BIG PHARMA & CELEBRITIES: THE INFLUENCE OF PHARMACEUTICAL INDUSTRY CREDIBILITY AND ENDORSER CREDIBILITY ON CONSUMER RESPONSES TO DIRECT-TO-CONSUMER PRESCRIPTION DRUG ADVERTISING

by

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(Under the Direction of Matthew Perri III)

ABSTRACT

The pharmaceutical industry is presently facing a challenge in projecting itself as a credible corporate citizen. Recognizing the effectiveness of celebrities in other product categories, the industry too has employed such spokespeople to re-direct public attention towards its charitable efforts. However, little remains known about the consumer population's attitudes towards the industry and its endorsers. Therefore, studying the influence of perceived industry credibility and endorser credibility on consumers' perceptions and responses to direct-to-consumer pharmaceutical advertising (DTCA) seems both contemporary and germane.

This research utilized a randomized post-test only experimental design integrating mall-intercept surveys (n=218), to assess differences in consumer perceptions and responses to a celebrity vs. typical man-on-the street endorser in a fictitious DTC ad. Additionally, it measured consumers' perceptions towards the credibility of the pharmaceutical industry. Employing structural equation modeling, we tested competing models hypothesizing relationships between the credibility of dual message sources in a DTC ad- the pharmaceutical industry and the endorser, and traditional measures of ad effectiveness.

This study finds that a celebrity is no more credible or effective than a non-celebrity as an endorser in a branded DTC ad. However, the credibility of dual sources in the DTC ad exerts a synergistic influence on consumers' attitude toward the ad. In turn, this exerts a significant effect on brand attitudes and likelihood of discussing the advertised drug with the physician.

The results imply that the pharmaceutical industry must attempt to improve its public image if it is to obtain a successful return on brand and corporate advertising investment. Moreover, a cost-effective branded DTC

strategy would be to employ believable endorsers, regardless of their celebrity status, to induce favorable reactions from the audience.

INDEX WORDS: Direct-to-consumer advertising, Pharmaceutical industry, Celebrity endorsers, Source credibility

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DEDICATION

To Mummy and Papa – whose unwavering love, support and guidance have helped turn my dreams into reality.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The effectiveness of an advertisement depends greatly on its ability to induce a positive opinion change among its audience. Marketing practitioners appear to share the belief that the perceived credibility of the source of the message is an important determinant of such an attitude change. It is logical to assume that a message emanating from a source perceived to be highly credible will induce greater attitude change in favor of the message than a source perceived to be less credible. Consequently, the widespread use of highly credible communicators in advertising messages is not surprising.

Consumer-directed advertising of prescription medications (DTC advertising) has been a feature of the pharmaceutical marketplace for over two decades. However, its ubiquity and growth is more recent. The novelty and innovativeness of this form of promotion is matched only by the lack of

empirical knowledge about its persuasiveness. As with other advertising messages, it may be argued that the credibility of the message source in DTC ads is central to its persuasiveness. Indeed, source credibility may assume even greater significance in DTC ads because lay consumers are relatively unsophisticated about medical issues. Consequently, they rely largely on external information sources for prescription drug information. Therefore, pharmaceutical marketers would be well served to consider keenly consumers' perceptions of source credibility in the development of their DTC message strategies.

Traditionally, the source in an advertisement has referred to the product endorser or spokesperson (Stern 1994). Unarguably, spokespersons and endorsers are prime visual components of the ad and therefore are most likely to be remembered as the source of the ad message. However, an advertising message may have more than just a single source. Apart from the endorser, these may include the corporate sponsor, the media vehicle and the advertising agency. The corporate sponsor of the ad bears a unique financial and ethical responsibility for the advertisement's content. Therefore, it is very likely that

credibility of the advertiser (henceforth referred to as corporate credibility) is central to the persuasiveness of the ad.

In the past, corporate credibility has either been subsumed within or used synonymously with corporate reputation and corporate image (Goldberg and Hartwick 1990). It may be argued that corporate credibility is a more specific construct than corporate image or corporate reputation. Corporate credibility refers to the "believability, honesty and expertise of a corporation" (Newell 1993).

Mackenzie and Lutz (1989) were responsible for an early exposition of the corporate credibility construct. They referred to this construct as "advertiser credibility". They posited that advertiser credibility and "attitude toward the advertiser" are influential antecedents of attitude-towards-the ad. A doctoral dissertation by Newell (1993) is the most explicit examination of the corporate credibility construct thus far. Newell developed and validated an instrument to measure perceived corporate credibility. Further, he developed a model evaluating the relationships between corporate credibility and widely accepted advertising effectiveness measures namely, attitude toward the ad (Aad), attitude toward the brand (Ab), and purchase intention (PI).

Newell (1993) randomly assigned study subjects to receive high-credibility and low-credibility descriptions of a corporation. Then, he examined the fit of his theoretical model for both groups (N=321). The results of Newell's research demonstrated a positive and significant association between corporate credibility and two of the three advertising effectiveness measures (Newell 1993). However, the influence of moderating variables such as consumers' involvement with the advertisement remained unexplored in this study. Furthermore, Newell's study pertained to the product category of shoes, which is a relatively low-risk consumer good.

More recently, there has been some interest in empirically investigating two distinct origins of source credibility in ad messages – corporate credibility and endorser credibility (Lafferty and Goldsmith 1999; Goldsmith, Lafferty and Newell 2000, Lafferty, Goldsmith and Newell 2002). Using alternatively surveys and experiments, this program of research implicated corporate credibility as a significant predictor of Aad and Ab. Endorser credibility directly influenced only Aad but not Ab. Further, corporate credibility had a weak direct effect on PI while endorser credibility did not directly influence PI. These studies suffer from

limited external validity because they used convenience samples. Additionally, the influence of moderating variables such as involvement was not assessed.

1.2 Problem Statement

The two distinct forms of source credibility – corporate credibility and endorser credibility – have become more important to the pharmaceutical industry recently. As with other industries, the pharmaceutical industry has come under increasing criticism for alleged corporate malfeasance and misgovernance. For example, Bristol-Myers Squibb is under investigation by the Securities and Exchange Commission (SEC) for "channel stuffing" (i.e. persuading wholesalers to purchase and store extra product stock) in order to boost annual earnings. More recently, Schering-Plough, the maker of anti-allergy drug Claritin® was penalized approximately $1 million, the largest penalty of this nature ever, for violating SEC regulations on fair disclosure of corporate performance to investors. Drug-maker ImClone suffered after reports of insider-trading activities involving its chief executive officer (CEO) were revealed.

In the context of the pharmaceutical industry, it is likely that consumers' perception of the credibility of one drug company may translate to other companies. This is because consumers' differentiation of pharmaceutical manufacturers may be relatively lesser than other industries. For example, consumers may more easily be able to differentiate between IBM, DELL and Gateway (computer corporations) than between Pfizer, Sankyo and Sanofi (pharmaceutical companies). Further, consumers may not be able to differentiate between pharmacy companies such as CVS, Eckerd's and Walgreen's that are responsible for dispensing of drugs at the retail level and pharmaceutical manufacturers that are responsible for actually producing drugs. Therefore, it may be argued that corporate credibility in the pharmaceutical industry may be an indicator of the credibility of the entire industry and not any single company.

The potential impact of the credibility of a corporation on consumers' reactions to that corporation's products is exemplified by the Tylenol-tampering incidents of the mid-1980s. The credibility of Tylenol's manufacturer, Johnson and Johnson plummeted as a result of the two incidents involving tampering with the over-the-counter pain reliever. In the immediate

aftermath of each of these incidents, consumers reacted negatively to the company, its products and its ads. Dramatic declines in sales and stock price followed. Exemplary management of this crisis by Johnson and Johnson (that included pulling ad campaigns, publicizing its co-operation with law enforcement and recalling Tylenol from the marketplace) helped its fortunes recover. Nevertheless, this incident demonstrates vividly how perceived corporate credibility may influence consumers' reactions to pharmaceutical goods and services.

Roping in celebrities to endorse brand-name prescription medications in DTC ads is a very recent strategy adopted by the industry. Generally, pharmaceutical manufacturers use celebrity endorsers only in public relations campaigns to spread awareness of certain diseases (e.g. Lance Armstrong's Tour of Hope ™ to promote awareness of cancer research), new drugs (e.g. Mickey Mantle for Ciba-Geigy's arthritis drug Votaren®) or in physician-directed ads (e.g. Cal Ripken for Astra-Zeneca's anti-hypertensive Prinivil®). However, some of these campaigns have prompted regulatory concerns about the potential for consumer misinterpretation of these endorsements. For example, the FDA argued that consumers might assume that Mr. Mantle's endorsement

was objective, when in fact he was paid for the effort. Also, Mr. Mantle's endorsement was considered to be a form of product-specific DTC advertising, which was in violation of FDA rules on DTC ads at that time. In fact, the FDA forced Ciba-Geigy to stop using Mickey Mantle to promote Voltaren®. In the context of Mr. Ripken's endorsement of Prinivil®, the FDA deemed that the ad lacked an appropriate disclaimer stating that the endorser did not use the product. Overall, these problems led to manufacturers shying away from attempting the celebrity endorsement strategy in their DTC marketing.

In 1997 the FDA relaxed restrictions on DTC advertising in the broadcast media. This led to an exponential increase in the number of DTC ads on television. However, considering the time constraint associated with effectively communicating information about a prescription drug on television, a celebrity endorser may attract instant attention to the ad and can help form a positive association between the brand and its several constituencies including, patients, lay consumers and health care professionals. Consequently, from 1997 onwards manufacturers have seized the opportunity to enhance the effectiveness of their marketing campaigns by incorporating celebrity endorsers. Beginning with Joan Lunden's endorsement of Schering-Plough's

anti-allergy drug Claritin® in 1998, several brands started employing such spokespersons (e.g. Bob Dole for Viagra, and Dorothy Hamill for Vioxx). Simultaneously, other companies began using celebrities in advertised patient educational campaigns about medical conditions. These campaigns aimed at encouraging consumers to talk to the doctor about a medical condition for which the company had a brand. This was meant to stimulate the growth of the entire market. For example, Amgen Inc. currently employs the actor Rob Lowe to talk about Neutropenia, a cancer chemotherapy-related infection. Amgen hopes this endorsement will stimulate patient-physician discussions about its Neutropenia drug Neulasta®, which is currently a market leader in this therapeutic area.

Marketing analysts believe that celebrity endorsements are effective when there is congruence between the celebrity and the product they endorse (Neff 2002). Conversely, it has been argued that celebrities do not possess adequate expertise about the drug and are unqualified endorsers. It is generally acknowledged that ads containing such endorsers may be unviable if the endorsers are not perceived as credible (Neff 2002).

DTC advertising is a unique tool in pharmaceutical marketers' efforts to "push" their prescription products directly to the end users of the product. This practice entails heavy expenditures and generates much controversy. However, the practice is bound to be a permanent fixture in the pharmaceutical marketplace. Consequently, it is imperative that researchers and practitioners move beyond the debate about the appropriateness of DTC and towards determining the factors that contribute to its persuasiveness. Taking into account the considerable body of research documenting the impact of the source characteristics on persuasion, it may be argued that corporate credibility and endorser credibility – two distinct origins of source credibility – may play a critical role in determining the persuasiveness of DTC advertisements. Still, an empirical exploration of these source effects is yet unavailable. Specifically, no previous investigation has examined consumers' perceptions of the credibility of the pharmaceutical industry. Further, consumers' perceptions and reactions to celebrity endorsers in DTC ads remain unclear. Both these issues are critical to the success of pharmaceutical marketing efforts.

Apart from source effects, the role of involvement in consumers' reactions to DTC ads is not well understood. While DTC campaigns are targeted

to the general consumer populace, it is likely that they are of greater interest to patients i.e. those consumers who have the medical condition for which the advertised drug is indicated. Therefore, it may be argued that consumers' involvement with the advertising message will play a key role in determining how persuasive a DTC ad is. However, no previous study has attempted to determine how this variable may influence the relationship between source credibility and DTC ad effectiveness. The current study attempts to address these research problems in the pharmaceutical marketing literature. Specifically, the major research questions are:

1. What are consumers' current perceptions of the credibility of the pharmaceutical industry?
2. Is a celebrity endorser in a DTC ad perceived as more credible than a non-celebrity endorser?
3. Does using a celebrity endorser influence ad effectiveness outcomes to a greater extent than using a non-celebrity endorser?
4. How does perceived pharmaceutical industry credibility and endorser credibility jointly influence consumers' attitude-toward-the DTC ad (Aad), attitude-toward-the advertised prescription drug brand (Ab) and

drug inquiry intent (DII) under the moderating influence of consumer involvement?

1.3 Theoretical Framework

In an attempt to address the gaps in the pharmaceutical marketing literature, the current study will attempt to develop an empirically testable model to assess the relationships between source credibility and DTC ad effectiveness. In this process, the current study uses the theoretical framework of the Dual Credibility Model (DCM) proposed by Lafferty, Goldsmith and Newell (2002). A brief description of this theoretical concept is presented below.

The DCM has been posited recently in the context of explaining the relationship between source credibility and advertising effectiveness. It postulates that corporate credibility and endorser credibility exert a mutual influence on Aad, Ab and Purchase Intention (PI). More specifically, the DCM theorizes that corporate credibility will directly affect Aad, Ab and PI. Endorser credibility will exert a direct impact upon only Aad, which mediates endorser credibility's influence on Ab and PI.

The DCM was proposed in the context of low-risk consumer products. In contrast, the current study focuses on the product category of prescription drugs. Consequently, it is unlikely that PI may be employed as a measure of DTC advertising effectiveness in this study because the consumer cannot purchase the drug without a prescription from the physician. Instead, it may be insightful to assess how source credibility influences consumers' intent to engage in discussions with the doctor about the appropriateness of an advertised drug (drug inquiry intent (DII)). Therefore, in the present study, we examine Aad, Ab and DII as measures of DTC advertising effectiveness.

The relationship between source credibility and advertising effectiveness may be moderated by consumers' involvement. It may be argued that consumers respond to a DTC ad when they deem that it is personally relevant and fulfills their need for cognition. The model that will be developed and tested in this study will explicitly incorporate the measurement of involvement as a moderator of source effects in ad effectiveness. Previous research on the role of involvement in information processing has been based on the Elaboration Likelihood Model (ELM).

The Elaboration Likelihood Model (ELM) posited by Petty and Cacioppo (1981, 1986) conceptualizes that there are two routes to persuasion – central and peripheral. The central route to persuasion involves consumers cognitively scrutinizing the quality of arguments to arrive at a conclusion about the persuasiveness of a message. Such cognitive scrutiny is most likely to occur only when the recipient is highly involved in the processing of the message. Alternatively, the peripheral route to persuasion occurs when a message recipient depends on certain elements of ad execution ("peripheral cue") to judge the message. It has been argued that source credibility is one such ad element. Petty and Cacioppo postulate that when the message is of lesser personal relevance or there is lesser ability to process the message, source credibility is used to form an opinion of the message.

1.4 Significance of the Research

Prior research has examined the influence of message variables (type of appeal, information content), audience characteristics (demographics, psychographics) and channel effects (print vs. TV) on the effectiveness of DTC advertising. The impact of source characteristics, specifically source credibility,

on consumers' processing of information from these ads remains less clear. This study is the first to assess consumers' perceptions of two distinct source credibility measures - corporate credibility and endorser credibility - in the context of DTC advertising. In doing so, this study is the first to provide some insight into the prevalent attitudes towards the pharmaceutical industry. Further, in examining how corporate credibility influences widely accepted measures of DTC advertising effectiveness, namely Aad, Ab and DII, this study provides actionable results for marketers.

This study is unique in measuring the impact of celebrity endorsers in pharmaceutical advertisements. The results of this research will help marketers determine if celebrity endorsements in DTC ads generate positive returns in terms of consumer attitudes and behavioral intentions. In this context, the current study has two specific aims - first, are celebrity endorsers more credible than non-celebrity endorsers? Second, to what extent do celebrity endorsers influence different DTC ad outcomes (e.g. Aad, Ab and DII)?

This research makes multi-faceted contributions to the extant literature in source credibility. There has been no previous investigation of source credibility in the pharmaceutical industry. Second, this study is distinct in its

appraisal of the combined influence of corporate and endorser credibility on DTC ad effectiveness. Finally, this study is unique in explicating on the potentially critical role played by involvement in influencing the relationship between corporate and endorser credibility and DTC advertising effectiveness.

In summary, this study is the first to investigate the effect of source credibility on DTC ad effectiveness. It is distinct in proposing and developing a model of source effects in pharmaceutical marketing. Considering the relevance of credibility in today's corporate environment and the heavy investment in celebrity endorsements by pharmaceutical companies, the topic under investigation could not be more pertinent and timely to pharmaceutical marketing research and practice. For academicians, this study serves to provide insights into previously unanswered research questions. For managers, it may provide a foundation upon which more effective pharmaceutical marketing strategies are developed in the future.

1.5 Organization of the Research

Chapter 2 presents a review of the literature that is relevant to the constructs in this study. Chapter 3 describes a theoretical model and lists the

research hypotheses. Chapter 4 explains the research design, measurement of constructs and methods employed in testing the study hypotheses. Chapter 5 describes the final results of the study. Chapter 6 discusses the study findings, presents implications for theory and practice, and offers directions for future research in this area.

CHAPTER 2

LITERATURE REVIEW

The research objectives set the stage for gaining a better understanding of the constructs that are relevant to the current study. Accordingly, this chapter reviews the literature pertinent to the constructs studied in this research. First, the practice of DTC advertising is described. Subsequently, previous research in social psychology, marketing and advertising is reviewed to provide some insights into source effects in persuasion.

2.1 DTC Advertising of Prescription Drugs

Traditionally, physicians have held complete sway over the prescribing decision. Consequently, they represented the major audience for the pharmaceutical industry's marketing efforts. Accordingly, physician-directed advertising, sales calls, free samples and conference exhibits constituted the bulk of drug manufacturers' promotional agenda. Over the last two decades

however, there has been a paradigm shift in manufacturers' marketing strategies. Recently, greater emphasis has been laid on adopting a more holistic approach that involves marketing directly to the end users of prescription drugs - consumers.

The move away from marketing merely to physicians has been influenced in part by the systematic change that has enveloped health care delivery in the U.S. Conventionally, health-care delivery and payment was based on the fee-for-service structure. According to this schema, the patient pays a fee for each service that is performed. However, this paradigm has shifted due to the emergence of managed care organisations such as health maintenance organisations (HMOs) and pharmacy benefit managers (PBMs). For example, under the staff model HMO, the physician receives a fixed or capitated payment for the services s/he renders irrespective of the number of patients s/he treats. Alternatively, under the physician model HMO, the capitated payment is based on the number of patients who choose to be treated by a particular physician. In both these HMO models, there is a potential disincentive for physicians to provide a greater amount of time and higher quality of care to their patients. Additionally, the managed care system usually restricts physicians' prescribing

to a selected list of drugs (formulary). It also reduces physicians' traditional control over the prescribing process by mandating prior authorisations for certain drugs. Some scholars believe that such restrictive changes in the health-care system have made it increasingly difficult for physicians to provide patients the level of treatment that they want to provide (Lipsky and Taylor 1997; Pinto, Pinto and Barber 1998).

Concurrent with the sea change in the health-care environment in the U.S, there is also a momentum among American consumers to play a greater role in their health-care decisions (Perri, Shinde and Banavali 1999). Given the availability of more information about prescription drugs through the media, consumers perceive a need to be empowered with information before making any health-care choice. In addition, upwardly spiraling drug costs have fueled consumers to seek greater information about available therapeutic options before making any health-care decision (Perri, Shinde and Banavali 1999; Peyrot *et al*. 1998). Perhaps, the confluence of these environmental and societal changes is driving manufacturers' efforts to supplement their traditional promotional strategies with innovative direct consumer marketing methods. DTC advertising may be described as "any paid promotional material of

pharmaceutical treatments, either product-specific or treatment specific, that is consumer-directed" (Smeeding 1990).

In contrast to many marketing methods that "push" the product to the consumer, DTC advertising employs a "pull" strategy to attract demand among the end users of prescription drugs (Balazs, Yermolovich and Zinkhan 2000). Manufacturers envisage that DTC advertising will stimulate greater awareness of their products and drive consumers to physicians' offices to discuss and possibly request advertised drugs (Ruby and Montagne 1991; Smeeding 1990). In turn, this may increase physicians' acquiescence to such requests, accelerate product adoption and generate brand loyalty. Consequently, such advertising may help differentiate the advertised product and stave off the competition resulting from increasing generic substitution.

2.1.1 Evolution of DTCA

The genesis of DTC advertising occurred in England in the early 1980s, where Naprosyn®, an anti-inflammatory drug used to treat arthritis, emerged as a popular television talk show topic. Pharmaceutical manufacturers

capitalized on the positive impact that this exposure had on product sales. Consequently, a U.S. subsidiary of the British drug company Boots Pharmaceuticals initiated a direct-to-consumer advertising campaign for its Ibuprofen brand Rufen®. Merck, Sharp and Dohme followed suit soon thereafter, with a campaign for Pneumovax®, a pneumonia vaccine targeted to the elderly. In late 1982, realizing the general lack of understanding and insight about the potential impact of DTC advertising among manufacturers, providers and consumers, the FDA called for manufacturers to voluntarily discontinue their advertising campaigns pending further research in this area.

In 1985 the FDA lifted the moratorium and permitted companies to launch DTC ad campaigns. However, the agency also held DTC advertising accountable to the same standards as physician-directed advertising. For instance, DTC ads that mentioned both, the name of the drug and the condition for which it was indicated were required to carry the “brief summary”, an extensive disclosure of drug risks, adverse effects, warnings and contraindications. DTC ads on television or radio could provide a “major statement” of risks as an alternative to the brief summary but were required to

make “adequate provision” for consumers to gather the complete prescribing information about the drug from other sources.

By 1997, it was clear that manufacturers were attempting to skirt the numerous restrictions on broadcast DTC advertising by resorting to unique types of DTC ads. One such variant did not mention the name of the product; rather it encouraged consumers to seek help for a particular condition (help-seeking ads). Another type of DTC advertising mentioned only the name of the product and encouraged consumers to ask their physicians about it, but did not offer any information about the condition the drug was intended to treat (reminder ads). Naturally, many consumers reported being confused by these ads (Pines 1999). Moreover, pharmaceutical marketers were adopting newer technologies such as the Internet in disseminating promotional information.

In the face of these challenges to the health care environment, the FDA decided to ease the restrictions on product-specific DTC advertising, especially in the broadcast media. As a result, the past several years have witnessed a dramatic increase in the number of drugs that have been marketed directly to consumers. Currently, annual expenditures on DTC advertising across the pharmaceutical industry amount to $ 2.7 billion (IMS Health 2002). The

importance of DTC advertising in the promotional agenda of pharmaceutical companies is highlighted by the fact that it ranks second only to physician detailing in terms of level of expenditure (Brichacek and Sellers 2001). Although DTC spending presently accounts for about 15% of pharmaceutical industry promotional dollars, it must be remembered that several companies do not use DTC advertising. Therefore, when considering only pharmaceutical companies that are involved in DTC campaigns, expenditures constitute approximately 46.5% of all brand promotional spending (Reiss 2003 in *DTC Perspectives*).

2.1.2 Advantages and Disadvantages of DTCA

Proponents of DTC advertising believe that it spurs greater consumer awareness of hitherto little known or misunderstood conditions. It may also increase lay consumers' interest in their personal health. Furthermore, DTC advertisements may assist physicians in having more informed discussions with their patients. Moreover, DTC advertising may help physicians in explaining to their patients, the necessity of prescription drug treatment. Also, DTC advertising may operate as a reminder for patients to refill their prescriptions. In turn, this may improve patient compliance with drug therapy.

Opponents of DTC advertising purport that it may fuel unnecessary demand among patients for advertised medications. In turn, this may lead to an increase in the cost burden of prescription drugs to the health care system in a society that is arguably "over-medicated" (Perri, Shinde and Banavali 1999; Findlay 2001). Given that several DTC ads in recent years have received notices of violation due to infringements of the FDA's requirement for a "fair balance" of risk and benefit information in the ad, it is conceivable that such advertising may mislead or confuse consumers (Lexchin and Mintzes 2002). The incorrect or inaccurate interpretation of important risk information may have serious consequences for patient care.

2.1.3 Past DTCA Research

An impressive amount of research has been undertaken to examine the sphere of social influence exerted by DTC advertising. A majority of the previous studies examining this practice examine its impact on the different stages of consumer information processing. A considerable body of evidence also exists about the effects of DTC advertising on the various other stakeholders in the health care system – manufacturers, payers, health care

professionals and regulators. From the perspective of drug manufacturers, DTC advertising campaigns have generated increased sales volume while remaining cost-effective and providing a positive return-on-investment in advertising expenditure (Basara 1996; Findlay 2001). DTC advertising is successful in influencing physicians' prescribing patterns for the most heavily advertised drugs (Zachry et. al. 2002). The potency of DTC advertising may be appreciated when its impact on physician office visits is considered for drugs that are the focus of substantial advertising efforts (e.g. anti-allergy drugs).

DTC advertising may also affect adversely the overall cost of delivering health care (Findlay 2001). Insurers attribute rising pharmacy budgets and increasing prescription drug spending for certain therapeutic classes not just in small part to the heavy DTC advertising for such drugs (Perri, Shinde and Banavali 1999). It is conceivable that DTC advertising drives the unnecessary utilization of expensive brand name drugs rather than equally efficacious and cheaper generic substitutes or alternative non-drug therapies (Wilkes, Bell and Kravitz 2000). In an attempt to offset the perceived effect of DTC advertising on drug costs, insurers attempt to discourage the use of advertised drugs by implementing higher co-payment systems for such drugs, imposing formulary

restrictions and providing incentives to physicians and pharmacists to practice generic substitution (Perri, Shinde and Banavali 1999).

A common perception among the lay public and policy-makers is that DTC advertising may be associated with the increase in prescription drug prices (Findlay 2001; Lexchin and Mintzes 2002). The correlation between retail drug sales and advertising expenditures is congenial to this notion. A significant proportion of the retail spending on prescription drugs comprises of sales of the most heavily advertised drugs (Findlay 2001). Perhaps, DTC advertising is blamed unfairly for being a key driver of rising drug costs. For example, Rosenthal et. al. (2002) concluded that DTC advertising accounts for only a fraction of the total promotional expenditures across the pharmaceutical industry. They report that while DTC advertising is a driver of increasing drug costs, its contribution is potentially over-estimated. Calfee (2002) observes that DTC advertising expenditures constitute an even smaller percentage of overall pharmaceutical spending. He purports that DTC advertising makes the pharmaceutical market more competitive and thereby may actually reduce prices. This postulation receives support from Kopp and Sheffet (1997) who surmise that DTC advertising may actually decrease the retail prices of

prescription drugs by increasing competition at the retail level. He bases this premise on the "dual stage theory", which hypothesizes that the greater demand for advertised brand name drugs compels retailers to forego their margins in return for greater sales volume. In turn, this will lead to lower drug prices for consumers.

Research on the impact of DTC advertising on consumers reveals an increasing trend in consumers' awareness of such ads (Bell, Wilkes and Kravitz 1999). During the infancy of DTC advertising, Perri and Nelson (1987) found only 12% awareness of an ad for Pneumovax®. Several years later, Alperstein and Peyrot (1993) reported that greater than 35% consumers were aware of DTC ads. After the relaxation of restrictions on DTC advertising in 1997, consumers' awareness of DTC advertising increased dramatically as there was an exponential increase in the number of such ad campaigns. Another study among members of a retirement community found that approximately 80% of the respondents were aware of DTC advertising. Further, almost all respondents recalled correctly the name of the drug in the ad that they had seen and the condition for which it was indicated (Balazs, Yermolovich and Zinkhan 2000).

