soap opera viewers (Giles, 2002). After one of the viewers in the study watched a car accident, they reported that they felt as though it had really happened to the character and the audience member wanted to help them. As a result of the study, McQuail revealed that the two primary attributes of parasocial interaction were companionship and personal identity (Giles, 2002). Rosengren and Windahl who additionally studied parasocial interaction claim that the phenomenon could occur even when the audience member does not specifically identify with the character, just as long as on some level they can relate to the actor (Giles, 2002). Subsequent research on parasocial interaction has focused on media figures such as newscasters (Levy, 1979), soap opera characters (Rubin & Perse, 1987), comedians (Auter, 1992), and hosts of TV shopping programs (Grant, Guthrie, & Ball-Rokeach, 1991). Due to the variety of media characters that viewers have created a parasocial relationship with, it is not outlandish to assume that viewers of DTC ads could create this bond with actors.

Audience members who experience parasocial relationships with media figures often relate characters to real people in their lives and watch how characters react to situations to interpret their own personal life. Meyrowitz (1986) reported that certain production techniques, including camera shots, influence the ability of audience members to form parasocial relationships with characters. Viewers process camera distances in the same manner that people react to interpersonal distances in their own life (Auter, 1992). Research on parasocial interaction reports that perceived realism during viewing influences whether a relationship is formed since viewers scrutinize characters the same as they would in real life (Rubin & Perse, 1987). If it is possible for parasocial interaction to be formed between an audience member and a character explaining drug risks and benefits in a DTC drug ad, this study may find that viewers will have greater recognition in direct address ads.

One limitation of using parasocial interaction to explain why direct address may be a more effective way to communicate drug risks and benefits than voiceover is the amount of time (a 30- or 60-second spot) a viewer has to form a relationship with the character. Despite this questionable time frame, the realistic nature of delivering information via direct address instead of voiceover may be great enough to influence an audience member to create a bond with the actor in a DTC ad. It is this connection between the audience member and televised character that leads to the hypothesis that direct address will have a greater positive effect on recognition than voiceover.

In Lang's (1995) research on defining A/V redundancy, one of the four ways the concept of A/V redundancy has previously been operationally defined is via talking heads. Talking heads is another term for direct address, considering that both are defined as an announcer speaking directly to a camera (Lang, 1995). From this point on, the two terms will be used interchangeably.

From a limited capacity standpoint, processing a talking head stimulus is not as complex as processing multiple-channel redundant messages or A/V conflicting messages (Lang, 1995). Voiceovers then are more complex to process than direct address messages, since voiceovers fall under both the multiple-channel redundant and A/V conflicting message categories. It is logical that direct address messages are less complex since humans are hardwired to communicate with each other and the viewer is processing the media message the same way they would process a person in a real-world scenario (Reeves & Nass, 1996). Because direct address messages are less complex, they require a relatively low capacity for complete processing than voiceovers. Furthermore, voiceovers in DTC advertising can fluctuate throughout a single ad from redundant to conflicting, both of which require more resources to process than a direct address message. The complexity of voiceovers is due to the amount of information being delivered. This includes an announcer via the audio track, and visual clips varying in production pacing and redundancy through the visual track (Lang, 1995).

Due to voiceovers requiring greater cognitive resources than direct address messages, it is assumed that voiceovers will require more resources allocated toward encoding. Because processing voiceovers may result in a state of cognitive overload, it is hypothesized that direct address messages will lead to greater recognition since there are more resources available for proper encoding. Based on the research conducted on parasocial interaction and talking heads, the following hypotheses are predicted:

H5: Recognition will be greater in ads utilizing direct address delivery style than in ads utilizing voiceover delivery style.

H6: Ads utilizing voiceover delivery style will require more effort to encode and store than ads utilizing direct address delivery style, marked by a greater deceleration in heart rate.

Chapter 3: Methodology

Experimental Design

This thesis employed a within-subjects repeated measures design, analyzing two independent variables separately, which were not crossed: information delivery style and drug attribute delivery style. Information delivery style has two levels, voiceover and direct address. Drug attribute delivery style factor has three levels: absence of videographics, low A/V redundancy, and high A/V redundancy. The unit of analysis in this experiment is a segment within an ad, utilizing an intra-stimulus conceptualization, rather than conceptualizing an ad itself as a stimulus representing a level of the independent variables. There are 4 segments for each IV level. Thus, a total of 14 ads were used since some ads contained more than one stimulus segment, for a total of 20 segments to be used as stimuli (12 segments for the videographic factor and 8 for the information delivery style factor).

