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## The Use of Multiple Media by Social Media Users

*By Martin P. Block, Professor, and Executive Director, Retail Analytics Council (RAC); Don E. Schultz, Professor (Emeritus-in-Service) and Director, RAC; and Vijay Viswanathan, Assistant Professor and Director, RAC, the Medill School, Integrated Marketing Communications Department, Northwestern University*

### Abstract

With the growing use of multiple media, firms have to understand the combination of media used by their target segments. This study examines the use of multiple media by two important target segments – individuals who use social media to seek product information, and those who use social media to share product information. The theoretical framework is based on the premise that understanding individuals' motivations for searching or sharing information can help explain the combination of media they consume. A multiple discrete-continuous choice extreme value (MDCEV) model that allows use of multiple media is used for the estimation. The study reveals interesting differences in the combination of media consumed by these groups of individuals. In summary, it was found that individuals who regularly seek product information spend more time on the Internet and less time on television and radio during prime time. However, individuals who share product information using social media spend more time, in aggregate, on television and the Internet. The results have important implications for firms' media plans and communication strategies.

### 1. Introduction

With a multitude of media forms now available to individuals, there is increasing evidence of cross-platform or multiple media use. Rideout, Foehr and Roberts (2010) find that 8-18-year-olds increased their time with multiple media from an average of 8.5 hours per day in 2005 to nearly 10 hours and 45 minutes per day in 2010. In its recent cross-platform study, Nielsen (2011) reports that more than 80 million households in the U.S. have access to both cable television and broadband Internet. Interestingly, while use of digital media is on the rise with 48 percent of U.S. households watching video online, non-shifted television is still the dominant medium and seems unaffected by increasing use of other media.

Accounting for the various media touch points is a fundamental aspect of integrated marketing communications (Calder and Malthouse, 2005; Schultz and Schultz, 2004). For instance, traditional marketing mix models that do not take into account the effects of digital media may overstate the importance of traditional advertising. Some studies have examined the synergies or interaction effects of advertising efforts across different media (e.g., Naik, Raman and Winer, 2005). However, these studies infer synergies at an aggregate level from firms' advertising efforts. Our study is different in that it considers at an individual level

the underlying motivations for using a certain medium, and thus explains the nature and combination of media consumed by different groups of individuals. We concur with Block et al. (2009, p.96) who emphasize that an important media form is one that influences the consumer's decision-making and not one where the firms' efforts are concentrated.

In recent years, we have witnessed remarkable growth in the use of social media, a set of digital applications based on Web 2.0 that enables individuals to create and share information online (Kaplan and Haenlin, 2010). For example, AddThis, a digital application that allows individuals to share information online, has approximately 1.2 billion users. Taking into consideration the strong positive relationship between word-of-mouth communication and product performance (Bass, 1969; Godes and Mayzlin, 2004; Sheth, 1971), it is reasonable to assume that firms would be interested in communicating with groups of individuals who share product information.

There is also evidence that individuals use social media to search for product information. A recent survey conducted by the Pew Research Center (2011) observes that 92 percent of adults in the U.S. who frequent the Internet seek information online and 57 percent do so on a typical day. Lecinski, in his e-book ZMOT, suggests that consumers search for online reviews and information for a variety of product categories. Therefore, it is also reasonable to assume that firms would be interested in communicating with groups of individuals who seek product information. However, prior studies have not examined the use of multiple media by these two groups of individuals. This study makes an important contribution as it investigates the nature and combination of media used by these groups of individuals, and thus helps firms integrate their marketing communication activities to target and activate them.

In this study, we classify television, radio, and print media as traditional media and the Internet as digital media. Our theoretical framework is based on the premise that understanding individuals' motivations for searching or sharing information can help explain the nature and combination of media they consume. In the interest of completeness, we include in the framework other relevant explanatory variables that influence the use of a medium. A key contribution of this study is the modeling framework. While, traditional marketing models assume individuals make a single discrete choice i.e., consume only one medium, we use a multiple discrete-continuous choice extreme value (MDCEV) model, which accounts for the consumption of multiple media (or goods).

Results from the empirical analysis provide marketers and academics initial insights into how to leverage synergies across media. During prime time, individuals who seek product information online spend more time on the Internet and less time on traditional media such as television and radio. Interestingly, these individuals also spend more time reading magazines during prime time. This result lends broad support to our argument that the Internet is able to meet the information needs of individuals who actively seek product information online more effectively than traditional media. However, individuals who use social media to share product information consume more television and Internet during prime time. This is again in line with the theory that this group of individuals not only has a greater need for social interaction but also a higher involvement with a product and its commercials, resulting in greater consumption of traditional and digital media. These results have important implications for marketing managers as they craft their media plans and communication strategies.