Separate surveys by *Prevention* magazine and the FDA in 1999 reported awareness to be approximately 70% (Prevention 1999, FDA 1999). There is evidence from recent FDA and Prevention magazine surveys showing that awareness of DTC ads is continually increasing. The most recent national consumer survey by the FDA shows that consumer awareness has reached 80% (FDA 2002).

The literature provides evidence to support the notion that consumers have generally positive attitudes toward DTC advertising (Alperstein and Peyrot 1993; Morris et. al. 1986; Perri and Nelson 1987; Perri and Dickson 1987; Williams and Hensel 1995). In turn, these favorable attitudes have influenced consumers' drug-related behaviors, specifically drug inquiry behavior and drug request behavior (Everett 1991; Alperstein and Peyrot 1993; Deshpande et. al. 2004). Survey research over the past decade reveals that nearly 25% to 30% consumers have specifically requested advertised drugs from their physicians. Importantly, in almost three-fourths of these cases, physicians complied with patients' requests (*Prevention* 1999; FDA 1999; 2002).

It may be argued that DTC advertising stimulates a paradigm shift in consumers' involvement with their health care decisions. Prior to the advent of

such advertising, consumers' involvement with the prescribing process was minimal. Currently however, most diagnosing and prescribing resembles a process of shared decision-making (Deshpande et. al. 2004; Perri, Shinde and Banavali 1999). Moreover, DTC advertising stimulates consumers to gather further information about the advertised medication (Menon et. al. 2002; Williams and Hensel 1995). Over half of the consumers surveyed by the FDA in 1999 were encouraged by DTC ads to seek more information about advertised drugs (FDA 1999). Recent research demonstrates that DTC advertising also inspires the diffusion and adoption of newer technologies such as the Internet (Menon et. al. 2002).

From the perspective of public-policy makers and regulators, the literature suggests that DTC advertising may be unable to ensure that the target audience is educated fairly about the risks and benefits of advertised drugs (Bell, Wilkes and Kravitz 2000). There exists evidence suggesting that DTC ads may not provide a "fair balance" of drug risk and benefit information (Kessler and Pines 1990; Roth 1996). Certainly, the avowed purpose of DTC advertising may not be to educate, but rather to inform, increase awareness and ultimately generate sales. Nevertheless, these goals may not be achieved if

the information does not facilitate consumers' understanding of important drug risk information (Morris, Mazis and Brinberg 1989; Tucker and Smith 1987). The majority of consumers who are exposed to DTC ads ignore completely the brief summary of risk information (Menon et. al. 2003). This finding assumes significance because the brief summary contains technical information related to appropriate drug utilization. Accordingly, it may be a critical source of information to those who take the medication. Conversely, consumers who pay at least some attention to the brief summary find the information useful in discussions with their physician (Menon et. al. 2003).

Clearly, opinions about the effectiveness of DTC advertising differ according to the perspective adopted. Nevertheless, the plethora of DTC advertising-related studies points to its significant influence on each stage of the hierarchy-of-effects model of advertising effectiveness (Lavidge and Steiner 1961). However, the mechanism by which DTC advertising induces an attitude change in its target audience is less clear. Answering this question warrants a deeper investigation of the potential determinants of DTC advertising persuasiveness.

2.1.4 DTCA and Persuasion

The nature and extent of attitude change or persuasion induced among the recipients of a communication may be attributable to a confluence of factors. Chief among these are characteristics of the source, message, channel, audience and destination (Lasswell 1948; McGuire 1985). In the context of DTC advertising, past research has allowed for broad postulation on only message, channel and audience characteristics.

Message-related characteristics in DTC advertising pertain to the type of appeal used in the ad or the format of the information content. Tucker and Smith (1987) showed that varying the format of the risk disclosure in a print DTC ad was associated with variations in consumers' reactions to the ad. Specifically, ads containing any amount of risk information were positively perceived. However, more favorable reactions were elicited when the risk information provided was of a more general nature. Morris, Ruffner and Klimberg (1985) disclosed that the absence of risk information in the ad led to perceptions of misinformativeness. Conversely, the complete lack of risk information stimulated consumers to perceive the product positively.

The nature of appeals used in DTC advertising messages has also been the subject of past studies. Pinto's (2000) exploration of affective appeals used in the visual and text components of print DTC ads revealed that the "fear" appeal found the most frequent use, followed by "humor", "guilt" and "sexual" appeals. Bell, Wilkes and Kravitz (2000) conducted a similar study to evaluate the informational appeals used in print DTC ads. They report that "effectiveness", "symptom control" and "dosing convenience" were the most frequently used cognitive appeals. They also show that the severity of the medical condition is highly associated with the type of informational appeal employed.

Consumers represent the audience of the DTC ad. As such, consumer characteristics such as demographics, psychographics, health-related knowledge and familiarity with prescription drugs may influence the persuasiveness of a DTC ad. For instance, prior experience with an advertised drug contributes significantly to retaining information from an ad (Sullivan, Schommer and Birdwell 1999). Schommer, Doucette and Mehta (1998) examined rote learning among consumers immediately after exposure to a televised DTC advertisement and found that younger, female and more

educated consumers were more likely to accurately recall and retain information from the ad. Surprisingly, older individuals who were assumed to be more knowledgeable about medications were less likely to correctly recall ad information. Another unanticipated finding was that consumers who reported greater involvement and interest in their medications were less likely to accurately recall information about the advertised drug.

Morris et. al. (1986) report that older individuals were more receptive towards DTC advertisements. They hypothesize that these individuals may have perceived prescription drugs as symbols of health. Conversely, younger individuals may perceive prescription drugs to have a negative connotation. Females and those taking more prescription medications were more likely to engage in drug request behavior after exposure to a DTC ad. Perrien et. al. (1998) investigated the effect of age on consumer reactions towards DTC advertising. They disclosed that the elderly had more affective reactions towards such ads. However, they also report that personal involvement with the ad mediates the effect of age on ad attitudes. Perri and Dickson (1988) report that consumers react to only those DTC ads that depict conditions that are relevant personally.

There is some evidence in the pharmaceutical marketing literature that suggests that channel-related characteristics may affect consumers' information processing from DTC ads. For example, consumers viewing televised DTC ads are more likely to inaccurately comprehend the risks and benefits of the advertised drug (Morris et. al. 1986). On the other hand, televised DTC ads also are associated with greater immediate recall and retention of information about the drug (Schommer, Doucette and Mehta 1998). Further, televised ads also induced more positive perceptions towards drug advertising than print DTC ads and stimulated greater information search (Morris et. al. 1986). Perhaps, print DTC ads are self-paced and provide readers with a greater opportunity to cognitively evaluate the informative content of the ad. In turn, print ads may imbue readers with self-confidence in their ability to reach a decision about the drug based on the information in the ad (Morris et. al. 1986). Print ads also present information on drug risks in greater depth and scope, possibly accentuating the negative attributes of the drug. Consequently, ads in this media are not viewed as favorably as broadcast ads (Morris et. al. 1986).

The literature in social psychology, marketing and advertising is replete with studies demonstrating that a high credibility message source increases the persuasiveness of a communication. However, similar research in the domain of DTC advertising is unavailable. Few studies have empirically evaluated perceptions of the source in DTC ads. Consequently, little is known about the influence of source characteristics on the persuasiveness of the communication.

Investigation of the impact of source characteristics and specifically source credibility, in DTC advertising assumes significance because of several reasons. First, the advertised product i.e. a prescription medication has a direct impact on public health. Prescription drugs are associated with a higher perceived risk than other consumer goods. Second, consumers are relatively unsophisticated processors of medical information and may rely to a greater extent on the credibility of the source to judge the credibility of the ad itself. Finally, given that DTC advertising represents a unique business-to-consumer scenario where millions of dollars are spent on advertising to an entity that is unable to make the final decision about product adoption; it is possible that the perception of the source's credibility may serve to influence physicians'

attitudes towards the source and product. In turn, this may impact the decision of the physician to prescribe the drug.

At the present time, the faith of the lay public in "big business" may be strained due to the adverse effect of multiple instances of corporate fraud on the nation's economy. The pharmaceutical industry is not exempt from this seemingly pervasive mistrust. A pharmaceutical corporation functions as a source in drug advertisements, since it commissions such ads and is responsible ultimately for the ads' information content. Accordingly, the present environment of corporate mistrust raises interesting questions for pharmaceutical companies. What are consumers' perceptions of the credibility of the pharmaceutical industry? How do these perceptions influence the perceived credibility of a pharmaceutical corporation? How will the perceived credibility of the corporation and celebrity endorsers in DTC ads be manifested in consumers' reactions to DTC ads and brands? In an attempt to shed new light on these issues, this study explores the influence of corporate credibility and endorser credibility on DTC advertising persuasiveness.

In order to better understand the topic under investigation, the following sections will deal successively with a review of the literature in source

credibility, celebrity endorser credibility and corporate credibility. Further, the role of these constructs as determinants of DTC advertising persuasiveness will be surmised.

2.2 Source Characteristics

Lasswell (1948) posited that the success of a communication depended on answering the question "who said what and to whom and with what effect". The "who" in the communication refers to the individual or group perceived to be responsible for its dissemination. The source may indicate the originator, the sponsor, the endorser, or the vehicle used in the delivery of the message. The effectiveness of the message may vary based on whom the audience perceives as the source. For example, the media vehicle that delivers the message may exert source effects. Specifically, product image ads are more effective when placed in "prestige" magazines. Conversely, product attribute ads elicit attitude change more when they appear in "expert" magazines (Aaker and Brown 1972). For example, when the ad for a cooking or kitchenware product emphasizes its attributes, it is prudent to place it in an expert magazine such as *Better Homes*. On the other hand, when building the image of

a brand, more favorable responses may be elicited by placing the product ad in "prestige" magazines like the *New Yorker* or *Vogue*.

Historically, it is theorized that characteristics of the source that have valence for attitude change or persuasion include credibility, attractiveness and power (Kelman 1961). Source credibility was originally conceptualized generally in terms of the expertise and trustworthiness of the source (Hovland and Weiss 1951). Conceivably, credibility exerts its impact on attitude change by stimulating the internalization of the source's attitude into the recipient's system of beliefs and values. That is, if the recipient perceives the source as highly credible and the source's position to be correct and objective regarding the message advocacy, the arguments posited by the source are rehearsed, learned, adopted and integrated into the belief system (McGuire 1985).

Source attractiveness is believed to impact the persuasiveness of a message by stimulating the recipient to identify with the source in an effort to improve self-concept or self-esteem. In this process of identification, the message recipient forms a role-relationship with the source. The development of a role-relationship between the source and the recipient is contingent on whether the recipient has favorable affective perceptions of the source

(likeability), is familiar with the source or perceives a sense of similarity with the source. The process that mediates identification remains active only so long as the recipient maintains the role-relationship. Also, it is necessary that the source's position on the issue remain the same. If the source changes his opinion on the advocacy, it is likely that the recipient returns to his initial attitude about the advocacy.

Source power exerts its impact on recipients' attitude change by inducing recipients' compliance with the message advocacy. In so far as the source wields some form of power over the recipient and is capable of both, verifying and influencing the consequences of recipients' non-compliance with the message advocacy, it is anticipated that attitude change occurs. When the source's control over the recipient is removed, it is liable that the recipient will also dispose of the attitude.

The above discussion suggests that source credibility, power and attractiveness are apparently distinct. Results of factor-analytic studies are congenial to this conceptualization (Berlo, Lemert and Mertz 1969; McCroskey 1966). Furthermore, it is assumed that these characteristics exert effects through the different processes of internalization, identification and compliance

respectively (Kelman 1961). However, some scholars speculate that attitude change provoked through one process may ultimately be realized through another (McGuire 1985). For example, attitudes that develop by identification with an attractive source may be internalized ultimately because the message recipient attempts to maintain consistency between attitude and behavior. That is, in an attempt to seek uniformity between actions and attitudes, message recipients rehearse and adopt internally the attitude proffered by the source (Festinger 1957).

The primary objective of this study is to assess the perceived credibility of dual sources in DTC ads, identified as the corporate sponsor and the celebrity endorser. For this purpose, the following section of the literature review focuses specifically on explicating source credibility and its underlying dimensions.

2.2.1 Source Credibility

The concept of source credibility stems from Aristotle's definition of ethos as a listener's assessment of the character of a speaker and the listener's proclivity to rely on both the speaker and his message (Giffin 1967).

Accordingly, source credibility has been variously branded as ethos, prestige, reputation, authority and competence (Andersen and Clevenger 1963). The prevailing definition of source credibility is "the extent to which a communicator is perceived to be a source of valid assertions and the degree of confidence in the communicator's intent to communicate the assertions he considers most valid" (Hovland, Janis and Kelley 1953). According to this definition, source credibility may be conceived as the trustworthiness and expertise of a communicator. However, perceived credibility may reflect upon several other facets of a communicator's personality (Bettinghaus 1969). For example, the audience's impression of a communicator's attractiveness is another dimension that contributes to perceptions of credibility (Shimp and Delozier 1986).

2.2.1.1 Past Research in Source Credibility

According to pioneering research by Hovland and his colleagues in the 1950s, the prime components of source credibility are expertise and trustworthiness. Expertise may be defined as the expectation that the source will "make valid assertions". Trustworthiness refers to the degree of confidence

they have in the source to transmit the assertions "considered to be most valid" in an unbiased manner (Hovland, Janis and Kelley 1953).

The literature is mostly supportive of Hovland and colleagues' conceptualization of the bi-dimensional structure of source credibility. For example, Berlo and Lemert (1961) factor analyzed a semantic differential scale measuring the perceived image of a speaker and found that competence and trustworthiness emerged as the major dimensions. It appears that these factors are remarkably similar to expertise and trustworthiness.

Berlo, Lemert and Mertz (1969) conducted further factor analyses of source credibility scales using various sources, topics and subjects and uncovered three factors namely, "safety", "qualification" and "dynamism" which are relatively consistent with the earlier bi-dimensional structure proposed by Hovland and his colleagues. McCroskey (1966) factor analyzed responses to Likert-type scales measuring ethos and reported two factors underlying the scale, namely source authoritativeness and character. Again, this postulation is in line with the findings of Hovland and his colleagues.

According to Kelman's conceptualization, source expertise and trustworthiness represent cognitive dimensions of the credibility construct. On

the other hand, source attractiveness represents the affective component and the third dimension of the source credibility construct. The increasing use of celebrity endorsers in advertising messages has underscored the importance of this component. There is widespread empirical support for visualizing attractiveness as an influential determinant of credibility. For instance, Berlo, Lemert and Mertz (1969) identified an attractiveness-related construct - "dynamism", as an underlying dimension of source credibility.

Source attractiveness finds operationalization in the literature in terms of likeability, similarity and familiarity (McGuire 1985). Joseph (1982) summarizes experimental studies across different streams of research and concludes that physically attractive sources are more likeable. In turn, more likeable sources exert a positive influence on the messages they communicate. Simons, Berkowitz and Moyer (1970) review the literature and infer that a source bearing relevant similarities to message recipients will be perceived as more credible.

In addition to measuring the perceived credibility of the pharmaceutical industry and that of endorsers in DTC ads, the second major objective of the current study is to measure how these source credibility measures impact upon the persuasiveness of DTC advertising. In this context, all three components of

source credibility; perceived expertise, trustworthiness and attractiveness are likely to play key roles. Consequently, the following section contends with the valence that each of these dimensions has for attitude change.

2.2.1.2 Source Expertise

Early social psychological research implicated the perceived expertise of the source as having a significant influence on the persuasiveness of a communication (Hovland, Janis and Kelley 1953). Indeed, considerable evidence exists concerning the greater and more immediate attitude change induced by communicators perceived to possess greater experience and knowledge about the subject of the message (Kelman and Hovland 1953; Maddux and Rogers 1980). Still, experimental inquiry of the influence of this source characteristic is inconsistent. While a majority of published studies in this area document a main effect of source expertise on persuasion (Homer and Kahle 1990; Hovland and Weiss 1951; Kelman and Hovland 1953; Maddux and Rogers 1980; McGinnies and Ward 1974; Mills and Harvey 1972), one study did not find a significant association between these constructs (Johnson and Scilleppi 1969)

The perceived expertise of a source exerts a pervasive influence. For instance, when a source is labeled as “Dr.” versus “Mr.”, the compliance of the message recipients was reported to be higher for the source that was thought to be a doctor (Crisci and Kassinove 1973). Perceived expertness on the subject of the communication positively influenced message persuasiveness even when other expertise-related attributes such as education and socioeconomic status are kept constant (Maddux and Rogers 1980). An expert communicator also has been found to induce greater opinion change among the audience than an attractive communicator (Mills and Harvey 1972).

In an advertising context, it is generally accepted that the perceived expertise of the source is more vital to persuasion when the product possesses a higher risk potential or is associated with more technical information (Friedman and Friedman 1979). This finding assumes great significance in the marketing of high-risk products such as prescription drugs. In general, a review of the literature suggests that the degree to which a source is perceived as an expert with regard to the subject of the communication is positively related to attitude change.

2.2.1.3 Source Trustworthiness

The trustworthiness of a source represents the confidence that the message recipient has in the source's communication. Past research demonstrates that trustworthiness exerts a tremendous influence on the extent and nature of opinion change after exposure to a communication. In fact, of the three components of source credibility, many researchers believe that trustworthiness has the greatest and most immediate impact. It has been reported that a trustworthy source induced greater attitude change than a non-trustworthy source irrespective of the source's perceived expertise (McGinnies and Ward 1980).

The trustworthiness of a message source may interact with the disclosure of the source's persuasive intent. A trustworthy source is more persuasive if the audience does not perceive that s/he has intent to persuade (Walston, Aronson and Abrahams 1966). From this perspective, it may be assumed that the source's objectivity regarding the message topic may contribute to the perception of trustworthiness. Overall, the literature suggests that together with expertise, trustworthiness is an influential determinant of the degree to which a message is persuasive.

The trustworthiness of a source of information about prescription drugs has important implications for consumers, providers and manufacturers alike. Certainly, consumers place great trust in their health care professionals' ability to provide them with complete information about the prescription drugs they take (Menon et. al. 2002). However, physicians are faced with greater time pressures now more than ever before. Correspondingly, there are more supplemental sources of information available to consumers. The trustworthiness of an information source may be vital in building a relationship with the consumer and stimulating customer loyalty and satisfaction.

2.2.1.4 Source Attractiveness

The influence of a communicator's physical attractiveness on message persuasiveness has been the subject of considerable research. The majority of studies in this area suggest that more attractive sources tend to induce greater attitude change among an audience. However, the evidence pertaining to the positive impact of physically attractive communicators on message persuasiveness is equivocal.

An attractive communicator induces greater opinion change (i.e. persuasion) among an audience than an unattractive communicator (Joseph 1982). However, such communicators may be unable to stimulate cognitive acceptance of the message (Baker and Churchill 1977). Similarly, Maddux and Rogers (1980) experimentally tested the persuasive effects of source attractiveness. They concluded that physical attractiveness did not have a significant positive impact on message persuasiveness.

The Elaboration Likelihood Model (Petty and Cacioppo 1981, 1986) explains the influence of source attractiveness as a "peripheral cue". That is, attractiveness influences persuasion only when the audience is unable or unmotivated to elaborate on the message arguments. Conversely, an attractive source may stimulate the audience to elaborate on the information in the message (i.e. central processing), if there is congruence between the source's attractiveness and the advertised product. For instance, Kahle and Homer (1985) show that a physically attractive source in an ad for a shampoo may lure the audience into becoming more involved with the arguments in the ad.

In sum, the literature implies that attractive communicators tend to improve the audience's affective responses towards an advertisement. Further,

attractive communicators tend to be better liked than non-attractive communicators. The cognitive acceptance and credibility of messages communicated by attractive communicators are increased if attractive communicators bear relevant similarities to the target audience. Finally, although attractive message sources elicit more favorable responses than unattractive sources, they are not necessarily considered more credible than unattractive sources (Newell 1993).

Source attractiveness is becoming more pertinent to prescription drug advertising with the rise in celebrity endorsements in such ads. Drug manufacturers are attempting to capitalize on the likeability and familiarity of celebrities to promote their products. Marketers attempt to build brand name recognition and top-of-mind awareness by stimulating an association between the advertised product and the celebrity. They aim to encourage consumers to follow the example of the celebrity endorser and engage their physicians in discussions about the advertised drug.

2.2.1.5 Source Credibility and Persuasion

A tremendous amount of research has been conducted with the aim of evaluating the process and extent of attitude change induced by a high or low credibility source. Seminal research in the social influence of source credibility was conducted by Hovland et. al. at Yale University. According to these scholars, a more credible source induces an immediate and positive attitude change among message recipients towards the advocacy as compared to a less credible source (Hovland, Lumsdaine and Sheffield 1949; Hovland and Weiss 1951). They hypothesized that attitude change occurs via the learning or rehearsing of the source's arguments. Contrary to expectations however, the results of their studies suggest that while source credibility does influence attitude change, no significant differences in learning occur between recipients who do and do not accept the source's attitude (Hovland, Janis and Kelley 1953).

The literature is ambivalent with regard to the pervasive influence of source credibility on attitude change (Dholakia and Sternthal 1977). It is possible that a variety of situational, message and audience characteristics may interact with source credibility in affecting attitude change (McGuire 1985). For

example, one contextual mediator of the persuasive impact of source credibility is the passage of time. Hovland, Lumsdaine and Sheffield (1949) demonstrated that differences in attitudes between recipients exposed to a low-credibility source versus those who were not exposed to the message increased after the passage of time. This was termed as the "sleeper effect". Presumably, recipients dissociate the source and the message with the passage of time (Hovland and Weiss 1951). Other studies however, dispute the proposition that such a "sleeper effect" operates (Capon and Hulbert 1973; Gillig and Greenwald 1974). Rather, they find that while the low credibility source did not induce attitude change immediately after exposure or after the passage of time, the high credibility source did experience decay in persuasiveness.

The timing of source identification within the message may also interact with source credibility in influencing attitude change after message exposure. Experimental research reveals that identifying the high credibility source before the message influences attitude change, but there is no such effect when identification is deferred (Ward and McGinnies 1974). Conversely, the low credibility source influences persuasion when identification is deferred to later in the message. In sum, the literature reveals that a high credibility source

should be introduced at the beginning of a message and a low credibility source should be presented later in the message (Greenberg and Miller 1966; Mills and Harvey 1972).

Message-related variables may interact with source credibility in influencing attitude change among recipients. For example, when the message advocacy is highly discrepant from the general attitude of the audience, the highly credible source induces positive attitude change. Conceivably, the credibility cue inhibited counter-argumentation by the audience. When the level of discrepancy is low, credibility did not exert a significant influence, although the magnitude of attitude change was higher for the high credibility source (Bochner and Insko 1966).

Forewarning of the source's persuasive intent is hypothesized to decrease the positive influence of source credibility because the audience discounts the arguments contained in the message (Hovland, Lumsdaine and Sheffield 1949). On the other hand, some scholars report that there is no attitude reduction after persuasive intent is disclosed (McGuire and Papageorgis 1962).

Audience factors may mediate the impact of source credibility on attitude change. For instance, the nature of recipients' initial opinion about the

advocated message may interact with source credibility. When the audience has unfavorable predispositions towards the advocacy, a highly credible source induces greater attitude change towards the advocacy by inhibiting the production of counter-arguments to the advocacy. Conversely, when recipients are positively inclined towards the advocacy, they do not experience a need to produce counter-arguments and therefore the high credibility source does not exert a significant influence. In such a situation, a low credibility source encourages recipients to produce arguments to bolster their favorable initial opinion on the issue, thereby producing greater attitude change (Sternthal, Dholakia and Leavitt 1978).

Recipients' involvement with the issue in the advocacy seems to systematically moderate the impact of source credibility. The majority of investigations in this area conclude that recipients exhibiting higher involvement with the message will have greater motivation and ability to elaborate critically the arguments presented in the message. Consequently, such individuals will form an evaluation of the message based on the quality of the arguments presented and not the source cue (Johnson and Scileppi 1969; Rhine and Severance 1970). Petty, Cacioppo and Schumann (1983) and Petty,

Cacioppo and Goldman (1981) report results that are congenial to the moderating role of involvement in source effects.

2.2.1.6 Summary of Source Credibility Research

The above review of past source credibility research has two main ramifications for the present study. First, it is evident that the perceived credibility of a source is composed of trustworthiness, expertise and attractiveness. Second, while subject to the influence of moderator variables such as consumer involvement, it is generally acknowledged that a more credible source induces greater attitude change among the audience than a source of lesser credibility (Dholakia and Sternthal 1977).

The current study examines perceptions of two distinct origins of source credibility in DTC advertising. These are: the pharmaceutical industry and the endorser in an ad. Accordingly, the next two sections review the extant literature in corporate credibility and endorser credibility.

2.2.2 Corporate Credibility

There is a considerable body of evidence in the trade and academic literatures stressing the importance of the reputation, image or credibility of a company. Caminiti (1992, p.74) states that a corporation's "good name can be their most valuable and enduring asset". Indeed, Fombrun (1996) suggests that a positive perception of corporate credibility offers a unique advantage that has noticeable financial implications. He observes that a positive reputation or high credibility creates a formidable barrier for rivals to overcome. Realizing the strategic benefits that may accrue from generating such reputational capital, companies spend large sums of money in corporate advertising, charitable donations, event sponsorships and advocacy of issues (Goldberg and Hartwick 1990).

The marketing literature is replete with references to the positive influence of corporate credibility on consumers' reactions to advertising campaigns, brand attitudes and buying intentions (Goldberg and Hartwick 1990; Mackenzie and Lutz 1989; Newell and Goldsmith 2001). It is logical to assume that a corporation with higher credibility will find it easier to market its products and build relationships with customers than a corporation whose

credibility has been tarnished. Nevertheless, previous studies have not been consistent in the definition, operationalization and measurement of this construct.

Various terms have been applied in past research to describe the perceived truthfulness, honesty and believability of a corporation. Accordingly, "credibility", "image" and "reputation" are often used inter-changeably to define consumers' impressions about a corporate sponsor of an advertisement (Goldberg and Hartwick 1990; Newell 1993).

"Corporate image" may represent a confluence of cognitive and affective associations that a consumer has for a corporation (Brown and Dacin 1997). It may be conceived of as a set of evaluations, beliefs and feelings that constitute attitudes towards the corporation (Barich and Kotler 1991; Dowling 1986; Johnson and Zinkhan 1990). The breadth and depth of the definition of corporate image may be appreciated by considering that a corporation has multiple images depending on the constituency whose perceptions are examined, such as consumers, government, media etc. (Fombrun 1996).

Like corporate image, "corporate reputation" has also been conceptualized as an expansive construct, closely allied with the dimensions of

"identity, image, prestige, goodwill, esteem and standing" (Wartick 2002). These dimensions may be considered synonymous with corporate reputation. The most widely used definition of corporate reputation is "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key constituents when compared with other leading rivals (Fombrun 1996, p.72).

Although conceptualized similar to reputation and image, "corporate credibility" is markedly more specific than corporate image and corporate reputation that encompass a broader array of perceptions and attitudes towards the corporate entity (Fombrun 1996; Lafferty, Goldsmith and Newell 2002). Corporate credibility represents a subset of the overall perceptions that a consumer has toward a corporation i.e. corporate image. Also, it is a component of the overall assessment that a consumer reaches regarding the general standing of the corporation i.e. corporate reputation (Keller 1998; Fombrun 1996).