Independent Variables

Information delivery style. Voiceover is conceptualized as a production technique where an announcer speaks over the audio track while visuals appear over the video track. Direct address, on the other hand, is defined as a character/actor on screen speaking directly into the camera, so that the viewer is essentially watching the announcer. Information delivery style was only examined during the risk segment of the ad.

Drug attribute delivery style. The first level of videographics contains four ads that do not include videographics, serving as the control. The second level, low A/V redundancy, refers to risk and benefit statements where the words delivered over the audio track never are displayed as text on the screen, so that the viewer never sees a redundant word on screen while the announcer speaks. The third level, high A/V redundancy, is conceptualized as risk and benefit statements where at least once during the videographic at least one word that is heard over the audio track appears as text on screen.

Dependent Variables

Attention. Attention is conceptualized in this thesis as resources allocated toward encoding. Specifically, attention for drug attribute delivery style and information delivery style was measured via phasic cardiac deceleration and phasic skin conductance level (SCL). Attention was indexed by recording the participant's heart rate (HR) during exposure to ads, as a measure of the limited cognitive resources allocated toward encoding a stimulus.

Three main categories that are used to examine psychophysiological recordings: spontaneous, tonic, and phasic (Stern, Ray & Quigley, 2001). While spontaneous responses refer to physiological activity attributed to unknown stimuli, tonic activity is defined as the resting level or background, and is considered the long-term component of attention. Attention for information delivery style will be measured via tonic cardiac deceleration.

Phasic activity, the short-term element, refers to a response that is evoked by a specific stimulus, such as a tone or visual. Past research by Barry (1990) indicated that the most accurate measure of indexing ORs is via phasic heart rate deceleration. During phasic deceleration, the heart beat slows for three to four beats, and then returns to baseline by the sixth or seventh beat (Graham & Clifton, 1966). When cardiac activity is measured just before exposure to a stimulus, it is called the baseline. For the variable, drug attribute delivery style, this thesis utilizes phasic heart rate change as the operational definition of the OR.

Heart rate data was collected throughout stimulus exposure, including a one-second recording of baseline before each stimulus. In preparing to measure resources allocated toward encoding, the primary investigator wiped down three areas on subjects' arms where surface electrodes were placed: two placements on each forearm and one on the left wrist. Each electrode was filled with electrode gel.

To ensure reliability, phasic skin conductance level (SCL) was used as an additional measure to index the OR. SCL measures activation of the sympathetic nervous system, and relates to fluctuations in the level of sweat produced by eccrine sweat glands located on the palms or feet. Measuring the "amount of conductivity occurring across electrodes," SCL in this study was recorded using electrodes placed on participants' palms (Dillman Carpentier & Potter, 2007). As operationalized in Dillman Carpentier and Potter's (2007) study, SCL was analyzed by examining change scores, which compare the conductivity level one second prior to the stimulus, to each second in the stimulus.

Skin conductance data was collected in the identical fashion as heart rate, except with only two surface sensors, both placed on one of the participant's palms. In addition, KY Gel was used instead of electrode gel for skin conductance.

Recognition. Recognition of ad content was measured as an indicator of how well stimulus segments were encoded into short-term memory and it was tested using a four-item forced-choice multiple choice test. Participants were asked one multiple choice question for each of the drug attribute delivery style stimuli and two multiple choice questions for each of the information delivery style stimuli. The number of questions for each variable differed since drug attribute delivery style stimuli were shorter and therefore, conveyed less information. The multiple choice questions for information delivery style consisted of specific risk statements contained in the audio track. The multiple choice questions for drug attribute delivery style included statements from the audio track explaining the purpose of the drug and how it works.

Stimulus Derivation

60-second DTC prescription drug commercials were obtained from the pharmaceutical company Pfizer at no cost. All commercials acquired had been previously aired on television within recent years. The experimenter created a coding procedure for stimulus ads so that segments within an ad could be grouped into one of five IV levels. After coding each ad, a total of 14 commercials were chosen, containing 20 segments to be used as stimuli.