The rest of the study is organized as follows. We develop and propose our theoretical framework in section 2. In the research design in section 3, we describe the data and the estimation methodology. We describe the results in section 4 and conclude with a discussion on the implications, limitations and areas for future research.



## 2. Theoretical Framework

### 2.1 Information Seeking and Use of Multiple Media

The need for information is a primary motivation for an individual to use a medium (McQuail, 1983). Recent studies (e.g., Ko, Cho and Roberts, 2005; Webster, 2009) suggest that traditional and digital media differ in their abilities to meet individuals' information needs. While traditional media can offer choice in content (e.g., television for entertainment, news, or sports; magazines for home projects, parenting, or recreation), individuals have to choose from the limited options available to them. On the other hand, the Internet can provide discrete or specific information that individuals are searching for and hence, can meet their information needs more effectively than traditional media. We therefore hypothesize that individuals who frequently seek product information online spend more time on digital media and less time on traditional media. Here, it is important to note that we account for other motivations that influence the use of a medium, such as need for relaxation, in the empirical analysis.

*Hypothesis 1: The greater the extent to which individuals use social media to seek product information, greater is the time they spend on digital media and lesser is the time they spend on traditional media.*

### 2.2 Information Sharing and Use of Multiple Media

Dichter (1966) observes that motivations to share product information fall broadly into four overlapping categories: self-involvement, other-involvement, product-involvement, and message-involvement. There is broad consensus among scholars that involvement is an individual-specific motivational state of arousal evoked by a certain stimulus such as a message source (Laczniak, Muehling and Grossbart, 1989; Mitchell, 1981). Dichter defines product-involvement as the pressure that builds up in an individual when he/she feels strongly about the product, and message-involvement as discussions stimulated by commercials, advertisements, and public relations messages. He also defines self-involvement as the gratification of emotional needs of the individual and other-involvement as the need to give something to the receiver. Self-involvement and other-involvement are important elements of social interaction (Turner, 1988). Other scholars (Engel, Blackwell, and Miniard, 1993; Sundaram, Mitra, and Webster, 1998) too have examined the motivations for sharing information and their findings largely overlap with Dichter's observations.

Studies examining the use of digital media have found that the need for social interaction influences use of the Internet (Ko et al., 2005; Stafford, Stafford, and Schdake, 2004). Studies have also found that greater product-involvement and information sharing is associated with greater search effort (Andrews, Durvasula and Akhter, 1990; Bloch, Sherrell, and Ridgway, 1986). Consistent with our earlier arguments, the digital medium can effectively meet the information needs of these individuals. We therefore expect that individuals who use social media to share product information spend more time on digital media.

Interestingly, studies that examine the use of traditional media have found similar results. For instance, studies have found that the need for social interaction has a positive effect on the use of traditional media such as television (e.g., Rubin, 1983). Individuals who are more involved with a product are more likely to read magazines that feature that product (Bloch, 1982). Individuals who share product information online often view and respond to commercials and advertisements that appear on traditional and digital media (Corcoran, 2009; Hanna, Rohm, and Crittenden, 2011).

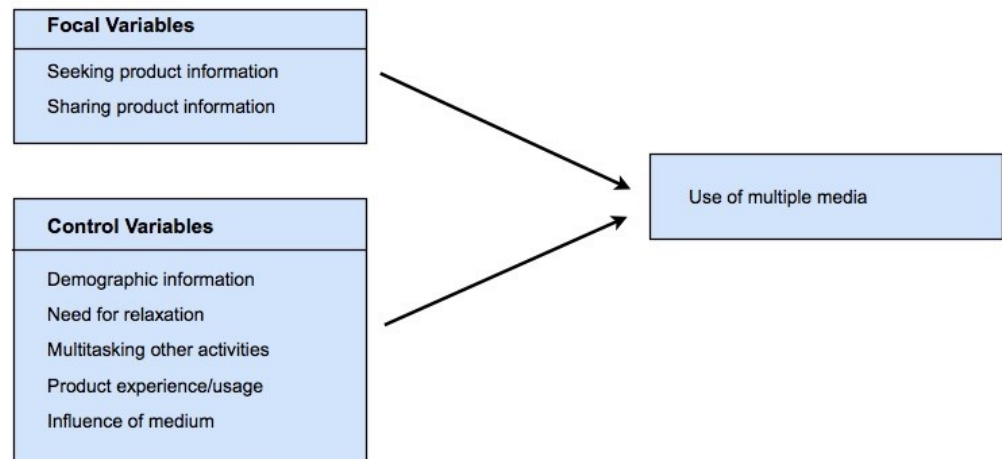
Based on these findings, we therefore hypothesize that individuals who use social media to share information consume both digital media and traditional media.



