Assessing the relationship of attitude toward the ad to intentions to use direct-to-consumer drugs: A systematic quantitative meta-analysis

Wan Jung,
Adjunct Professor
Department of Mass Communication and Communication Studies
Towson University
wjung@towson.edu

Eun "Soo" Rhee,
Assistant Professor
Department of Mass Communication and Communication Studies
Towson University
erhee@towson.edu

Abstract

Attitude toward the ad (A_{ad}) is widely known to be an essential predictor of behavioral intentions. Therefore, a number of studies have addressed A_{ad} in the DTCA literature. Despite this interest in A_{ad}, there has not been a comprehensive attempt to investigate general findings across independent DTCA studies. Such an investigation is useful in understanding the general strength and variability of the relationships. In the current meta-analysis, the data provided a summary of 278 samples reported in the 36 articles for which the author could obtain usable data. The aggregated study effects suggested a significant relationship between A_{ad} and a number of important constructs, including both antecedents (education and income) and consequences (behavioral intention). The results from the current meta-analysis suggest that A_{ad} is a statistically significant predictor of behavioral intentions, but that A_{ad} has a small to moderate effect size in terms of affecting consumers' intentions.

Key words: Attitude toward the ad, meta-analysis, DTCA, Direct-to-consumer advertising

Introduction

Direct-to-consumer prescription drug advertising (DTCA) is becoming increasingly common in the USA. DTCA refers to any promotional effort by a pharmaceutical firm to present prescription drug information to consumers via the mass media (Wilkes, Bell and Kravitz 2000). Advertising pharmaceutical products has generated a controversial debate since its inception. For example, DTCA proponents claim there is an educational value to DTCA and contend that DTCA increases the consumer's knowledge and awareness regarding available medical treatment options (e.g., Capella and Taylor 2014; Treise and Jung, 2014). Advocates also assert that DTCA may enable patients to notice a disease in the early stages. By contrast, opponents argue that DTCA encourages inappropriate use of medications and drives up drug spending and price. Since most DTCA fails to inform consumers of the potential (side) effects of drug mis- and over-use or to provide directions for adequate usage, it can be considered as dissemination of improper information about the potential and foreseeable risks connected to prescription drugs (e.g., Frosch, Grande, Tarn and Kravitz 2010; Lee, Salmon and Paek, 2007). Ironically, such criticism is evidence that DTCA has a significant effect on consumer and physician behavior. Furthermore, more and more empirical evidence has been collected of the effect that DTCA has on consumer knowledge, awareness, and attitudes toward DTCA, as well as behavior related to health care treatment. The significant effect of DTCA has led many researchers to contribute to the debate surrounding DTCA.

A number of empirical studies have addressed various aspects of DTCA such as governmental regulation and policy (e.g., Green 1995; Reichertz 1996; Statman and Tyebjee 1984), DTCA industry and management issues (e.g., Leffler 1981; Rheinstein 1982), or DTCA effects (e.g., Alperstein and Peyrot 1993). In addition, questions related to what DTCA does or what its effects are have often been investigated in extant DTCA literature. As DTCA is a common phenomenon, greater attention has been paid to identifying the variables that predict the desired behavioral outcomes, which is the ultimate goal of the marketing efforts for pharmaceutical products.

As a result of prior research on DTCA, some variables have been identified that anticipate the likelihood of such behavior in the context of DTCA, such as A_{ad}. Not surprisingly, A_{ad} is the most frequently employed variable in DTCA-related research to predict consumer behaviors (Wilson and Till 2007) because A_{ad} is considered the best indicator of advertising effectiveness (Haley and Baldinger 1991). Despite its importance, there has not been a comprehensive attempt to evaluate the general findings across independent studies. Moreover, several research

findings on the relationship between A_{ad} and its outcome variables vary in terms of the strength and direction of the relationships. For example, while some studies have reported no evidence of a significant effect of DTCA on consumer behavior (e.g., Williams and Hensel 1995), others have reported a significant effect (e.g., An 2007). Furthermore, different studies have found widely varying magnitudes of DTCA effect on consumer behavior. This suggests that DTCA research should first develop an understanding of the nature of the relationship between advertising outcomes and antecedents such as A_{ad} in order to determine whether the patterns of these relationships are consistent or inconsistent across other independent studies.

Evaluating the general findings across independent studies will be useful in understanding the general variability and strength of the relationships and the research conditions (e.g., methodological and research environment differences) that moderate those relationships because A_{ad} related studies have been conducted in various methodological contexts. However, there has been no attempt to assess the robustness of A_{ad} effects across different methodological conditions. The current study begins with a review of the literature regarding A_{ad} in the context of DTCA and then a review of the outcome variables and other moderators, using a meta-analysis technique. The results of this study help determine the strength and direction of relationships between A_{ad} and the outcome variables.

Literature Review

Effect of the Attitude toward the Ad

The concept of attitude toward the ad (A_{ad}) has been subject to a great deal of empirical study in the context of DTCA, both as an antecedent and a consequence of other advertising-related variables of interests. In spite of the importance of A_{ad}, no one has comprehensively and systematically attempted to assess the empirical findings across other independent studies related to DTCA and A_{ad}. As other researchers have emphasized meta-analysis, "the primary questions of interest in a meta-analysis concern the robustness of the relationships studied and the specification of conditions that limit these relationships' generalizability" (Brown and Stayman 1992, p. 35). This study is the first to review and analyze previous DTCA-related research findings in terms of the relationships between consumers' (or patients') A_{ad} and its antecedents and consequences. In the current study, the variability and strength of the relationship between A_{ad} and its outcome constructs will be investigated using a meta-analysis technique.