Table 2.
Operationalizing Independent Variables.

Independent Variable/Level	**Coding Description**
DRUG ATTRIBUTE DELIVERY STYLE	
No videographic	Ad contains no videographic; In place of videographic is a voiceover; Audio and video not redundant
High A/V Redundancy videographic	At least once during videographic, at least one word delivered through the audio track appears as text on the screen
Low A/V Redundancy videographic	The words delivered through the audio track do not appear as text on the screen in the videographic
INFORMATION DELIVERY STYLE	
Voiceover	During drug risk statement, while the announcer is heard over the audio track, visuals (not semantically related) appear on video track
Direct Address	During drug risk statement, the announcer speaks directly into the camera

Procedure

The experiment took place at the University of Missouri's Psychological Research on Information and Media Effects (PRIME) lab. Upon arrival, participants were greeted and asked to read and sign a written informed consent form. Participants were then probed on what they just read so that they are fully aware of the experiment's procedure and risks. They were reminded that they may leave at any time should they feel uncomfortable. A drug questionnaire was given to each subject that asked them to report how familiar (on a seven-point scale) they were with 14 prescription drug brands. The brands were from the 14 commercials they were about to view, and the questionnaire's purpose was to control for pre-existing familiarity.

Participants were seated in the experiment room, where electric surface sensors was placed on their arms and palms. Experiment instructions and questions were designed using Media Lab, enabling participants to complete the experiment at their own speed with a keyboard and mouse. On the first screen, participants read that they were about to view 14 prescription drug commercials. Stimulus order were randomized for each participant to avoid primacy and recency effects. Following the commercials, participants viewed a distracter task consisting of a 3-5 minute video clip from a classic sitcom. Participants then completed the recognition portion of the experiment. The recognition portion included answering questions regarding whether or not certain statements were included in recently viewed ads. After completing the recognition task, they were given a participation receipt, debriefed regarding the study's purpose, asked not to discuss the study with anyone, thanked and dismissed.

Participants

Fifty-one students were recruited from upper-level journalism classes at the University of Missouri. Participants received research participation credit in their class upon completing the experiment.

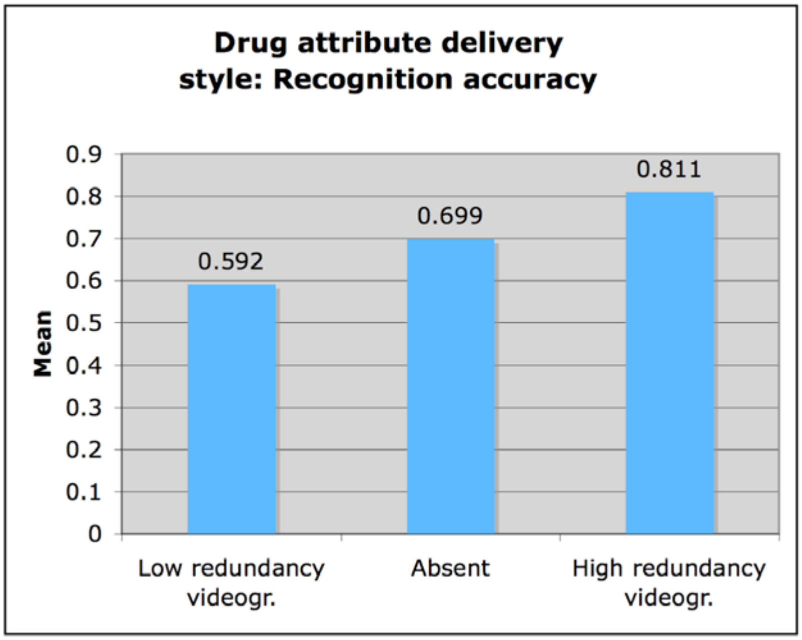
Chapter 4: Results

H1

The first hypothesis predicted that the presence of videographics would lead to higher recognition than ads without videographics. Recognition was measured via one forced-choice multiple-choice question for each drug attribute delivery style stimulus. For the recognition analysis, a total of 49 participants' data were used; two subjects' data were missing and were thrown out. The data were transformed from four answers to binary (1=correct answer, 0=incorrect). In determining the effect of drug attribute delivery style on accuracy, the data were submitted to a 3 (Drug attribute delivery style) x 4 (Stimuli) repeated measures ANOVA. The three levels of drug attribute delivery style included the absence of videographics, high and low redundancy videographics. H1 was tested by determining if low and high redundancy videographics had significantly higher recognition accuracy than stimuli absent of videographics.