2.2.2.1 Past Research in Corporate Credibility

Corporate credibility may be defined as "the extent to which consumers believe that a firm can design and deliver products and services that satisfy customer needs and wants" Keller (1998, p.426). From this definition, we may infer that corporate credibility implies the trustworthiness and expertise of a corporation. This contention receives some support from Haley (1996) who finds that consumers use the criteria of trustworthiness, expertise (or "competence") and attractiveness (or "likeability") to identify corporate image and credibility. However, some researchers posit that attractiveness (likeability, familiarity and/or similarity) may not be directly applicable in measuring the credibility of a corporation; since this dimension has a markedly physical annotation that is irrelevant to the credibility of a corporate entity (Lafferty, Goldsmith and Newell 2002; Newell 1993).

The majority of published work in corporate credibility has not devoted adequate attention to assessing the validity of the employed measures. Moreover, no univocal indicator has been used in its measurement. Rather, multiple scales and items have been used to measure corporate credibility. Further, previous studies have arrived at inconclusive results about the

underlying dimensionality of corporate credibility. These factors have contributed to an inconsistency in the appropriate assessment of this construct (Newell 1993; Ohanian 1990; Schumann, Hathcote and West 1991).

It is reasonable to assume that a corporation perceived to be highly trustworthy and expert in its field would be able to build product recognition and increase sales more easily than corporations that have lower credibility. Consumers will have positive attitudes towards the advertisements of a corporation that is perceived to be more credible (Keller 1998). This notion receives support from the literature in source effects research in advertising. For instance, Mackenzie and Lutz (1989) showed that advertiser credibility is strongly and positively related to consumers' attitude-towards-the ad (Aad).

Goldberg and Hartwick (1990) evaluated the impact of advertiser reputation, using measures of the credibility-related dimensions of expertise and trustworthiness, on the effectiveness of a product advertising campaign. They report that positive corporate reputation (higher expertise and trustworthiness) was significantly associated with better evaluations of the advertised brand. Further, a better corporate reputation was also associated with positive perceptions of the ad's credibility. In addition, the findings

suggest that when a corporation is perceived as highly credible, even extreme product claims in advertisements are perceived as credible.

2.2.2.2 Corporate Credibility and Persuasion

The potential influence of corporate credibility on consumers' reactions to DTC advertisements is of particular interest in this study. Keller and Aaker (1992) postulate that a consumer's attitude towards a particular advertisement may develop from an evaluation of a variety of factors including the image or reputation of the ad's corporate sponsor. It has been hypothesized that variables relating to a corporation's reputation may play a critical role in theoretical models of advertising effectiveness (Lutz 1985; Mackenzie and Lutz 1989). Nevertheless, the literature has omitted a systematic measurement of the corporate credibility construct in order to test this hypothesis.

A limited number of empirical studies have examined the relationship between perceived corporate credibility and widely accepted measures of advertising effectiveness, namely attitude-towards-the ad (Aad), attitude-towards-the brand (Ab) and purchase intentions (PI). Mackenzie and Lutz (1989) conducted an experiment using a student subject sample and a fictitious

product manufactured by a real corporation to test a comprehensive framework of relationships between constructs that were hypothesized to be antecedents of attitude-toward-the ad (Aad). Among these were two constructs that pertained to the corporate sponsor of the ad, namely "attitude towards the advertiser" and "advertiser credibility". Specifically, the authors hypothesized that advertiser credibility would affect Aad indirectly through the mediating influence of ad credibility. Further, they conjectured that advertiser credibility would exert a direct influence on attitude towards the advertiser. In turn, attitude towards the advertiser would impact Aad.

The results of Mackenzie and Lutz's study showed that consumers' perceptions of an advertisement's corporate sponsor were indeed strongly related to their perceptions of the advertisement itself. Specifically, "advertiser credibility" and "attitude toward the advertiser" (among other variables) were critical determinants of Aad and Ab, explaining a large proportion of the variance in these constructs. Further, advertiser credibility directly influenced attitude towards the advertiser. In turn, this construct was a significant determinant of Aad.

Mackenzie and Lutz suggest that in their study setting (an ad pretest setting), advertiser-related information was processed "centrally". That is, information about the corporate sponsor of an advertisement provided a basis on which consumers made judgments about the ad and brand. Indeed, the authors state "advertiser attitude appears to be a particularly important factor to consider" (p.332).

This contention contrasts with a general perception among cognitive response theorists who posit that source credibility mostly operates as a "peripheral" cue, influencing persuasion only in the absence of active elaboration of the ad's content (Petty and Cacioppo 1981, 1986). The fact that affective constructs such as "advertising attitudes" (a global evaluation of attitude-towards-advertising in general) did not emerge as significant antecedents of Aad supports this contention. Mackenzie and Lutz contend that the perception of corporate credibility is an accumulation of consumers' prior knowledge and experiences with a corporation and its products (Lutz 1985). Perhaps, forming a perception of the credibility of the corporate entity behind the ad may obviate the need to scrutinize the strength of the arguments contained in the ad.

Mackenzie and Lutz's study was the first to empirically test the influence of corporate credibility-related constructs on consumers' attitudes towards the ad and brand. Nevertheless, the results of their study are limited by a lack of attention to ascertaining the validity of the measures used to assess the credibility construct. Also, although Mackenzie and Lutz (1989) indicate that an indirect relationship exists between the corporate credibility-related measures and attitude-towards the brand (Ab), they do not attempt to examine the existence of a direct relationship between the two constructs.

Everett (1989) studied the influence of "advertiser credibility" on consumers' perceptions of the risk of product use and attitude toward the brand (Ab). He used an 8-item seven point semantic differential scale to measure credibility. The items pertained to various attributes associated with the corporation namely, trustworthiness, competence, dignity, reliability, qualification, likeability, respectability and successfulness. Everett randomly assigned equal numbers of subjects to high and low product knowledge groups (N=156). In addition, half of the subjects in each knowledge group received a high-complex warning message and the other half received a low-complex warning message. It was expected that among consumers undertaking lesser

elaboration of message arguments (i.e. those in the lower product knowledge receiving highly complex warnings) the paths in the model between advertiser credibility and Ab and between Aad and advertiser credibility would be stronger.

Everett's results reveal a significant relationship between Aad and advertiser credibility. In addition, he finds that advertiser credibility directly and significantly influences brand attitudes. Another interesting finding was that there were no significant differences between high-elaboration (high-knowledge) and low-elaboration consumers in terms of the strength of the path between advertiser credibility and brand attitudes and between Aad and advertiser credibility. This serves to bolster the argument that consumers may rely on corporate credibility not simply when they are unable or unmotivated to access product-relevant information, but also when they need to assess the quality of arguments in the message. Indeed, Everett states "there is no theoretical barrier to a variable occupying both central and peripheral roles in the ELM".

Newell (1993) undertook a comprehensive examination of the corporate credibility construct. He developed and validated a scale to measure corporate

credibility. Further, he hypothesized that perceived corporate credibility exerts a direct influence on widely accepted measures of advertising effectiveness, namely, attitude toward the ad (Aad), attitude toward the brand (Ab) and purchase intentions (PI). Newell (1993) randomly assigned study subjects to receive high-credibility and low-credibility descriptions of a corporation and tested the fit of the proposed model in both manipulations. Newell's analysis showed that the direct paths between perceived corporate credibility and Aad and Ab were stronger for the high-credibility manipulation than the low-credibility manipulation. However, the relationship between corporate credibility and PI did not reach statistical significance in the low-credibility group.

Lafferty and Goldsmith (1999) offer more recent evidence on corporate credibility. They examine the effect of the perceived credibility of dual message sources – the corporate sponsor of the ad and the endorser – on ad cognitions. They undertook an experiment using 100 female subjects, manipulating levels of corporate credibility and endorser credibility. Their investigation reveals that corporate credibility positively influences all three measures of advertising effectiveness, namely Aad, Ab and PI. In another experiment (N=81), the same

authors manipulate corporate credibility and endorser attractiveness to test how these credibility cues influence consumers' reactions to an advertisement for a high technology product. The results suggest that corporate credibility may influence Ab but is "relatively unimportant" in influencing Aad and PI when the advertised product is a technological innovation. In yet another study, using a cross-sectional survey design, Goldsmith, Lafferty and Newell (2000) assess consumers' perceptions of the credibility of the corporate sponsor and endorser and, advertising effectiveness measures, Aad, Ab and PI. Their path analysis suggests that perceived corporate credibility is strongly associated with all advertising effectiveness measures.

In the most recent addition to their program of research in this area, Lafferty, Goldsmith and Newell (2002) propose a "dual credibility model" that unites the well-documented impact of two sources in an advertisement – the corporation and the endorser. Corporate credibility was experimentally manipulated (positive description of credibility vs. negative description of credibility). A between-subjects factorial design was used to test the hypothesis that corporate credibility would directly influence the measures of advertising effectiveness. The path analysis revealed that corporate credibility exerted

direct and significant effects on advertising effectiveness. However, the presence of the celebrity endorser in the ad seemed to directly influence only Aad.

2.2.3 Celebrity Endorsers

Celebrity endorsements are widely prevalent in consumer-directed advertising messages. A celebrity endorser is defined as "an individual who enjoys public recognition and who uses this recognition on behalf of a consumer good by appearing with it in ad advertisement" (McCracken 1989, p. 310). Accordingly, famous personalities from different fields including the arts, sports, business and public service have all been tapped to lend their name and image to a brand's advertising campaign. Madonna, Michael Jordan, Lee Iacocco and Bob Dole are a few examples of celebrity endorsers.

There is evidence that celebrity endorsements are on the rise (Kamins et. al. 1989). Presently, it is estimated that 1 in every 3 television commercials feature a celebrity endorsement (Agrawal and Kamakura 1995). Also, celebrity endorsements are associated with prohibitive expenses. Tiger Woods received $100 million for endorsing Nike products. Several years ago, Michael Jackson

was paid $10 million for appearing in a handful of television ad spots for Pepsi Cola (Moon 1990). Great sums of money are spent on garnering such endorsements. It has been reported that more than 10% of television ad budgets are spent on this practice (Moon 1990).

The use of celebrity endorsers in prescription drug advertisements is a relatively recent phenomenon. It was only in 1998 – soon after the relaxation of restrictions on broadcast DTC advertising – that celebrity endorsers were first put into use. Starting with the endorsement of allergy drug Claritin® by television journalist Joan Lunden, several drug ads now feature celebrities as spokespersons. It is only now that pharmaceutical marketers are realizing the fact that celebrities suffer from medical conditions just as much as the lay consumer. Celebrities are also becoming more comfortable with talking about conditions that affect them or their family members now more than ever before. Consequently, such celebrities represent a potential resource that marketers can tap into in order to build brand recognition quickly. Further, since celebrities are sought after by the media very frequently, they can be more effective at increasing awareness of a drug or a medical condition and thereby reaching the intended audience across channels and viewing contexts, in

contrast to traditional marketing or advertising strategies that may be limited by the cost of air time and type of medium.

2.2.3.1 Past Research in Celebrity Endorsers

Advertising practitioners and researchers seem to believe that celebrity endorsements represent a multifaceted marketing approach that is designed to increase consumers' desire for the product. They argue that the celebrity endorsement attracts attention to the ad, increases product awareness and may influence consumers' desire to buy the product (Mowen 1980). Additionally, the qualities of the celebrity are transferred to the brands with which s/he is associated. In turn, this association may help enhance brand equity (Keller 1993). However, past ad testing research shows that less than half of the ads tested significantly increase brand awareness and brand attitudes (Surgi Speck, Schumann and Thompson 1987).

Despite their ubiquitous presence in the media, celebrity endorsements have not always yielded the desired results. In fact, in some situations, celebrities could develop into persuasive liabilities for marketers. For example, multiple endorsements by a single celebrity may reduce his/her appeal.

Consumers may not be able to identify the celebrity with a particular brand or ad due to the over-exposure (Tripp, Jensen and Carlson 1994). In addition, there may be no logical association between the celebrity and the product s/he endorses. This is termed as "match-up" failure (i.e. incongruence between the celebrity and advertised product) (DeSarbo and Harshman 1985). Also, publicity of negative information about the celebrity may compromise the credibility they impart to the brand (Till 1998). For instance, negative publicity involving O.J. Simpson and Mike Tyson led to their removal as endorsers for Hertz and Pepsi respectively.

2.2.3.2 Endorser Credibility and Persuasion

There has been little attention devoted to the mechanism by which celebrity endorsements influence persuasion. The research in this area draws mostly from Kelman's conceptualization of the way in which source characteristics exert social influence. Kelman (1961) postulated that the source of a message induces attitude change among the audience by stimulating "identification" among message recipients. Identification refers to the message

recipients' adoption of the source's attitude because of the desire to emulate the source.

Kelman's contention has received support from more recent studies of celebrity endorser effectiveness. For example, Assael (1984) implies that consumers regard the celebrity as a referent and attempt to form a symbolic association with the celebrity. Mostly, the identification relates to affective characteristics, such as the familiarity, likeability and similarity of the source. Atkin and Block (1983) surmise that celebrities are associated with qualities such as dynamism and sociability that makes them attractive and likeable. McCracken (1989) suggests that these qualities are transferred to the brand that is being endorsed.

The consistent theme in previous research on using endorsers as message sources implicates source credibility as a significant factor in determining persuasion. Source credibility and its constituent dimensions have already been identified as an influential determinant of the credibility of a message sources, especially spokespersons, in the social psychology literature (Hovland, Janis and Kelley 1953, Hovland and Weiss 1951). It is well acknowledged that a message from a source perceived to be trustworthy,

expert and attractive is regarded as more effective (Sternthal, Phillips and Dholakia 1978).

There is evidence in the literature that shows that the expertise dimension may be the most influential component of endorser effects. For instance, Freiden (1982) concluded that an endorser perceived as having expertise in the area produced a greater impact on brand attitudes than a celebrity endorser or a typical consumer. Kamen, Azhari and Kragh (1975) report that subjects in their experiment rated poorly the credibility of the celebrity endorser (Johnny Cash) because he was not considered as having the expertise to endorse the advertised brand (Amoco Oil – a high-risk product). On the other hand, studies examining the effectiveness of Chief Executive Officer (CEO) endorsements in ads reveal that the credibility of the CEO is instrumental in shaping brand attitudes and purchase intent (Kerin and Barry 1981).

Despite some evidence suggesting that expert endorsers are optimally effective, the jury is still out in this regard. For example, Fireworker and Friedman (1977) found no significant differences in consumers' purchase intent when exposed to ads featuring celebrities versus experts versus typical

consumers. Other studies indicate that trustworthiness and attractiveness are key variables in affecting consumers' reactions to celebrities. For example, Friedman and Friedman (1979) find that celebrities who exhibit greater likeability are perceived as more credible. Friedman, Santeramo and Traina (1979) document that consumers perceive greater similarity with highly credible celebrities than with less credible celebrities. In turn, celebrity endorser credibility positively influences the persuasiveness of the message.

The influence of endorser credibility on message persuasiveness may be subject to moderating influences. Prior research implies that there is an interaction between product type and endorser credibility. In this context, Freiden (1984) found that for a product carrying high financial risk (television set), a celebrity endorser produced a greater affective response. That is, the celebrity was perceived as more likeable than the other endorser types used in the study (CEO, expert and typical consumer). However, he reported no statistically significant differences between the different endorsers in terms of the credibility of the ad, product attribute ratings and purchase intent.

Applying the tenets of the ELM to study the interaction between celebrity endorsement, involvement and argument strength for a shaving product, Petty,

Cacioppo and Schumann (1983) showed that the credibility of the celebrity endorser is not influential in determining ad and brand attitudes when consumers exhibit high involvement with the content of the advertisement. Nevertheless, they point out that celebrity endorser credibility may serve as an information tool when involvement is low. They state, "For most people, the celebrity status of the endorsers was irrelevant to an evaluation of the true merits of a disposable razor, but because the celebrity endorsers were liked more than the ordinary citizens, they could still serve as a positive peripheral cue" (p. 138).

Kahle and Homer (1985) tested the hypothesis that the attractiveness dimension of celebrity endorser credibility may serve also as a central cue in influencing consumers' information processing. Specifically, they manipulated the attractiveness of a celebrity endorser and subjects' involvement with the product in a fictitious ad for a shampoo. They found that among both highly involved and less-involved individuals, the attractive celebrity endorser produced greater brand recall, induced more positive attitudes toward the brand and stimulated greater purchase intent than the unattractive celebrity.

2.3 Summary of the Literature Review

The key take-aways from the literature review are that the endorser in the ad and the corporate sponsor of the ad represent dual sources of the ad message. The perceived credibility of both these sources may exert a significant influence on the effectiveness of the ad. The credibility of the message source is related to the dimensions of trustworthiness, expertise and attractiveness. The cognitive response formulation of information processing suggests that source characteristics are differentially influential under conditions of high vs. low consumer involvement with the issue in the ad.

The literature review also reveals the gaps in the extant literature. Specifically, no study till date has investigated the joint effect of corporate credibility and endorser credibility and the effectiveness of DTC ads. There is little known about whether celebrity endorsers in DTC are perceived to be more or less credible than non-celebrities. The differential effects of celebrity endorsers vs. non-celebrity endorsers on consumers' reactions to DTC ads are not clear. It is worth reiterating that with an increase in "medical consumerism" (Perri, Shinde and Banavali 1999), lay consumers, being unsophisticated processors of drug information, rely to a greater extent than before on external

information sources, such as DTC advertising, to obtain drug-related information. Naturally then, the perceived credibility of the individuals or entities that deliver this information to consumers cannot be under-estimated.

CHAPTER 3

THEORETICAL DEVELOPMENT AND RESEARCH HYPOTHESES

The literature review suggests that there is a pattern of relationships between source credibility and DTC advertising effectiveness. In order to better understand the mechanism underlying these relationships, the current study uses two theoretical frameworks – 1) the Dual Credibility Model and 2) the Elaboration Likelihood Model.

This chapter briefly describes the DCM and the ELM and how they are applied to the current research. Based on this theoretical understanding, the current study presents a theoretical model of source credibility and DTC ad effectiveness. The proposed model will be tested empirically. The paths between the constructs in the empirical model form the crux of the research hypotheses.

3.1 Dual Credibility Model

The Dual Credibility Model (DCM) evolved from a need to understand the antecedents of advertising effectiveness. While much was known about how Aad, Ab and PI represented the ultimate outcomes for advertisers, little was known about the factors that exerted a causative influence on these outcomes. Especially, the impact of dual source-related factors on ad effectiveness was not well understood. Earlier, several researchers had shown that a causal sequence exists between the ad effectiveness measures - from Aad to Ab and from Ab to PI (Brown and Stayman 1992; Lutz, Mackenzie and Belch 1983; Mackenzie, Lutz and Belch 1986; Mackenzie and Lutz 1989). However, the antecedent system of ad and brand cognitions was less clear. The DCM sought to explain the mechanism by which source credibility functioned as a key antecedent of advertising effectiveness. The endorser and the corporation represented the dual sources in the DCM. See figure 1 for a description of the DCM.

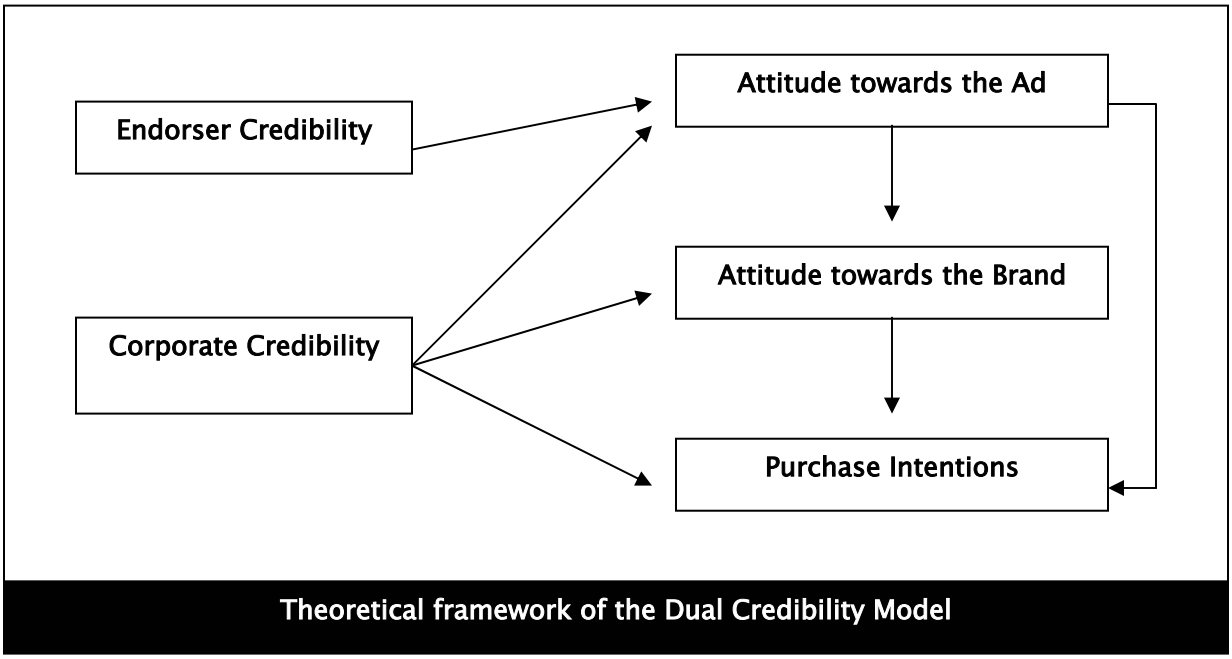


Figure 1: Dual Credibility Model

The model posits that corporate credibility and endorser credibility are utilized in forming evaluations of the ad and brand. It postulates that corporate credibility and endorser credibility individually and directly affect attitude toward the ad. Corporate credibility also directly influences attitude toward the brand. Subsequently, there is a causal sequence from attitude toward the ad to attitude toward the brand. In turn, attitude toward the brand leads to purchase intent.

The literature provides evidence to support the notion that Aad directly influences PI, without the mediating influence of Ab. This occurs when consumer involvement with the message is low and the ad stimulus evokes an affective response. In turn, such an affective response may directly influence behavioral intent (PI) without the mediating effect of brand attitudes.

The DCM conceives that endorser credibility does not directly affect Ab and PI directly. Rather, Aad mediates the relationship between endorser credibility and Ab and PI. Also, the DCM does not consider explicitly the variable of involvement. Involvement has been postulated to moderate the sequence of relationships between source credibility and message persuasiveness. In order to explain the key role of involvement, this study adapts tenets from the Elaboration Likelihood Model (ELM). This paradigm is discussed in relation to its relevance to the current study.

3.2 Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) posited by Petty and Cacioppo (1981, 1986) conceptualizes that the persuasiveness of a message depends on the degree to which the message recipient is involved with the message.

According to this contention, when recipients are highly involved with the message, attitude formation toward the message may occur through cognitive scrutiny of the issue-relevant arguments in the message ("central" route). Conversely, when recipients exhibit lesser involvement with the message, they may depend on non-message executional cues such as source credibility to form an evaluation of the message ("peripheral" route).

In the current study, the ELM is adapted in assessing how involvement moderates the mechanism by which consumers' perceptions of the credibility of the pharmaceutical industry and endorsers in drug ads impact attitude toward the ad, attitude toward the brand and drug inquiry behavior. Traditionally, the ELM has regarded endorser credibility and attractiveness as peripheral cues that consumers use to form an opinion about the advertisement only under low involvement. This contention has received tremendous support in the literature. However, it is possible that corporate credibility engenders central processing of information from the ad. This is because corporate credibility perception may be built upon an accumulation of information and experiences that the consumer has had with the corporation/industry. Therefore, forming this

perception would require cognitive elaboration on the part of the consumer about the company or industry (Mackenzie, Lutz and Belch 1989).

Especially in the context of pharmaceutical companies, it is logical to assume that consumers would have to engage in thinking about the pharmaceutical industry's credibility since their relative lack of knowledge about individual pharmaceutical corporations would preclude development of affective reactions towards any particular pharmaceutical company. Consequently, it may be argued that in this situation, perceptions of corporate credibility may affect persuasion more strongly via the central route (which requires cognitive scrutiny), than via the peripheral route. This notion has received some support from previous research. For example, Everett (1989) expected that the credibility of the corporate sponsor would influence the perception of risk information in an ad only when prior product knowledge was low i.e. when involvement was low. However, he discovered that corporate credibility's impact was clearly discernable even among consumers who had high product knowledge, who theoretically should not have used the credibility perception to evaluate the ad, if corporate credibility functioned only as a simple peripheral cue. As he notes, "there is no theoretical barrier to a variable

occupying both central and peripheral roles for high and low elaboration groups within the ELM" (p.146). In the context of DTC ads, the perceived credibility of the pharmaceutical corporation may represent an indicator of the quality or strength of the information in the ad, thereby facilitating cognitive processing. Therefore, it is conceivable that perceived corporate credibility may be relevant in arriving at an opinion about the brand.

Based on the conceptual framework of the DCM and ELM, the current study proposes and tests a theoretical model that seeks to explain the influence of corporate and endorser credibility on attitude toward the ad (Aad), attitude toward the brand (Ab), and drug inquiry intent (DII). Further, these relationships will be tested separately under conditions of high and low involvement with the issue in the ad. See Figure 2 for a description of the proposed model and the hypothesized paths under high and low involvement processing conditions.

