

The Relationship Between Product Placement And the Performance of Movies

Can Brand Promotion in Films Help or Hurt Moviegoers' Experience?

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Star power, genre, sequel, and word of mouth (WOM), are among the critical factors affecting a film's box-office success. The current study added a new wrinkle to the WOM factor, analyzing whether advertising in the form of product placements in films affected consumer enjoyment of the movie, and, in turn, whether the related positive or negative WOM about the film affected box-office revenues. The authors investigated the relationship between product placements and the performance of 122 movies released between 2000 and 2007 and found that product placements had both helpful and harmful consequences. Product placements exhibited a positive relationship with movie revenues, but when used in excess (*i.e.*, more than 44 placements per movie) the relationship with revenues turned negative.

INTRODUCTION

Brands long have appeared in all kinds of entertainment programming. A few successful examples in film include "Wings," a 1927 movie and the winner of the first Academy Award for Most Outstanding Production, which featured Hershey's chocolate bars. The first movie in the James Bond series, "Dr. No," plugged the Aston Martin automobile

and Smirnoff vodka. The Hershey Company's Reese's Pieces appeared in "E.T.;" Tom Cruise wore Ray-Ban sunglasses in "Risky Business" and "Top Gun"; and Mr. Potato Head, Slinky, Etch-a-Sketch, and Barbie, among other toy brands, have been placed in the three "Toy Story" animated movies.

Whether visual or audible, *product placement*—defined as the inclusion of a product, brand, or

Management Slant

- Product placements in movies exhibit a positive relationship with movie revenues, but when used in excess, this relationship with revenues turns negative.
- The relationship between product placement and the benefits a consumer receives from media programming is robust across movies with different budgets and qualities.
- These findings have important managerial implications for both media programmers and advertisers, who may need to reevaluate the widely assumed negative effects of product placements.

firm in entertainment programing for promotional purposes (d'Astous and Chartier, 2000)—is an important part of the product-service marketing mix. Global spending on product placement in film and television totaled an estimated \$10.6 billion in 2014 (PQ Media, 2015).

There is a rich tradition of research about product placements describing consumers' attitudes toward the practice and the effects on viewers (McCarty and Lowrey, 2012). To the authors' knowledge, however, there is less work describing the relationship between product placement and the performance of the programing in which the brands or products appear.

On some occasions, the direct impact on the bottom line of the content producer is evident: Heineken, for example, reportedly paid \$45 million to appear in the James Bond movie, "Skyfall" (Graser, 2012). But, in other instances, the broader relationship between product placement and media-programing performance is less clearly defined: Two prominent brands that appeared in the movie, "Up in the Air"—American Airlines and Hilton Hotels—for example, did not pay the production company, Paramount; instead, they provided production locations for filming (such as in airports, airplanes, and hotels) and branding that helped defray what otherwise would have been incrementally massive production costs (Hampp, 2009).

Although the means to the end of brand engagement might matter, whether the engagement is direct (Heineken) or indirect (American Airlines and Hilton Hotels) is important to programmers and placement firms in that it may affect pricing strategies and negotiation outcomes.

The authors do not claim product placement as the principal driver of box office performance for movies. Clearly a number of other factors are critical to the success or failure of movie, including, but not limited to

- star performers (De Vany and Walls, 1999),
- directors and producers (Hennig-Thurau, Walsh, and Wruck, 2001),
- advertising (Faber and O'Guinn, 1984),
- number of screens (Swami, Eliashberg, and Weinberg, 1999),
- moviegoers' word of mouth (Bruce, Foutz, and Kolsarici, 2012; Craig, Greene, and Versaci, 2015; Moon, Bergey, and Iacobucci, 2009; Neelamegham and Chintagunta, 1999),
- Motion Picture Association of America ratings (Prag and Casavant, 1994),
- genre (Litman, 1983), and
- sequel (Hennig-Thurau, Houston, and Walsh, 2006).

Prior studies have indicated that product placements improve consumer awareness, brand image, and sales of the placed product (e.g., Russell and Belch, 2005; Van der Waldt, Du Toit, and Redelinghuys, 2007), but their relationship with the revenues of the surrounding media content is unknown. The authors of the current article believe that their research addresses this important gap.