*Hypothesis 2: The greater the extent to which individuals use social media to share product information, greater is the time they spend on both digital media and traditional media.*

The theoretical framework consisting of the focal variables described and the control variables that we describe below is presented in Figure 1.

Figure 1. Theoretical Framework.



### 2.3 Other Determinants of Use of Multiple Media

We also include in the framework relevant individual- and medium-specific characteristics that influence the use of a medium. Regarding individual-specific determinants, studies have found that demographics influence the nature of media consumed. For instance, younger individuals spend more time on television and Internet media (Rideout, Foehr, and Roberts, 2010). According to Dennis, Kinney, and Hung (1999), women are more sensitive to non-verbal cues (e.g., visual) than men. According to the U.S. Department of Commerce (2011), computer ownership varies significantly depending on income levels. Studies also suggest that use of a medium varies depending on the presence of children in the household (Roberts 2000). Age, gender, income levels, and the presence of children under the age of 18 in the household are therefore included in the framework as factors that influence the use of a medium.

Previous studies that explain the use of a medium following the “uses and gratifications” approach (McQuail, 1983), find a positive relationship between need for relaxation and use of traditional media (e.g., Rubin, 1983). A similar relationship has been found between the need for relaxation and use of digital media (e.g., Stafford, Stafford, and Schkade, 2004). We therefore account for whether individuals spend their leisure time on television, radio, print, and the Internet and evaluate the combination of media they consume. Studies suggest that some individuals have an inherent need to carry out multiple activities (Kaufman and Lane, 1997; Kaufman, Lane, and Lindquist, 1991; Turner et al., 2006). Therefore, we include in the framework individuals’ involvement in other activities while consuming media. We also include experience with new technologies in the framework since studies have found that experience with a certain medium affects its usage (e.g., King and Weidong, 1997).

To account for medium-specific characteristics, we include the influence of a medium (Block et al., 2009) in the framework. Previous work in the communication literature suggests that characteristics of a medium, such as its richness in providing cues (Daft and Lengel, 1986), influence the use of a medium. Since



we lack information on media richness, we account for medium-specific characteristics in our estimation methodology. Specifically, we estimate intercepts for each medium to account for characteristics specific to a medium.

### 3. Research Design

#### 3.1 Estimation Methodology

Most estimation methodologies focus on the performance outcome of one good or item e.g., subject chooses either television or print. However, we often observe that individuals choose one or more alternatives<sup>1</sup> that are imperfect substitutes for one another. Examples of such multiple choice situations that have been studied so far include grocery purchases (Kim et al., 2002), individual activity participation and time-use (Bhat, 2005; Srinivasan and Bhat, 2006; Pinjari et al., 2009; Habib and Miller, 2009), household expenditure allocation patterns (Ferdous et al., 2008), household travel expenditures (Rajagopalan and Srinivasan, 2008), and household vehicle ownership and usage (Fang, 2008; Bhat et al., 2009).

Other than the study by Kim et al., all of the studies mentioned above use the MDCEV estimation methodology or its variations. As Bhat et al., (2009) explain, the MDCEV approach has certain key advantages. First, it captures important features of choice making, including the diminishing feature nature of marginal utility with increasing consumption. Second, it has a closed-form consumption probability expression thus avoiding the use of computationally expensive simulation methods. In the event that all decision makers make only a single choice, the MDCEV simplifies to the familiar multinomial logit (MNL) model.

With respect to this study, the MDCEV approach is consistent with the theoretical framework. For instance, a key contribution of this study is that different segments choose and allocate time to multiple media to meet their needs given time constraints. If the results from the analysis suggest that each consumer segment chooses only one medium of its choice, a simple MNL model would suffice. However, as we explain in detail later, we find that our focal consumer segments use multiple media and more interestingly, allocate time to different combinations of media to meet their needs. Next, an important factor that affects choice of multiple media in our theoretical framework is that media differ from each other in their abilities to satiate the needs of individuals. For instance, the Internet can meet an individual's information needs faster than television as it can provide discrete pieces of information. The MDCEV model can estimate the satiating capabilities of different media and validate this assumption of the theoretical framework. We, therefore, believe that the MDCEV is a suitable estimation approach for this study.

#### 3.2 Data

The Media Behavior and Influence (MBI) is a syndicated online study of American adult (18+) consumers that is conducted twice a year by BIGinsight of Columbus, Ohio. It uses a double opt-in methodology and is balanced to meet demographic criteria established by the U.S. Census. The study has been conducted continuously since 2002, and is used by a variety of well-known commercial marketing organizations. For the purpose of this study, we use the survey conducted in October 2010, a wave in which 23,237 individuals initially participated. However, some subjects did not report information on age (n=1,050), income (n=5,286), and presence of children under the age of 18 in the household (n=2,337). The final sample for the analysis was therefore reduced to 16,785 individuals.