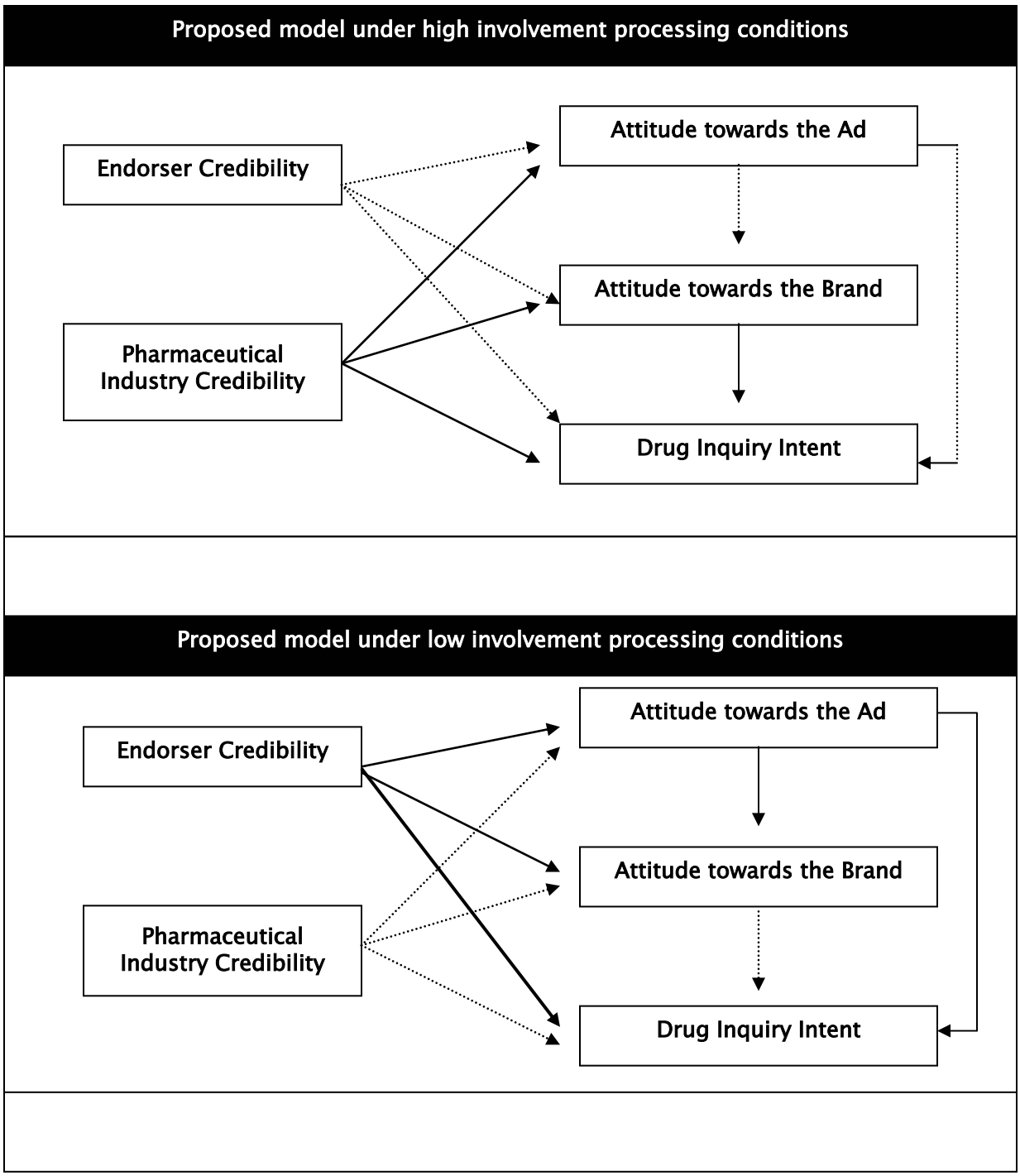


Figure 2: Proposed Study Model

3.3 Research Hypotheses

The attributes of the endorser that are most effective in influencing ad and brand attitudes have been the subject of past investigation. Some studies implicate physical attractiveness and likeability as key characteristics that differentiate the celebrity endorser from the non-celebrity endorser (Kahle and Homer 1985; Kamins 1990). Friedman and colleagues (Friedman and Friedman 1976; Friedman, Santeramo and Traina 1979) point out that celebrities who are liked more are also perceived to be trustworthier. Ohanian (1990) suggests that celebrity endorsers differ from non-celebrity endorsers in trustworthiness, expertise and attractiveness – which are dimensions of source credibility. McCracken (1989) opines "…it appears safe to say that celebrities owe some of their effectiveness as marketing devices to their credibility" (p.311). Conversely, Joseph (1982) reviewed the literature and reported that physically attractive celebrities may not be as credible as they are liked. There appears to be mixed evidence in the marketing literature to postulate that celebrities are more credible than non-celebrities. Also, it is unclear if this effect holds true in health care as well. Therefore, we hypothesize,

$H_0$1: There is no significant difference in the perceived credibility of a celebrity endorser versus a non-celebrity endorser in a DTC ad.

The sequence of relationships from attitude toward the ad to attitude toward the brand and finally to purchase intent reflects closely the model of advertising effectiveness posited by Lavidge and Steiner (1961). Past research suggests that celebrity endorsements may produce markedly different effects in terms of each of these indicators of ad effectiveness as compared to non-celebrities. For example, celebrity endorsers are more effective than non-celebrities in influencing consumers' awareness and recall of the ad and brand (Kamen, Azhari and Kragh 1975). Celebrities have also been shown to be more persuasive than other endorser types in influencing purchase intent of a product when they are associated solely with that product (Mowen and Brown 1980).

Kamins and Gupta (1994) disclosed that celebrity endorsers induce greater attitude change toward the endorsed brand than non-celebrities when there is congruence between endorser and the endorsed product. However, it is yet unclear that celebrities manage to induce similar effects in DTC ads because

many celebrity endorsers do not actually take the drug s/that they endorse. Therefore, the congruence between the celebrity and the advertised drug may be minimal. Consequently, the ability of celebrities to induce positive attitude change towards the message and brand in DTC ads is unclear. This leads us to hypothesize,

$H_0$2: There is no significant difference in attitude toward the ad between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser.

$H_0$3: There is no significant difference in attitude toward the brand between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser in a DTC ad.

$H_0$4: There is no significant difference in likelihood of brand inquiry between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser in a DTC ad.

There is a considerable body of research that examines the impact of endorser characteristics on consumers' ad responses under varying involvement. For example, Petty, Cacioppo and Goldman (1981) varied the personal relevance, source expertise and strength of arguments in a message and tested the main effects and interaction effects of these variables on attitudes towards the message. Under conditions of low personal relevance, recipients' attitudes towards the source were key drivers of attitudes towards the communication. Drawing from the Elaboration Likelihood Model, these researchers explained that source expertise operated solely as a peripheral cue in influencing consumers' reaction to the communication. This contention has received support more recently from Zhang and Buda (1999), who found that consumers who had a low need for cognition and therefore were less involved with the message, exhibited an unfavorable response to an ad that did not contain a source cue. Based on the evidence that is supportive of the ELM's contention, we hypothesize,

$H_0$5: Perceived endorser credibility has no significantly stronger effect on attitude toward the ad between consumers who exhibit high versus low involvement with treating their allergies.

The literature offers ample evidence about the impact of peripheral cues (such as endorser credibility) on the persuasiveness of a communication (Gorn 1982; Miniard, Sirdeshmukh and Innis 1992). Peripheral cues may shape consumers' product attitudes. Sanbonmatsu and Kardes (1988) conducted a lab experiment in which they subjected students to moderate and high levels of physiological arousal through exercise routines. Thereafter, the subjects were exposed to ads featuring alternatively a celebrity and non-celebrity endorser. The subjects' attitudes toward the endorsed brand were then measured. The results demonstrated that when physiological arousal, was high, students had lesser ability to cognitively process the message (lower involvement). In this situation, the celebrity endorser elicited significantly higher brand attitudes than a non-celebrity endorser. Further, under moderate ability to cognitively process the message in the ad (moderate involvement), argument strength exerted a main effect on brand attitudes, but not the status of the endorser.

These results are in accordance with the ELM's contention. Therefore, we hypothesize,

$H_0$6: Perceived endorser credibility no significantly stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

There is mixed evidence about the relationship between peripheral cues and behavioral intent. Gorn (1982) exposed subjects to a pen paired with a peripheral cue (liked vs. disliked music) and subsequently asked subjects to choose between the advertised pen (paired with music) and an unadvertised pen (which was similar to the advertised pen in all respects except for the pairing with music). It was found that most subjects chose the pen that was paired with music when the music was liked, while the unadvertised pen was chosen when the music was disliked.

Miniard, Sirdeshmukh and Innis (1992) conducted three experiments in which they used pictures as the peripheral cues in their ad stimuli. They discovered that brand choice was indeed affected by prior exposure to an ad

containing a pictorial element. Other researchers uncovered no significant differences in brand choice among subjects exposed to ads containing peripheral cues such as music and color (Allen and Madden 1985; Kellaris and Cox 1993). Given the mixed evidence in the literature to support the potential for peripheral cues such as source credibility to influence drug inquiry intent, we hypothesize,

$H_0$7: Perceived endorser credibility no significantly stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

Despite the well-acknowledged contention that source credibility is integral to the effectiveness of a communication, the credibility of an ad's corporate sponsor has only recently started receiving some attention in the trade and academic literatures. Various terms have been assigned to describe corporate credibility. These include advertiser credibility (Mackenzie and Lutz 1989), advertiser reputation (Goldberg and Hartwick 1990) and corporate sponsor credibility (Everett 1989). Corporate credibility reflects the "perceived

believability, truthfulness or honesty of the sponsor of the ad" (Newell 1993). Drawing upon the research of Everett (1989), Mackenzie and Lutz (1989) and Newell (1993), it is suggested that perceived corporate credibility has a direct influence on a variety of advertising outcomes including attitude toward the ad, attitude toward the brand and purchase intention.

It may be argued that forming a perception of corporate credibility requires an accumulation of information and past experiences with the corporate entity (Mackenzie and Lutz 1989). Therefore, it is possible that the perception of corporate credibility is formed via the central route of information processing. On the other hand, as Petty and Cacioppo (1986) imply, any source credibility perception may operate only as a readily accessible peripheral cue, upon which message recipients may base judgment rather than upon the message itself. As such, little is known about the role corporate credibility plays in information processing from DTC ads. Moreover, while it may be assumed that a consumer will form an impression about source credibility from a DTC ad, the impact of that perception on other elements of information processing from that ad is unclear. This leads to the next set of hypotheses.

$H_0$8: Perceived pharmaceutical industry credibility has no stronger effect on attitude toward the ad between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$9: Perceived pharmaceutical industry credibility has no stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$10: Perceived pharmaceutical industry credibility has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

The effect of attitude toward the ad (Aad) on attitude toward the brand (Ab) has been the subject of past investigations (Brown and Stayman 1992). A series of studies by Mackenzie and colleagues (Mackenzie and Lutz 1982; Mackenzie and Lutz 1983; Lutz, Mackenzie and Belch 1985; Mackenzie, Lutz and Belch 1986) suggest that Aad influences Ab directly and indirectly via Aad's effect on brand cognitions. Their proposed model of these effects was named

the dual mediation hypothesis. This model received support from other researchers who examined the mediating influence of Aad on advertising effectiveness (e.g. Brown and Stayman 1992 and Coulter and Punj 1999).

While the influence of Aad on Ab has not been disputed, the mechanism by which this influence occurs has remained less clear. It has been argued that Aad more strongly impacts Ab when involvement is low. For example, Petty and Cacioppo (1981) espoused that under lesser motivation and ability to process a message; Aad's effect on Ab would be greater. They labeled this route of attitude change as "peripheral". Specifically, they proposed that under lower involvement, consumers would develop Ab due to the ancillary characteristics of the ad, such as source attributes. Mackenzie and Spreng (1992) revealed that Aad represented a peripheral cue that exerted influence on brand attitudes only when motivation to process the ad information was low. Droge (1989) found that Aad influenced Ab only in non-comparative ads that require less cognitive elaboration of the message arguments. This supports the ELM's inference that Aad operates only as a peripheral element in persuasion.

On the other hand, studies by Homer (1990), Mackenzie and Lutz (1989), Mitchell (1986) and Park and Young (1986) all show that involvement does not

operate as a motivational moderator of the relationship between Aad and Ab. Lutz, Mackenzie and Belch (1985) studied the antecedents and consequences of Aad in an ad pre-testing situation. They tested the strength of relationships between Aad and Ab (peripheral processing) and between brand cognition (Cb) and Ab (central processing) in two groups of subjects having high and low product knowledge and importance.

Lutz, Mackenzie and Belch expected that under conditions of high knowledge and importance, the Cb-Ab relationship would be stronger than the Aad-Ab relationship. However, the researchers found that while Aad had an expectedly stronger effect on Ab in the low knowledge/importance group, it also influenced Ab more strongly than Cb in the high knowledge/importance group. This is contrary to Petty and Cacioppo's postulation of Aad's role as a peripheral cue and the implication that the Aad-Ab link should have been much weaker than Cb-Ab in the high knowledge/importance group. The mixed evidence regarding the moderating role of involvement on the relationship between Aad and Ab creates ambiguity about which argument is more convincing. Therefore, we hypothesize,

$H_0$11: Consumers' attitude toward the ad has no stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

The programmatic research of Lutz and colleagues shows that attitude toward the brand (Ab) is strongly linked to purchase intent and behavior (Lutz, Mackenzie and Belch 1983; Mackenzie, Lutz and Belch 1986; Mackenzie and Lutz 1989). PI may be largely determined by brand-related beliefs and evaluation of brand attributes (Biehal, Stephens and Curlo 1992). Still, the moderating role of involvement on the relationship between Ab-PI is unclear. For example, it has been found that the effect of Ab on PI is stronger for comparative ads that require greater elaborative processing than for non-comparative ads (Droge 1989). On the other hand, the relationship between Ab and PI has been shown to exist across different levels of involvement (Homer 1990).

In the context of DTC ads, consumer attitudes toward a particular drug brand may influence their intent to discuss the drug with their health care

professional. Still, the impact of their involvement level on this relationship is unclear. This leads to the next hypothesis,

$H_0$12: Consumers' attitude toward the brand has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

According to the dual mediation hypothesis of Lutz, Mackenzie and Belch (1983), Aad influences purchase intention only through the mediating influence of Ab. The findings of their study were replicated and supported across varying levels of involvement and brand consideration set (Gardener 1985; Homer 1990). However, Lord, Lee and Sauer (1995) posit an alternative model of Aad's antecedents and consequences. They propose a combined influence hypothesis that expands the role of Aad beyond that restricted to peripheral processing of elements in the ad. These researchers varied argument strength, peripheral cues, number of ad exposures and involvement in an experimental setting. They found that Aad directly influenced PI and indirectly influenced it via Ab,

across high and low involvement. However, the Aad – PI relationship was more significant under low involvement than under high involvement.

Mitchell and Olson (1981) disclosed that Aad emerged as a significant determinant of both Ab and PI. In fact, consumers' affective reactions to the ad (Aad) constituted the major determinant of Ab and PI. Shimp and Yokum (1981) examined the effect of Aad on actual purchase behavior. They exposed consumers to three ads for a cola product. In this experiment, they manipulated advertisement content (deceptive vs. non-deceptive) and product attributes. Subsequently, they observed which cola choice the consumers made and the ratings of the taste of the colas. Their results show that consumers' evaluation of the advertisement caused their purchase choice.

On the basis of the differential results of various models in the literature, we anticipate that consumers' attitude toward the DTC ad will influence their intention to talk to their health care professional about the advertised drug. Additionally, this effect may vary with involvement level. Accordingly, we hypothesize,

$H_0$13: Consumers' attitude toward the ad has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

In summary, this chapter has described the overall research problems, specific aims and research hypotheses of interest to the current study. Chapter 4 describes in detail the operational definitions of the constructs, and the research design and methods used to empirically test the research hypotheses.

CHAPTER 4

MEASUREMENT, RESEARCH DESIGN AND METHODS

The research design and methodology reflect this study's two main aims. First, we attempted to assess current perceptions of the credibility of the pharmaceutical industry and examined if there were significant differences in the perceived credibility and effectiveness of a celebrity endorser vs. a non-celebrity endorser in a DTC ad.

The second main thrust of this study focused on analyzing the hypothesized relationships in the proposed model. In doing so, the strength and effect of the hypothesized relationships were compared for high vs. low-involved consumers.

4.1 Operational Definitions and Measurement of Constructs

All constructs that are included in the proposed model were operationally defined and measured to reflect the research problem under investigation. The

items on all measurement scales that are employed in this research were adapted to the domain of pharmaceuticals.

4.1.1 Independent Variables

4.1.1.1 Pharmaceutical Industry Credibility

Based on Newell's (1993) research, pharmaceutical industry credibility is operationally defined in this study as "a consumer's perception of the believability, truthfulness, reliability, honesty and expertise of the pharmaceutical industry". It is important to consider that most studies of industry/corporate credibility have focused on the credibility of individual corporations (real and fictitious). In contrast, the current study focused on the extent to which consumers perceive that the pharmaceutical industry is credible. This definition is deliberately broad in its scope because it is believed that in general, the awareness of specific pharmaceutical companies is low. Further, it is possible that consumers may be unable to differentiate between the pharmaceutical manufacturers (companies who produce medications) and pharmacy companies (companies responsible for dispensing drugs at retail level). For example, a lay consumer may be unable to distinguish between a

drug manufacturer such as Sanofi-Synthelabo Inc. and a pharmacy chain such as Eckerd Drug Company.

Consumers' perceptions of the credibility of the pharmaceutical industry were measured using the corporate credibility scale developed by Newell (1993). This is an 8-item 7-point Likert scale anchored between strongly disagree and strongly agree. The scale has been subjected to confirmatory factor analysis revealing the existence of two factors: expertise and honesty, which are significantly correlated ($r>0.5$). For the purpose of the current study, we are not concerned with the factor structure of the pharmaceutical industry credibility scale, which represents the measurement component of the proposed model. Only the structural component of the model was assessed, i.e. the relationships between pharmaceutical industry credibility, endorser credibility and the ad effectiveness outcomes (Aad, Ab and DII).

The items on the corporate credibility scale have in past research, demonstrated convergent and discriminant validity (Lafferty and Goldsmith 1999; Newell and Goldsmith 2001). The corporate credibility scale has also been shown to have external validity since it has been successfully tested in different study populations (students vs. adults), in the context of different ad

stimuli (fictitious vs. real) and across different product categories (shoes vs. motor oil vs. cellular phone).

The overall measure of corporate credibility (computed by summing the eight items) has shown excellent reliability (Cronbach's α=0.92) (Lafferty, Goldsmith and Newell 2002). Responses to this scale were scored from one to seven with a higher score representing greater agreement with the item statement. The average score of responses to all eight items was computed as an index of perceived credibility of the pharmaceutical industry.

Please think about the pharmaceutical industry that makes medicines, like Allergone®, and is responsible for the information in such advertisements. Based on your feelings towards the pharmaceutical industry, please indicate how strongly you agree or disagree with each of the following statements by placing a 'X' in the appropriate space.

	Strongly disagree			**Neutral**			**Strongly agree**
The pharmaceutical industry has great expertise	___	___	___	___	___	___	___
The pharmaceutical industry does not	___	___	___	___	___	___	___

have much experience*.

The pharmaceutical industry is skilled in what it does.	___	___	___	___	___	___	___
The pharmaceutical industry has a great amount of experience.	___	___	___	___	___	___	___
I trust the pharmaceutical industry.	___	___	___	___	___	___	___
The pharmaceutical industry makes truthful claims.	___	___	___	___	___	___	___
The pharmaceutical industry is honest.	___	___	___	___	___	___	___
I do not believe what the pharmaceutical industry tells me*.	___	___	___	___	___	___	___

* Indicates that the item is reverse coded

4.1.1.2 Endorser Credibility

Endorser credibility is operationally defined in this study as "the extent to which the endorser is perceived as possessing expertise relevant to the communication and can be trusted to give an objective opinion on the subject" (Goldsmith, Lafferty and Newell 2000). Endorser credibility was measured using a 6-item 7-point bi-polar adjective word pair semantic differential scale used by Lafferty and colleagues (Lafferty and Goldsmith 1999; Lafferty, Goldsmith

and Newell 2002). This scale is a parsimonious form of the original endorser credibility scale developed by Ohanian (1990). The items on this scale measure different components of source credibility namely, attractiveness, trustworthiness and expertise.

Lafferty and colleagues established the construct validity of the six bi-polar adjective items by factor analysis using oblique rotation. This procedure revealed that the six bi-polar adjective items all loaded heavily on a single factor, termed "endorser credibility". Consequently, the six items were summed to form an endorser credibility measure. This measure demonstrated good internal consistency reliability (Cronbach's α=0.93) (Lafferty, Goldsmith and Newell 2002).

In the current study, subjects were asked to respond to the measurement scale by checking one of the seven intervals. These responses were then assigned a value of one to seven, with higher scores towards the positive end of the bi-polar continuum. The responses to the six items were averaged to compute an index score of endorser credibility.

Please think about the person whose picture appears in this ad and who is endorsing Allergone®. What do you think or feel about this person?

Unattractive	_____	_____	_____	_____	_____	_____	_____	Attractive
	1	2	3	4	5	6	7	
Unclassy	_____	_____	_____	_____	_____	_____	_____	Classy
Insincere	_____	_____	_____	_____	_____	_____	_____	Sincere
Untrustworthy	_____	_____	_____	_____	_____	_____	_____	Trustworthy
Not an expert	_____	_____	_____	_____	_____	_____	_____	Expert
Inexperienced	_____	_____	_____	_____	_____	_____	_____	Experienced

Additional item for manipulation check:

Very unfamiliar	_____	_____	_____	_____	_____	_____	_____	Very familiar

4.1.2 Manipulated Variable

4.1.2.1 Endorser type

In this study, endorser type was experimentally manipulated in terms of celebrity status. In marketing research, endorsers are selected based on their "Q" or fare quotient ratings that measure the endorser's familiarity and marketability (Ohanian 1990). It may be assumed that a celebrity endorser

would be more familiar to consumers than a non-celebrity endorser. However, does the greater familiarity of the celebrity translate into greater source credibility? To test the comparative effects of using a celebrity vs. a non-celebrity as an endorser in a DTC ad on measures of source credibility, Aad, Ab and DII, we manipulated endorser type by featuring a celebrity endorser in one version of the DTC ad stimulus and a non-celebrity endorser in the alternative DTC ad stimulus.

The effectiveness of the manipulation of endorser type in this study is contingent upon whether the celebrity endorser is considered more familiar than the non-celebrity endorser. Therefore, an additional item was added to the endorser credibility scale to measure the familiarity of the endorser. If the independent variable of endorser type is effectively manipulated, then the celebrity should receive higher scores on the familiarity item. A single-item seven-point bi-polar adjective semantic differential scale will measure familiarity with the endorser (Alba and Hutchinson 1987). A t-test for significant differences between study subjects, exposed to the two treatments was conducted to assess if the manipulation was successful. In addition, subjects in the celebrity endorser condition will respond to a dichotomous

question in the instrument asking them if they had heard or seen the endorser previously. This was followed by a multiple-choice question that asks the subjects to associate the endorser with a particular context. The candidate responses to the multiple-choice context item were: movies, sports and politics.

4.1.3 Moderator Variable

4.1.3.1 Involvement

Involvement is operationally defined in this study as "a person's perceived relevance of the advertisement based on inherent needs, values and interests" (Zaichowsky 1985, p.342). The current study measured involvement using the revised *Personal Involvement Inventory* (Zaichowsky 1994). It comprises ten items that are measured on a 7-point bi-polar semantic differential scale. This scale demonstrates excellent reliability across different product categories, ad stimuli and subject samples (Cronbach's α>0.90, test-retest reliability>0.70). The content validity of this scale has been assessed by expert judge ratings. In addition, factor analyses of this scale reveal the existence of one underlying factor (Zaichkowsky 1994). Responses to this scale were scored from one to

seven. The scores on each of the ten involvement scale items were averaged to compute an index involvement score for each subject.

The purpose of this section is to measure your interest in getting relief from your allergies. Please indicate by placing an "X" on the space in the questionnaire that best reflects how you feel about treating your allergies.

Important to me	_____ 1	_____ 2	_____ 3	_____ 4	_____ 5	_____ 6	_____ 7	Unimportant to me*
Boring to me	____	____	____	____	____	____	____	Interesting to me
Relevant to me	____	____	____	____	____	____	____	Irrelevant to me *
Exciting to me	____	____	____	____	____	____	____	Unexciting to me *
Means nothing to me	____	____	____	____	____	____	____	Means a lot to me
Appealing to me	____	____	____	____	____	____	____	Unappealing to me *
Fascinating to me	____	____	____	____	____	____	____	Mundane to me *
Worthless to me	____	____	____	____	____	____	____	Valuable to me
Involving to me	____	____	____	____	____	____	____	Uninvolving to me *
Not needed by me	____	____	____	____	____	____	____	Needed by me

*** Indicates that the item is reverse-coded**

4.1.4 Dependent Variables

4.1.4.1 Attitude toward the advertisement

Attitude toward the ad (Aad) is operationally defined in this study as a "predisposition to respond in a favorable or unfavorable manner to a particular DTC advertising stimulus during a particular exposure situation" (Mackenzie, Lutz and Belch 1986, p.130). It is well acknowledged that Aad operates as a mediator of consumers' reactions to advertising (Mackenzie and Lutz 1989). Indeed, while purchase intention and behavior is considered the ultimate goal of advertising, it is necessary that attitudes be formed toward the ad and brand prior to the consideration of purchase. Therefore, it is logical to assume that it will have an impact on other DTC advertising effectiveness outcomes such as Ab and DII.

There is a school of thought that has conceptualized Aad in terms of two constituent components – cognitive and affective (Gresham and Shimp 1985; Shimp 1981). However, most researchers have measured it using a summated or averaged index of item responses (Burton and Lichtenstein 1988 in Newell 1993).

In the current study, we employed a 3-item 7-point bi-polar adjective semantic differential scale consisting of: pleasant/unpleasant, good/bad and

favorable/unfavorable (Mackenzie and Lutz 1989). This scale has been shown to have high internal consistency reliability (α ranges from 0.86 to 0.93) (Lafferty, Goldsmith and Newell 2002; Mackenzie and Lutz 1989; Newell 1993). Factor analysis of this scale has revealed a uni-dimensional Aad construct (Lafferty, Goldsmith and Newell 2002). From this perspective, this scale demonstrates construct validity.

Subjects in the current study were asked to respond to each of the three Aad items by checking one of seven intervals along the 7-point bi-polar continuum, described by the word pair. These responses were scored from one to seven, with a higher score representing a more positive response to the item. In order to reduce measurement error and increase reliability (Gardner 1985, p.195), the responses to these items were averaged to obtain an index measure of attitude toward the DTC ad.

Below you will find a list of descriptions that represent different feelings about the advertisement that you just read. Based on your assessment of the ad, please indicate by placing an "X" on the space that best reflects how you feel about this ad.

Bad	_____	_____	_____	_____	_____	_____	_____	Good
	1	2	3	4	5	6	7	
Unpleasant	_____	_____	_____	_____	_____	_____	_____	Pleasant
Unfavorable	_____	_____	_____	_____	_____	_____	_____	Favorable

4.1.4.2 Attitude toward the brand

Attitude toward the advertised brand (Ab) is operationally defined as a "predisposition to respond in a consistently favorable or unfavorable manner to a particular brand" (Ajzen and Fishbein 1980; Muehling and Laczniak 1988). This construct was measured using the 3-item 7-point semantic differential scale used by Muehling and Laczniak (1988). This scale has demonstrated acceptable reliability in past investigations using student populations (α=0.95) (Newell 1993).

In the current study, respondents were asked to check one of seven intervals along the 7-point bi-polar continuum, described by the word pair. These responses were scored from one to seven, with a higher score representing a more positive response to the item. In order to reduce measurement error and increase reliability (Gardner 1985, p.195), the

responses to these items were averaged to obtain an index measure of attitude toward the advertised drug brand.

Based on your assessment of the Allergone® brand, please indicate by placing an "X" on the space that best reflects how you feel about Allergone® as a product.

Bad	_____	_____	_____	_____	_____	_____	_____	Good
	1	2	3	4	5	6	7	
Negative	_____	_____	_____	_____	_____	_____	_____	Positive
Unfavorable	_____	_____	_____	_____	_____	_____	_____	Favorable

4.1.4.3 Likelihood of Brand inquiry Behavior

Likelihood of brand inquiry behavior is operationally defined in this study as the consumer's assessment of the likelihood that s/he will ask the doctor in the future to prescribe the advertised drug for his/her medical condition. The use of behavioral intention as an ad effectiveness outcome has been well supported in the marketing literature (Coulter and Punj 1999; Gresham and Shimp 1981; Mackenzie, Lutz and Belch 1986). In the current study, we contend that drug request likelihood is an outcome of the consumer's assessment of a

variety of factors including perceived industry credibility, perceived endorser credibility, Aad and Ab. Furthermore; we hypothesize that these assessments will differ across involvement levels. Drug request likelihood is measured by using a 3-item, 7-point bi-polar adjective semantic differential scale. This scale has been validated in previous studies that have employed different subject samples (probability vs. non-probability) and across several product categories (toothpaste vs. soft drinks vs. jeans vs. prescription drugs). This scale has shown high internal consistency reliability (α ranges from 0.88 to 0.95) (Mackenzie, Lutz and Belch 1986; Machleit, Allen and Madden 1993; Shinde 2003).

In the current study, respondents were asked to check one of seven intervals along the 7-point bi-polar continuum, described by the word pair. These responses were scored from one to seven, with a higher score representing a more positive response to the item. In order to reduce measurement error and increase reliability (Gardner 1985, p.195), the responses to these items were averaged to obtain an index measure of a consumer's intention to engage in drug inquiry.