Customers' utility (*i.e.*, enjoyment)—the total satisfaction received from consuming a good or service—is a vital component in measuring the effect of advertising—and in the instance of this study, product placements in media programing.

Arguments suggest the possibility of both positive and negative effects of product placements for consumers of entertainment programing. For example, on the positive side, product placements have been shown to increase realism of the programing for consumers (DeLorme and Reid, 1999), whereas on the negative side, product placements have been shown to interrupt the viewing experience for consumers (Cowley and Barron, 2008).

Opinions among prominent filmmakers about the effects of product placements

also vary. David Lynch (Lynch, 2008) has observed, "Product placement in a film putrefies the environment. It is so absurd, but it is happening more and more." And, Ron Howard (Dretzka, 1998, p. 16) has said, "I don't feel using an actual product detracts from the movie. It creates opportunities, enhances the story and can actually draw people in."

Scholars, in fact, have found that effective product placements can enhance a viewer's experience by increasing realism, such as the use of real beer brands in "Forrest Gump" (e.g., DeLorme and Reid, 1999), whereas incongruent product placements can diminish a viewer's experience by being out of place (e.g., Russell, 2002), *ceteris paribus*.

Word of Mouth and Films With Product Placements

To examine the relationship between product placements and media-programing performance, the authors mined data on 122 movies released between 2000 and 2007 in which there were 1,497 occasions of product placement (See Methodology—The Data, p. 327).

The data indicated an inverted U-shaped relationship. Holding all other movie characteristics constant, the link between product placement and movie performance (revenue, as measured by gross weekly ticket sales) was positive initially, but excessive placements led to a negative turn. This finding does not mean that product placements alone drove the success or failure of a movie; instead, product placements, on average, helped a movie be more successful unless used in excess, in which case they could hurt a movie's box office revenue, *ceteris paribus*.

As part of their analysis, the authors completed additional study on the relationship between product placements and consumer word of mouth (WOM), as measured by consumer ratings. Drawing

If the significant relationship between product placements and movie performance is because of WOM, the current authors expected to see a significant relationship between product placements and consumer WOM.

from previous research that defined the relationship between WOM and performance of film, the authors speculated that the significant relationship between product placements and movie box-office performance likely reflected online and offline WOM. That is, if product placements increased consumers' overall enjoyment of the film, overall WOM, as measured by consumer ratings would increase, *ceteris paribus*.

Indeed, consumers often rely on WOM and recommendations from other viewers when deciding which movie to watch (e.g., Chintagunta, Gopinath, and Venkataraman, 2010; Liu, 2006). And consumer WOM has been shown to affect the performance of movies both directly (e.g., Bruce *et al.*, 2012; Craig *et al.*, 2015; Moon *et al.*, 2009) and indirectly through greater buzz (e.g., Duan, Gu, and Whinston, 2008). If the significant relationship between product placements and movie performance is because of WOM, the current authors expected to see a significant relationship between product placements and consumer WOM. Using data on the same 122 movies, the results showed that when holding all other movie-performance characteristics constant, a significant, positive relationship between product placements and consumer WOM existed.

The findings from this study may help inform negotiations between media programmers and advertisers. Advertisers may have more leverage because of the increased

value product placements have to programmers. Alternatively, programmers may have more leverage because of the larger audiences and more favorable brand attitudes from product placements. Additionally, as the example from the movie, "Up in the Air," shows, the two parties can benefit from collaborative integrations of products in the content, instead of relying solely on a monetary exchange (Hampp, 2009).

LITERATURE REVIEW

Product placement in programming is nearly as old as the movie industry. In 1896, the Sunlight Soap brand appeared in the French film "Défilé du 8^e Bataillon" (Newell, Salmon, and Chang, 2006). Product-placement discussions in the popular press began in the late 1970s. Scholars introduced product placement as a hybrid message with elements of both advertising and publicity (Balasubramanian, 1994).

Most of the resulting literature on product placement has focused on its effect on consumers, such as their

- attitudes toward product placements and their related consumption experiences (de Gregorio and Sung, 2010; DeLorme and Reid, 1999; Nelson, 2002),
- brand recognition and recall (Bressoud, Lehu, and Russell, 2010; d'Astous and Chartier, 2000; Dens, De Pelsmacker, Wouters, and Purnawirawan, 2012; Russell, 2002),
- brand attitudes (Cowley and Barron, 2008; Homer, 2009; Russell and Stern, 2006; Tiwsakul, Hackley, and Szmigin, 2005; Van Reijmersdal, 2009), or
- purchase intentions and choices (Hang, 2014; Law and Braun, 2000; Morton and Friedman, 2002).