While there was a significant (α=.05) main effect for drug attribute delivery style ($F_{(1,48)}$=14.98, $p<.001$, partial η^2=.238), the means show that participants only encoded high redundancy videographics better than stimuli without videographics, instead of both high and low redundancy videographics. The means are displayed in Graph 1. Thus, H1 was not supported.

Graph 1.
Drug Attribute Delivery Style: Recognition Accuracy.



H2

The second hypothesis stated that individuals would orient at the onset of videographics in DTC prescription drug ads. Orienting response (OR) was operationalized by a phasic cardiac deceleration in heart rate. Change scores were calculated for each drug attribute delivery style stimulus; the second preceding the stimulus was subtracted from each second in the stimulus. Each stimulus was analyzed separately due to differing segment durations. After throwing out four participants' heart rate data due to extremely inconsistent beats per minute (BPM), a total of 47 subjects were used in heart rate and skin conductance analyses.

Because of the differing stimulus lengths, eight repeated measures ANOVAs were performed, with the number of levels corresponding to the length of the videographic in seconds. For example, for the first analysis, Vgh1Time (high redundancy videographic 1) had 10 seconds, so there were 10 levels. Specifically, the researcher looked for a significant cubic or quadratic trend. The quadratic trend for high redundancy videographic 3 was significant ($F_{(1,45)}$=4.949, p=.031, partial η^2=.099). However, inspection of the cardiac response curve revealed that the pattern was not indicative of an OR curve. The means are displayed in graph 2. The cubic trend for high redundancy videographic 3 was not significant ($F_{(1,45)}$=1.205, p=.278, partial η^2<.026).

Graph 2.
Significant Quadratic Trend Means for High Redundancy Videographic Stim 3.
($F_{(1,45)}$=4.949, p=.031, partial η^2=.099)

Time (in seconds)	**Mean**
1	-.393
2	.078
3	.750
4	-.091
5	-.351
6	-1.628
7	-2.221

Results from the other seven stimuli were not significant. Only one stimulus out of eight evoked a significant orienting response; thus, H2 was not supported.

One of the two ways the elicitation of an OR is shown in this thesis is through a brief increase in skin conductance and through a three to four beat deceleration in heart rate (Graham, 1979). As mentioned in Chapter 3, phasic heart rate has been found to be the most accurate indicator of an OR (Barry, 1990). Skin conductance is a more sensitive measure than heart rate. Due to insignificant heart rate findings, skin conductance was not analyzed since the measure alone is not reliable enough to indicate an OR.

H3

The third hypothesis predicted that recognition would be greater for high A/V redundancy videographics than for low A/V redundancy videographics. A 2 (Videographics: high/low) x 4 (Stimulus) repeated measures ANOVA was conducted. Supporting H3, there was a significant main effect for videographics ($F_{(1,48)}$=28.63, $p<.001$, partial η^2=.374) such that participants scored higher accuracy on high redundancy videographics than low. Table 3 displays the means.

Table 3. *Recognition Accuracy for Two Levels of Videographics.*

Accuracy (percent correct)	
Low redundancy	High redundancy
59.2	81.1

H4

Hypothesis four stated that low A/V redundancy videographics would evoke a stronger orienting response (OR) than high A/V redundancy videographics. Because videographics did not elicit an OR as hypothesized in H2, analysis could not be performed for H4. Thus, H4 was not supported.

H5

The fifth hypothesis predicted that recognition would be greater in ads utilizing direct address delivery style than in ads utilizing voiceover delivery style. The data were submitted to a 2 (Delivery: voiceover/direct address) x 4 (Stimulus) x 2 (Multiple choice question) repeated measures ANOVA. No main effect was found for delivery ($F_{(1,48)=}$.912, p=.344, partial η^2=.019, voiceover mean=.666, direct address mean=.633). Thus, H5 was not supported.