To understand the relationship between A_{ad} and advertising effects, it is necessary to explore the concept of attitude and identify the roles of attitude in general. The concept of attitude has played a critical role in the fields of psychology and education to understand human thought and behavior. Since 1974,

more than 34,000 published studies have addressed attitudes in some way (Kraus 1995). The roles of attitude that researchers have identified are that they, in some way, influence, direct, guide, or predict actual behavior, and researchers have taken much interest in this attitude-behavior relationship.

In the fields of advertising and marketing, researchers have applied the concept of attitude to advertising, created the concept of attitude toward the ad (A_{ad}), and tested whether the role of A_{ad} is similar to attitude in general. A_{ad}, one of the most important constructs in advertising research, refers to "an affective construct representing consumers' feelings of favorability/unfavorability toward the ad itself" (MacKenzie, Lutz and Belch 1986 p. 130). Shimp (1981) introduced the general importance and construct of A_{ad}, and he viewed A_{ad} as an important mediator of brand choice (also see Mitchell and Olson 1981). Furthermore, a great deal of advertising research has investigated the roles of A_{ad} in determining advertising outcomes, because brand attitudes and behavioral intentions are functions of A_{ad} in general (e.g., MacKenzie et al. 1986; MacKenzie and Lutz 1989). Shimp (1981) proposed the Three Alternatives Brand Choice Mechanisms, suggesting attitude-transfer from advertising to brand which culminates in brand choice. MacKenzie et al. (1986) also proposed the Four Alternative Structural Specifications of the mediating role of A_{ad} that are causal models derived from A_{ad} research as a mediator: affect transfer model, dual mediating model, reciprocal mediation model, and independent influences model. Although there are several models to explain the role of A_{ad}, they have something in common in that A_{ad} is viewed as an affective construct and an influence on intentions (Homer 1990).

DTCA researchers have incorporated the concept of A_{ad} in terms of how A_{ad} affects consumers' intentions. A substantial body of empirical research supports the relationship between A_{ad} and intentions. However, in the context of DTCA, it should be noted that consumers' intentions cannot be operationalized as actual purchases or purchase intentions because it is impossible that a consumer will purchase certain drugs without a prescription. Instead of measuring purchase intentions directly, DTCA research to date has investigated various types of behavioral intentions as outcomes of A_{ad}, such as intentions to request that physicians prescribe the advertised drug (e.g., An 2007; Mehta and Purvis 2003; Hausman 2008), intentions to ask physicians for more information about the advertised drug (e.g., An 2007; Herzenstein, Misra and Posavac 2005), intentions to discuss symptoms with physicians (e.g., Miller and Blum 1993; Yuan 2008), and intentions to visit their physicians(e.g., Gonul, Cater and Wind 1999). In addition to the effects of A_{ad} on intentions, another marketing variable, brand attitudes, was investigated as well (e.g., Hausman 2008).

In sum, the earlier foundational theoretical models in ad attitude research would lead one to assume that consumers' behavioral intentions could be reflective of their attitudes toward advertising. In other words, it could be argued that if consumers have positive attitudes toward DTCA, they are more likely to adopt the specific advertised brand and vice versa. Based on the majority of past

research and attitude/A_{ad}-brand attitude-behavior models, it is hypothesized that A_{ad} is a significant predictor of behavioral intentions and attitude toward the brand in the context of DTCA.

H_1: In extant DTCA literature, attitude toward the ad is positively related to behavioral intentions (e.g. drug request intention, drug inquiry intention, drug information search intention, and physician visit intention).

H_2: In extant DTCA literature, attitude toward the ad is positively related to attitude toward the brand.

Coded Study Characteristics

As noted before, the primary purposes of a meta-analytic study are to assess the strength of the relationships and specific conditions that limit the generalizability of these relationships. However, in terms of research methods and environments, this particular research stream encompasses diverse studies. This suggests that the methodological decisions might influence the robustness of pairwise relationships. Many meta-analysis researchers have provided useful guidelines on how to code study characteristics for moderator analyses (e.g., Hedges and Olkin 1985; Rosenthal 1984). As is typical in meta-analytic studies, research characteristics will be investigated as to whether they moderate the advertising effects in extant DTCA literature. Coding for the research characteristics will include the following: (a) type of sample, (b) type of research methodology, (c) measurement of constructs, and (d) theoretical basis (if any).

Type of sample The use of student samples has been a subject of debate in quantitative research (Calder, Phillips, & Tybout, 1981). The type of study subject (student or not) often functions as a moderator because the homogeneity of the student sample may produce strong bias effects that are not typically found in the general population and which culminate in a bias toward stronger effects.

Type of research methodology. Due to the vulnerability of the use of student sample and the reliability issues of measuring instruments, the survey method tends to be more variable across independent studies with regard to research findings as compared to the experiment method.

Measurement of constructs. To measure A_{ad}, ad awareness, and intentions, some studies have used multi-item scales, whereas others have used a one-item scale. The analysis of the number of scale items has been suggested in a meta-analytic method because multi-item scales tend to be more reliable and sensitive in general. The current study expects that multi-item scales may lead to greater effect sizes due to less attenuation from measurement error (Johnson and Eagly 1989).