Another stream of product-placement literature addresses film-production companies and advertising firms. An application of social-exchange theory and qualitative expert interviews indicated that advertising firms use product placements as a communication tool, whereas the production companies use them to offset production costs and for cross-promotional opportunities (Chang, Newell, and Salmon, 2009). These views seemingly have changed over time, though, such that each side recognizes trade-offs between the financial benefits and creative harms of product placements (Karrh, McKee, and Pardun, 2003). Event studies also have specified the product placement's worth to the advertising firm (Karniouchina, Uslay, and Erenburg, 2011; Wiles and Danielova, 2009).

The authors of the current study found a notable gap in the literature: full consideration of the relationship between product placement and the performance of the placement medium (e.g., movie, television show, video game). In the context of film, a number of factors have been shown to determine box-office performance, including star power, directors-producers, and WOM (See Introduction). Extant literature has predicted some potential implications of the effect of product placements but no conclusive or empirical evidence. For example, film production companies should be wary of the continued use of prominent product placements to avoid potentially lowering consumers' attitudes toward media programming and decreasing audience sizes (Homer, 2009).

In the authors' view, however, if the advertising diminishes the overall consumption experience, consumers provide less positive WOM.

In addition to addressing this gap, the current study represented a response to scholars' calls to explore the placement saturation (Balasubramanian, Karrh, and Patwardhan, 2006) that occurs when too many product placements appear in media programming and, thereby, invoke negative reactions by consumers. This negative reaction, the current authors presumed, may be related to lower overall performance of the programming.

Conceptual Background

Product placement is a form of advertising. Advertising has three broad roles: persuasive, informative, and complementary (Bagwell, 2007):

- In its "persuasive" role, advertising creates product differentiation and brand loyalty by altering customers' tastes, mainly through repeated exposures to advertisements (e.g., Boulding, Lee, and Staelin, 1994; Comanor and Wilson, 1967).
- In its "informative" role, advertising provides customers with information vital to their purchase decision (Eckard, 1991; Nelson, 1970, 1974), whether directly (e.g., price) or indirectly (e.g., quality signaled by the level of firm spending on advertising).
- In its "complementary" role, advertising targets some innate and stable preferences of customers (*i.e.*, social prestige), through which it increases customers' use or satisfaction. This effect helps reconcile the persuasive influence of advertising (Galbraith, 1967) with consumer

utility maximization (*i.e.*, maximizing benefits given resource constraints).

Some scholars have suggested examining complementary advertising from the perspective of whether it is "good" or "bad" for the consumer (Becker and Murphy, 1993). "Good"—positive, in this sense—means the advertising enhances consumer benefits; "bad"—negative—lessens consumer benefits.

The authors considered that product placements have positive relationships with programming performance only because the advertising enhances the overall consumption experience, holding all other characteristics (star power, etc.) constant. When consumers like a product better, they will spread more positive WOM, all else equal. In the context of films, WOM has been shown to be an important determinant of movie performance (e.g., Bruce *et al.*, 2012; Craig *et al.*, 2015; Duan *et al.*, 2008; Moon *et al.*, 2009). In the authors' view, however, if the advertising diminishes the overall consumption experience, consumers provide less positive WOM. The current authors do not claim that product placements are a principal driver of consumer WOM but instead are a factor among a host of factors that affect WOM.