H6

H6 hypothesized that ads utilizing voiceover delivery style would require more effort to encode and store than ads utilizing direct address delivery style, marked by a greater deceleration in heart rate. Due to differing stimulus durations, the data in longer stimuli were converted to 11 data points since the shortest stimulus was 11 seconds. Data were converted by averaging two to three heartbeats at a time. A 2 (Delivery: voiceover/ direct address) x 4 (Stimulus) x 11 (Data point) repeated measures ANOVA was performed. Delivery style was not significant ($F_{(1,45)=}$.936, p=.338, partial η^2=.02), nor was the delivery x data point interaction significant ($F_{(1,45)=}$1.582, p=.109, partial η^2=.034). The mean for voiceover was -.242 and the mean for direct address was -.529. H6 was not supported.

Drug familiarity questionnaire

Responses from the drug familiarity questionnaire (seven-point familiarity scale) that participants completed prior to viewing ads, were entered as a covariate in the recognition analyses. Results showed that prior commercial viewing did not impact recognition. Voiceover stimulus 1 (Ambien CR) was the only significant stimulus ($F_{(1,40)}$=4.301, p=.045, partial η^2=.097, mean square=1.707). Table 4 shows the results from the remaining stimuli. Thus, it can be concluded that higher recognition for certain ads was not a familiarity effect.

Table 4. Insignificant drug familiarity questionnaire results.
(dvo= delivery style voiceover, dda= delivery style direct address, vgh= high redundancy videographic, vgl= low redundancy videographic)

dvo2 ($F_{(1,40)}$=.001, p=.976, partial η^2<.001), mean square<.001
dvo3 ($F_{(1,40)}$=.577, p=.452, partial η^2=.014), mean square=.229
dvo4 ($F_{(1,40)}$=2.705, p=.108, partial η^2=.063), mean square=1.073
dda1 ($F_{(1,40)}$=.088, p=.769, partial η^2=.002), mean square=.035
dda2 ($F_{(1,40)}$=.754, p=.39, partial η^2=.019), mean square=.299
dda3 ($F_{(1,40)}$=.371, p=.546, partial η^2=.009), mean square=.147
dda4 ($F_{(1,40)}$=.464, p=.5, partial η^2=.011), mean square=.184
vgh1 ($F_{(1,40)}$=.952, p=.335, partial η^2=.023), mean square=.19
vgh2 ($F_{(1,40)}$=.032, p=.859, partial η^2=.001), mean square=.006
vgh3 ($F_{(1,40)}$=.114, p=.737, partial η^2=.003), mean square=.023
vgh4 ($F_{(1,40)}$=2.467, p=.124, partial η^2=.058), mean square=.492
vgl1 ($F_{(1,40)}$=.17, p=.682, partial η^2=.004), mean square=.034
vgl2 ($F_{(1,40)}$=.52, p=.475, partial η^2=.013), mean square=.104
vgl3 ($F_{(1,40)}$=.435, p=.513, partial η^2=.011), mean square=.087
vgl4 ($F_{(1,40)}$=1.018, p=.319, partial η^2=.025), mean square=.203

Chapter 5: Discussion

The purpose of this thesis was to examine how videographics and the information delivery style of prescription drug risks and benefits impact cognitive processing in direct-to-consumer (DTC) prescription drug ads. Specifically, the goal was to identify certain production features in drug ads that convey a clear understanding of a particular drug's risks, benefits and use.

Using repeated measures ANOVA to analyze each hypothesis, the results of this study suggest that while participants did not orient to videographics as expected, high redundancy videographics were remembered better than low redundancy videographics despite no significant difference in resources allocated toward encoding. Additionally, voiceover delivery style did not require more effort to encode than direct address delivery style, nor were there significant differences in recognition between the two levels.

While the results suggest that recognition was greater for high redundancy videographics than low (H3), participants did not encode both levels of videographics better than stimuli without videographics (H1). The differentiating characteristic between videographic levels was that high redundancy videographics contain at least one word written as text on screen while the same word(s) is stated in the audio track.

Half the studies conducted on A/V redundancy suggest that redundancy enhances memory, whereas the other half claims redundancy hinders memory (Basil, 1992). Lang (1995) pointed out that part of the reason for this is due to differing operational definitions of A/V redundancy. Seeing that recognition for high and low redundancy videographics in this study was significantly different explains why many studies have produced differing results. Only looking at one level of A/V redundancy may produce unreliable results since the effectiveness of A/V redundancy is a function of how you operationalize the concept "redundancy."