<sup>1</sup> The methodology used in this study can also handle situations where none of the alternatives, i.e., the outside good, is chosen.

### 3.2.1 Dependent Variable – Multiple Media Consumption

Subjects in the survey report consumption of four different media for seven dayparts. The seven dayparts are 1 a.m. to 6 a.m., 6 a.m. to 10 a.m., 10 a.m. to noon, noon to 4:30 p.m., 4:30 p.m. to 7:30 p.m., 7:30 p.m. to 11 p.m., and 11 p.m. to 1 a.m. For this study, we focus on a single daypart and consider two important factors while deciding which daypart to use for the analysis. First, advertising expenditure data from SRDS<sup>2</sup> suggest that advertising on television during prime time is more expensive than advertising during other dayparts. Second, studies suggest that media availability is an important factor that influences media consumption (Webster, 2009). It is reasonable to assume that individuals can access all four media during prime time, i.e., from 7:30 p.m. to 11 p.m. We therefore focus on prime time and use individuals' self-reported consumption of television, radio, Internet, and print media on weekdays between 7:30 p.m. and 11 p.m. (i.e., 210 minutes). Print in this study refers to magazines and not newspapers. We exclude media such as newspapers and mobile phones from this study because the sample of individuals who report using such media during prime time is very small.

The dependent variable in our model is the time that an individual spends with each medium. Individuals report in the survey if they use a certain medium (1=Yes/0=No) during prime time and we use this information to calculate the time an individual spends with each medium. We calculate the consumption time in minutes for medium  $k$  as  $210 * c$ , where  $c = 1$  if  $k$  is consumed, and  $c = 0$  otherwise. The model allows for the possibility that none of the four media (i.e., the outside good) is consumed. In our data, 9 percent of individuals ( $n=1,575$ ) do not report consumption of any of the four media during prime time. For such individuals, the time spent on the outside good is measured as 210 minutes. We also allocated a small time of five minutes as the time spent on the outside good for all individuals who consumed at least one medium. Robustness checks, which include increasing the time spent on the outside good to 15 minutes for such individuals, did not reveal any significant change in the results. The descriptive statistics relating to consumption of the four media are in Table 1. Television has the highest average consumption during prime time, followed by the Internet, print, and radio.

Table 1. Descriptive Statistics for Media Consumption During Prime Time.

	Television Minutes	Radio Minutes	Print Minutes	Internet Minutes
<b>Mean</b>	192.77	26.67	56.29	127.55
<b>Std. Deviation</b>	87.68	69.93	93.02	102.55
<b>Correlation Matrix</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Television Minutes</b>	1			
<b>Radio Minutes</b>	-0.05			
<b>Print Minutes</b>	0.15	0.04	1	
<b>Internet Minutes</b>	0.15	0.13	0.12	1

### 3.2.2 Independent Variables

Here, we explain the operationalization of the explanatory variables used in our framework. We first explain how we develop measures for the focal variables i.e., seeking product information and sharing product information online. We

<sup>2</sup> SRDS is a division of Kantar Media that collects, curates, and delivers data to media buyers.

then describe the measures for individual characteristics and media influence. The descriptive statistics for these variables are in Table 2.

Table 2. Descriptive Statistics for Explanatory Variables.

Variable	Type	Mean	Standard Deviation
<b>Age of the individual</b>	Continuous categorical	43.79	14.21
<b>Gender</b>	(1=Male/0=Female)	0.51	0.50
<b>Children &lt;18 yrs. in household</b>	Categorical (1=Yes/0=No)	0.69	1.06
<b>Medium income</b>	Categorical (1=\$35,000<Income<\$75,000, 0=No)	0.37	0.48
<b>High income</b>	Categorical (1=Income>\$75,000, 0=No)	0.35	0.48
<b>Leisure time: watch TV</b>	Categorical (1=Yes/0=No)	0.03	0.99
<b>Leisure time: listen to music</b>		0.06	1.00
<b>Leisure time: read newspapers/ magazines</b>		0.00	1.00
<b>Leisure time: online activities</b>		0.01	1.00
<b>Regular desktop user</b>	Categorical (1=Yes/0=No)	0.87	0.33
<b>Regular tablet user</b>		0.06	0.23
<b>Regular smartphone user</b>		0.29	0.46
<b>Regular portable user</b>		0.64	0.48
<b>Search product information online</b>	Categorical (1=Yes/0=No)	0.45	0.50
<b>Share product information online</b>		0.20	0.40

#### *Using Social Media to Seek and Share Product Information*

In the survey, individuals were asked, “How often do you research products online before purchasing them in person or in a store?” Subjects had to choose from one of three options – regularly, occasionally, and never. We use a dummy variable to capture the extent to which individuals seek product information online. We encoded individuals who reported that they regularly searched for product information as one, and those who reported occasionally or never as zero. Around 45 percent of the sample reported that they regularly searched for information.