Assume that you are currently suffering from allergies. Now, based on your assessment of Allergone®, please indicate with a 'X', how likely is it that you will talk to your doctor about Allergone® during your next visit?

Likely	_____	_____	_____	_____	_____	_____	_____	Unlikely
	1	2	3	4	5	6	7	
Probable	———	———	———	———	———	———	———	Improbable
Possible	———	———	———	———	———	———	———	Impossible

4.1.5 DTC Ad stimulus

A DTC advertisement is operationally defined in the current study as a product-specific consumer-directed print advertisement that promotes a prescription drug brand (i.e. it mentions the name of the product and the medical condition it is indicated to treat). A DTC ad for a fictitious drug – "Allergone" – that is based on Allegra® (fexofenadine), an anti-histaminic prescription medication indicated in the treatment of a wide variety of allergies, was used as the ad stimulus. The ad stimulus replicated the product attribute information that is found in a current print ad for Allegra®. In this study, we used two versions of the DTC ad for Allergone. One version of the stimulus featured a celebrity endorser. The second version featured a non-celebrity

endorser. A fictitious product was used in this study to ensure that subjects have not had an opportunity to develop an attitude toward the ad or brand. Accordingly, it may be assumed that consumers' reactions to the ad and brand are attributable uniquely to the stimulus.

4.1.6 Selection of Celebrity Endorser

The celebrity endorser in the ad stimulus was selected after conducting a pre-test with a convenience sample of approximately 120 students at the University of Georgia, College of Pharmacy. These subjects were given a list of names of 10 celebrities who have been associated with endorsements for prescription drugs. In an approach similar to that of Moon (1990), the subjects were asked to rate each of these celebrities on five-point semantic differential bi-polar adjective scales on the dimensions of familiarity (familiar/unfamiliar) and likeability (likeable/not likeable), since these are integral components of the "Q" measure, a widely accepted rating of celebrity marketability. These scores were summed to compute a pseudo Q score. Subsequently, subjects were asked to indicate their perception of the compatibility between each celebrity and the product category of allergy medicines using a 1-item 5-point

semantic differential bipolar adjective scale (suitable/unsuitable). The celebrity endorser who receives one of the top three pseudo Q scores and highest compatibility with the product category was chosen. The person appearing in the non-celebrity endorser version of the ad stimulus was of the same gender and had similar physical features as the celebrity endorser, in order to minimize any differences between the two versions of the stimulus. Finally, all executional elements in the two ads were consistent.

4.1.7 Selection of Disease Condition

Allergy was selected as the disease condition for which the ad stimulus in this study is indicated, because it is a widely prevalent condition in this country. In 2001, it was reported that over 66 million persons in the US exhibited allergy symptoms. Surveillance studies report that the prevalence of allergies among adults in the U.S. varies between 9%-20% (NCHS 2002). Furthermore, this condition has been the subject of heavy DTC advertising expenditures. In fact, two of the top three heaviest DTC spenders in 2002 were antihistamine products. The category is well suited to DTC advertising because allergy represents a chronic disease that is widely prevalent and impairs quality of life.

Further, many people can be reached by advertising anti-allergy medications because of the large target market.

In terms of etiology, an allergy is an inflammatory condition triggered by immunoglobulin E (IgE) antibody in response to a wide variety of antigens, such as pollens, mold spores, and dust mites. Production of IgE triggers a chain of reactions involving histamine, leukotrienes, cytokines and chemokines. The result is hyper-responsiveness of the nasal membrane and symptoms of sneezing, runny nose (rhinorrhea), and conjunctivitis.

4.1.8 Audience Characteristics

Apart from the constructs under investigation in the model, constructs related to consumer demographics, psychographics, health-related characteristics, and media and advertising exposure were measured. These audience characteristics will help in providing a better description of the study sample. The characteristics on which data were elicited are as follows:

Demographics: Age category, race, gender, Educational status, income level. Health characteristics: Use of prescription drug for allergy (yes/no), use of over-the-counter drug for allergy (yes/no), use of vitamin/herbal product for

allergy. Psychographics: aided recall of DTC ads for allergy and aided recall of celebrity endorsers for prescription products. Behavioral questions: Past information search for prescription drugs, frequently used sources of information about prescription medicines (Internet, 1-800 number, health care professional, print media source), past drug inquiry and brand inquiry behaviors, and media of exposure to DTC ads.

4.2 Study Design

The study employed a randomized post-test only research design and involved cross-sectional collection of data. The stimulus that was used to evoke responses to the variables was a product-specific advertisement for a fictitious antihistaminic prescription medication indicated in the treatment of allergy.

We decided to use a fictitious DTC ad in order to eliminate the potential for bias arising from pre-existing attitudes toward the ad (Kamins 1990). Using a fictitious ad stimulus allows the investigator to have full control of the study design since there is little chance that any of the study subjects could have developed attitudes towards fictitious ad stimuli. Study subjects were asked to

read the ad before attempting to provide responses to items on the measurement scales.

A single manipulation was introduced into the study design, pertaining to the type of endorser that was featured in the DTC ad stimulus. In this context, study subjects were randomly assigned to the DTC ad stimulus that features a celebrity endorser or the DTC ad stimulus that features a non-celebrity endorser. All other executional elements of the two stimuli were uniform. Subsequently, subjects in both groups (celebrity endorser/non-celebrity endorser) responded to measurement scales for the constructs in the study namely, endorser credibility, pharmaceutical industry credibility, Aad, Ab and brand inquiry. In addition, all subjects were asked to respond to the involvement measurement scale. In addition, demographics, psychographics, health-related characteristics were measured for the purposes of descriptive analyses. No other unique identifiers about the consumer (address, telephone number, SSN etc.) were obtained.

Data were collected by personal interviews at two malls in the Atlanta, GA metropolitan area. A questionnaire containing primarily closed-ended questions for the constructs was used as the instrument of data collection.

4.2.1 Sampling Design

The target population for this study is U.S. adults who suffer from allergies. The sampling frame will comprise adults in the U.S. that have been diagnosed with allergies and have purchased an anti-allergenic agent. We decided to sample only allergy sufferers to exclude persons for whom the ad and brand would be of absolutely no relevance. We argue that the product category under investigation should possess at least some relevance to the sample, since it is this group of consumers that drug companies are interested in reaching through their DTC communications. By following this approach, it is anticipated that our sample will comprise of allergy sufferers having varying degrees of involvement with the issue in the ad, depending on the frequency and severity of their allergies and the level of medical care and drug utilization that their allergies demand.

4.2.2 Sample Size Estimation

The minimum sample size required for this study was determined so that the statistical tests achieve a power level of 0.8 as recommended by Cohen (1988). The statistical power of a test refers to the probability of correctly

rejecting the null hypothesis (i.e. rejecting the null hypothesis when the null hypothesis is false). The power of any test depends on the sample size, probability of falsely rejecting the null hypothesis, i.e. Type I error (α level), and the probability of incorrectly accepting a false null hypothesis, i.e. Type II error.

Taking into account the considerations for achieving statistical power, we calculated the minimum sample size required to establish the validity of the ANOVA test that was used to test the differences between celebrity and non-celebrity endorser on the measures of perceived credibility, Aad, Ab and DII, and for testing the fit of the proposed path model. Based on previous research by Moon (1990) and Kamins (1990), we assumed an effect size of eta^2=. 15 (this is considered a small effect size according to Cohen (1988)), a minimum significance level of α=0.05 and recommended power of 0.8. It is estimated that we will require a total of 200 responses to establish the validity of the test of differences between the two treatment groups in terms of their perceptions of endorser credibility, Aad, Ab and brand inquiry.

We can conceptualize the path model in terms of a series of multiple regression equations. In the current study, we have three dependent variables, each of which is predicted by a regression equation involving sets of predictor

variables. These equations are described in greater detail in the analysis section of this chapter. Accordingly, we need 58, 66 and 73 responses for each of the regression equations, assuming an α=0.05 and desired power=0.8. The effect size for each of the regression equations was assumed to be small according to Cohen (1988) (R^2 = 0.15). Since path analysis estimates all three regression equations simultaneously, the overall sample size required is approximately 200. Another way of estimating sample size for path models is to obtain a number of responses that is at least five times the number of parameters that are free to be estimated in the model (Bentler and Chou 1987). Using 200 as the required sample size will meet that criterion.

4.2.3 Method of administration

A mall-intercept research technique using personal interviews was employed to collect data. A quota sampling procedure was used to determine inclusion into the sample so that it was representative of the target population i.e. adults in the US that suffer from allergies. Two malls in the Atlanta, GA metropolitan area, were selected as the sites for data collection. An experienced mall-intercept research agency was employed to undertake the data collection

procedure. Interviewers received training in the study specifics (eligibility criteria, sampling etc) from the principal investigator, who worked closely with the interviewers during the data collection.

We obtained approval from the Human Subjects Office of the Institutional Review Board (IRB) at the University of Georgia, Athens, GA. The study subjects were not informed of the endorser type manipulation. The actual intent of the study was disguised by informing the subjects that this study wished to elicit their opinions on ads for prescription drugs, which would help in designing better drug ads in the future. The survey questionnaire (in booklet form, printed front and back), along with a copy of the ad stimulus (manually inserted within the booklet) and a cover letter that contained information explaining the study's objectives, its potential contributions, a consent form and contact information of the principal investigator and the IRB office at the University of Georgia, were provided to the interviewers. The research agency offered a specific incentive to facilitate participation. Subjects were asked to read the ad and answer the questionnaire. After they had completed the questionnaire, they were provided a debriefing statement that informed them of the actual intent of

the study and that the ad was fictitious and that the endorsers in the ad were in no way associated with the advertised product.

4.3 Data Management

The returned questionnaires were transcribed into a Microsoft Excel database by the principal investigator. 10% of the returned questionnaires were selected randomly for data verification. Since multiple errors were discovered during the data check process, the entire data were re-examined for consistency with responses on the questionnaires.

Level of involvement in obtaining a treatment for allergies, an indicator of the personal relevance of the ad information to the study subjects, was measured and subjects were categorized into high and low-involvement groups based on the median involvement score. This approach is useful because it does not compel us to introduce artificial manipulations of personal variables such as involvement (Laczniak and Muehling 1993). We fit the proposed path model in both the low-involvement and high-involvement groups. Subsequently, we assessed the potential moderating effect of involvement on

the hypothesized relationships in the path model. This is called multiple-group path analysis.

Averages of the responses to the measurement scales for each of the hypothesized constructs were computed as a score for that construct. Scales, which contained negatively worded items, were reverse-coded to ensure that all items on a scale have responses that are in the same direction.

4.4 Analysis

One-way analyses of variance (ANOVA) were used to test if significant differences exist between the groups of subjects randomly assigned to the two experimental treatments (celebrity endorser/non-celebrity endorser). The ANOVAs determined if there are significant differences between these two groups on their perceptions of endorser credibility, Aad, Ab and Drug request.

Path analysis, one form of causal modeling, was used to estimate the multiple causal relationships between the source credibility-related constructs and DTC advertising effectiveness measures. Path analysis is used for this purpose when a theory-driven model is specified *a priori*. Subsequently, direct,

indirect and total effects of the relationships between the variables in the model are assessed.

Prior to delving into the path analytic model, it is instructive to briefly describe this procedure. A path model describes relationships between observed variables. The observed variables in a path model may serve as independent (exogenous) variables that exert a causal effect on dependent variables (endogenous) that receive the causal effect. Path analysis is concerned with estimating the strength of the relationships between these observed variables. It is important to note that only those paths that are grounded in theory are estimated. In practice, therefore, we "free" certain paths for estimation, while "constraining" other paths to equal a value of zero (signifying the absence of a causal relationship). The strength of the linear relationship between two observed variables is estimated by path coefficients. These coefficients are similar to correlation coefficients in that they range from -1 to 1 in their values.

There are certain conventions for representing the components of a path model. Observed variables (both exogenous and endogenous) are represented in square boxes. The causal order of relationships flows from left to right in a

path model. This implies recursive relationships. A one-headed arrow between two variables indicates the direction of casual influence. Two one-headed arrows in opposite directions imply a feedback effect (i.e. reverse causation) between two variables. The absence of an arrow between two variables indicates that the two constructs are assumed to be not causally related. A two-headed curved arrow between two variables is used to represent the covariation between the exogenous variables and also to represent covariation between the error terms. These are unanalyzed associations. That is, we assume that the two variables or error terms are correlated; however; the directionality of this correlation is not under investigation (Kline 1998).

The functional form of a path analytic model may be represented as follows:

$$\mathbf{Y}=\mathbf{B}\mathbf{Y} + \Gamma\mathbf{X} + \zeta$$

Here,

Y = Y is (NY x 1) column vector of endogenous variables

X = X is (NX x 1) column vector of exogenous variables

B = Beta is a (NY x NY) matrix of path coefficients between endogenous variables

ζ = Zeta is a (NY x 1) column vector of error terms (disturbances) that are associated with the endogenous variables

Γ=Gamma is a (NX x NY) matrix of path coefficients between exogenous variables and endogenous variables

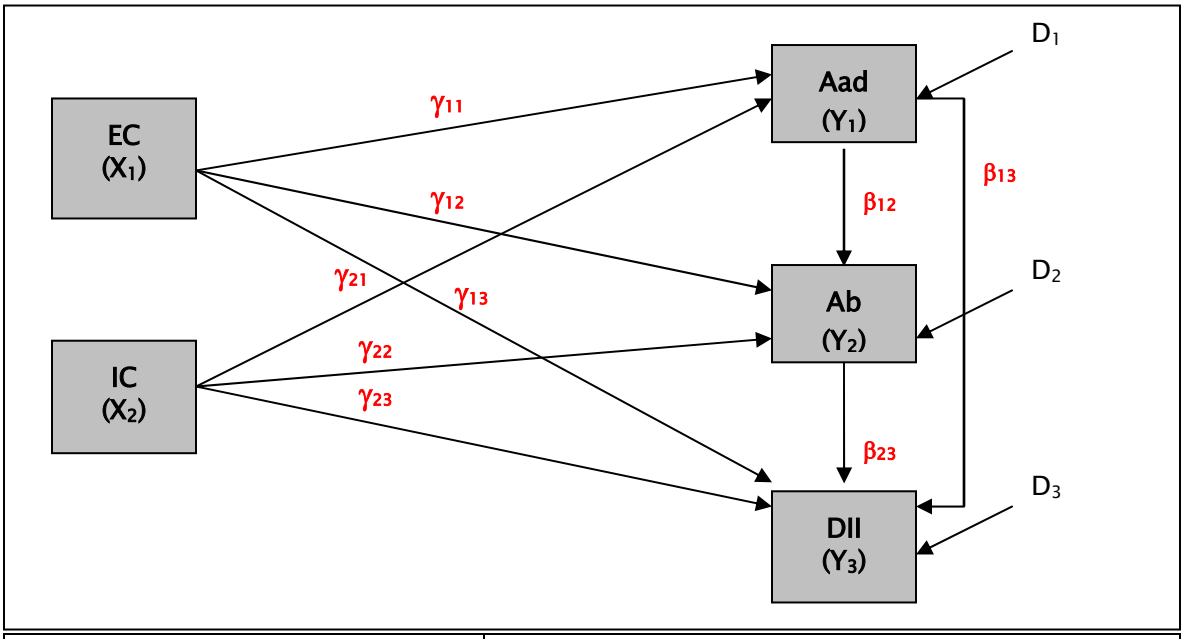
In addition we also have:

Φ = Phi is a (NX x NX) variance/covariance matrix of exogenous variables

Ψ = Psi is a (NY x NY) variance/covariance matrix of elements in ζ i.e. error terms associated with endogenous variables

According to Hair et. al. (1998), there are six steps that must be followed for path analysis once a theoretical model is specified. First, the path model must be described diagrammatically and in the form of structural equations. Second, appropriate measures need to be specified for the measurement of the constructs. Third, it is necessary to verify if the model is identified i.e. whether there is a unique set of values for the model parameters that are to be estimated. The fourth step is to test to the significance of the hypotheses. Fifth, the appropriateness of the model is judged by the model goodness-of-fit statistics. Finally, the model needs to be interpreted and modified if necessary.

The path diagram and the structural equations representing the causal relationships between the observed variables are presented below. There are two exogenous variables included in the model, namely perceived pharmaceutical industry credibility (IC), which is represented by X1 and perceived endorser credibility (EC), which is represented by X2. There are also three endogenous variables in the model, namely, attitude toward the ad (Aad), attitude toward the brand (Ab) and brand inquiry behavior (DII).



EC = Endorser Credibility	X_i = Exogenous Variables
CC = Corporate Credibility	Y_i = Endogenous variables
Aad = Attitude towards the Ad	D_i = Disturbance terms or residuals of Y_i
Ab = Attitude towards the brand	γ_{ij} = Path coefficients between Xs & Ys
DII = Drug Inquiry Intent	β_{ij} = Path coefficients between Ys

Figure 3: Path Diagram of Proposed Model

Structural Equations of the Path Diagram

$Y_1 = \gamma_{11} X_1 + \gamma_{21} X_2 + D_1$

$Y_2 = \gamma_{12} X_1 + \gamma_{22} X_2 + \beta_{12} Y_1 + D_2$

$Y_3 = \gamma_{13} X_1 + \gamma_{23} X_2 + \beta_{13} Y_1 + \beta_{23} Y_2 + D_3$

Based on the conventions for representing a path model, the strength of the relationship between an exogenous variable and an endogenous variable is measured by a path coefficient denoted by γ. The strength of the relationships between two endogenous variables is measured by a path coefficient denoted by β. The Ds in the path model are disturbance terms associated with the endogenous variables that indicate the error associated with measuring the endogenous variables.

Generally, the value of the variance of the disturbance term is shown at the end of the arrow that emanates from that disturbance term to the endogenous variable. This indicates the variance in the endogenous variable that has not been accounted for after the influence of the exogenous variable is accounted. This remaining variance represents the disturbance term or residual in explaining the endogenous variables. The subscripts on the γ and β

coefficients represent the construct of the path's origin and destination construct.

The estimation of a path model mandates that certain measurement assumptions be met. The assumptions made in the present study follow those specified by Mueller (1996). These assumptions include:

1) Both the endogenous and exogenous variables are assumed to be measured with negligible error.
2) Both the endogenous and exogenous variables expressed as deviation scores have a mean of zero i.e. $E(X) = E(y) = 0$.
3) All hypothesized relationships between the exogenous and endogenous variables are assumed to be linear in nature.
4) The disturbances associated with the endogenous variables have a mean of zero and are homoscedastic i.e. $E(D_i) = 0$ and variance of D_i is constant across all observations.
5) The disturbances associated with the endogenous variables are uncorrelated with the exogenous variables which is represented as follows $E(XD') = E(DX') = 0$

6) The disturbances associated with the endogenous variables are uncorrelated with each other i.e. all off-diagonal elements of the ψ matrix (variance/covariance matrix of D_is) are zero.

The scales used in the measurement of all constructs in the path model have been widely used in the past. All the measurement scales have demonstrated good internal consistency reliability and convergent and discriminant validity. However, we argue that there may be some error present in the measurement of the observed variables that results in less than perfect construct reliabilities. Many path analytic models assume this measurement error to be zero. In this study however, we will explicitly incorporate these measurement errors into the model by specifying two additional variance-covariance error matrices - $\theta\delta$ and $\theta\varepsilon$. The $\theta\delta$ matrix is the variance-covariance matrix of measurement errors associated with the observed exogenous variables (the Xs), while the $\theta\varepsilon$ matrix represents measurement errors associated with the observed endogenous variables (the Ys). The measurement errors are calculated as: $1- (\alpha)^{½}$, where α is the internal consistency reliability estimate of each construct in the proposed model (Jaworski and MacInnis 1989). This procedure constrains the reliabilities of the constructs to that of

their indicators. This provides a degree of control over the potential measurement error associated with the constructs (Mackenzie and Lutz 1989; Newell 1993).

Identification of the model involves assessing if there are more known quantities in the model ("observations") than unknown quantities (parameters to be estimated). If the number of observations is greater than the number of parameters to be estimated, the model is called over-identified; if the number of observations is equal to the number of parameters, the model is called just-identified or saturated and, if the number of parameters to be estimated is greater than the number of observations, the model is under-identified. If the model is under-identified there are an infinite number of values that the parameters can assume. Such a model precludes estimation. Prior to conducting the path analyses, it is essential to confirm that the proposed path model is identified. In the absence of identification, it is necessary that the researcher reduce the number of paths that are being hypothesized (essentially fix certain theoretically redundant paths to be equal to 0). Alternatively, it is advisable to fix the estimates of any coefficient whose value is already known (e.g. from literature) to that known value.

In the current model, there are fewer parameters to be estimated than the number of units of information available for use (i.e. observations). The model proposed here is identified with three degrees of freedom. Moreover, the model presented here is fully recursive, since there is no feedback relationship assumed between the observed variables. Another condition for establishing the recursive nature of a path relationship is that if endogenous variables are related, their disturbance terms should not be related.

For testing the significance of the hypothesized relationships, the variance/covariance matrix of all observed variables constitutes the datum that was input into the LISREL program. Using a variance/covariance matrix provides the opportunity to compare between different groups, such as the high and low-involvement groups in this study. Furthermore, this approach is recommended in theory-testing studies and in capturing the proportion of variance in the endogenous variables of interest to this study (Hair et. al. 1998). Subsequently, the parameters in the model (paths between observed variables, variances and covariances of the disturbances, variances and covariances of exogenous variables) was estimated by inputting all matrices previously discussed (B, Γ, ς, ϕ and, ψ) into the LISREL program. The relationships between

the variables were specified in these matrices as, parameters that are free to be estimated or parameters fixed at 0 (i.e. there is no relationship). The maximum likelihood procedure was employed in the estimation of the model parameters.

The paths in the proposed model represent the hypotheses to be tested. Path coefficients that are estimated by the LISREL program represent the strength of the relationships between the variables. Significance testing was conducted using a one-tailed t-test since directionality is specified in the path model.

Evaluation of model goodness-of-fit was conducted using the Chi-square goodness-of-fit test. Prior to calculating model goodness-of-fit, offending estimates in the path model are identified. Offending estimates include negative error variances for any observed variable (Heywood cases), standardized coefficients having a value greater than 1 and very large standard errors associated with any of the estimated coefficients (Hair et. al. 1998). A model with good fit is suggested by a non-significant chi-square statistic, since the null hypothesis of the chi-square test is that there is no significant difference between the observed and real covariance matrix structures. However, it is recognized that since the chi-square statistic is sample size-

dependent, it may lead to an incorrect rejection of the null hypothesis (Hu and Bentler 1993). Accordingly, we will also rely upon alternative widely accepted modification (fit) indices that are less dependent on sample size, including the, Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), Standardized Root Mean Square Residual (SRMSR) and, Root Mean Squared Residual of Approximation (RMSEA). The rule-of-thumb for the SRMSR and the RMSEA is a cut-off value of 0.08 or less (Hu and Bentler 1999; Joreskog and Sorbom 1996). Values of 0.9 or more are suggested as adequate values of the CFI and NNFI (Bentler 1990; Hu and Bentler 1999).

In the absence of acceptable model fit, it was decided that we would switch from testing our model to generating another model that demonstrates a better fit to the data (Joreskog 1993). The alternative models were developed by excluding paths (relationships) that are non-significant at $p<0.05$ and refitting the model to determine if goodness-of fit improves. Improvement of fit was assessed using the chi-square test of difference between the alternate models. Also, differences in the values of the other fit indices were observed. Modifications to the model were grounded in theory in order to determine the most parsimonious model that fit the data well.

4.4.1 Testing the Moderating Role of Involvement

A multiple group analysis was undertaken since we anticipated that differing levels of involvement (high/low) would modify the relationships between the constructs. Path coefficients between the two groups were subject to comparison in order to determine the influence of involvement as a moderator of causal effects between source credibility and ad effectiveness measures.

In this study, we initially fit the proposed model to both low and high-involved consumer datasets. The coefficients in the two datasets for each path that is hypothesized to change under differing conditions of involvement were visually compared to assess if significant differences exist. For the purpose of the multiple group analyses, the path coefficients that are hypothesized to vary with involvement were fixed or constrained to be of equal value. Then, the chi-square goodness-of-fit difference between the two models indicated which model fits better. In essence, if the fit of the constrained model is worse than that of the unconstrained model then we may say that differences exist between the two groups in terms of that particular relationship, i.e. that

relationship is moderated by involvement. This procedure was repeated for each path that is hypothesized to vary with involvement.

CHAPTER 5

RESULTS

5.1 Pre-tests

119 usable pre-test questionnaires were returned from among the convenience sample comprising 120 student volunteers recruited at the University of Georgia College of Pharmacy for selecting the celebrity endorser to be used in the ad stimuli. These volunteers were asked to rate a list of 10 celebrities (See Table 1) on the domains of familiarity ("On a scale of 1 to 5, please rate how familiar this person is to you") and attractiveness ("On a scale of 1 to 5, please rate how attractive you feel this person is"). The celebrities on the list were eminent personalities in their respective fields (entertainment, sports and politics). Most had been associated with brand advertising campaigns in the past, and others were included in the list after anecdotal discussions with consumers of all age groups. A Q-score (measure of celebrity marketability) was computed as a sum of the familiarity and attractiveness

ratings for each celebrity. The results revealed that Meg Ryan, Katie Couric and Tom Hanks obtained the highest average Q-scores. Among these three celebrities, Meg Ryan was deemed most compatible with an allergy medication (See Table 2) On the basis of this pre-test; Meg Ryan was chosen as the celebrity endorser in the study.

A second pre-test that was conducted with a convenience sample of 20 students at the University of Georgia College of Pharmacy to evaluate the psychometric properties of the rating scales and to verify the non-celebrity endorser revealed a statistically significant difference between subjects exposed to the celebrity and non-celebrity on familiarity ($p<0.01$), but no differences on attractiveness (See Table 3). Additionally, the scales used in measuring pharmaceutical industry credibility, endorser credibility, involvement with treatment of allergies, attitude toward the ad, attitude toward the brand and likelihood of brand inquiry behavior, all showed excellent internal consistency reliability (See Table 4). The Cronbach's α for each of these scales exceeded 0.9, indicating an acceptable level of scale reliability (Hair et. al. 1998).

This pre-test was also intended to detect any problems arising from spelling, formatting or readability. The respondents were asked to indicate if they were confused or were otherwise unable to understand the directions in the questionnaire. Since no such issues were reported, we decided to finalize the questionnaire design. On average, the pre-test subjects took 12 minutes to complete the questionnaire. See Appendix B for a final version of the questionnaire and other survey materials.

5.2 Main Study

5.2.1 Sample Characteristics

The scales used in measuring pharmaceutical industry credibility, endorser credibility, involvement with treatment of allergies, attitude toward the ad, attitude toward the brand and likelihood of brand inquiry behavior, all showed excellent internal consistency reliability (See Table 5-11). The Cronbach's α for these scales ranged between 0.9 and 0.99 (See Table 5). The reliability analysis indicated that all items on each scale of interest (endorser credibility, pharmaceutical industry credibility, involvement, Aad, Ab and DII) had high item-total correlations, and that the overall reliability of each scale

would decrease if any single item were deleted. The reliability results indicated that the scales used in measurement in this study were psychometrically sound.

Data were collected during May 2004. A total of 218 responses were obtained from the two malls in the Atlanta metropolitan area. A majority of the sample comprised of females (54.1%) and Caucasians (62.4%). Approximately 40% of the sample had attained some level of college education and almost half of the subjects (48.8%) reported annual household incomes between $25,000 - $50,000. Most respondents were between 18 and 35 years of age (67.4%). The sample was fairly representative of the adult population in the state of Georgia (See Table 12).