As noted previously, in examining the impact that differing videographic levels have on resources allocated toward encoding and recognition, two factors must be taken into account: a) the degree to which a message is redundant and b) how many channels it requires to process a message. Lang's research on redundancy as well as the results from this study suggest that the more redundant the text on the screen, audio, and video, the better the information will be encoded (1995, 2005).

This thesis also contributes insight as to how multiple information channels interact with A/V redundancy to influence recognition. High redundancy videographics have an additional channel (text on screen) as compared to low redundancy videographics, which require more cognitive resources. Before conducting the experiment, it was unknown whether the additional channel would interfere or aid processing since the viewer simultaneously is exposed to: moving visuals in the videographic, complex audio information about a drug, and text on screen associated with the visual. Findings from this study show that despite the extra channel, the increased redundancy in high redundancy videographics aids recognition more than an additional channel is detrimental to recognition.

In regards to practical implications, these results suggest that if pharmaceutical companies are concerned with viewers' recognition of how a drug works and what it treats, the commercial should include a high A/V redundancy videographic.

Interestingly, overall, videographics were not encoded or remembered better than ads without videographics. Despite previous research showing that individuals orient to videographics (Thorson & Lang, 1992), participants did not orient to videographics as hypothesized in H2. As discussed in Chapter 2, two types of stimuli can elicit an OR: novel and signal stimuli. The stimuli under investigation in this thesis are novel stimuli, characterized as new or unexpected in the environment (Thorson & Lang, 1992). Novel stimuli are the same for all people (Lang, 2006, p. S60). Because viewers did not orient to videographics in this thesis, it is likely that DTC advertising videographics are not novel enough to elicit an OR considering the rest of the environment. This suggests advertising creatives should try to additionally incorporate unexpected production features into videographics, such as audio sound effects, for example, which have been shown in the past to elicit an OR (Lang, 2006).

It was hypothesized that direct address messages would score higher in recognition than voiceover stimuli. This prediction was made because from a limited capacity standpoint, direct address messages are visually less complex (Lang, 1995). Furthermore, humans are hardwired to communicate with each other, and media consumers process messages the same way they would process real-world stimuli (Reeves & Nass, 1996). However, the accuracy means for voiceover and direct address were almost identical, not supporting H5.

One explanation may be that the complexity of the audio information in the recognition task was simply too difficult, and any differences in delivery were irrelevant in this case. The accuracy means for direct address (.633) and voiceover (.666) were just over 50 percent. This means that roughly every other question the participant could correctly recognize a drug risk.

The recognition task for information delivery style was over risks stated in the audio track. As previously discussed, audio processing requires more cognitive resources than visual processing (Lang, et al., 1999; Lang, 2005). Seeing as risk information in prescription drug ads consists of more complicated information than the average commercial combined with the knowledge that audio processing requires more resources, recognition suffered. While subjects may have been allocating resources toward encoding the message, more resources may have been required than were available.

Another explanation as to why there were no significant differences in information delivery style is that except for extremely severe risks, motivation to process irrelevant risks is low (Witte, 1992). According to Witte's (1992) Extended Parallel Process Model, when individuals feel less vulnerable to danger, in this case a medical condition, individuals are likely to avoid a message as a result of fear control. Fear control is a concept associated with motivation to control fear in relation to a danger presented in a message using fear appeal (Witte, 1992). Therefore, unless an individual currently has been diagnosed with the disease discussed in the ad, they may not be motivated to process risk statements.

Because this study did not find that direct address recognition accuracy was significantly better than voiceover, it is unlikely that parasocial interaction occurred. Parasocial interaction is characterized by media consumers developing a bond with characters or actors. If parasocial interaction had occurred, one would expect individuals to be able to correctly recognize information from when parasocial interaction occurred. It is possible that a 60-second commercial may not be long enough for a view to form a connection with the actor.

While not supported, H6 predicted that ads utilizing voiceover delivery style would require more effort to encode and store than ads utilizing direct address delivery style. This was hypothesized because voiceovers require more cognitive resources (Lang, 1995). However, there was no main effect for information delivery style. Both voiceover and direct address stimuli consisted of drug risks. Three possible explanations of why individuals did not allocate as many resources toward encoding risks include a) viewers hold the belief that the risks mentioned in prescription drug commercials usually only affect a small percentage of patients and therefore, it excludes themselves, b) they're not a candidate for the advertised drug so they do not see the relevance in attending to the risks, or c) the information stated in the drug risks is seen as boring or complicated and so viewers don't allocate controlled resources.