Subjects were also asked how they communicate with others about a service, product, or brand. Individuals who reported using online communities/social media were encoded as one, and zero if they did not use social media to share information. Descriptive statistics suggest that 20 percent of the respondents reported using social media to communicate information on products, services, and brands.



**Control Variables**

The average age of the sample is 44 years. Males constitute 51 percent of the sample. Individuals with an income of more than \$75,000 were considered as high-income individuals and those with an income between \$35,000 and \$75,000 were considered as medium-income individuals. Summary statistics suggest that 35 percent of the sample was in the high-income category and 37 percent in the medium-income category. Sixty-nine percent of households have children under the age of 18.

Since individuals also use media to fulfill their relaxation needs, we include relevant measures from the survey in the model. Subjects were asked, "What are some of your favorite ways of spending your free, leisure time?" While the survey provides subjects 37 different options (Yes=1, No=0), we include in the model options relating to "watch TV," "listen to music," and "read magazines/newspapers" to account for the effect of need for relaxation on the use of television, radio, and print media respectively. To control for use of the Internet, we use the average of responses to "surf the Internet," "email/instant messaging/blogging," and "online communities/social media." While 77 percent of the sample indicated they watch television during leisure time, 64 percent reported listening to the radio, 48 percent reported reading magazines/newspapers, and 44 percent indicated online activities. Studies suggest that some individuals have an inherent need to carry out multiple activities. Subjects were asked whether they engaged in 18 different activities when using media. Results from a factor analysis suggest that while consuming media, multitasking individuals carry out household, social, and outdoor-related activities. The results of the factor analysis with the reliability scores are in Table 3.





Table 3. Factor Analysis of Multitasking Activities.

	1	2	3
<b>Factor 1: Multitasking media with housework (<math>\alpha = 0.82</math>)</b>			
Do Laundry	0.781		
Do Housework	0.775		
Cook	0.719		
Make Grocery List	0.611		
Do Personal Care	0.581		
Eat	0.569		
Drive/Commute	0.446	0.440	
Care for Children	0.342		
<b>Factor 2: Multitasking media with socializing (<math>\alpha = 0.68</math>)</b>			
Text Messaging on Cell Phone			0.722
Study			0.597
Shop			0.594
Talk on Phone	0.439		0.590
Entertain		0.401	0.458
<b>Factor 3: Multitasking media with outdoor activities (<math>\alpha = 0.61</math>)</b>			
Work on Car		0.695	
Do Yard Work		0.694	
Exercise/Play Sports		0.485	
Do a Hobby/Craft		0.472	
Work/Job		0.452	0.310

Note: Loadings <0.3 were removed.

We include self-reported measures of regular usage of four devices: desktop, tablet (iPad), smartphones, and portables to account for degree of expertise with digital devices. Eighty-seven percent of the subjects reported themselves as regular desktop users. Only 5 percent of the sample self-identified as regular tablet (specifically iPad) users. Approximately 29 percent of the sample self-identified as regular smartphone users (i.e., iPhone, Droid, Blackberry, or Palm) and 62 percent as regular portable users (i.e., netbook and/or laptop).

Consumers report the influence of 24 different forms of communication on their purchase decisions in nine product categories: electronics, apparel, grocery, home improvement, automobiles, medicines, telecom services, dining, and financial services. We use these responses to compute measures for influence of traditional media and influence of digital media in the following way. First, we compute the average influence that each communication form has on an individual's purchase decision across the nine product categories. We then conduct a factor analysis of the average influence of these 24 forms of communication (see Table 4). Three factors have an eigenvalue greater than 1 and explain 53 percent of the variance. Two of the three factors indicate the influence of traditional media and digital media. The third factor, interestingly, reveals the influence of marketing communication. Reliability scores (i.e., alpha) for all three factors are high.



Table 4. Factor Analysis of Influence of Communication Forms.

	1	2	3
<b>Factor 1: Influence of digital media (<math>\alpha=0.91</math>)</b>			
Video on Cellphone	0.864		
Text Messaging	0.818		
Mobile Devices	0.812		
Instant Messaging	0.809		
Online Video Game	0.799		
Web Radio	0.773		
Satellite Radio	0.734		
Blogging	0.685		
Social Media	0.604		
Outdoor Billboards	0.499		0.422
Yellow Pages	0.468		
<b>Factor 2: Influence of Marketing Communication (<math>\alpha=0.91</math>)</b>			
Coupons		0.718	
Direct Mail		0.702	
Advertising Inserts		0.642	
Newspaper		0.588	
Email Advertising		0.587	
In-store Promotion		0.582	0.319
Read Article on Product		0.523	0.403
Magazines		0.518	0.382
Word of Mouth		0.511	0.388
Internet Advertising	0.316	0.416	0.371
<b>Factor 3: Influence of Linear Communication (<math>\alpha=0.76</math>)</b>			
Cable			0.784
Television/Broadcast			0.780
Radio	0.308	0.327	0.514
Product Placement	0.332		0.477

Note: Loadings <0.3 were removed.