5.2.2 Endorser Manipulation Check

Subjects in the main study were randomly assigned to one of two ad manipulations, celebrity (n=109) and non-celebrity (n=109). The effectiveness of the endorser manipulation depended on whether the celebrity demonstrated significantly greater familiarity than the non-celebrity. Accordingly, an item measuring subjects' perception of endorser familiarity ("On a scale of 1 to 7, where 1=very unfamiliar and 7=very familiar, please tell us what you think or

feel about the person, whose picture appears in the ad and who is endorsing Allergone®") was included as a manipulation check. A t-test of differences in mean scores revealed that the celebrity endorser was significantly more familiar than the non-celebrity ($p<0.001$).

5.2.3 Descriptive Statistics

Subjects in the study responded to 7-point bi-polar semantic differential rating scales that measured perceptions of pharmaceutical industry credibility, endorser credibility, level of involvement in treatment of allergies, attitude toward the ad, attitude toward the brand and likelihood of brand inquiry behavior (See Table 13). On average, subjects reported having positive perceptions towards the credibility of the pharmaceutical industry (Mean=5.26, SD=1.33). The survey also contained an unaided awareness item about pharmaceutical companies (See Table 14). Pfizer Inc. emerged as the pharmaceutical company with the greatest top-of-mind awareness in the sample (16.5%), followed by Johnson & Johnson (10.1%). Consumers may have confused pharmacy companies with pharmaceutical companies. This was clearly demonstrated by the high top-of-mind awareness of CVS (11%), Eckerd (9.2%)

and Walgreen (8.7%) as pharmaceutical companies, when in fact they were pharmacies.

The perceived credibility of each endorser type was high (Mean $_{celebrity}$=5.15, SD $_{celebrity}$ =1.63; Mean $_{non-celebrity}$ =5.19, SD $_{non-celebrity}$ =1.36). Subjects' level of involvement in treating their allergies, reflecting the personal relevance of the information in the ad was similarly high (Mean=5.22, SD=1.43). Subjects reported having favorable perceptions of the ad (Mean=5.26, SD=1.55), and brand (Mean=5.34, SD=1.52). The likelihood of engaging in brand inquiries was also high (Mean=5.38, SD=1.66).

In addition to measuring the above constructs, this research examined consumers' experience with allergy treatments (See Table 15). Specifically, we were interested in identifying potential gaps in the anti-histamine therapeutic market, consumers' treatment decision-making pattern, causes of their allergies and severity of allergy symptoms. We employed a 7-point semantic differential scale to capture satisfaction with current allergy therapy as an indicator of the potential unmet need in the anti-histamine market. On average, consumers reported being adequately satisfied with their current allergy therapy on the items measuring quick relief of allergy symptoms (Mean=5.15,

SD=1.51), effective relief from allergy symptoms (Mean=5.02, SD=1.50), fewer side effects such as rashes and drowsiness (Mean=5.01, SD=1.55), effectiveness for both indoor and outdoor allergens (Mean=5.06, SD=1.54) and requiring fewer visits to the physician's office (Mean=5.06, SD=1.65). Consumers reported being less satisfied with their current allergy medications in needing fewer medications to relieve allergy symptoms (e.g. needing an anti-histamine and decongestant) (Mean=4.94, SD=1.52). Consumers also reported being less satisfied with the cost of their current allergy medications (Mean=4.53, SD=1.65).

In terms of treatment decision-making patterns (See Table 16), a majority of consumers preferred to purchase over-the-counter (OTC) medicines to treat their allergies (60.6%), while slightly more than a third reported that they visited the physician's office to get a prescription as their most frequent way of treating their allergies. Slightly over half the sample had used a prescription medication in the past to treat their allergies. A significant majority of consumers reported that they suffered from outdoor allergies (86.2%), while indoor allergens were the causative agents for 32% of the sample. Most of the

consumers in the sample reported that their allergy symptoms were either mild (41.3%) or moderately severe (34.4%)

An indicator of the effectiveness of current celebrity endorsements is consumer awareness (See Table 17, 18). Accordingly, aided awareness items asked consumers if they recalled seeing ads for prescription drugs featuring celebrity spokespersons. We also checked whether respondents could correctly identify the disease or the drug with which the celebrity was associated; we asked about, John Elway (spokesperson for anti-ulcer drug, Prevacid®), Bob Dole (spokesperson for erectile dysfunction drug Viagra®), Mike Ditka (spokesperson for erectile dysfunction drug, Levitra®) and Dorothy Hamill (spokesperson for anti-arthritis drug, Vioxx®). In addition, we also included an aided awareness item for Tom Hanks, who has never endorsed a pharmaceutical product. The results showed that Bob Dole obtained the highest aided awareness ratings (14.2%), followed by John Elway (12.4%), Dorothy Hamill (11.9%) and Mike Ditka (9.2%). Few subjects in our study could correctly identify the disease or brand associated with each celebrity. Only 7% respondents correctly identified Bob Dole as a spokesperson for Viagra® or erectile dysfunction; 3.2% subjects correctly associated Dorothy Hamill with

Vioxx® or arthritis and only 1.4% correctly identified Mike Ditka as being associated with Levitra® or impotence. The awareness ratings of these endorsers should be considered in light of the fact that 7.3% of the consumers in the sample reported being aware of Tom Hanks as a celebrity spokesperson for prescription drugs.

As evaluating DTC advertising effectiveness was a paramount objective of this research, a series of aided recall items were included in the survey to assess consumers' awareness of DTC advertisements for prescription allergy medications – (Clarinex®, Singulair®, Zyrtec®, Flonase®) (See Table 19). A false response check was also included among these items (Breatheamine®). Clarinex had the highest awareness among the allergy medications, followed by Flonase, Zyrtec and Singulair respectively. The ratings for these drugs must be tempered by a consideration of the relatively high awareness of the false response check item Breatheamine® (14.2%). We were also interested in assessing which media represented the main sources for consumer exposure to DTC ads (TV, magazines, Internet). The results showed that most consumers' had seen DTC ads on television (87.6%), over 50% had read DTC ads in

newspapers/magazines, while, only a few (23.4%) had seen DTC ads on the Internet (See Table 20).

Consumers' drug inquiry and drug request behaviors represent important metrics of DTC's success (See Table 21). This study shows that a significant proportion of consumers have talked to their doctors about advertised prescription medications (41.7%), while more than a third (35.3%) have requested for specific brands. Almost 80% of consumers who request their doctor for a specific advertised drug received a prescription for that drug.

An important antecedent of consumers' decision-making behavior is their search for additional information about the product. In this regard, DTC ads offer consumers multiple sources of "adequate provision", where they may be able to find information about the advertised drug that supplements the information in the DTC ad. This study asked consumers to indicate whether DTC ads had stimulated information-seeking activity (See Table 21). Approximately 40% of consumers had engaged in some form of information search for DTC-advertised prescription drugs. The heaviest information seeking activity after exposure to a DTC ad was on the Internet (23%), while other

sources included, the health care professional (15.6%), print media sources (10.1%) and 1-800 toll-free numbers (4.6%)

5.2.4 ANOVAs

One-way analyses of variance (ANOVA) were run to determine if significant differences existed between the two groups (celebrity vs. non-celebrity) on the credibility of the endorser and three outcome measures – Attitude toward the Ad (Aad), Attitude toward the brand (Ab) and, Likelihood of Brand inquiry (DII).

The first hypothesis pertained to the existence of significant differences in the perceived credibility of a celebrity endorser vs. a non-celebrity endorser in a DTC print ad.

$H_0$1: There is no significant difference in the perceived credibility of a celebrity endorser versus a non-celebrity endorser in a DTC ad.

The ANOVA reveals that there are no significant differences ($p>0.5$) between the subjects exposed to the celebrity manipulation vs. the non-celebrity manipulation (See Table 22). Therefore, this null hypothesis is not rejected.

The second hypothesis related to significant differences in attitude toward the ad (Aad) between consumers exposed to the ad stimulus with a celebrity endorser and those exposed to the ad stimulus with a non-celebrity endorser.

$H_0$2: There is no significant difference in attitude toward the ad between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser.

The ANOVA indicates that these two groups of consumers do not differ significantly with respect to their attitudes toward the DTC ad stimuli (See Table 23). Therefore, this null hypothesis is not rejected.

The third hypothesis tested significant differences in attitude towards the brand (Ab) between consumers exposed to the ad stimulus with a celebrity endorser and those exposed to the ad stimulus with a non-celebrity endorser.

$H_0$3: There is no significant difference in attitude toward the brand between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser.

The ANOVA indicates that these two groups of consumers do not differ significantly with respect to their attitudes toward the Allergone® brand of

allergy medication (See Table 24). Therefore, this null hypothesis is not rejected.

The fourth hypothesis tested significant differences in likelihood of brand inquiry behavior (DII) between consumers exposed to the ad stimulus with a celebrity endorser and those exposed to the ad stimulus with a non-celebrity endorser.

$H_0$4: There is no significant difference in likelihood of brand inquiry between consumers exposed to a celebrity endorser versus consumers exposed to a non-celebrity endorser.

The ANOVA indicates that these two groups of consumers do not differ significantly with respect to their likelihood of requesting the Allergone® brand of allergy medication (See Table 25). Therefore, this null hypothesis is not rejected.

5.2.5 Path Analyses

LISREL 8.53 (Joreskog and Sorbom 2002) was used to conduct the path analyses and obtain Maximum Likelihood (ML) estimates of the path coefficients. The items were assumed to be approximately normally distributed

since moments of distribution (skewness and kurtosis) for all items were $< |2.0|$. This indicated that the data were normally distributed.

Proposed Study Model

A model was proposed to determine the effect of pharmaceutical industry credibility and endorser credibility on three ad effectiveness measures (Aad, Ab and DII). Further, the causal pathway between the ad effectiveness measures was also tested. It was hypothesized that the level of involvement that consumers reported in obtaining treatment for their allergies would moderate the relationships between the constructs in the model.

To assess the moderating influence of involvement level on the relationships hypothesized in the proposed model, we categorized respondents into more-involved and lesser-involved groups according to the median score on the involvement scale (5.31 on a scale of 1 to 7). Thereafter, we conducted a multi-sample analysis, by running the LISREL model simultaneously for both groups of consumers in two different forms – constrained and unconstrained. In the unconstrained model, the paths in the model that were hypothesized to vary by involvement level were allowed (free) to vary. In the constrained model a

cross-group equality constraint was applied to those paths that were hypothesized to vary across involvement level. In other words, the value of each parameter that was hypothesized to change according to involvement level, was constrained to be equal for both groups of more and less-involved consumers. The effect of involvement was determined by identifying which model (unconstrained vs. constrained) fit the data better. If involvement did indeed moderate the relationships between the constructs in the model, it was expected that the fit of the constrained model would be significantly worse than that of the unconstrained model.

The results showed that the unconstrained model ($\chi2=0.16$, d.f. $=6$, $p=1.00$) and the constrained model ($\chi2=13.19$, d.f. $=15$, $p=0.59$) both fit the data well and had similar values across several goodness-of-fit measures including the comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), and Root Mean Square Error of Approximation (RMSEA). This suggests that there is no significant difference between the two forms of the proposed model (Table 26). A $\chi2$ difference of fit test, analyzing the difference in fit of the constrained vs. unconstrained model indicated no significant differences ($\chi2diff=13.03$, d.f. $=9$, $p>0.1$). The difference in CFI between the two models was <0.01,

confirming the lack of difference between the constrained and unconstrained models (Cheng and Rensvold 2002). Another method of determining if any of the paths differed between the two models is to examine the modification indices for the relationships that are hypothesized to vary by involvement. The modification index (also known as the Lagrange multiplier) has a value that follows a $\chi 2$ distribution with 1 degree of freedom. If the modification index for any path achieves statistical significance, the value of that index indicates the improvement in $\chi 2$ of the model that could be gained by changing that particular path. However, in this study, none of the modification indices for the parameters that were hypothesized to vary with involvement achieved statistical significance. Therefore, it is concluded that consumers' level of involvement in treating their allergies and thereby the personal relevance of the ad information, does not change the nature of the relationships between the constructs in the model. Accordingly, the following null hypotheses fail to be rejected.

$H_0$5: Perceived endorser credibility has no significantly stronger effect on attitude toward the ad between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$6: Perceived endorser credibility has no significantly stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$7: Perceived endorser credibility has no significantly stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$8: Perceived pharmaceutical industry credibility has no stronger effect on attitude toward the ad between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$9: Perceived pharmaceutical industry credibility has no stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$10: Perceived pharmaceutical industry credibility has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$11: Consumers' attitude toward the ad has no stronger effect on attitude toward the brand between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$12: Consumers' attitude toward the brand has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

$H_0$13: Consumers' attitude toward the ad has no stronger effect on likelihood of brand inquiry between consumers who exhibit high versus low involvement with treating their allergies.

Since consumers' level of involvement did not moderate the relationships between the constructs, the proposed study model was run using data pooled from both involvement groups. This structural model, having 3 degrees of freedom (Figure 4) fit the data well (Table 27). Accordingly, the goodness-of-fit indices had high values ($\chi 2$ =0.20, d.f. =3, p=0.98), Comparative Fit Index= 1.00, Normed Fit Index= 1.00, RMSEA = 0.000, Standardized Root Mean Square Residual=0.0098.

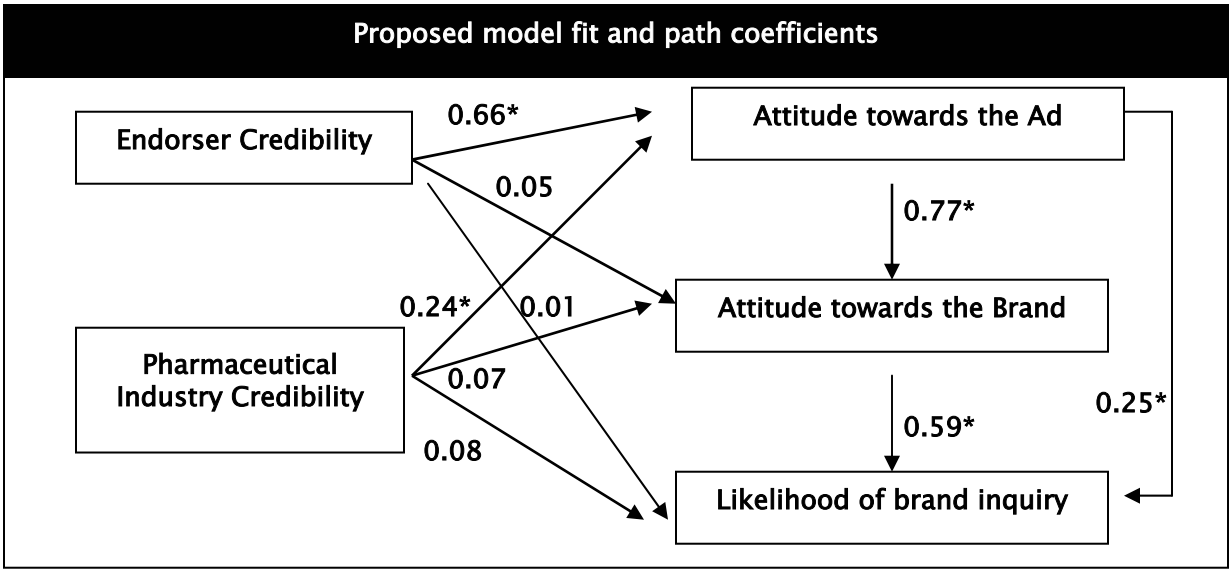


Figure 4: Proposed Study Model Fit and Path Coefficients

* Indicates that the relationship is statistically significant at $p<0.05$

The path analysis for the proposed study model revealed that parameter estimates representing the relationships between the following constructs (See Table 28) were statistically significant ($p<0.05$):

1) endorser credibility and attitude toward the ad,
2) pharmaceutical industry credibility and attitude toward the ad,
3) attitude toward the ad and attitude toward the brand,
4) attitude toward the brand and likelihood of brand inquiry and,
5) attitude toward the ad and likelihood of brand inquiry.

The other relationships hypothesized in the proposed study model, namely the effect of endorser credibility and industry credibility each on attitude toward the brand and likelihood of brand inquiry, did not achieve statistical significance.

Alternative Models

1) Dual Credibility Model (original theoretical framework)

In path analysis, it is recommended that non-significant relationships or paths be excluded from the model and a trimmed model be fit to the data. While it is important that the fit of the model not be compromised by reducing the number of parameters to be estimated, an equally well-fitting or better-fitting but parsimonious model is preferable to a well-fitting model that uses more degrees of freedom. Therefore, we decided to fit the dual credibility model (the original theoretical framework) to the data. Accordingly, the non-significant paths between endorser credibility and Attitude toward the ad, and attitude toward the brand were excluded (See Figure 5).

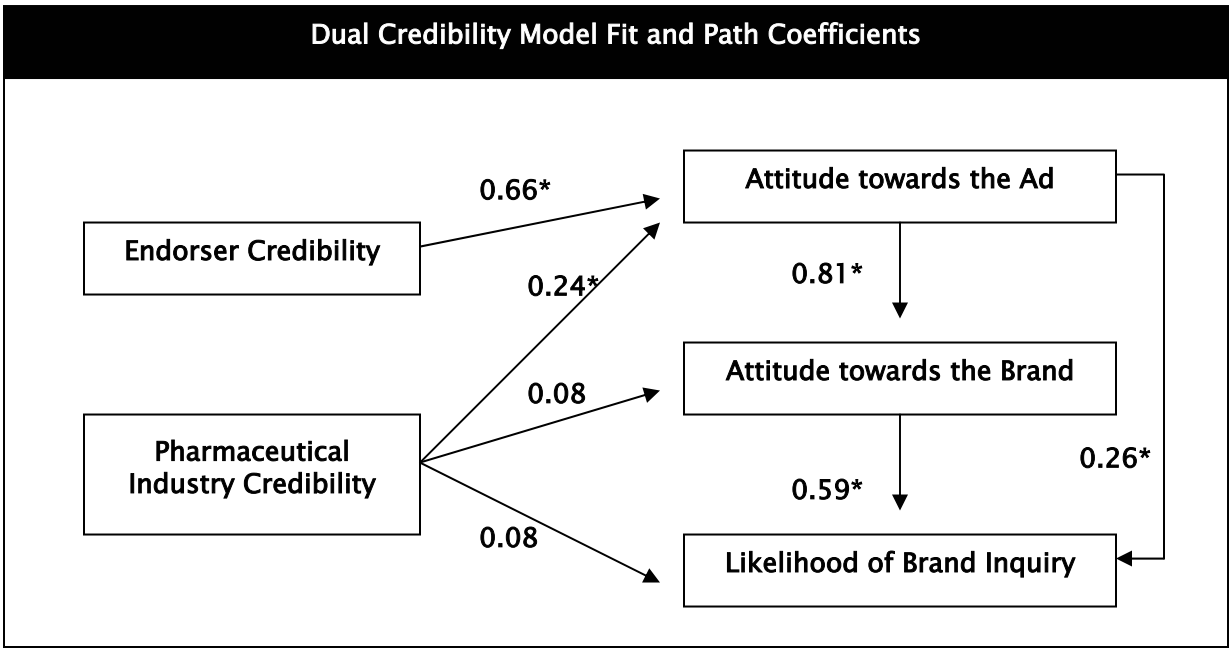


Figure 5.:Dual Credibility Model Fit and Path Coefficients

* Indicates that the relationship is statistically significant at $p<0.05$

When the dual credibility model was fit, it demonstrated an excellent fit to the data, having 7 degrees of freedom. The goodness-of-fit indices had high values ($\chi 2 = 1.09$, d.f. =5, $p=0.95$), Comparative Fit Index= 1.00, Normed Fit Index= 1.00, RMSEA = 0.000, Standardized Root Mean Square Residual=0.010 (See Table 27). A $\chi 2$ difference of fit test, analyzing the difference in fit of the dual credibility vs. the proposed study model indicated

no significant differences ($\Delta\chi 2 = 0.90$, d.f. $= 2$, $p > 0.50$, $\Delta CFI < 0.01$). A comparison of the fit estimates also showed that the 2 models were not different in terms of how well they fit the data. However, since an objective of path analyses and other structural equation modeling techniques is to develop a well-fitting but parsimonious model, it behooves researchers to assess certain other goodness-of-fit measures that take into account the number of degrees of freedom consumed by LISREL in analyzing the model fit. Accordingly, the Parsimony Goodness of Fit Index (PGFI) and the Parsimony Normed Fit Index (PNFI) were examined. These indexes revealed that the dual credibility model provided a more parsimonious fit to the data than the proposed study model.

The path analysis for the dual credibility model revealed that parameter estimates representing the relationships between the following constructs (See Table 29) were statistically significant ($p < 0.05$):

1) endorser credibility and attitude toward the ad,

2) pharmaceutical industry credibility and attitude toward the ad,

3) attitude toward the ad and attitude toward the brand,

4) attitude toward the brand and likelihood of brand inquiry and,

5) attitude toward the ad and likelihood of brand inquiry.

The other relationships hypothesized in the dual credibility model, namely the effect of industry credibility each on attitude toward the brand and likelihood of brand inquiry, did not achieve statistical significance.

2) Final Trimmed Model

We also decided to fit another model to the data in which all non-significant paths from the proposed model were excluded (See Figure 6). This trimmed model demonstrated an excellent fit. The goodness-of-fit indices were high ($\chi 2$ =5.10, d.f. =7, p=0.64), Comparative Fit Index= 1.00, Normed Fit Index= 0.99, RMSEA = 0.000, Standardized Root Mean Square Residual=0.024 (See Table 27). A $\chi 2$ difference of fit test indicated no significant differences with either the proposed model ($\Delta\chi 2$=4.91, d.f. =4, p>0.25) or the dual credibility model ($\Delta\chi 2$=4.01, d.f. =2, p>0.10).

A comparison of the fit estimates for the final trimmed model also showed that it was not different from either the proposed model or the dual credibility model (ΔCFI<0.01). In order to determine whether the trimmed model was worth retaining, the three models were compared on the PNFI and

the PGFI. The findings reported here reveal that the final trimmed model has a much higher PGFI (0.46) and PNFI (0.70) than both, the proposed study model (PGFI=0.20, PNFI=0.30) and the dual credibility model (PGFI=0.33, PNFI=0.50). Accordingly, this trimmed model was retained as the final model of choice for fitting to the data.

The path analysis for the final trimmed model revealed that parameter estimates representing the relationships between the following constructs (See Table 30) were statistically significant ($p<0.05$):

1) endorser credibility and attitude toward the ad,
2) pharmaceutical industry credibility and attitude toward the ad,
3) attitude toward the ad and attitude toward the brand,
4) attitude toward the brand and likelihood of brand inquiry and,
5) attitude toward the ad and likelihood of brand inquiry.

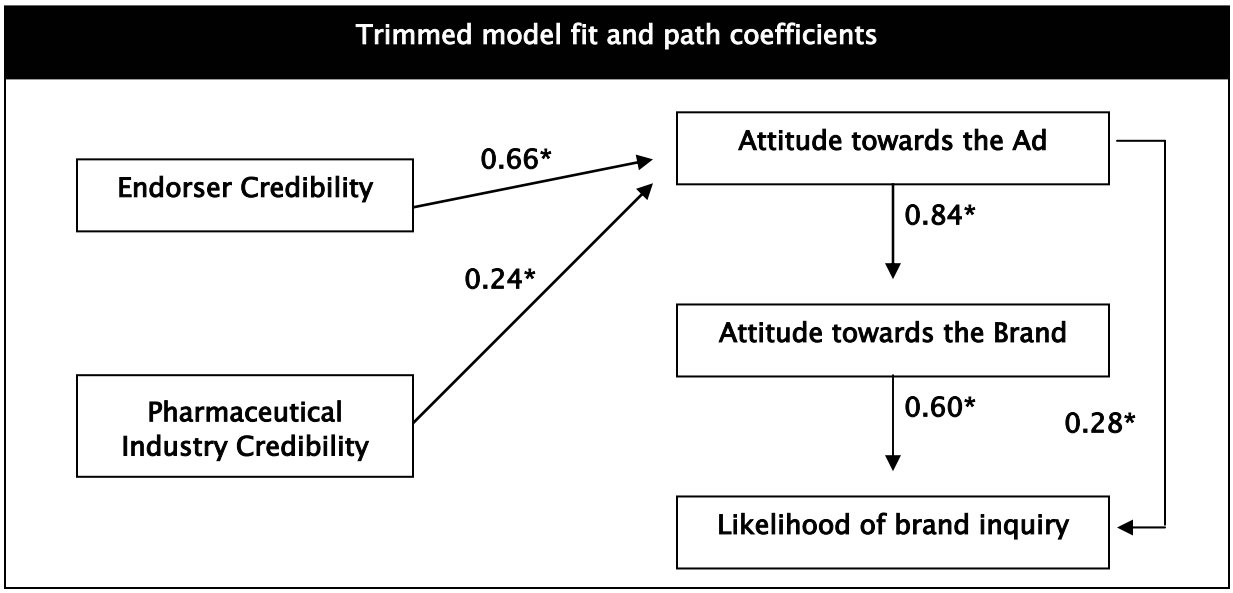


Figure 6: Trimmed Model Fit and Path Coefficients

* Indicates that the relationship is statistically significant at $p<0.05$

CHAPTER 6

DISCUSSION AND CONCLUSIONS

The primary objective of this research was to investigate determinants of the persuasive mechanism underlying DTC promotion. In particular, we focused on uncovering the role played by source credibility, a key element in persuasion theories. Building on extant research in other product categories, we conceptualized the existence of dual message sources in DTC ads – the pharmaceutical industry (ethically and financially responsible for the information and content) and the human endorsers who conveyed the message.

This research served to delineate the relationship between consumers' perceptions of the credibility of both sources and their subsequent perceptions and behavioral intentions. Our second objective was to determine whether a celebrity endorsement was perceived to be more credible and more effective than a testimonial from a non-celebrity. In examining the hypothesized relationships, we also analyzed whether consumers' level of involvement (high

or low) in treating their allergies would moderate the relationship between perceived source credibility and DTC ad effectiveness.

This chapter summarizes the results and discusses the implications of this study in the context of the research objectives. In addition, we delineate the limitations of the research design and offer ideas for future investigation.

6.1 Discussion of Study Results

6.1.1 Source Credibility and DTC Ad Effectiveness

This is the first study we are aware of that has attempted to model the relationship between source credibility and DTC ad effectiveness. Consequently, the findings reported here cover new ground in pharmaceutical marketing. Specifically, the results show that consumer perceptions of endorser credibility and pharmaceutical industry credibility both exert a significant and positive influence on attitudes toward the DTC ad. Neither of the source credibility constructs significantly influenced attitude toward the brand or likelihood of brand inquiry. However, attitude toward the ad had a significant direct influence on attitude toward the brand. Also, Aad directly and indirectly (through Ab)

significantly influenced likelihood of brand inquiry. Attitude toward the brand had a significant direct influence on likelihood of brand inquiry.

The findings reported here have two major implications for marketers. First, endorsers in DTC ads must be credible and believable as message sources. Perhaps, an endorser who has actually used the advertised drug may be more credible and in turn, more effective than a celebrity who is used simply to attract attention to the ad. Endorser credibility facilitates consumers' identification with the message source and thereby stimulates favorable affective attitudes towards the message and associated brand.