Theoretical basis. According to Farley and Lehman (1986), theory-driven studies tend not to have spurious effects. Therefore, it is necessary to examine the theoretical foundations of each independent study to analyze the study quality.

Method

Data Set and Procedures

All extant literature on the effects of DTCA was reviewed and synthesized in this research. For the purpose of this review and synthesis, the current study meta-analyzed the range of articles that deal with DTCA and appeared in U.S. and international journals from 1981, when Leffler's (1981) DTCA study appeared to issues current at the time when the present analysis was conducted (2011). The current study used the following computerized searches to identify all extant literature on the effect of DTCA: (a) *Journal of American Medical Association & Archives* (*JAMA & Archives*), (b) *Ebsco Source Premier*, (c) *PubMed Central*, (d) *Science Direct*, (e) *Springer Link*, (f) *JSTOR*, (g) *ProQuest*, (h) *Wiley InterScience*, (i) *Business Source Premier*, (j) *Academic Search Premier*, (k) Social Sciences Citation Index, and (l) *PSYCHLIT*. Additionally, Google Scholar was used to search articles using the following search terms: "direct to consumer advertising of prescription drugs," "DTC," "DTCA," "pharmaceutical advertising," "pharmaceutical promotion," "prescription drug advertising," "promotion of prescription drugs," "drug promotion," "advertising of prescription drugs," and "drug advertising."

In addition to the computer search, a manual search was conducted in two fashions. After reading the selected articles, the reference lists of previous reviews of DTCA literature were also screened to ensure a complete review. The search process yielded 36 articles that presented empirical findings that could be used in the meta-analysis. Thirty six independent studies provided 278 effect sizes.

The effect size estimate was the correlation coefficient (*r*) which is the square root of the variance explained by a given variable or combination of variables (Rosenthal 1984). This study choose the correlation coefficient as the measure of effect size because it is easy to compute from a *t*- or *F*-statistic and easy to interpret (Janiszewski, Noel and Sawyer 2003). However, it is well known that correlation coefficients are not normally distributed. It is, therefore, conventional in meta-analysis to convert correlations to *z* scores using Fisher's *r*- to -*z* transformation $Z_r = .5 [\ln (1 + r) - \ln (1 - r)]$, where $\ln(x)$ is the natural logarithm function.

In order to synthesize the empirical findings across independent studies, it was needed to convert all test statistical information to a standardized form, *r*. Moreover, statistical tests such as *t*-tests, *F*-tests, chi-square statistics, and *p*-value are not effect sizes because for any given effect, their value increases as the sample size increases (Rothstein, McDaniel and Borenstein 2001). Therefore, when necessary, the statistical information in primary studies was converted into the correlation coefficient effect size (Arthur, Jr., Bennett, Jr. and Huffcutt 2001). Examples of equations for transformation to *r* are

illustrated in Table 1.

Table 1 *The Conversion Statistical Equations*

t to $r = t / \sqrt{(t^2 + N - 2)}$	t distribution, df (degrees of freedom)
d to $r = d / \sqrt{(d^2 + 4)}$	N (sample size)
F to $r = \sqrt{(F) / (F + df_{error})}$	$\chi2$ (chi square)
χ^2 to $r = \sqrt{(\chi^2 / N)}$	F distribution
Z to $r = Z / \sqrt{(N - 1)}$	d (effect size)

File Drawer Problem

A common concern surrounding the meta-analytic research method is that the literature search process contains all studies pertaining to the research domain. As published studies are more easily obtained, it is more likely that a meta-analysis contains the highest quality studies of a given subject area, which are also often those containing statistically significant outcomes. Moreover, the situation that any number of unpublished works could influence overall findings is a persistent problem for meta-analysis. Such studies remain in the "file-drawers" of the researchers. This problem was given the name "file drawer problem" by Rosenthal (1984). To calculate the fail-safe N, Rosenthal (1984) provided a formula that used the combined Z-scores from the articles included in the meta-analysis to determine the number of non-significant (or null-effect) studies. The formula is as follows: X = [(SUM Z) ^{2} / G] – k, where X = the number of studies needed to reverse the statistically significant findings, k = the number of studies combined in the meta-analysis, (SUM Z) = the sum of the Z scores for the individual studies, and G = the Z score that falls at the p-critical value being evaluated.

Fail-safe Ns for each pairwise relationship were presented in Table 2.

Table 2 *Analysis of the File Drawer Problem*

Relationship	k	Fail-Safe N at .05 level	Relationship	k	Fail-Safe N at .05 level
Age-A$_{ad}$	6	86	Age-Intention	21	104*
Gender-A$_{ad}$	5	16*	Gender-Intention	12	185
Ethnicity-A$_{ad}$	6	228	Ethnicity-Intention	10	-5*
Education-A$_{ad}$	7	712	Education-Intention	16	13*
Health Status-A$_{ad}$	9	-8*	Health Status-Intention	9	845
Involvement-A$_{ad}$	3	55	Involvement-Intention	4	332
Ad exposure-A$_{ad}$	5	-2*	Drug usage-Intention	10	1176
Ad awareness-A$_{ad}$	2	1*	Income-Intention	8	-6*
Drug use-A$_{ad}$	4	0*	Media consumption-Intention	7	8*
Income-A$_{ad}$	4	109	Ad exposure-Intention	10	2608
			Ad awareness-Intention	8	10*
			Aad-Intention	45	47112
			A$_{ad}$-Pharmacist Intention	4	56
			A$_{ad}$-Friend Intention	2	3*