#### 4. Results

We introduced variables in a step-wise manner in the model to ensure there are no multicollinearity issues. We also included other demographic information such as ethnicity and political ideology; however, these variables were consistently insignificant and we removed them from the framework. In addition to the main effects, we also examined various interaction effects. However, these effects were insignificant and did little to improve model fit. We therefore present only the main effects in our results. The significant estimates are in bold in Table 5.



Table 5. Estimates from MDCEV Model.

	Television Minutes		Radio Minutes		Print Minutes		Internet Minutes	
	Coeff.	t-stat.	Coeff	t-stat.	Coeff	t-stat.	Coeff	t-stat.
Intercept	-1.858	-22.00	<b>-3.524</b>	<b>-22.52</b>	<b>-3.876</b>	<b>-32.31</b>	<b>-2.101</b>	<b>-23.78</b>
Age	<b>0.013</b>	<b>12.14</b>	<b>-0.015</b>	<b>-7.11</b>	<b>0.0005</b>	<b>2.82</b>	<b>-0.003</b>	<b>-2.98</b>
Gender	0.017	0.63	<b>0.327</b>	<b>6.21</b>	<b>-0.163</b>	<b>-4.15</b>	<b>0.210</b>	<b>7.17</b>
Children <18 yrs. in household	<b>-0.022</b>	<b>-1.72</b>	<b>-0.054</b>	<b>-2.37</b>	<b>-0.058</b>	<b>-3.23</b>	<b>-0.052</b>	<b>-4.00</b>
Medium-income	<b>0.178</b>	<b>5.48</b>	<b>-0.235</b>	<b>-4.07</b>	<b>0.370</b>	<b>7.44</b>	-0.008	-0.23
High-income	<b>0.205</b>	<b>5.98</b>	<b>-0.335</b>	<b>-5.31</b>	<b>0.610</b>	<b>12.02</b>	0.012	0.32
Need for relaxation: watch TV	<b>0.576</b>	<b>17.58</b>	<b>-0.235</b>	<b>-4.03</b>	<b>-0.090</b>	<b>-2.05</b>	-0.039	-1.17
Need for relaxation: listen to music	<b>-0.057</b>	<b>-2.04</b>	<b>0.521</b>	<b>8.77</b>	-0.056	-1.41	-0.038	-1.25
Need for relaxation: read print	0.043	1.59	0.027	0.52	<b>1.070</b>	<b>26.74</b>	<b>-0.111</b>	<b>-3.88</b>
Need for relaxation: online activities	-0.002	-0.05	<b>0.191</b>	<b>2.46</b>	<b>-0.348</b>	<b>-6.06</b>	<b>0.666</b>	<b>15.31</b>
Regular desktop user	<b>0.173</b>	<b>4.42</b>	<b>0.212</b>	<b>2.83</b>	<b>0.166</b>	<b>2.92</b>	0.054	1.35
Regular tablet user	<b>-0.899</b>	<b>-12.93</b>	0.109	1.16	<b>-0.282</b>	<b>-3.13</b>	<b>-0.325</b>	<b>-5.12</b>
Regular smartphone user	-0.013	-0.41	0.030	0.53	<b>0.113</b>	<b>2.71</b>	<b>0.079</b>	<b>2.52</b>
Regular portable user	0.039	1.39	-0.014	-0.26	<b>0.081</b>	<b>2.06</b>	<b>0.241</b>	<b>8.03</b>
Multitasking with household activities	<b>0.070</b>	<b>5.05</b>	<b>0.121</b>	<b>4.93</b>	<b>0.071</b>	<b>3.74</b>	<b>0.127</b>	<b>8.92</b>
Multitasking with social activities	<b>0.152</b>	<b>10.42</b>	<b>0.051</b>	<b>1.82</b>	<b>0.127</b>	<b>6.13</b>	<b>0.090</b>	<b>5.86</b>
Multitasking with outdoor activities	<b>0.041</b>	<b>3.30</b>	<b>0.145</b>	<b>6.82</b>	<b>0.110</b>	<b>6.67</b>	<b>0.052</b>	<b>4.02</b>
Influenced by digital media	<b>-0.51</b>	<b>-10.03</b>	<b>0.102</b>	<b>5.80</b>	<b>-0.041</b>	<b>-2.18</b>	<b>-0.049</b>	<b>-3.61</b>
Influenced by market-ing communications	<b>0.076</b>	<b>5.71</b>	<b>0.079</b>	<b>3.23</b>	<b>0.139</b>	<b>8.00</b>	<b>0.073</b>	<b>5.26</b>
Influenced by traditional media	<b>0.061</b>	<b>5.06</b>	<b>0.062</b>	<b>2.89</b>	<b>0.064</b>	<b>3.92</b>	<b>0.035</b>	<b>2.76</b>
Seeking product information	<b>-0.048</b>	<b>-1.82</b>	<b>-0.083</b>	<b>-1.69</b>	<b>0.069</b>	<b>1.90</b>	<b>0.094</b>	<b>3.42</b>
Sharing product information	<b>0.019</b>	<b>4.35</b>	0.005	0.52	-0.001	-0.23	<b>0.034</b>	<b>7.04</b>