Secondly, the impact of perceived pharmaceutical industry credibility raises the need for the industry as a whole to engage in a better public relations effort. A united effort may be more successful than singular campaigns by individual drug companies because awareness of individual pharmaceutical companies is very low. In fact, respondents in this study exhibited some confusion between pharmaceutical companies and pharmacy companies. A collaborative effort perhaps, launched by an organization that represents the pharmaceutical industry (e.g. PhRMA) to inform the general public about specific activities undertaken by the drug industry and the long-term value of

the investments in research and development may evoke sympathy and affect towards an industry that perceives itself to be “under siege” (Slaughter, 2004). Such a united marketing campaign may be used to highlight the reasons why drug prices in the US are much higher than in other countries. These tactical steps may help the industry improve its credibility perception and deflect some of the criticism about rising drug prices. It is imperative that the drug industry exhibits good corporate citizenship and governance, as consumers may not engender positive attitudes towards their products if they feel that the drug industry is not credible in its activities.

The strength and effect of the relationship between source credibility measures (endorser credibility, pharmaceutical industry credibility) and DTC ad effectiveness (Aad, Ab, DII) provides valuable product promotion insights to product managers and brand teams as the pharmaceutical environment becomes even more competitive and cost-conscious. For example, if a celebrity is needed to endorse a brand, it may be prudent to use someone who has either taken the particular brand of medication (e.g. Bob Dole for Viagra®) or suffers from the disease for which the drug is indicated (e.g. Alonzo Mourning for

Procrit® and Kidney disease). This will make the endorser more credible when publicly speaking about a product or company.

6.1.2 Celebrity Endorsers and DTC Ad Effectiveness

This study found that consumers exposed to the DTC ad with a celebrity endorser did not significantly differ from consumers exposed to the DTC ad with a non-celebrity endorser on endorser credibility, Aad, Ab or DII. The absence of significant differences was apparent even across demographic characteristics (gender, race, educational attainment, income levels and age categories). The lack of an effect induced by the presence of a celebrity is contrary to our hypotheses and several other studies across product categories. Generally, it is expected that a celebrity would induce far more positive attitudes towards the ad as compared to a non-celebrity (Lafferty, Newell and Goldsmith 2002). Our study is distinct in examining this effect in the pharmaceutical product category.

In previous research, the celebrity effect on ad effectiveness outcomes, especially Aad, is most evident when the ad bears little personal relevance to the respondent. This study employed a screening criterion that allowed for

inclusion of only those consumers who were suffering from allergies or had reported a purchase of an anti-allergy drug in the past. Certainly, among consumers for whom the ad was personally relevant, variations in the level of involvement with obtaining allergy treatment are bound to exist. However, even after categorizing consumers into more and less involved, based on their responses to the involvement scale, there was no significant interaction effect of celebrity manipulation and level of involvement on any of the ad effectiveness outcomes. Essentially, this indicates that irrespective of the level of involvement, consumers exposed to the celebrity endorser did not differ significantly in their perceptions and behavioral intentions from consumers exposed to the non-celebrity endorser.

The results reveal that a celebrity spokesperson by her/himself will not necessarily induce greater affect towards the ad or brand, nor will s/he stimulate consumers' brand inquiry behavior. The implication for practitioners is that a non-celebrity endorser may be just as credible and effective as a celebrity endorser in the DTC advertising context. Therefore a prudent strategy, especially for brands with a limited advertising budget is to be cost-efficient in using a non-celebrity endorser that is believable and credible.

The results reported here do not however give us latitude to infer that a celebrity adds little value to a brand's equity. Certainly, a celebrity endorser may draw greater attention to an ad than a typical-man-on-the street testimonial, thereby increasing awareness of the ad and brand. In turn, this may heighten the possibility that the interested consumer will talk to the doctor about the celebrity-endorsed prescription drug. Celebrities who are credible may stimulate market growth and product use when employed in unbranded patient education or public affairs campaigns. In addition, the value of celebrities in attracting attention to the ad and thereby stimulating development of affective attitudes cannot be ruled out.

6.1.3 Involvement and Source Credibility Effects

The results of this study revealed that, consumers' level of involvement in getting a treatment for their allergies did not moderate the relationships between the source credibility constructs (pharmaceutical industry credibility and endorser credibility) and Aad, Ab and DII. The moderating role is similar to an interaction effect. As such, just as the interaction effect of celebrity manipulation and involvement did not significantly influence the ad

effectiveness outcomes (see section 6.1.2), it did not play a role in the path model either.

This study demonstrates that the effects of source credibility on Aad, Ab and DII do not vary across levels of involvement with the disease and treatment. It is likely therefore, that source credibility is a perception that is processed centrally rather than as a peripheral cue as some prior research suggests (Petty and Cacioppo 1986). Perhaps, as Mackenzie, Lutz and Belch (1987) suggest, developing perceptions of the credibility of the pharmaceutical industry and towards endorsers in drug ads requires some level of central processing. Accordingly, both credibility perceptions are encoded into memory and may induce more lasting effects on attitude formation and behavioral intention.

6.2. Conclusions and Implications

This study empirically assessed the impact of source credibility as part of the system of antecedents of DTC advertising effectiveness. In doing so, this study is distinct and covers new ground in pharmaceutical marketing research. This study shows that, consumers' perceptions of the credibility of the pharmaceutical industry and that of its endorsers play an important role in

formation of favorable attitudes towards the DTC ad. Subsequently, perceptions towards the ad affect product attitudes and intention to discuss the drug with the physician. While our proposed model fit the data well, we developed a trimmed model that fit equally well and was parsimonious. This model may be used as a foundation upon which future pharmaceutical marketing strategies may be developed.

This research also demonstrates a lack of effect of celebrity endorsements on DTC advertising effectiveness. The findings imply that a cost-efficient DTC marketing strategy would be to use credible and believable endorsers, irrespective of their celebrity status, in branded promotional campaigns.

The findings reported here clearly show that while consumers have favorable perceptions towards the credibility of the drug industry, their awareness of drug companies is poor. The drug industry should undertake a united public relations effort that attempts to create better rapport with the public. An effort of this nature will involve boosting public recognition of the charitable efforts that are prevalent across the drug industry such as drug discount programs. In addition, the drug industry should unitedly address the

issue of rising drug prices by increasing awareness of the investment in drug discovery and research. While many of these measures have been initiated at a company-specific level, it is the responsibility of the entire industry to collaboratively tackle the current challenge of being projected as a credible corporate citizen.

This research is unique in addressing the issue of dual source effects in the area of pharmaceutical marketing. It remains distinct in its application of a conceptual framework, and the development of a theoretically sound and actionable model to examine the mechanism by which the credibility of dual sources influences DTC ad effectiveness, taking into account the role played by consumers' level of involvement. It is the first experimental investigation into the effectiveness of celebrity endorsers in pharmaceutical advertising. In analyzing how perceptions of source credibility can affect attitudes toward DTC ads and influence consumer behavior, it offers practical advice to marketers at the brand and corporate level in undertaking future campaigns. Finally, it adds to the extant theoretical development in the field of pharmaceutical marketing and marketing research, by adapting traditional ad effectiveness theories and

methodologies from psychology to empirically gauge the persuasive effects of source credibility in direct-to-consumer pharmaceutical marketing.

6.3. Limitations and Considerations for Future Research

The unique findings of this research must be tempered by a consideration of certain limitations. First, as with all cross-sectional research, it must be remembered that data for this study were collected at a single point in time. As such, the ecological validity of the findings reported here must be interpreted with caution. It would be prudent to conduct such experimental studies longitudinally. Such a design may change the effects and strength of the relationships in our model but would definitely add to the validity of the research.

Second, consumers in our study received a forced exposure to the ad stimulus. Considering that attitude formation typically requires several repetitive exposures, it may not be surprising that celebrity effect was not demonstrable. In particular, it must be remembered that celebrities are usually employed over several exposures to attract attention to the ad. However, in this study attention to the ad was not assessed. Therefore, future research must

employ attention to the DTC ad as an outcome of interest in evaluating the comparative effectiveness of celebrities vs. non-celebrities.

This study failed to demonstrate a moderating influence of involvement on the relationships between source credibility and ad effectiveness. This may be attributable to the fact that we had consumers in the sample for whom, the ad and product (anti-allergy) bore some personal relevance. However, since DTC ads typically are meant to target consumers who have the disease that the advertised drug is indicated for, this aspect of the study design does not limit the external validity of its findings.

Finally, there may exist within the study measures, a degree of common method variance that accounts for the high correlation between the credibility and ad effectiveness measures (pharmaceutical industry credibility, endorser credibility, Aad, Ab and DII). Despite the fact that the measures employed here were psychometrically sound, they may be unable to offer the discrimination necessary to assess the variability in these constructs. Future investigations should attempt to develop measures of these outcome variables that will help maximize their discriminating power.

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TABLES

Table 1: Pre-test Q-scores for celebrities

Celebrity	Mean Q-score	Std. Deviation
a. Meg Ryan	8.82	1.42
b. Lance Armstrong	5.47	2.31
c. Dorothy Hamill	4.00	2.10
d. Tom Hanks	7.90	1.31
e. Barry Bonds	5.36	2.22
f. Bob Dole	5.32	1.61
g. Dan Reeves	4.43	2.17
h. Katie Couric	7.13	2.32
i. Noah Wylie	6.10	3.02
j. Michelle Pfeiffer	8.50	1.69

Table 2: Pre-test compatibility rankings for top 3 celebrities

Celebrity	Mean Q-score	n	Percentage (%) of respondents
a. Meg Ryan	8.82	47	39.5%
b. Michelle Pfeiffer	8.50	15	12.6%
c. Tom Hanks	7.90	18	15.1%

Table 3: Pre-test endorser manipulation check

Item	Levene's test for equal variances			t-test for equality of means		
	Variances	F	p-value	t	df	p-value
Endorser Familiarity	Equal variances assumed	1.91	.18	-4.01	17	.001
	Equal variances not assumed			-3.94	14.91	.001

Table 4: Pre-test scale reliabilities

	Reliability (Cronbach's α)
Industry Credibility	0.86
Endorser Credibility	0.83
Involvement in getting treatment for allergies	0.95
Attitude toward the ad	0.95
Attitude toward the brand	0.98
Likelihood of brand Inquiry	0.96

Table 5: Main Study: Reliability of Industry Credibility scale

SCALE: Industry Credibility
Number of Items = 8
n=213
Cronbach's α = 0.90

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
a. The pharmaceutical industry makes truthful claims	36.85	88.12	0.75	0.89
b. The pharmaceutical industry does not have much expertise*	36.41	97.21	0.46	0.92
c. The pharmaceutical industry is skilled in what it does	36.80	85.56	0.80	0.89
d. The pharmaceutical industry has great expertise	36.86	86.56	0.79	0.89
The pharmaceutical industry has a great amount of experience	36.80	86.54	0.81	0.89
f. I do not believe what the pharmaceutical industry tells me*	36.71	90.47	0.61	0.91
g. The pharmaceutical industry is honest	37.18	88.25	0.72	0.90
h. I trust the pharmaceutical industry	37.10	88.44	0.74	0.90

*Note: Items denoted with an * are reverse coded. These were recoded prior to reliability estimation

Table 6: Main Study: Reliability of Involvement scale

SCALE: Involvement with allergies
Number of Items = 10
n=215
Cronbach's α = 0.99

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
a. Important to me - Unimportant to me*	46.44	173.55	0.68	0.93
b. Boring to me - Interesting to me	47.07	166.70	0.74	0.92
c. Relevant to me - Irrelevant to me*	46.79	168.76	0.72	0.92
d. Exciting to me - Unexciting to me*	47.51	166.49	0.68	0.93
e. Means nothing to me - Means a lot to me	47.14	166.26	0.76	0.92
f. Appealing to me - Unappealing to me*	47.06	166.73	0.79	0.92
g. Fascinating to me - Mundane to me*	47.22	169.11	0.73	0.92
h. Worthless to me - Valuable to me	46.92	171.63	0.74	0.92
I. Involving to me - Uninvolving to me*	46.91	169.51	0.76	0.92
j. Not needed by me - Needed by me	47.20	167.46	0.70	0.93

*Note: Items denoted with an * are reverse coded. These were recoded prior to reliability estimation

Table 7: Main Study: Reliability of Endorser Credibility scale

SCALE: Endorser Credibility
Number of Items = 6
n=217
Cronbach's α = 0.91

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
a. Unattractive - Attractive	25.65	58.52	0.71	0.90
b. Unclassy - Classy	25.55	59.55	0.79	0.89
c. Insincere - Sincere	25.83	58.93	0.76	0.90
d. Untrustworthy - Trustworthy	25.85	58.92	0.73	0.90
e. Not an expert - Expert	26.33	54.54	0.77	0.90
f. Inexperienced - Experienced	26.02	54.89	0.79	0.89

Table 8: Main Study: Reliability of attitudes towards the ad scale

SCALE: Attitude towards the ad
Number of Items = 3
n=216
Cronbach's α = 0.94

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
a. Bad - Good	10.54	10.23	0.86	0.92
b. Unpleasant - Pleasant	10.54	9.95	0.90	0.90
c. Unfavorable - Favorable	10.52	9.57	0.87	0.92

Table 9: Main Study: Reliability of Attitudes towards the brand scale

SCALE: Attitude towards the brand
Number of Items = 3
n=215
Cronbach's α = 0.95

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
Bad - Good	10.63	9.73	0.89	0.94
Negative - Positive	10.69	9.66	0.92	0.93
Unfavorable - Favorable	10.74	9.16	0.91	0.93

Table 10: Main Study: Reliability of Brand Inquiry Behavior scale

SCALE: Brand Inquiry Behavior
Number of Items = 3
n=217
Cronbach's α = 0.94

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
Unlikely - Likely	10.81	10.80	0.91	0.90
Improbable - Probable	10.88	11.33	0.89	0.92
Impossible - Possible	10.64	12.23	0.86	0.94

Table 11: Main Study: Reliability of Satisfaction with allergies scale

SCALE: Satisfaction with allergy treatment
Number of Items = 7
n=218
Cronbach's α = 0.90

Items	Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α if Item Deleted
a. Quick relief of allergy symptoms	29.62	59.38	0.77	0.89
b. Effectiveness in relieving of allergy symptoms	29.74	59.81	0.75	0.89
c. Fewer side effects like drowsiness and rashes	29.76	59.94	0.71	0.90
d. Fewer number of medications to treat the allergy	29.83	59.04	0.78	0.89
e. Cost	30.24	59.50	0.61	0.91
f. Ability to treat both indoor and outdoor allergies	29.70	59.70	0.73	0.89
g. Fewer visits to the doctor's office	29.71	58.11	0.74	0.89

Table 12: Descriptives - Demographic Characteristics

Variable	Categories	n	Percentage (%)
Age	18-25 years	80	36.70%
	26-35 years	67	30.73%
	36-45 years	43	19.72%
	46-55 years	19	8.72%
	56-65 years	6	2.75%
	>65 years	3	1.38%
Gender	Male	100	45.87%
	Female	118	54.13%
Race	American Indian	3	1.38%
	Asian	7	3.21%
	Black	57	26.15%
	Hispanic	11	5.05%
	White	136	62.39%
	Mixed	3	1.40%
	Unknown	1	0.50%
Level of education	Less than high school	10	4.59%
	High school graduate	73	33.49%
	Associates degree	43	19.72%
	Some college	56	25.69%
	College graduate	31	14.22%
	Grad school or higher	5	2.29%
Annual Household Income	Less than $15,000	20	9.17%
	$15,000-$24,999	21	9.63%
	$25,000-$34,999	45	20.64%
	$35,000-$49,999	61	27.98%
	$50,000-$74,999	38	17.43%
	$75,000-$99,999	19	8.72%
	Greater than $100,000	13	5.96%
	Refused	1	0.50%

Table 13: Descriptives for model constructs

Constructs	N	Mean	Median	SD	Range	Minimum	Maximum
Industry credibility	213	5.26	5.38	1.34	5.88	1.13	7.00
Endorser credibility	217	5.17	5.50	1.50	6.00	1.00	7.00
Attitude towards the ad	216	5.27	5.67	1.55	6.00	1.00	7.00
Attitude towards the brand	215	5.34	5.67	1.53	6.00	1.00	7.00
Brand Inquiry behavior	217	5.39	6.00	1.67	6.00	1.00	7.00
Involvement with allergy treatment	215	5.23	5.30	1.44	6.00	1.00	7.00

Table 14: Descriptives – Unaided awareness of pharmaceutical companies

Company	n	Unaided awareness (%)
Pfizer	36	16.50%
Aventis	29	13.30%
Johnson & Johnson	22	10.10%
Merck	13	6.00%
BMS	11	5.00%
GlaxoSmithKline	9	4.10%
Eli Lilly	8	3.70%

Table 15: Descriptives - satisfaction with allergy treatment

Variable	N	Mean	Median	SD	Range	Minimum	Maximum
a. Quick relief of allergy symptoms	218	5.15	5.00	1.52	6.00	1.00	7.00
b. Effectiveness in relieving of allergy symptoms	218	5.02	5.00	1.50	6.00	1.00	7.00
c. Fewer side effects like drowsiness and rashes	218	5.01	5.00	1.56	6.00	1.00	7.00
d. Fewer number of medications to treat the allergy	218	4.94	5.00	1.52	6.00	1.00	7.00
e. Cost	218	4.53	5.00	1.79	6.00	1.00	7.00
f. Ability to treat both indoor and outdoor allergies	218	5.06	5.00	1.55	6.00	1.00	7.00
g. Fewer visits to the doctor's office	218	5.06	5.00	1.66	6.00	1.00	7.00

Table 16: Descriptives – Allergy management

Allergy Management		n	Percentage (%)
Most frequent option used to treat allergies	Visit MD to get prescription	72	33.03%
	Use OTC products	132	60.55%
	Use vitamins or home remedies	14	6.42%
Use prescription to treat allergies	Yes	111	51.15%
	No	107	48.85%
Cause of allergy	Outdoor allergens*	188	86.20%
	Indoor allergens*	70	32.10%
Severity of allergy symptoms	Very severe	28	12.84%
	Moderately severe	75	34.40%
	Mild	90	41.28%
	Very mild	25	11.00%

*Note: Percentages may not sum up to 100% due to membership in multiple categories

Table 17: Descriptives – Awareness of celebrity endorsements

Celebrity	n	Percentage (%)
Aware of at least 1 celebrity endorser	78	35.8%
Not aware of any celebrity endorser	140	64.2%

Table 18: Descriptives – Aided awareness of celebrities

Celebrity	Aided awareness (%)	n	Correctly identified celebrity with brand/disease state (%)	n
Bob Dole	14.20%	31	6.90%	15
John Elway	12.40%	27	0.00%	0
Dorothy Hamill	11.90%	26	3.20%	7
Mike Ditka	9.20%	20	1.40%	3
Tom Hanks*	7.30%	16	N/A	N/A

* Note: Tom Hanks was a check for false responses

Table 19: Descriptives – Aided awareness of allergy DTC ads

DTC advertisement	Aided awareness (%)	n
Clarinex	71.60%	156
Zyrtec	67.90%	148
Breatheamine*	14.20%	31
Singulair	37.60%	82
Flonase	70.60%	154

*Note: Breatheamine was a check for false responses

Note: Percentages may not sum up to 100% due to membership in multiple categories

Table 20: Descriptives –Past exposure to DTC ads by media

Media	Awareness (%)	n
Television DTC ads	87.60%	191
Magazine/Newspaper DTC ads	54.10%	118
Internet DTC ads	23.40%	51

Note: Percentages may not sum up to 100% due to membership in multiple categories

Table 21: Descriptives –Past behavior after exposure to DTC ads

Behavior		Percentage (% of entire sample)	n
Brand Inquiry		58.30%	91
Brand Request		64.70%	77
Doctor acquiescence		6.90%	59
Information search behavior		39.40%	86
Information search media used*	Internet	22.90%	50
	Toll free number	4.60%	10
	Magazines	10.10%	22
	Health care professional	15.60%	34

*Note: Percentages may not sum up to 100% due to membership in multiple categories

Table 22: ANOVA results for effect of celebrity on Endorser credibility

	Sum of Squares	df	Mean Square	F statistic	p-value
Between Groups	0.10	1	0.10	0.04	0.83
Within Groups	488.72	215	2.27		
Total	488.82	216			

Table 23: ANOVA results for effect of celebrity on Aad

	Sum of Squares	df	Mean Square	F statistic	p-value
Between Groups	0.11	1	0.11	0.04	0.82
Within Groups	517.71	214	2.41		
Total	517.82	215			

Table 24: ANOVA results for effect of celebrity on Ab

	Sum of Squares	df	Mean Square	F statistic	p-value
Between Groups	0.22	1	0.22	0.09	0.75
Within Groups	497.85	213	2.33		
Total	498.086	214			

Table 25: ANOVA results for effect of celebrity on brand inquiry behavior

	Sum of Squares	df	Mean Square	F statistic	p-value
Between Groups	0.63	1	0.63	0.22	0.635
Within Groups	601.51	215	2.79		
Total	602.15	216			

Table 26: Multi-Group Path Analysis testing Involvement as a Moderator

	Model fit				Model Comparison (Constrained vs. Unconstrained)			
	$\chi 2$	df	RMSEA	CFI	$\Delta\chi 2$	Δdf	ΔRMSEA	ΔCFI
Constrained	12.37	15	0.00	1.00	12.22	9	0.00	0.00
Unconstrained	0.15	6	0.00	1.00				

Note: The constrained and unconstrained models did not differ significantly on fit statistics

Table 27: Goodness-of-fit Indices of Structural Models

Model Comparison	$\chi 2$	df	RMSEA	CFI	NFI	NNFI	PGFI	PNFI
Proposed Model	0.19	3	0.00	1.00	1.00	1.00	0.20	0.30
Dual Credibility Model	1.09	5	0.00	1.00	1.00	1.01	0.33	0.50
Final Trimmed Model	5.10	7	0.00	1.00	0.99	1.00	0.46	0.70
Model	**$\Delta\chi 2$**	**Δdf**	**ΔRMSEA**	**ΔCFI**	**ΔNFI**	**ΔNNFI**	**ΔPGFI**	**ΔPNFI**
Proposed Model vs. Dual Credibility Model	0.90	2	0.00	0.00	0.00	0.01	0.13	0.20
Dual Credibility Model vs. Final Trimmed Model	4.01	2	0.00	0.00	0.01	0.01	0.13	0.20
Proposed Model vs. Final Trimmed Model	4.91	4	0.00	0.00	0.01	0.00	0.26	0.40

Note: RMSEA= Root Mean Square Error of Approximation
CFI= Comparative Fit Index
NFI=Normed Fit Index
NNFI=Non-Normed Fit Index
PGFI=Parsimony Goodness of Fit Index
PNFI=Parsimony Normed Fit Index
$\Delta\chi 2$= Chi-square difference of fit test

Note: $\chi 2$ Goodness-of-fit index and other fit indices are not significantly different from each other (<0.01), but parsimony fit indices are different from each other

Table 28: Parameter Estimates of Proposed Structural Model

Dependent variable	Predictors	Std. Coefficients	Unstd. Coefficients	Std Error	t-Value
Attitude toward the Ad (R^2=0.55)	a. Endorser Credibility	0.61*	0.66	0.06	10.90
	b. Industry Credibility	0.21*	0.24	0.07	3.66
Attitude toward the brand (R^2=0.46)	a. Endorser Credibility	0.05	0.05	0.06	0.94
	b. Industry Credibility	0.06	0.07	0.05	1.34
	c. Attitude toward the ad	0.79*	0.77	0.05	14.25
Likelihood of brand inquiry (R^2=0.36)	a. Endorser Credibility	0.01	0.01	0.07	0.17
	b. Industry Credibility	0.06	0.08	0.07	1.16
	c. Attitude toward the ad	0.23*	0.25	0.10	2.48
	d. Attitude toward the brand	0.55*	0.59	0.09	6.35

*Note: Parameter estimates are statistically significantly different from zero at $p<0.01$

Table 29: Parameter Estimates of Dual Credibility Structural Model

Dependent variable	Predictors	Std. Coefficients	Unstd. Coefficients	Std Error	t-Value
Attitude toward the Ad (R^2=0.55)	a. Endorser Credibility	0.62*	0.66	0.06	10.94
	b. Industry Credibility	0.21*	0.24	0.07	3.66
Attitude toward the brand (R^2=0.44)	a. Industry Credibility	0.07	0.08	0.05	1.62
	b. Attitude toward the ad	0.82*	0.81	0.04	18.98
Likelihood of brand inquiry (R^2=0.35)	a. Industry Credibility	0.06	0.08	0.06	1.24
	b. Attitude toward the ad	0.24*	0.26	0.09	2.78
	c. Attitude toward the brand	0.54*	0.59	0.09	6.33

*Note: Parameter estimates are statistically significantly different from zero at $p<0.01$

Table 30: Parameter Estimates of Final Trimmed Structural Model

Dependent variable	Predictors	Std. Coefficients	Unstd. Coefficients	Std Error	t-Value
Attitude toward the Ad (R^2=0.55)	a. Endorser Credibility	0.61*	0.66	0.06	10.92
	b. Industry Credibility	0.21*	0.24	0.07	3.70
Attitude toward the brand (R^2=0.41)	a. Attitude toward the ad	0.86*	0.84	0.04	23.28
Likelihood of brand inquiry (R^2=0.31)	a. Attitude toward the ad	0.26*	0.28	0.09	3.09
	b. Attitude toward the brand	0.56*	0.60	0.09	6.50

*Note: Parameter estimates are statistically significantly different from zero at $p<0.01$

APPENDICES

Appendix A: Pretest Questionnaire for Q-score Elicitation

Celebrity	**Familiarity**	**Attractiveness**	**Total Score (Familiarity + Attractiveness)**
Meg Ryan			
Lance Armstrong			
Dorothy Hamill			
Tom Hanks			
Barry Bonds			
Bob Dole			
Dan Reeves			
Katie Couric			
Noah Wylie			
Michelle Pfeiffer			

Now, select the **top 3 celebrities** from the list above on the basis of their **total score**. Please write their names below. Circle the name of the celebrity who you think is <u>most likely to use a prescription medication to treat allergies.</u>

1. _____
2. _____
3. _____

Appendix B: Main Study Mall Intercept Questionnaire

Part A:

Please look at the advertisement for Allergone® – a prescription medicine for treating allergies. Observe the advertisement as you would normally do and please answer the following questions.

Part B: Survey Questionnaire

Instructions: ***Please answer the following questions by placing an 'X' in the space that best reflects how you feel. For example, if the question is "How is the weather today?" and you feel that the weather is extremely good, then you would place the 'X' as follows:***

Good	_ X__ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Bad

Please place your 'X' in the middle of the spaces.

Section 1: Please think about the pharmaceutical industry that makes medicines like Allergone®, and is responsible for the information in such advertisements. Based on your feelings towards the pharmaceutical industry, please show how strongly you agree or disagree with each of the following statements by placing an 'X' in the appropriate space.

The pharmaceutical industry makes truthful claims.	_ __ Strongly disagree	_ __	_ __	_ __	_ __	_ __	_ __ Strongly agree
The pharmaceutical industry does not have much experience.	_ __	_ __	_ __	_ __	_ __	_ __	_ __
The pharmaceutical industry is skilled in what it does.	_ __	_ __	_ __	_ __	_ __	_ __	_ __
The pharmaceutical industry has great expertise.	_ __	_ __	_ __	_ __	_ __	_ __	_ __

The pharmaceutical industry has a great amount of experience.	_ __	_ __	_ __	_ __	_ __	_ __	_ __
I <u>do not</u> believe what the pharmaceutical industry tells me.	_ __	_ __	_ __	_ __	_ __	_ __	_ __
The pharmaceutical industry is honest.	_ __	_ __	_ __	_ __	_ __	_ __	_ __
I trust the pharmaceutical industry.	_ __	_ __	_ __	_ __	_ __	_ __	_ __

When you think of the pharmaceutical industry, which particular companies come to your mind? Please list the names of the top 3 companies that you remember.