Note: k = number of studies in the meta-analysis
*Fail-Safe N (X = [(SUM Z) ^{2} / G] – k) > Tolerance level X (5k + 10)

A number of relationships pertinent to the hypotheses and research questions were examined. Once transformed into the common effect size metric (*r*), the individual effect sizes for independent studies can be synthesized to obtain an average or pooled effect size. To calculate the pooled effect size, the effect sizes are weighted by an individual study's sample size, where the results of studies that have large sample sizes receive more weight. To test the significance of the effect sizes, Ankem's (2005) suggestions can be used, and he stated, "upon calculation of the aggregated effect size, significance in meta-analysis is generally gauged by computing 95% confidence intervals around the average effect size" (p. 164). If the confidence interval does not include zero, the effect size is significant.

Results

The overall objective of the current study is to provide a quantitative review of antecedents-A_{ad}-consequences constructs and to investigate their relationships in the context of DTCA. This study employed the meta-analytic technique to statistically identify the strength and direction of the pairwise relationships. Upon completion of the coding process, it was determined that 36 studies would contribute data for the current meta-analytic database. Thirty six independent studies provided 278 effect sizes. The interpretation of effect size magnitude is guided by Cohen's (1988) definitions of small (r = .10), moderate (r = .30), and large (r = .50) effect sizes. Cohen (1988) established the medium effect size as one that was large enough so that people would naturally recognize it in everyday life, the small effect size to be one that was noticeably smaller, but not trivial, and the large effect size to be the same distance above the medium effect size as small was below it.

Attitude toward the Ad, Attitude toward the

brand and Intention

The current research investigated the relationship between A_{ad} and outcomes variables such as behavioral intentions. Consistent with H1, A_{ad} is a significant predictor of behavioral intentions. The mean correlation between A_{ad} and behavior intentions was 0.19, which was statistically significant. The A_{ad}-intention relationship was consistently positive as indicated by the confidence interval, which did not include zero. The findings of a statistical significance at the 95% confidence level indicated that the relationship falls within a 0.14 - 0.24 interval.

In the DTC studies, behavioral intentions have been operationalized in four different ways such as intention to request physicians to prescribe the advertised drugs (Intention 1), intentions to ask physicians for more information about the advertised drugs (Intention 2), intentions to search more information about the advertised drugs (Intention 3), and intentions to visit their physicians (Intention 4). To clarify the relationship, the current research further analyzed the relationship A_{ad} and four-differently-operationalized-intentions. The results of the A_{ad} and intention relations are presents in Table 3.

Table 3 *Analysis of the Relationship between Aad and Intentions*

IV	DV	N	k	r	Z_r	SD_{Zr}	CI_{Zr} 5%	CI_{Zr} 95%
A_{ad}	Overall Intention	54,282	45	.19	.20	.03	.14	.25*
A_{ad}	Intention 1	7618	8	.29	.29	.06	.18	.40*
	Intention 2	18479	14	.16	.16	.04	.08	.24*
	Intention 3	2342	4	.15	.15	.08	-.01	.31
	Intention 4	25843	19	.18	.18	.04	.11	.25*

Note. Intention 1 = Intention to request physicians to prescribe the advertised drugs, Intention 2 = Intention to ask physicians for more information about the advertised drugs, Intention 3 = Intentions to discuss symptoms/the advertised drugs with physician, Intention 4 = Intention to visit a physician, k = number of correlation coefficients, r = mean observed correlation, Z_r = Fisher's Z between Aad and intention, SD_{Zr} = estimated strandard deviation of Fisher's Z, CI_{Zr} 5% = lower bound of the confidence interval for Fisher's Z, CI_{Zr} 95% = upper bound of the confidence interval for Fisher's Z

Regardless of the operationalization of the behavioral intentions, the analysis found that all relationships are at least marginally significant. More specifically, A_{ad} is a statistically significant predictor of consumers' intentions (a) to request physicians to prescribe the advertised drug, (b) to ask physicians for more information about the advertised drugs, and (c) to visit their physicians. The relationship between A_{ad} and intentions to search more information about the advertised drugs is marginally significant. Furthermore, in H2, it was predicted that brand attitude would be a function of A_{ad}. However, the relationship could not be tested because only one study had addressed the role of A_{ad} in terms of predicting brand attitudes.

Other Relationships Found

The comprehensive search for previous research on DTCA found that a number of studies have investigated such other construct as demographic factors, ad exposure, drug usage, health status, involvement, ad awareness, and ad exposure. Those constructs were examined as antecedents of A_{ad} in the DTCA studies. The findings of a statistical significance at the 95% confidence level show that education - A_{ad} and income - A_{ad} relationships do not include 0, which indicates that education and income are significant predictors of A_{ad}. Although the education- and income-A_{ad} relationships are statistically significant, the strength of the relationships is small. Such other factors as age, gender, ethnicity, health status, involvement, ad exposure, ad awareness, and drug usage do not predict consumers' attitudes toward the ad in the extant DTCA literature. Other findings of the conducted antecedents- A_{ad} meta-analysis are presented in Table 4.