Product Placements as a Positive

To be considered positive, product placements must enhance the consumption experience consumers obtain from media programming. If used appropriately, product placements increase the realism of the programming (DeLorme

and Reid, 1999; Sung, De Gregorio, and Jung, 2009; Van der Waldt *et al.*, 2007). Consumers may find a movie more realistic, for example, if product placements help them:

- place a story in the past (DeLorme and Reid, 1999), such as with the placement of Miller Beer in the 1955 Hill Valley, California, setting in "Back to the Future";
- imagine a narrative in the future, such as with the placement of Nike lace-free high-tops in the 2015 Hill Valley setting of "Back to the Future II."¹

But moviegoers may feel "irritated and insulted by generic product props" (DeLorme and Reid, 1999, p. 78). As LeeAnne Stables, Paramount's executive vice president of worldwide marketing partnerships, has said with respect to the aforementioned "Up in the Air": "I think depicting fake brands would take people more out of the movie. This is a movie depicting the lives of real people, who are involved with brands every day of their life" (Hampp, 2009). This effect likely explains why consumers have "generally favorable attitudes toward product placements" (Gupta and Gould, 1997, p. 37), with some exceptions for ethically charged items such as alcohol, cigarettes, and guns (Gupta and Gould, 1997; Nebenzahl and Secunda, 1993).

By enhancing the realism of movies—the authors considered, drawing from earlier research—product placements may help "transport" moviegoers in a film. Transportation is a "distinct mental process and integrative melding of attention, imagery, and feelings" (Green and Brock, 2000, p. 701), and this engagement with a

¹ The current authors' use of movie examples is illustrative; testing whether each specific example actually enhanced or detracted from the audience's consumption experience was beyond the scope of this study.

narrative world may increase enjoyment (Green, Brock, and Kaufman, 2004).

Realism is an influential determinant of audience enjoyment (Ang, 1985) and may increase positive attitudes toward a movie (Koordeman, Anschutz, and Engels, 2014). Because personal experiences have the strongest influences on WOM (Allsop, Bassett, and Hoskins, 2007), greater realism should encourage more positive WOM in accordance with the audience's positive attitudes. WOM, in turn, exerts a strong effect on the success of entertainment goods in general (Chevalier and Mayzlin, 2006) and movies in particular (Chintagunta *et al.*, 2010; Craig *et al.*, 2015; Liu, 2006).

Thus, if product placements relate positively to movie realism, which—the authors presumed—can increase enjoyment by transporting audiences, then product placements also should have a positive relationship with movie performance because of increased positive WOM.

Additional arguments further suggest product placements are positive when

- movie-going frequency relates positively to attitudes toward product placement (de Gregorio and Sung, 2010). According to exposure theory, as a person watches more movies, his or her exposure to product placements increases, and the person becomes more familiar with the practice; this familiarity results in more positive attitudes (de Gregorio and Sung, 2010). Thus, the authors asserted, people who most likely will consume movies also are the people who mostly likely will enjoy product placements.

- consumers who communicate with peers about brands tend to have positive attitudes toward product placements (de Gregorio and Sung, 2010).

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In the context of movies, which often is a social activity, product placements provide more opportunity for these consumers to discuss brands among their peers, which may enhance the consumer's benefit from watching the movie (de Gregorio and Sung, 2010). This reasoning also suggests a positive relationship between the consumer's familiarity with the placed products and the performance of the media programing, as indicated by extant literature on product placements (DeLorme and Reid, 1999).

Overall, the consequences of positive product placements that may enhance the movie-going experience include

- increased realism;
- a positive relationship between movie-going frequency and attitudes toward product placements;
- a positive relationship between brand familiarity and attitudes toward product placements.

Therefore, the authors proposed, a positive relationship should arise between product placement and programing performance, as well as between the proportion of placements that feature familiar brands and programing performance.

Product Placement as a Negative

When product placements interrupt the viewing experience and prompt consumers to consider the commercial intent of the placement, they decrease the utility (*i.e.*, enjoyment, interest) that consumers

experience from consuming media programing and detract from their consumption experience (Cowley and Barron, 2008). If the audience believes the producer has been obligated to insert placements in the content to earn auxiliary sources of income, their consumption experience likely suffers (Cowley, 2012). Moreover, incongruent product placements that do not fit the plot adversely affect brand attitudes (Russell, 2002).

The use of 30-year-old Converse All-Stars by Will Smith's character in "I, Robot," and the extended consumption of Pepsi One in a single scene by actor Rene Russo's character in "The Thomas Crown Affair," were cited widely as inappropriate product placements (*e.g.*, Carlson, 2008). These placements were not seamless, and their incongruence distracted viewers from the overall consumption experience (McCarty, 2004).