Limitations

Even though pre-existing advertisement familiarity was controlled for by the drug familiarity questionnaire, using entirely unfamiliar commercials and brand names would be ideal. Using new or fake brands and messages would decrease the likelihood that an individual would have prior exposure, whether it be advertising or exposure about a drug and what it treats from other individuals.

Studying and trying to control for certain variables in televised messages is a complex matter considering how dynamic the medium is. Visual complexity, production pacing, background music, and audio statements are constantly changing throughout any given message. As such, examining production features in DTC prescription drug commercials is challenging, since each ad differs in visual complexity depending on how many times phone numbers, logos or additional text are shown on screen. Taking this into account, variables and levels were defined as specific as possible, as to ensure that the operational definitions and results were valid. Additionally, this thesis utilized a repeated-measures design to ensure that changes between groups were due to the production feature under investigation rather than extraneous variables.

Lastly, researchers studying DTC prescription drug advertising should be cognizant of participants' overall views and attitudes harbored towards prescription drug advertising. Individuals who are against taking prescription drugs may automatically tune out the entire message, while hypochondriacs may specifically key into the benefits statement.

Future Research

As prescription drug advertising is a relatively new phenomenon, research topics in this area are vast and crucially needed. It important to conduct and replicate prescription drug advertising studies in order to advance theoretical relationships, such as A/V redundancy in this thesis. Additionally, it's essential to sensitively study this topic since DTC advertising can influence individuals to buy a critically life-altering product. Knowing the effects of adding certain production features to a commercial is extremely important considering the health risks and benefits being conveyed in the messages.

Because this thesis found that high A/V redundancy videographics were better remembered than low A/V redundancy videographics, conducting a study specifically on the high manipulation may further inform the relationship between three information channels (audio, video, and text on screen) and its effect on recognition. More specifically, using conditions with varying amounts of text would especially be interesting because researchers could gauge at which point too much text interferes with how well a piece of information is remembered. The high redundancy videographics in this study were found to be effective at increasing recognition accuracy, but one would expect that at a certain point, adding too much text becomes detrimental to recognition.

DeLorme, et al., 2006 studied how age affects consumers' behavior following DTC advertising exposure. Another angle that future researchers should take in examining DTC drug ads is studying whether age mediates the relationship between multiple information channels and recognition. Due to cognitive aging, viewers in the oldest age bracket may remember less than the youngest viewers.

Future research may also inform how other production variables influence resources allocated toward encoding and recognition. For example, a study could be conducted about whether or not perceived source credibility mediates the relationship between medical expertise and recognition. Medical expertise in this case may refer to actors dressed as doctors or nurses. It is likely that commercials featuring medical experts have increased perceived source credibility, and higher recognition.

While this thesis addresses specifically production features and its influence on cognitive processing, it is also worth discussing broader topics regarding DTC advertising as a whole and where the field should head. DTC advertising restrictions were discussed in the Introduction of this thesis, and while policy makers weigh many factors in regulating this product category, DTC advertising has serious implications. Advertisers pay to promote their brand and they should be allowed to emphasize the benefits of their product, but there are two issues that arise when drug information is marketed towards consumers. First, by only learning about a brand, consumers are unaware of generic drugs, which treat a given condition just as effectively as the advertised brand, yet are less expensive. This concern is especially important, and real, for indigent patients.

Second, advertised drugs have the power to create brand loyalty. This is an issue because: a) a doctor may realize that while the patient has the symptoms advertised, a different treatment option is appropriate based on a patient's family history and current health status, and b) organizations such as the AMA oppose DTC advertising- one reason being that it weakens the patient-physician relationship. Patients come to their doctor's office already brand loyal, determined to receive a prescription for the advertised drug. Instead of spending time diagnosing a condition and determining the appropriate treatment option, physicians lose time convincing patients that the drug is not suited for them.