Table 4 *Analysis of the Relationship between Antecedents and Aad*

IV	DV	N	k	R	Z_r	SE_{Zr}	CI_{Zr} 5%	CI_{Zr} 95%
Age	A_{ad}	7634	6	-.03	-.03	.05	-.15	.09
Gender		2141	5	.02	.02	.03	-.70	.10
Ethnicity		7573	6	-.12	-.12	.06	-.27	.02
Education		9067	7	-.12	-.12	.05	-.23	-.01
Health Status		11147	9	.02	.02	.03	-.04	.08
Involvement		480	3	.27	.32	.25	-.77	1.41
Ad exposure		2295	5	.02	.02	.09	-.24	.29
Ad awareness		468	2	.04	.04	.16	-2.00	2.08
Drug use		4207	4	.05	.05	.08	-.08	.17
Income		6741	4	-.08	-.08	.02	-.13	-0.03

Note. IV = Independent Variable, DV = Dependent Variable, k = number of correlation coefficients, r = mean observed correlation, Zr = Fisher's Z between Aad and intention, SD_{Zr} = estimated standard deviation of Fisher's Z, CI_{Zr} 5% = lower bound of the confidence interval for Fisher's Z, CI_{Zr} 95% = upper bound of the confidence interval for Fisher's Z

The current study also investigated A_{ad}-not-involved relationships (e.g., personal difference variables-behavioral intention relation). DTCA researchers have investigated the effects of such personal differences as demographic factors on behavioral intentions. Statistical significance at the 95% confidence level shows that gender – intention, health status – intention, drug usage – intention, and ad exposure - intention relationships do not include 0, which indicates that gender, health status, drug usage, and ad exposure are significant predictors of behavioral intentions in the extant DTCA literature. Such other factors as age, ethnicity, education, involvement, income, and media consumption do not predict consumers' behavioral intentions. The results of the A_{ad}-not-involved relationships are presents in Table 5.

Table 5 *Analysis of the A_{ad} - not-involved relationships*

IV	DV	N	k	R	Z_r	SE_{Zr}	CI_{Zr} 5%	CI_{Zr} 95%
Age	Intention	21,208	21	.02	.02	.02	-.02	.07
Gender	**Intention**	**10,515**	**12**	**.05**	**.05**	**.01**	**.02**	**.08***
Ethnicity	Intention	11,965	10	-.01	-.01	.02	-.05	.03
Education	Intention	15,200	16	-.02	-.02	.03	-.07	.04
Health Status	**Intention**	**11,822**	**9**	**-.12**	**-.12**	**.01**	**-.15**	**-.09***
Involvement	Intention	4,904	4	.23	.24	.08	-.03	.51
Drug Usage	**Intention**	**10,070**	**10**	**.14**	**.15**	**.02**	**.09**	**.20***
Income	Intention	7,879	8	.02	.03	.06	-.11	.17
Media Consumption	Intention	833	7	.06	.06	.05	-.07	.19
Ad Exposure	Intention	8,769	10	.23	.24	.03	.16	.32

Note. Intention 1 = Intention to request physicians to prescribe the advertised drugs, Intention 2 = Intention to ask physicians for more information about the advertised drugs, Intention 3 = Intentions to search more information about the advertised drugs, Intention 4 = Intention to visit their physicians, k = number of correlation coefficients, r = mean observed correlation, Zr = Fisher's Z between Aad and intention, SD_{Zr} = estimated strandard deviation of Fisher's Z, CI_{Zr} 5% = lower bound of the confidence interval for Fisher's Z, CI_{Zr} 95% = upper bound of the confidence interval for Fisher's Z

In addition to the findings of the relationships between personal difference variables and behavioral intentions in the extant DTCA literature, the researcher has studied such other relationships as gender-drug usage, ethnicity-drug usage, education-drug usage, age-health status, education-health status, involvement-price perception, involvement-health status, drug knowledge-behavioral intention, ad message clarity-A_{ad}, age-ad exposure, and gender-ad exposure. However, those relationships have not appeared in multiple studies. Since meta-analytic research needs at least two research findings on the same topic, the relationships were not included in the current study.

Moderator Analyses

Moderator analyses were conducted to further clarify the strength of each pairwise relationship. Hunter et al. (1982) suggested that a moderator will show itself in the way: the average correlation coefficient will vary from subset to subset (e.g., between student sample and non-student sample). The differences between the subset results were tested statistically using a t test. The analyses were mainly conducted on five factors: study sample characteristic (student vs. non-student and local vs. nationwide sample), number of scale items (single vs. multiple-item scale), theoretical foundation (theoretical vs. atheoretical study), research method (experiment vs. survey), and degree of effect size estimation (no-estimation vs. estimation). It was expected that studies would use a student sample and multi-item scale, and theories would have stronger relationships than those using a non-student sample, single-item measures, and non-theories. However, no relationships were affected by the type of sample, the number of scale items, and theoretical foundation.

This study also tested the moderator effects of the degree of effect size estimation (no estimation vs. estimation), study sampling location (local sample vs. nationwide sample), and research method (experiment vs. survey). The analyses revealed that a stronger relationship between drug usage and behavioral intentions was detected in the studies with reported effect sizes than those with estimated effect sizes (.07 - no estimation vs. .03 - estimation). The study sampling location appeared to have a more consistent effect than did other moderators across all relationships identified. The use of a local sample resulted in stronger relationships than the use of a nationwide sample in age – A_{ad} (.16 – local sample vs. -.07 – nationwide sample), ethnicity – intention (-.11 vs. .00), and income – intention (.24 vs. -.05) relationships. The research method was tested as a potential moderator. However, no relationships were affected by the research method.