Because such product placements may decrease the benefit consumers obtain from their media consumption, they also might have negative effects on attitudes toward the media programing. In this case, product placements may negatively affect the movie-going experience, leading to less positive WOM about the movie, holding all other performance-related factors (star power, etc.) constant. The resulting relationship between product placements and programing performance likely is negative.

The authors do not claim that product placements need to be discussed to have an effect on WOM. Rather, product placements can

- enhance the consumer experience through, for example, greater realism (DeLorme and Reid, 1999), or
- detract from the consumer experience through, for example, interrupted viewing (Cowley and Barron, 2008),

leading to more positive or less positive WOM, all else equal. Detailing actual WOM on the movies used in the current analysis is beyond the scope of this article.

Positive and Negative Product Placement

Excessive product placements make it difficult to combine advertisements seamlessly with media programming and increase the possibility of hindering the consumer's viewing experience. In particular, consumers of various types of media dislike excessive product placements (DeLorme and Reid, 1999) and express irritation in response.

Viewers who exhibit a high need to evaluate the positive and negative qualities of an object are significantly more irritated by high—compared with low—commercial density when watching a television program (Fennis and Bakker, 2001). Research on advertising clutter, which examines the level of advertising in a medium, also can provide guidance (Cowley and Barron, 2008; Karniouchina *et al.*, 2011).

Similar to most research on product placements, most research on advertising clutter examines how clutter affects advertising effectiveness (Rosengren and Dahlén, 2013). This stream of research shows that more clutter—similar to excessive product placements—results in

- more negative attitudes toward the advertising (Elliot and Speck, 1998; Ha, 1996),
- decreased effectiveness of advertising (Hammer, Riebe, and Kennedy, 2009), and, ultimately,

- advertising avoidance (Cho and Cheon, 2004; Elliot and Speck, 1998).

Although marketers understand the negative aspects of advertising clutter, it widely is viewed as a necessary trade-off for lower cost reach (Nelson-Field, Riebe, and Sharp, 2013). In one of the few studies to examine the effect of clutter on the medium, greater advertising clutter decreased circulation rates in a magazine context (Ha and Litman, 1997).

Drawing from the earlier literature, the authors predicted there could be positive consequences of product placements, such as what they see as the potential for enhancing the movie-going experience—up to a certain threshold. After this saturation point, however, excessive placements should backfire, detracting from the movie-going experience and lead to less positive WOM. As a result, the authors predicted that the relationship between product placements and media programming performance should exhibit an inverted U shape.

The above discussion informed the current authors' research questions:

RQ1: Considering the strong potential that product placements could be both positive and negative for consumers of media programming, what is the relationship between product-placement advertising with media-programming performance, specifically in the context of cinema?

RQ2: If a significant relationship between product-placement advertising and media-programming performance exists, does a significant relationship also exist between product-placement advertising and word of mouth?

METHODOLOGY

The Data

Movies serve as the empirical context for this study of the relationship between product placements and media programming performance. Cinema has served as the context for a variety of research in marketing, such as WOM (Craig *et al.*, 2015; Liu, 2006) and advertising (Joshi and Hanssens, 2009) as well as in product-placement research (Karniouchina *et al.*, 2011; Wiles and Danielova, 2009).

The authors obtained product-placement data from the Brand Hype Movie Mapper² (<http://www.brandhype.org>), which detailed product placements in 205 movies released between 1968 and 2007 and served as a source for previous product-placement research (Karniouchina *et al.*, 2011). To ensure sufficient advertising data availability, the authors included movies listed on Brand Hype between 2000 and 2007. Additional data collection relied on Boxofficemojo (www.boxofficemojo.com, hereafter "Mojo"), Internet Movie Database (www.imdb.com, hereafter "IMDb"), Kantar Media, and Interbrand (See Table 1).

After excluding data that had excessive missing information (e.g., advertising spending, production budget), the sample consisted of 122 movies and 1,497 product placement occasions.

For each movie, the variables included

- the total number of product placements (obtained from Brand Hype);
- the proportion of product placements by major brands (Brand Hype), such that a brand is major if it appeared among "The Top 100 Brands" for that year (Interbrand);
- the total length of all product placements (Brand Hype);

² The Brand Hype Movie Mapper was created (and continues to be maintained) by Professor Matt Soar of Concordia University, Montreal.