Note: t-statistics in bold have p-value <0.1.

We first discuss the results of the focal variables. According to H1, individuals who regularly seek product information online spend more time on digital media and less time on traditional media. The coefficients for time on television and radio are



negative and significant, while the coefficient for digital media is positive and significant as expected. The results suggest that individuals who seek product information online spend significantly more time on the Internet and significantly less time on traditional media such as television and radio. However, the coefficient for time on print is also positive and significant suggesting that these individuals also spend significantly more time on print media. The results therefore partially support H1.

According to H2, individuals who use social media to share product information spend more time on digital and traditional media. The coefficients for television and the Internet are positive and significant as expected. The results suggest that these individuals consume significantly more television and Internet during prime time, lending support to H2. We summarize the results for the focal variables in Table 6. In the discussion section, we explain the implications of these results for firms who wish to communicate with these groups of individuals.

Table 6. Summary of Results for Focal Variables.

Use Social Media For	Traditional Medium Used	Digital Medium Used
Information Seeking	Print	Internet
Information Sharing	Television	Internet

Regarding demographic variables, we observe that older individuals spend significantly more time on television and print, and spend less time on the Internet and radio than younger individuals. Men spend significantly more time than women on the radio and Internet during prime time. However, women spend more time than men reading magazines. These results are consistent with findings from previous studies and lend face validity to our study.

Households with children less than 18 years of age spend significantly less time than other households on the radio and Internet during prime time. Medium- and high-income individuals consume similar bundles of media and spend significantly more time on television and print than low-income individuals. However, low-income individuals consume more radio than high- or medium-income individuals.

As expected, individuals who report spending time with a certain medium to fulfill their relaxation needs spend significantly more time with that medium during prime time. More importantly, the results also reveal interesting insights on their use of multiple media. Individuals who spend their leisure time watching television spend significantly less time on radio and print. Individuals who spend their leisure time listening to music spend less time watching television during prime time. Individuals who spend their leisure time reading magazines and newspapers spend less time on the Internet. Finally, individuals who spend their leisure time on online activities spend more time on the radio and less time on print.

Individuals, irrespective of whether they are engaged in household, social, or outdoor activities, spend significantly more time on all four media during prime time. Regular users of different electronic devices differ considerably in the combination of media that they consume. While desktop users spend significantly more time on television, radio, and print media, tablet (i.e., iPad) users spend significantly less time on television, print, and the Internet during prime time. Users of portables (i.e., laptops and netbooks) and smartphones spend significantly more time on the print and Internet media during prime time.

Individuals who are influenced by digital media consume significantly less Internet, print and television during prime time. However, these individuals spend more time listening to the radio during prime time. Individuals whose purchase decisions are influenced by traditional media consume significantly more



traditional media and digital media during prime time. We also find similar results for individuals who are influenced by marketing communication.

*Satiation Parameters:* This is perhaps the first study that compares the satiation abilities of different media. The satiation parameters ( $\alpha_k$ ) for the four media (Table 7) are significantly different, suggesting that the four media are not perfect substitutes. The satiation parameter for radio is the highest, signifying that radio has the smallest satiation effect of the four media. In other words, individuals need to spend less time with radio than other media before they are satiated. The satiation parameter for television is the smallest signifying that individuals need to spend more time with television than other media to be satiated. This result is a possible explanation for why television is still the dominant medium during prime time.

Table 7. Satiation Parameters ( $\alpha_k$ ).

Medium	Parameter ( $\alpha_k$ )	p-value
Television	0.654	0.00
Radio	0.916	0.00
Print	0.883	0.00
Internet	0.787	0.00

## 5. Discussion

The main objective of this study is to understand the nature and combination of media consumed by different groups of individuals and help marketers integrate their marketing activities across media. Here, we examine the combination of media consumed by two important target segments: individuals who use social media to seek information and those who use social media to share product information. In the interest of completeness, we include other relevant variables that influence the use of a medium. Relevant data from a survey consisting of a nationally representative sample are used for the empirical analysis. Contrary to traditional estimation methodologies that allow only use of only one medium (or good), the approach used in this study allows individuals to use multiple media.