Discussions and Implications

Role of Attitude toward the Ad

The results of this paper challenge the effect of A_{ad} on consumers' behavioral intentions in terms of DTCA. In particular, A_{ad} is widely known to be an essential predictor of behavioral intentions. As a result, a number of studies have addressed A_{ad} in the DTCA literature. Despite the large volume of research in the area of DTCA, the findings in terms of ad effects have been inconsistent. The current study's comprehensive analysis found that A_{ad} is a statistically significant predictor of consumers' intentions, it has a small to moderate effect according to Cohen's effect size interpretation guide (e.g., .1 = small, .3 = moderate, and .5 = strong). More specifically, since consumers need prescriptions to buy an advertised drug, DTCA studies have operationalized intentions in different ways (e.g., intention to request physicians to prescribe the advertised drugs, intention to ask physicians for more information about the advertised drugs, intentions to search more information about the advertised drugs, and intentions to visit a physician). Among the four different types of intentions, patients' intentions to request prescriptions for the advertised drugs are the strongest outcome of A_{ad}, a moderate effect. A_{ad} has a small effect on the other types of intentions.

The results of the meta-analysis of the A_{ad}-intention relation in the context of DTCA have important theoretical and practical implications. Since Lutz et al. (1983) proposed the dual mediation model, which explains the A_{ad}-intention relation, many studies have tested this relation in the fields of advertising and marketing. It is worth comparing the results of the current study with those in the previous study that meta-analyzed the dual mediation model. Brown and Stayman (1992) combined the effect sizes of A_{ad}-intention relationships across independent studies. The research found that A_{ad} has a strong effect on consumers' intentions (r = .43), which is much stronger than that found in the current study (r = .19).

From the marketing and DTCA literature, three explanations for the limited effect of A_{ad} on intentions is the present study seemed plausible. First, it is possible that the limited DTCA effect hinges on the traditional relationships between patients and doctors. Advocates of DTCA contend that the advent of DTCA has given consumers opportunities that they have never had before. They claim that consumers can take an active role in the treatment of their medical conditions via the knowledge consumers acquire from DTCA. However, there is a disparity between reality and expectation. For example, even though many patients have the desire to question the appropriateness of physician-prescribed decisions, some of them are unwilling to ask about the advertised prescription drugs. Patients believe that physicians may view patient inquiries or prescription requests as a sign of distrust or even disrespect (Petroshius et al. 1995). Although pharmaceutical industry advocates point to the educational value of DTCA, patients do not obtain enough medical information, either because the amount of information delivered via DTCA is limited or because the content of the medical information is difficult. Patients' limited access to medical information pertaining to various prescription drugs has culminated in patients relying heavily on the advice of their physicians to select appropriate medications. This

reliance causes the patients' unwillingness to question or request prescription drugs.

Second, as mentioned previously, A_{ad} is "an affective construct representing consumers' feelings of favorability/unfavorability toward the ad itself" (MacKenzie et al. 1986, p. 130). When consumers are about to choose their medical treatment options, their involvement level is usually high. This implies that consumers rely more on careful evaluation of advertising information than on their feelings about drug advertising for the better medical decision. In other words, consumers tend to value trustworthiness/believability of the advertisement or the advertiser more than their attitudes toward the ad when they process health-related information. In addition, many have insisted for a long time that if consumers do not believe what is being said, the probability of evoking a desired response is greatly weakened (Atkin and Beltramini 2007). Thus, although the attitude-behavioral intention relation in the context of DTCA has been statistically supported, the strength of the relation is small to moderate.

Lastly, potentially, the effects of A_{ad} for different product categories are different. The results of this study revealed that the A_{ad} effect for health products is lower than that for normal consumer goods. It is possible that the lower A_{ad} effect is due to consumers' decision making processes, which are different for prescription products in general than they are for other product categories. This implies that future research should address how and why those processes are different. In addition, future research also needs to investigate to what extent A_{ad} effects are different for different product categories.

This result suggests that future research needs to develop other constructs that predict consumer behavior better than A_{ad} in the context of health-related communications and identify other possibilities that limit the A_{ad} and intention relationship. As noted previously, A_{ad} is an affective construct. A cognitive construct would be a better predictor of consumers' medical decision-making behavior. This fact implies that future researchers need to find or develop a new construct that can replace A_{ad}. In addition to developing a cognitive construct, it is also important to investigate other factors that can cause the limited effect of A_{ad}. For example, patients' accessibility to medical services is directly related to their intentions to visit a doctor's office, which is a pre-step for DTC drug prescriptions.

Role of Antecedents of Attitude toward the Ad.

According to empirical findings and theories in the DTCA literature, it was expected that consumer characteristics would be related to DTCA effectiveness. Consumer characteristics consist of demographics, involvement/health status, ad awareness/ad exposure, and health characteristics (such as health conditions and prescription drug utilization). DTCA effectiveness, including A_{ad} and behavioral intentions, were analyzed as outcomes of

DTCA. The current meta-analysis identified the variables that affect consumers' attitudes toward the ad; education and income. The results revealed that gender and ethnicity were marginally significant predictors of A_{ad}. More specifically, consumers who were less educated, poor, female, and non-white were more likely to have favorable attitudes toward the ad than those who were more educated, rich, male, and white.