TABLE 1

Variables, Measures, and Data Sources

Variables	Descriptions (Measures)	Source
PLACE	Number of product placements	Brand Hype
MAJOR	Proportion of placements by major brands (%)	Interbrand
MAIN	Proportion of placements used by main characters (%)	Brand Hype
LENGTH	Total length of product placements (minutes)	Brand Hype
REV	Weekly box office revenue (\$)	Mojo
AD	Total advertising spending (\$)	Kantar Media
PREAD	Prelaunch advertising spending (\$)	Kantar Media
WKLYAD	Weekly advertising spending (\$)	Kantar Media
BUDGET	Production budget (\$)	Mojo
WOM	Word of mouth valence (Consumer rating, 1–100)	IMDb
WOMVOL	Word of mouth volume	IMDb
SCRN	Weekly number of screens	Mojo
STAR	Star power, measured as total box office revenues of the movies in which the actor was a starring cast member five years before the release of the movie (\$)	Mojo
SEQUEL	Dummy variable for sequel	Mojo
MPAA	Dummy variables for MPAA ratings (G, PG, PG13, and R)	Mojo
GENRE	Dummy variables for genres	Mojo
INDIE	Dummy variable for independent films	Mojo

- weekly U.S. box office revenue (Mojo);
- advertising spending (Kantar Media);
- production budgets (Mojo);
- star power (Mojo), measured as the total box office revenues of the movies in which the actor was a starring cast member five years prior to the release of the movie;
- weekly number of theater screens (Mojo);
- Motion Picture Association of America (MPAA) rating (Mojo);
- producing studio (Mojo);
- genre (Mojo);
- sequel (Mojo);
- independent films (Mojo);
- word of mouth valence (consumer rating; IMDb);
- word of mouth volume (IMDb).

Additionally, the character that uses the product is an important driver of consumer attitudes toward a product placement. For example, moviegoers prefer products used by main characters, because the use of a familiar product helped them relate to the character (DeLorme and Reid, 1999). Similarly, moviegoers had more positive associations with brands used by star actors (DeLorme and Reid, 1999). Thus, the current study also included the proportion of product placements used by main characters (Brand Hype).

To measure WOM, the current authors used the valence and volume of online consumer ratings (IMDb). The use of valence and volume of online consumer ratings as

a measure of WOM is widely accepted in a number of experience goods contexts, including

- movies (Dellarocas, Awad, and Zhang, 2007; Duan *et al.*, 2008);
- music (Dhar and Chang, 2009);
- books (Chevalier and Mayzlin, 2006); and
- beer (Clemons, Gao, and Hitt, 2006).

Descriptive statistics from this study revealed that movies averaged 15.87 product placements—33 percent of them in support of major brands and another 81 percent used by main characters (See Table 2). The average WOM valence (consumer rating) and volume from IMDb were 69.61 and 175,833, respectively. For revenue, advertising spending, production budget, and star power, the figures were adjusted for inflation.

EMPIRICAL ANALYSIS**The Model**

To test the relationship between product placements and movie performance, the authors estimated their regression model, which utilized the panel structure of the data:

$$\begin{aligned} \ln REV_{mt} &= \alpha_0 + \alpha_1 PLACE + \alpha_2 PLACESQ \\ &\quad + \alpha_3 X_{1,m} + \alpha_4 X_{2,mt} + \alpha_5 X_{3,t} + \varepsilon_{mt} \end{aligned} \quad (1)$$

They specified $\varepsilon_{mt} = c_m + v_{mt}$, where c was unobserved, movie-specific fixed effects, and v was the error term.

For each movie m :

- REV was the box office revenue for week t (using its natural logarithm, because of its skewed distribution);
- $PLACE$ was the number of product placements; and
- $PLACESQ$ was the squared number of placements.

Furthermore, X_1 was a vector of time-invariant, movie-specific variables:

- the proportion of placements by major brands (*MAJOR*), as a proxy for brand familiarity;
- the proportion of placements used by main characters (*MAIN*);
- total screen time for all product placements in a movie (*LENGTH*), as a control for product placement intensity;
- word of mouth valence (*WOM*);
- word of mouth volume (*WOMVOL*);
- star power (*STAR*);
- production budget (*BUDGET*);
- a dummy variable that indicates whether the movie is a sequel (*SEQUEL*); and
- dummy variables for the MPAA ratings (*MPAA*), 17 genres (*GENRE*), and independent films (*INDIE*).