As an attempt to address a solution, it's necessary to question whether the current DTC advertising regulations are a product of an archaic legal perspective that stress a "fair balance" of drug benefits and risks. Based on the results of this thesis as well as a DTC advertising study conducted by Rebecca Norris and Paul D. Bolls in 2007 at the University of Missouri, it is apparent that viewers of DTC advertising have a difficult time remembering risk information. The 2007 study found that the average score for cued recall of risk information for visual complexity and emotional tone was 42 per cent. For recognition, the average recognition score for drug risk information was 71 per cent. The average score for recognition of risk information in this thesis was 65 per cent.

Therefore, it may be appropriate to debate the necessity of requiring that risk information be conveyed since the information is remembered so poorly. Tying together the previous points about the repercussions of DTC advertising and the difficulty in viewers' memory of risk information, maybe a more effective use of the time spent discussing risks in these commercials, is to instead include two mandatory statements:

1. “There are generic drugs your doctor may be able to recommend based on your current health and family history that may be a better option,” and
2. “There are other non-drug treatment options to consider with your doctor.”

The best way to look at a debate surrounding whether to keep or eliminate the drug risk requirement is by looking at both arguments. In favor of eliminating the risk statement are the following reasons: a) drug risk information is poorly remembered and assuming that no additional production techniques can be added to enhance memory of risk information, other equally-important information could replace it (such as the two mandatory statements above), and b) some viewers who would otherwise consult their doctor about a treatment, don’t seek medical advice because they’re afraid of the risks, even though only a small percentage of patients actually experience the side effects. As a result, their condition worsens because of their fear of drug risks.

On the other hand, keeping drug risk information is important for the following reasons: a) by only knowing drug benefits, viewers become brand loyal for a drug that may not even be the appropriate treatment option, and b) even though it is a small percentage of individuals who experience the risk, the side effects are a real consequence of taking the drug, and patients need to be informed of them.

If stating a drug’s risk information continues to be a requirement in DTC advertising, and viewers currently have a difficult time remembering risk information in DTC drug commercials, maybe it's time to rethink the medium used in conveying this information. Considering the difficulty of the information contained in the risk statement compared to information in most other commercials on cable or network television, other mediums may do a better job of presenting this information. For example, by advertising in newspaper, magazine and Internet, there are no time constraints. If an individual gets interrupted while reading about the drug, they can always go back and read more. Whereas in television, a viewer has one opportunity to learn the information. The aforementioned mediums also allow for further explanation, since there's a lot of room for text. The Internet is an especially dynamic medium, because the amount of text that can be used is endless, and it also has audio and video capabilities. Therefore, advertisers may want to question using the television medium. Additionally, researchers should consider empirically studying the abilities of each medium to convey drug benefits and risks.

Both eliminating and keeping drug risk information as a requirement in DTC advertising has benefits, and a more in-depth examination of this topic should be studied to gain a better understanding of the meaning of an "effective" DTC ad as well as the overarching implications of DTC advertising. The more researchers who study production features and its affect on cognitive processing in DTC drug ads, the better policy makers will be informed to regulate DTC advertising, and the more innovative ad campaigns can be created to maximize viewers' memory of drug attributes. Thus, more researchers must delve into studying DTC advertising in order to expand the total breadth of knowledge in this area.

Appendix 1

Commercials Used as Stimuli

1. AmbienCR 090206
2. Avodart 041706
3. Crestor 021306
4. Cymbalta 121706
5. Detrol LA 050506
6. Fosamax Plus D 020606
7. Humira 071006
8. Levitra 101106
9. Lipitor 101606
10. Lunesta 020606
11. Nexium 060806
12. Plavix 112506
13. Zelnorm 032906
14. Zetia 022206

Appendix 2

Stimuli for each Independent Variable level

Drug attribute delivery style

Videographics absent

1. Fosamax Plus D 020606
2. Humira 071006
3. Levitra 101106
4. Lunesta 020606

Low A/V redundancy videographics

1. Detrol LA 050506
2. Lipitor 101606
3. Nexium 060806
4. Plavix 112506

High A/V redundancy videographics

1. AmbienCR 090206
2. Cymbalta 121706
3. Avodart 041706
4. Zelnorm 032906

Information delivery style

Voiceover

1. AmbienCR 090206
2. Detrol LA 050506
3. Levitra 101106
4. Lunesta 020606

Direct address

1. Crestor 021306
2. Fosamax Plus D 020606
3. Humira 071006
4. Zetia 022206

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