Another interesting finding was that consumer characteristics were directly related to behavioral intentions. For instance, consumers' higher behavioral intentions were a function of gender (female), health status (poor health condition), prescription drug utilization (high drug consumption), and frequent ad exposure. There are two implications of the results of the relationships between antecedents and intentions. First, it is noteworthy that frequent ad exposure is related to patients' behavioral intentions. It implies that advertising media planners need to focus more on frequency than on reach or other criteria related to the effect measurements of the media. Second, pharmaceutical companies can use the findings of the present study on antecedents of DTCA effects to develop market segmentation strategies. For instance, although DTCA is an effective communication tool for some consumer groups (e.g., less educated), there are also many consumers whose attitudes toward the ad are not favorable and who are not willing to request drug prescriptions or information. This means that to increase the sales of pharmaceutical products, marketers have to utilize other customized marketing tools such as drug price-off coupons for those who have unfavorable attitudes toward DTCA and low behavioral intentions.

Limitations

In synthesizing previous studies on A_{ad} in the DTCA field, Cooper's (1998) suggestion of validity issues guided the current study. Cooper emphasized the importance of defining the objectives and scope of the meta-analytic review, searching for studies, reporting analysis procedures and results, and interpreting the results. The results and conclusions of the current study should be evaluated with Cooper's criteria of validity issues. Although the findings of the meta-analysis provide good implications for both advertising practitioners and researchers, some limitations were unavoidable. First, the scope of the analysis assessing issues pertaining to the advertising effect was broad. A comprehensive and thorough search for relevant studies found 36 articles for which usable quantitative data were available. However, in spite of the author's efforts, data for four additional studies identified as pertinent to the topic of this study were unavailable. Thus, some differences might have resulted if the not-included studies had strong effects.

Second, the number of included empirical studies, based on the set of inclusion criteria, was limited. Even though advocates of meta-analysis proclaim it is appropriate to test effects from a limited number of studies, particular caution was used to interpret the findings of the current study. More specifically, some cells in the moderator analyses and some relationships had a very small number of study effects (as few as a single observation for the moderator analyses and two

observations for relationship analyses). Limited data availability did not allow for meaningful interpretation of some relationships and the effects of moderators on pair-wise relationships. Another main cause of the small number of studies included in the meta-analysis was the lack of necessary statistics for calculating effect sizes. For instance, some studies reported only statistical significance of their results without *p*-value, sample size, and other statistical values. Therefore, researchers should mindful of reporting necessary statistics for other researchers in primary studies.

Finally, this study was limited in representing all research domains in extant pharmaceutical advertising literature because the focus was on consumer responsiveness to DTCA. In other words, it is recommended that future research address the

impact of DTCA on physicians in terms of their prescription-writing habits and responsiveness to patient drug inquiries and requests. In addition to the effect on patients, although advertising of prescription drugs (DTCA) represents 60% of the total spending on drug advertising (General Accounting Office 2002), for better understanding of the landscape of drug advertising in general, future studies need to address the role of over-the-counter drug advertising (OTCA). The unique feature of DTC drugs is that consumers cannot directly purchase prescription drugs. However, the purchase process for OTC drugs is different from that of DTC drugs. Thus, it would be interesting to compare the effect of OTCA on behavioral intentions with that of DTCA or the results of Brown and Stayman's study.

References

Alperstein, N. M., & Peyrot, M. (1993). Consumer awareness of prescription drug advertising. *Journal of Advertising Research*. *33(4)*, 50-56.

An, S. (2007). Attitude toward direct-to-consumer advertising and drug inquiry intention: The moderating role of perceived knowledge. *Journal of Health Communication. 12(6)*, 567-580.

Ankem, K. (2005). Approaches to Meta-Analysis: A Guide for LIS Researchers. *Library and Information Science Research. 27 (2),* 164-176.

Arthur, W., Bennett W, & Huffcutt, AI. (2001). *Conducting meta-analysis using SAS*. Mahwah, NJ: Erlbaum.

Atkin J. L, & Beltramini, R. F. (2007). Exploring the perceived believability of DTC advertising in the US. *Journal of Marketing Communications. 13 (3),* 169-180.

Brown, S. P. & Stayman, D. M (1992). Antecedents and consequences of attitude toward the ad: A meta-analysis. *Journal of Consumer Research, 19 (June),* 34-51.

Calder, B.J., Phillips, L.W., & Tybout, A., M. (1981). Designing Research for Application. *Journal of Consumer Research. 8 (September)*, 197-207.

Capella, M., L., & Taylor, C., R. (2014). Pharmaceutical DTC advertising provides valuable information to health-care consumers. In C. J., Pardun (Ed.) *Advertising and society: An introduction* (pp. 146-154). Malden, MA: Wiley Backwell.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cooper, H. (1998). *Synthesizing research: A guide for literature reviews* (3rd ed.). Beverly Hills, CA: Sage.

Farley, J., U. & Lehmann, D., R. (1986). *Meta-Analysis in Marketing: Generalization of Response Models.* Lexington, MA: Lexington Books.

Frosch, D., L., Grande, D., Tarn, D., M. & Kravitz, R., L. (2007). A decade of controversy: Balancing policy with evidence in the regulation of prescription drug advertising. *American Journal of Public Health. 100 (1),* 24-32.

General Accounting Office (2002). *Prescription Drugs: FDA Oversight of Direct-to-Consumer Advertising Has Limitations*. Washington, DC: United States General Accounting Office.

Gonul, F., Carter, F., & Wind, J. (1999). What kind of patients and physicians value direct-to-consumer advertising of prescription drugs. *Health Care Management Science. 3 (3),* 215-226.