The study reveals interesting differences in media consumption between individuals who use social media to seek product information and those who use social media to share product information. For instance, individuals who use social media to seek product information spend more time on the Internet and print media and less time with other traditional media such as television and radio. The result lends support to the theory that the Internet is able to meet the information needs of individuals more effectively than traditional media such as television and radio. The use of the print medium during prime time by this group of individuals is an interesting outcome and provides marketers insights on which combination of media to use to communicate with individuals who seek information. Firms can conduct integrated marketing campaigns on the Internet and print media during prime time to target individuals who seek product information. It also seems that allocating resources to television and radio to target information seekers during prime time is inefficient and perhaps ineffective.

The results also suggest that individuals who use social media to share product information consume both television and Internet during prime time. This result lends support to the theory that individuals who share information have higher self-involvement and other-involvement. Consequently, they have a higher need for social interaction and hence consume more television (Rubin, 1983) and In-





ternet (Ko et al., 2005). Furthermore, this result has important implications for marketers because individuals who share information about certain products are deeply involved with these products and their commercials. Firms can use this information to conduct integrated marketing campaigns on television and Internet during prime time to communicate with this group of individuals. Evidence suggests that firms are allocating more resources to social media (eMarketer, 2011). This study cautions that allocating resources to social media alone would not be as effective as allocating resources to both traditional and digital media to activate this group of individuals.

Since the study incorporates frequently used segmentation variables pertaining to demographics, product usage, and behavior, the results provide useful information to firms on which combination of media to use to target specific groups of individuals. Individuals who are influenced by marketing communication and traditional media spend significantly more time with all four media. This is an interesting and informative result for firms as they work to integrate their marketing communications across different media. Similar results are obtained for individuals who perform other activities while consuming media. These results not only help explain the pervasive use of cross-platform media, but also provide information on the different groups of individuals using multiple media.

## 6. Limitations and Future Research

The study is not without its limitations, suggesting opportunities for future research. The study uses self-reported measures of media consumption and uses nominal variables to compute the time spent with a medium. This study examines multiple media consumption from a static point of view and does not take dynamics into account. In addition to the medium, it would be useful for firms to understand how to allocate resources to different programming content (e.g., entertainment – reality shows, dramas, etc.; sports – football, Olympics, etc.). However, it is important to note that each of these limitations has implications for data collection. While we have attempted to alleviate concerns on unobserved heterogeneity by including demographic and behavioral variables in the analysis, a mixed effects model is better suited to handle such issues. However, this entails increasing the complexity of the model and we leave this for future research.

The study also suffers from a few other limitations. We only examine media consumption during prime time. It is quite possible that the combination of media consumed differs for other dayparts e.g., the radio may be the dominant medium in the morning while driving to work. Further analysis is needed to understand the media consumption behavior of individuals whose purchase decisions are influenced by digital media during other dayparts. In this study, we did not include the phone as a medium because few subjects in the survey report using this medium during prime time. However, mobile usage continues to grow and the effectiveness of mobile marketing efforts needs to be examined. The satiation effects of the four media provide useful insights on the ability of each medium to satisfy the needs of the user, however, more work is needed to understand the factors that influence satiation. We leave it to future research to examine these interesting and important issues.

Looking beyond, the study is an ideal building block for future research on multiple media consumption. With access to granular information on media consumption, future work can help us understand if individuals consume multiple media simultaneously (Schultz, Block, and Raman, 2009), or whether they frequently switch between media, or if they spend time with a medium until they are satiated and then switch to the next medium. It is possible that an individual



exhibits all of these behaviors over the duration of a day or even a daypart. These actions have implications for how individuals process, store, and recall information as they access information from multiple channels and repositories. Consequently, they have a bearing on firms' communication and media planning activities. Research that investigates these issues will truly help us further our understanding of multiple media consumption.

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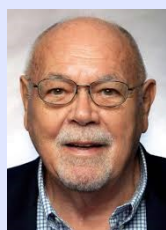


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## Multiple Media (cont'd.)



Martin P. Block is a Professor at the Medill School, Integrated Marketing Communications department, Northwestern University, and the Executive Director of the Retail Analytics Council (RAC).



Don E. Schultz is a Professor (Emeritus-in-Service) at the Medill School, Integrated Marketing Communications department, Northwestern University, and a Director of the RAC.



Vijay Viswanathan is an Assistant Professor at the Medill School, Integrated Marketing Communications department, Northwestern University, and a Director of the RAC.

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