1) _____ 2) _____ 3) _____

<u>Section 2:</u> Please think about the person whose picture appears in this ad and who is endorsing Allergone®. What do you think or feel about this person?

Unattractive	_ __ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Attractive
Unclassy	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Classy
Insincere	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Sincere
Untrustworthy	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Trustworthy
Not an expert	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Expert
Inexperienced	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Experienced
Very unfamiliar	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Very familiar

If the person in the ad is familiar to you, please indicate with an 'X' in what area or context have you seen or heard this person?

_____Movies/Television **_____Sports** **_____Politics**

<u>Section 3:</u> The purpose of this section is to measure your interest in getting relief from your allergies. Please indicate by placing an "X" on the space in the questionnaire that best reflects how you feel about treating your allergies.

Important to me	_ __ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Unimportant to me
Boring to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Interesting to me
Relevant to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Irrelevant to me
Exciting to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Unexciting to me
Means nothing to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Means a lot to me
Appealing to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Unappealing to me
Fascinating to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Mundane to me
Worthless to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Valuable to me
Involving to me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Uninvolving to me
Not needed by me	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Needed by me

Section 4: Below you will find a list of descriptions that represent different feelings about the advertisement that you just read. Based on your assessment of the ad, please indicate by placing an "X" on the space that best reflects how you feel about this ad.

Bad	_ __ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Good
Unpleasant	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Pleasant
Unfavorable	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Favorable

Section 5: Based on your assessment of the Allergone® brand, please indicate by placing an "X" on the space that best reflects how you feel about Allergone® as a product.

Bad	_ __ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Good
Negative	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Positive
Unfavorable	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Favorable

Section 6: Assume that you are currently suffering from allergies. Now, based on your assessment of Allergone®, please indicate with an 'X', how likely is it that you will talk to your doctor about Allergone® during your next visit?

Unlikely	_ __ 1	_ __ 2	_ __ 3	_ __ 4	_ __ 5	_ __ 6	_ __ 7	Likely
Improbable	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Probable
Impossible	_ __	_ __	_ __	_ __	_ __	_ __	_ __	Possible

Section 7: Now, we would like to learn about your experience with your allergy medications.

1) How satisfied have you been with your current or past allergy medication in meeting the following needs? Please rate your satisfaction by placing an 'X' in the appropriate space.

Quick relief of allergy symptoms like itchy eyes, and runny nose	– – Not at all satisfied	– –	– –	– –	– –	– –	– – Completely satisfied
Effectiveness in relieving allergy symptoms	– –	– –	– –	– –	– –	– –	– –
Fewer side effects like drowsiness and rashes	– –	– –	– –	– –	– –	– –	– –
Fewer number of medications to treat allergy	– –	– –	– –	– –	– –	– –	– –
Cost	– –	– –	– –	– –	– –	– –	– –
Ability to treat both indoor and outdoor allergies	– –	– –	– –	– –	– –	– –	– –
Fewer visits to the doctor's office	– –	– –	– –	– –	– –	– –	– –

2) Which of the following options do you use most frequently to treat your allergies? Please ☑ only one option.

- ☐ Visit the doctor to get a prescription to treat your allergy
- ☐ Purchase an over-the-counter (OTC) medicine that you can get without a prescription
- ☐ Use vitamins/herbal products/home remedies to treat your allergy

3) Have you ever used a prescription medication for treating your allergy? Please ☑ only one option.

- ☐ Yes
- ☐ No

4) What causes your allergies? Please ☑ all that apply.

- ☐ Outdoor allergens such as pollen
- ☐ Indoor allergens such as pet dander or dust

5) When you experience allergy symptoms, how severe are they? Please ☑ only one option.

- ☐ Very severe
- ☐ Moderately severe
- ☐ Mild
- ☐ Very mild

Section 8: We would like to know about your experience with advertisements for prescription medicines.

1) Which of the following famous persons or celebrities have you seen in advertisements for prescription medicines? Please ☑ all that apply. If you happen to remember the medicine or disease this celebrity is associated with, please list that in the blank space.

- ☐ John Elway _____ (List the medicine or disease)
- ☐ Bob Dole _____
- ☐ Mike Ditka _____
- ☐ Dorothy Hamill _____
- ☐ Tom Hanks _____

2) Which of the following prescription allergy medications have you seen or heard advertised in the past year? Please ☑ all that apply.

- ☐ Clarinex®
- ☐ Zyrtec®
- ☐ Breatheamine®
- ☐ Singulair®
- ☐ Flonase®

3) Where have you seen ads for prescription medications? Please ☑ all that apply.

- ☐ On television or radio
- ☐ In magazines or newspapers
- ☐ On the Internet

4) In the past, have you ever talked to your doctor about a medication you had seen/heard advertised?

- ☐ Yes
- ☐ No

5) In the past, have you ever asked your doctor to prescribe you a medication you had seen/heard advertised?

- ☐ Yes
- ☐ No

If you checked yes, did your doctor prescribe the medication you requested?

- Yes
- No

6) After seeing/hearing an ad for a prescription medication, have you ever searched for more information about that medication?

- Yes
- No

If you checked yes, where have you searched for more information? Please ☑ all that apply.

- Internet websites
- 1-800 toll free number
- Magazines
- Physician/ Pharmacist/ other healthcare professionals

Section 9: Finally, just a few questions about you. This information is for descriptive purposes only.

1) What is your gender?

- Male
- Female

2) What is the highest level of education you have completed?

- Lesser than high school
- High school graduate or equivalent (e.g. GED)
- Associates/Technical/Vocational degree
- Completed some part of college, but no degree
- College graduate
- Graduate school or higher

3) How do you describe yourself? (Please indicate mixed racial heritage by ☑ more than one category).

- American Indian or Alaska native
- Asian
- Black or African-American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White

4) Which of the following categories best describes your age?

- Less than 25 years
- 26 – 35
- 36 – 45
- 46 – 55
- 56 – 65
- Above 65 years

5) What is your annual household income?

- Less than $15,000
- $15,000 to $24,999
- $25,000 to $34,999
- $35,000 to $49,999
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 or more

Thank you very much for your time! Your participation has been valuable and helpful.

Appendix C: Cover letter for mall intercept study participants

This research study is titled "CONSUMERS' RESPONSES TO PRESCRIPTION DRUG ADVERTISING" and is being conducted by Ajit M. Menon, from the College of Pharmacy at the University of Georgia (706-542-0418) under the direction of Dr. Matthew Perri III, College of Pharmacy, University of Georgia (706-542-5365). Participation in this study is voluntary. Participation in this study can be ended at any time without giving any reason, and without penalty. You can ask to have all of the information about you returned to you, removed from the research records, or destroyed.

The reason for this study is to measure consumers' attitudes towards the advertising of prescription medications to determine how to make these ads better suited to you.

You will be asked to do the following things:

1. Read an advertisement for a prescription medication. (2 minutes)
2. Fill out a survey questionnaire measuring my perceptions toward the advertisement and demographic characteristics. (10 minutes)

In order to make this study a valid one; some information about your participation will be withheld until the completion of the study. The study will take approximately 12 minutes to complete. The survey will be completely anonymous. The investigator will answer any further questions about the research, now or during the course of the project (706-542-0418).

_____	_____	_____	_____
Signature	**Date**	**Signature**	**Date**

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Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Appendix D: Lisrel Matrices

1. Variance-Covariance Matrix (More-involved group) n=104

AAD	AB	DINQ	ENDCRED	INDCRED
1.48	1.05	0.84	1.11	0.64
1.05	1.05	0.80	0.82	0.43
0.84	0.80	0.85	0.65	0.36
1.11	0.82	0.65	1.41	0.75
0.64	0.43	0.36	0.75	1.42

2. Variance-Covariance Matrix (Less-involved group) n=103

AAD	AB	DINQ	ENDCRED	INDCRED
1.48	1.05	0.84	1.11	0.64
1.05	1.05	0.80	0.82	0.43
0.84	0.80	0.85	0.65	0.36
1.11	0.82	0.65	1.41	0.75
0.64	0.43	0.36	0.75	1.42

3. Variance-Covariance Matrix (pooled data from more and less-involved groups) n=209

AAD	AB	DREQ	ENDCRED	INDCRED
2.41	2.01	1.88	1.60	1.07
2.01	2.32	1.96	1.42	1.00
1.88	1.96	2.73	1.34	1.00
1.60	1.42	1.34	2.11	1.00
1.07	1.00	1.00	1.00	1.77

Appendix E: DTC Ad Stimuli

Side effects with Allergone were similar to Allegra alone and may include headache, insomnia, and nausea. Due to the decongestant (pseudoephedrine) component in Allergone, this product must not be used if you: are taking an MAO inhibitor (a medication for depression) or have stopped taking an MAO inhibitor within 14 days; retain urine; have narrow-angle glaucome; have severe high blood pressure of severe heart disease. You should also tell your doctor if you have high blood pressure, diabetes, heart disease, glaucome, thyroid desease, impaired kidney function, or symptoms of an enlarged prostate such as difficulty urinating. Allergone is for people 12 and older.

Join the extras program @ allergone.com.
For more information call 1-800-allergone.
Please see additional improtant information on next page.

allergone © 2004 Avanlis Pharmaceuticals Ind. ALD-JA 10574-1

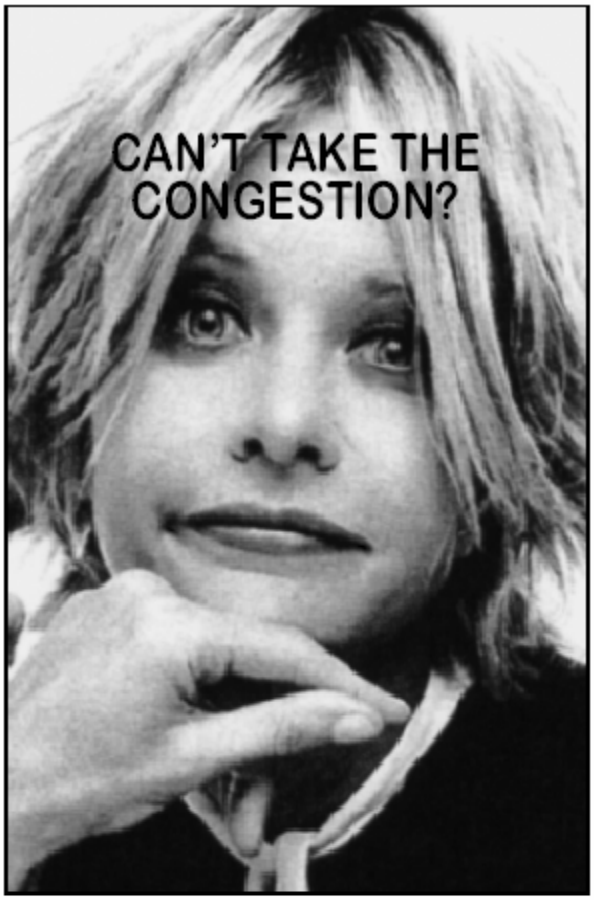
ALLERGONE RELIEVES YOUR MOST FRUSTRATING ALLERGY SYMPTOM: CONGESTION.

And it doesn't cause drowsiness like many other allergy medicines can. Because only Allergone has the unique allergy-fighting combination of fexofenadine and pseudoephedrine. Ask your doctor about Allergone. And don't let allergy congestion frustrate you another day.

allergone

fexofenadine HCl 60 mg/pseudoephedrine HCl 120 mg
Extended-Release Tablets

FINALLY, D-CONGESTED.



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Please see additional improtant information on next page.

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ALLERGONE RELIEVES YOUR MOST FRUSTRATING ALLERGY SYMPTOM: CONGESTION.

And it doesn't cause drowsiness like many other allergy medicines can. Because only Allergone has the unique allergy-fighting combination of fexofenadine and pseudoephedrine. Ask your doctor about Allergone. And don't let allergy congestion frustrate you another day.

allergone

fexofenadine HCl 60 mg/pseudoephedrine HCl 120 mg
Extended-Release Tablets

FINALLY, D-CONGESTED.

Brief Summary of
Prescribing Information as of January 2004

ALLERGONE ®
(fexofenadine HCl 60 mg and
pseudoephedrine HCl 120 mg)
Extended-Release Tablets

INDICATIONS AND USAGE

ALLERGONE is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 12 years of age and older. Symptoms treated effectively include sneezing, rhinorrhea, itchy nose/palate/and/or throat, itchy/watery/red eyes, and nasal congestion.

ALLERGONE should be administered when both the antihistaminic properties of fexofenadine hydrochloride and the nasal decongestant properties of pseudoephedrine hydrochloride are desired (see CLINICAL PHARMACOLOGY).

CONTRAINDICATIONS

ALLERGONE is contraindicated in patients with known hypersensitivity to any of its ingredients.

Due to its pseudoephedrine component, ALLERGONE is contraindicated in patients with narrow-angle glaucoma or urinary retention, and in patients receiving monoamine oxidase (MAO) inhibitor therapy or within fourteen (14) days of stopping such treatment (seeDrug Interactions section). It is also contraindicated in patients with severe hypertension, or severe coronary artery disease, and in those who have shown hypersensitivity of indiosyncrasy to it components, to adrenergic agents, or to other drugs of similar chemical structures. Manifestations of patient idiosyncrasy to adrenergic agents include: insomnia, dizziness, weakness, tremor, or arrhythmias.

WARNINGS

Sympathomimetic amines should be used judiciously and sparingly in patients with hypertension, diabetes mellitus, ischemic heart disease, increased intraocular pressure, hyperthyroidism, renal impairment, or prostatic hypertrophy (see CONTRAINDICATIONS).

Sympathomimetic amines may produce central nervous system stimulation with convulsions or cardiovascular collapse with accompanying hypotension.

PRECAUTIONS

General

Due to its pseudoephedrine component, ALLERGONE should be used with caution in patients with hypertension, diabetes mellitus, ischemic heart disease, increased intraocular pressure, hyperthyroidism, renal impairment, or prostatic hypertrophy (see WARNINGS and CONTRAINDICATIONS). Patients with decreased renal function should be given a lower initial dose (one tablet per day) because they have reduced elimination of fexofenadine and pseudoephedrine (See CLINICAL PHARMACOLOGY and DOSAGE AND ADMINISTRATION).

Information for Patients

Patients taking ALLERGONE tablets should receive the following information. ALLERGONE tablets are prescribed for the relief of symptoms of seasonal allergic rhinitis. Patients should be instructed to take ALLERGONE tablets only as prescribed. **Do not exceed the recommended dose.** If nervousness, dizziness, or sleeplessness occur, discontinue use and consult the doctor. Patients should also be advised against the concurrent use of ALLERGONE tablets with over-the-counter antihistamines and decongestants. The product should not be used by patients who are hypersensitive to it or to any of its ingredients. Due to its pseudoephedrine component, this product should not be used by patients who are hypersensitive to it or to any of its ingredients. Due to its pseudoephedrine component, the product should not be used by patients with narrow-angle glaucoma, urinary retention, or by patients receiving a monoamine oxidase (MAO) inhibitor or within 14 days of stoppint use of MAO inhibitor. It also should not be used by patients with severe hypertension or severe coronary artery disease.

Patients should be told that this product should be used in pregnancy or lactation only if the potential benefit justifies the potential risk to the fetus or nursing infant. Patients should be cautioned not to break or chew the tablet. Patients should be directed to swallow the tablet whole. Patients should be instructed not to take the tablet with food. Patients should also be instructed to store the medication in a tightly closed container in a cool, dry place, away from children.

Drug Interactions

Fexofenadine hydrochloride and pseudoephedrine hydrochloride do not influence the pharmacokinetics of each other when administered concomitantly.

Fexofenadine has been shown to exhibit minimal (ca. 5%) metabolism. However, co-administration of fexofenadine with ketoconazole and erythromycin led to increased plasma levels of fexofenadine. Fexofenadine had no effect on the pharmacokinetics of erythromycin and ketoconazole. In two separate studies, fexofenadine HCl 120 mg BID (twice the recommended dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady-state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QT interval were observed when subjects were administered fexofenadine HCl alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on Steady-State Fexofenadine Pharmacokinetics After 7 Days of Co-Administration with Fexofenadine Hydrochloride 120 mg Every 12 Hours (twice recommended dose) in Normal Volunteers (n=24)

Concomitant Drug	Cmax ss (Peak plasma concentration)	AUC ss (0-12h) (Extent of systemic exposure)
Erythromycin (500 mg every 8hrs)	+82%	+109%
Ketoconazole (400 mg once daily)	+135%	+164%

The changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials. The mechanism of these interactions has been evaluated *in vivo*, *in situ* and *in vivo* animal models. These studies indicate that ketoconazole or erythromycin co-administration enhances fexofenadine gastrointestinal absorption. *In vivo* animal studies also suggest that in addition to enhancing absorption, ketoconazole decreases fexofenadine gastrointestinal secretion, while erythromycin may also decrease biliary excretion.

ALLERGONE tablets (pseudoephedrine component) are contraindicated in patients taking monoamine oxidase inhibitors and for 14 days after stopping use of an MAO inhibitor. Concomitant use with antihypertensive drugs which interfere with sympathetic activity (eg, methyldopa, mecamylamine, and reserpine) may reduce their antihypertensive effects. Increased ectopic pacemaker activity can occur when pseudoephedrine is used concomitantly with digitalis.

Care should be taken in the administration of ALLERGONE concomitantly with other sympathomimetic amines because combined effects on the cardiovascular system may be harmful to the patients (see WARNINGS).

Carcinogenesis,Mutagenesis, Impairment of Fertility

There are no animal or in vitro studies on the combination product fexofenadine hydrochloride and pseudoephedrine hydrochloride to evaluate carcinogenesis, mutagenesis, or impairment of fertility.

The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine exposure (area-under-the plasma concentration vadreus time curve (AUC). No evidence of carcinogenesity was observed when mice and rats were given daily oral doses up to 150% mg/kg of terfenadine for 18 and 24 months, respectively. In both species, 150 mg/kg of terfenadine produced AUC values of fexofenadine that were approximately 3 times the human AUC at the maximum recommended daily oral dose in adults.

Two-year feeding studies in rats and mice conducted under the auspices of the National Toxicology Program (NTP) demonstrated no evidence of carcinogenic potential with ephedrine sulfate, a structurally related drug with pharmacological properties similar to pseudoephedrine, at doses up to 10 and 37 mg/kg, respectively (approximately 1/3 and 1/2, respectively, the maximum recommended daily oral dose of pseudoephedrine hydrochloride in adults on a mg/m² basis).

In in vitro (Bacterial Reverse Mutation, CHO/HGPRT Forward Mutation, and Rat Lymphocyte Chromosomal Abedration assays) and in vivo (Mouse Bone Marrow Micronucleus assay) test, fexofenadine hydrochloride revealed no evidence of mutagenicity.

Reproduction and fertility studies with terfenadine in rats produced no effect on male or female fertility at oral doses up to 300 mg/kg/day. However, reduced implants and post implantation losses were reported at 300 mg/kg. A reduction in implants was also observed at an oral dose of 150 mg/kg/day. Oral doses of 150 and 300 mg/kg of terfenadine produced AUC values of fexofenadine that were approximately 3 and 4 times, respectively, the human AUC at the maximum recommended daily oral dose in adults.

Pregnancy

Teratogenic Effects: Category C. Terfenadine alone was not teratogenic in rats and rabbits at oral doses up to 300 mg/kg; 300 mg/kg of terfenadine produced fexofenadine AUC values that were approximately 4 and 30 times, respectively, the human AUC at the maximum recommended daily oral dose in adults.

The combination of terfenadine and pseudoephedrine hydrochloride in a ratio of 1:2 by weight was studied in rats and rabbits. In rats, an oral combination dose of 150/300mg/kg produced reduced fetal weight and delayed ossification with a finding of wavy ribs. The dose of 150 mg/kg of terfenadine in rats produced an AUC value of fexofenadine that was approximately 3 times the human AUC at the maximum recommended daily oral dose in adults. The dose of 300 mg/kg of pseudoephedrine hydrochloride in rats was approximately 10 times the maximum recommended daily oral dose in adults on a mg/m² basis. In rabbits, an oral combination dose of 100/200 mg/kg produced decreased fetal weight. By extrapolation, the AUC of fexofenadine for 100 mg/kg orally of terfenadine was approximately 10 times the human AUC at the maximum recommended daily oral dose in adults. The dose of 200 mg/kg of pseudoephedrine hydrochloride was approximately 15 times the maximum recommended daily oral dose in adults on a mg/m² basis.

There are no adequate and well-controlled studies in pregnant women. ALLERGONE should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nonteratogenic Effects. Dose-related decreases in pup weight gain and survival were observed in rats exposed to an oral dose of 150 mg/kg of terfenadine, this dose produced an AUC of fexofenadine that was approximately 3 times the human AUC at the maximum recommended oral dose in adults.

Nursing Mothers

It is not known if fexofenadine is excreted in human milk. Because many drugs are excreted in human milk, caution should be used when fexofenadine hydrochloride is administered to a nursing woman. Pseudoephedrine hydrochloride administered alone distributes into breast milk of lactating human females. Pseudoephedrine concentrations in milk are consistently higher than those in plasma. The total amount of drug in milk as judged by AUC is 2 to 3 times greater than the plasma AUC. The fraction of a pseudoephedrine dose excreted in milk is estimated to be 0.4% to 0.7%. A decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. Caution should be exercised when ALLERGONE is administered to nursing women.

Pediatric Use

Safety and effectiveness of ALLERGONE in pediatric patients under the age of 12 years have not been established.

Geriatric Use

Clinical studies of ALLERGONE did not include sufficient numbers of patients aged 65 and older to determine whether they respond differently from younger patients, although the elderly are more likely to have adverse reactions to sympathomimetic amines. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy. The pseudoephedrine component of ALLERGONE is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and it may be useful to monitor renal function.

ADVERSE REACTIONS

ALLERGONE

In one clinical trial (n=601) in which 215 patients with seasonal allergic rhinitis received the 60 mg fexofenadine hydrochloride/120mg pseudoephedrine hydrochloride combination tablet twice daily for up to 2 weeks, adverse events were similar to those reported either in patients receiving fexofenadine hydrochloride 60 mg alone (n=218 patients) or in patients receiving pseudoephedrine hydrochloride 120 mg alone (n=218). A placebo group was not included in this study.

The percent of patients who withdrew prematurely because of adverse events was 3.7% for the fexofenadine hydrochloride/pseudoephedrine hydrochloride combination group, 0.5% for the fexofenadine hydrochloride group, and 4.1% for the pseudoephedrine hydrochloride groups. All adverse events that were reported by greater that 1% of patients who received the recommended daily dose of the fexofenadine hydrochloride/pseudoephedrine hydrochloride combination are listed in the following table:

Adverse Experiences Reported in One Active-Controlled Seasonal Allergic Rhinitis Clinical Trial at Rates of Greater than 1%

Adverse Experience	60 mg Fexofenadine Hydrochloride/120 mg Pseudoephedrine Hydrochloride Combination Tablet Twice Daily (n=215)	Fexofenadine Hydrochloride 60 mg Twice Daily (n=218)	Pseudoephedrine Hydrochloride 120 mg Twice Daily (n=218)
Headache	13.0%	11.5%	17.4%
Insomnia	12.6%	3.2%	13.3%
Nausea	7.4%	0.5%	5.0%
Dry Mouth	2.8%	0.5%	5.5%
Dyspepsia	2.8%	0.5%	0.9%
Throat Irritation	2.3%	1.8%	0.5%
Dizziness	1.9%	0.0%	3.2%
Agitation	1.9%	0.0%	1.4%
Back Pain	1.9%	0.5%	0.5%
Palpitation	1.9%	0.0%	0.9%
Nervousness	1.4%	0.5%	1.8%
Anxiety	1.4%	0.0%	1.4%
Upper Respiratory Infection	1.4%	0.9%	0.9%
Abdominal Pain	1.4%	0.5%	0.5%

Many of the adverse events occurring in the fexofenadine hydrochloride/pseudoephedrine hydrochloride combination group were adverse events also reported predominately in the pseudoephedrine hydrochloride group, such as insomnia, headache, nausea, dry mouth dizziness, agitation, nervousness, anxiety, and palpitation.

Fexofenadine Hydrochloride

In placebo-controlled clinical trials, which included 2461 patients receiving fexofenadine hydrochloride at doses of 29 mg to 249 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. The incidence of adverse events, including drowsiness, was not dose related and was similar across subgroups defined by age, gender, and race. The percent of patients who withdrew prematurely because of adverse was 2.2% with fexofenadine hydrochloride vs 3.3% with placebo.

Events that have been reported during controlled clinical trials involving seasonal allergic rhinitis and chronic idiopathic urticaria patients with incidences less that 1% and similar to placebo and have been rarely reported during postmarketing surveillance include: insomnia, nervousness, and sleep disorders or paroniria. In rare cases, rash urticaria, pruritus and hypersensitivity reactions with manifestations such a angioedema, chest tightness, dyspnea, flushing and systemic anaphylaxis have been reported.

Pseudoephedrine Hydrochloride

Pseudoephedrine hydrochloride may cause mild CNS stimulation in hypersensitive patients. Nervousness, excitability, restlessness, dizziness, weakness, or insomnia may occur. Headache, drowsiness, tachycardia, palpitation, pressor activity, and cardiac arrhythmias have been reported. Sympathomimetic drugs have also been associated with other untoward effects such as fear, anxiety, tenseness, tremor, hallucinations, seizures, pallor, respiratory difficulty, dysuria, and cardiovascular collapse.

OVERDOSAGE

Most reports of fexofenadine hydrochloride overdose contain limited information. However, dizziness, drowsiness, and dry mouth have been reported. For the pseudoephedrine hydrochloride component of ALLERGONE, information on acute overdose is limited to the marketing history of pseudoephedrine hydrochloride. Single doses of fexofenadine hydrochloride up to 800 mg (6 normal volunteers at this dose level), and doses up to 690 mg twice daily for one month (3 normal volunteers at this dose level), were administered without the development of clinically significant adverse events.

In large doses, sympathomimetics may give rise to giddiness, headache, nausea, vomiting, sweating, thirst, tachycardia, precordial pain, palpitations, difficulty in micturition, muscular weakness and tenseness, anxiety, restlessness, and insomnia. Many patients can present a toxic psychosis with delusions and hallucinations. Some may develop cardiac arrhythmias, circulatory collapse, convulsions, coma, and respiratory failure.

In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Hemodialysis did not effectively remove fexofenadine from blood (up to 1.7% removed following terfenadine administration. The effect of hemodialysis on the removal of pseudoephedrine is unknown. No deaths occurred in mature mice and rats at oral doses of fexofenadine hydrochloride up to 5000 mg/kg (approximately 1/0 and 3/0 times, respectively, the maximum recommended daily oral dose in adults on a mg/m² basis). In dogs, no evidence of toxicity was observed at oral doses up to 2000 mg/kg (approximately 450 times athe maximum recommended human daily oral dose in adults on a mg/m² basis). The oral median lethal dose of pseudoephedrine hydrochloride in rats was 1674 mg/kg (approximately 55 times the maximum recommended daily oral dose in adults on a mg/m² basis).

DOSAGE AND ADMINISTRATION

The recommended dose of ALLERGONE is one tablet twice daily for adults and children 12 years of age and older. It is recommended that the administration of ALLERGONE with food should be avoided. A dose of one tablet once daily is recommended as the starting dose in patients with decreased renal function. (See CLINICAL PHARMACOLOGY and PRECAUTIONS.)

Please see product circular for full prescribing information.

Rx only

Brief Summary of Prescribing Information as of January 2004

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