Green, W. (1995). Consumer-directed advertising of contraceptive drugs: The FDA, depo-provera, and product liability. *Food and Drug Law Journal. 50 (4)*, 553-568.

Haley, R., I., & Baldinger, A., L. (1991). The ARF copy research validity project. *Journal of Advertising Research. 31(2),* 11-32.

Hausman, A. (2008). Direct-to-consumer advertising and its effect on prescription request. *Journal of Advertising Research. 48 (1),* 42-56.

Hedges, L. V., & Olkin, L. (1985). *Statistical Methods for Meta-analysis*. Orlando, FL: Academic Press.

Herzenstein, M., Misra, S., & Posavac, S. S. (2004). How consumers' attitudes toward direct-to-consumer advertising of prescription drugs influence ad effectiveness, and consumer and physician behavior. *Marketing Letters*, *15*(4), 201-212.

Homer, P. M. (1990). The mediating role of attitude toward the ad: Some additional evidence.*Journal of Marketing Research*, 78-86.

Hunter, J., E., Schmidt, F., L., & Jackson, G., E. (1982). *Meta-Analysis: Cumulating Research Findings across Studies.* Beverly Hills. CA: Sage Publications.

Janiszewski, C., Noel, H., & Sawyer, A. G. (2003). A Meta-analysis of the Spacing Effect in Verbal Learning: Implications for Research on Advertising Repetition and Consumer Memory. *Journal of consumer research*, *30*(1), 138-149.

Johnson, B., T., Eagly, A., H. (1989). *Effects of Involvement on Persuasion: A Meta-analysis. Psychological Bulletin. 106 (2),* 290-314

Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and social psychology bulletin*, *21*(1), 58-75.

Lee, B., Salmon, C. T., & Paek, H. J. (2007). The effects of information sources on consumer reactions to direct-to-consumer (DTC) prescription drug advertising: a consumer socialization approach. *Journal of Advertising*, *36*(1), 107-119.

Leffler, K. B. (1981). Persuasion or Information? The Economics of Prescription Drug Advertising. *Journal of Law and Economics. 24 (1),* 45-74.

MacKenzie, S., B., & Lutz, R., J., A. (1989). Empirical Examination of the Structural Antecedents of Attitude toward the Ad in an Advertising Pretesting Context. *Journal of Marketing. 53*, 48-65.

MacKenzie, S., B., Lutz, R., J., & Belch, G., E. (1986). The Role of Attitude toward the Ad as a Mediator of Advertising Effectiveness: A Test of Competing Explanations. *Journal of Marketing Research. 23*, 130-143

Mehta, A., & Purvis, S. C. (2003). Consumer response to print prescription drug advertising. *Journal of Advertising Research*, *43*(02), 194-206.

Miller, L. G., & Blum, A. (1993). Physician awareness of prescription drug costs: a missing element of drug advertising and promotion. *The Journal of family practice*, *36*(1), 33-36.

Olson, J. C., & Mitchell, A. A. (2000). Are product attribute beliefs the only mediator of advertising effects on brand attitude?. *Advertising & Society Review*, *1(1)*, 318-322.

Petroshius, S. M., Titus, P. A., & Hatch, K. J. (1995). Physician attitudes toward pharmaceutical drug advertising. *Journal of Advertising Research*, *35*, 41-52.

Rheinstein, P., H. (1984). A Head Start, a Broader Audience, and an Emphasis on Difference: The New Frontiers of Prescription Drug Promotion. *Food and Drug* Law Journal. 37, 330-335.

Rosenthal, R. (1984). *Meta-Analytic Procedures for Social Research.* Newbury Park. CA: Sage.

Rothstein, H., R., McDaniel, M., A., & Borenstein, M. (2001). Meta-Analysis: A review of quantitative cumulation methods. In N. Schmidt & F. Drasgow (Eds.). *Advances in measurement and data analysis* (pp. 534-571). San Francisco: Jossey-Bass.

Shimp, T., A. (1981). Attitude toward the Ad as a Mediator of Consumer Brand Choice. *Journal of Advertising. 10(2),* 9-15.

Statman, M., & Tyebjee, T. T. (1984). Strategic Responses to Changes in Public Policy: The Case of the Pharmaceutical Industry and Drug Substitution Laws. *Journal of Public Policy & Marketing*, 99-112.

Treise, D., Jung, W., S. (2014). Feel empowered! Enhanced health knowledge! In C. J. Pardun (Ed.). *Advertising and society: An introduction* (pp. 154-160). Malden, MA: Wiley Backwell.

Wilkes, M., S., Bell, R., A., & Kravitz, R. (2000). Direct-to-Consumer Prescription Drug Advertising: Trends, Impact, and Implications. *Health Affairs*. 19 (2), 110-128.

Williams, J., R, & Hensel, P., J. (1995). Direct-to-Consumer Advertising of Prescription Drugs: Attitudes toward This Type of Advertising Influence the Information-Seeking Behavior of Older Adults. *Journal of Health Care Marketing. 15 (1),* 35-41.

Wilson, R. T., & Till, B. D. (2007). Direct-to-consumer pharmaceutical advertising: building and testing a model for advertising effectiveness. *Journal of Advertising Research*, *47*(3), 270-282.

Yuan, S. (2008). Public Responses to Direct-to-Consumer Advertising of Prescription Drugs. *Journal of Advertising Research*. *48 (1),* 30-41.