The X_2 vector of time-varying, movie-specific variables included the number of screens (*SCRN*) and advertising expenditures (*WKLYAD*; first-week advertising also included prelaunch expenditures).

Given the host of factors that have been shown to affect movie box-office performance, the X_1 and X_2 vectors were included so the derived relationship between product placements and movie box-office performance held the aforementioned factors (star power, etc.) constant.

Finally, X_3 was the time trend (*TREND*, in weeks).

WOM and *WOMVOL* were included to test whether *WOM* was a driver of movie performance. The positive effect of *WOM* on box-office revenues, if it existed, would help support the link between product placements and movie performance.

The *MAJOR* and *MAIN* measures used proportions, because the dependent variable (weekly box-office revenue) was movie specific, but not brand or placement specific. Independent movies typically are produced by independent studios with

TABLE 2
Descriptive Statistics

Variable	M	SD	Min	Max
PLACE	15.87	16.49	1.00	102.00
MAJOR	0.33	0.23	0.00	1.00
MAIN	0.81	0.22	0.00	1.00
LENGTH	1.28	1.66	0.03	12.07
REV	85.4	81.4	1.15	404.00
AD	26.2	11.5	0.54	57.20
PREAD	12.4	5.77	0.01	25.30
BUDGET	55.6	48.4	0.40	258.00
WOM	69.61	9.60	27.00	85.00
WOMVOL	175.83	137.63	6.25	710.64
SCRN	988.30	469.99	23.06	2,005.92
STAR	1,200.00	1,090.00	0.00	6,650.00
SEQUEL	0.07	0.25	0.00	1.00
INDIE	0.23	0.42	0.00	1.00

Note: N = 122. REV = total revenues; AD = total advertising spending. REV, AD, PREAD, BUDGET, and STAR are in millions of dollars. WOMVOL is in thousands of ratings (WOM posts about the movie). Variables are adjusted for inflation where appropriate. SCRN = average weekly number of screens.

lower budgets and characterized by different content and style than major films; they also tend to feature fewer product placements than mainstream movies.³

The data showed that mainstream movies include significantly more product placements than independent movies ($M_{MAIN} = 17.54$, $M_{INDEP} = 10.25$; $t = 2.09$; $p < 0.05$). The dummy variable for independent movies controlled for differences between the types of movies.

Although product placements may increase moviegoers' benefit (experience), it is possible that excessive placements in a movie have a negative effect on consumer benefit. In other words, an inverted U-shaped relationship may exist between the number of placements and performance of the media in which products are placed.

Including both the number of placements and the squared value allowed the analysis of the potential U-shaped effect.

Accounting for Endogeneity

The number of product placements may have been endogenous because of unobserved heterogeneity (c_m). For example, both producing firms (studios) and placement firms (advertisers) may have wanted to place more products if they thought the movie was of high quality. In this case, placements would have been correlated with the combined error term ($c_m + v_m$). Similarly, studios may have increased the number of screens for a high-quality movie, therefore the number of screens would have been correlated with the error term.

A first differencing operation could account for endogeneity by eliminating fixed effects (c_m), but the model also

³ The authors thank an anonymous reviewer for suggesting this point.

included time-invariant independent variables, such as *PLACE* and *PLACESQ*, that would have been eliminated by first differencing.

Instead, this study used a system “generalized method of moments” (GMM) estimator (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998; Holtz-Eakin, Newey, and Rosen, 1998). The system GMM estimator is appropriate for a small number of time periods and a large number of panels and when the independent variables are not strictly exogenous. The data consisted of 122 movies (panels), but some movies were shown as little as four weeks (time periods) in theaters. System GMM can estimate the coefficients of both time-varying (e.g., weekly screens and advertising) and time-invariant (e.g., MPAA rating, number of product placements) variables while also accounting for fixed individual effects, heteroscedasticity, and autocorrelation within panels.

Thus, the system GMM was advantageous to the current researchers, in that it could control for unobserved heterogeneity without removing time-invariant independent variables, by using equations in levels and in differences. That is, the system GMM first estimated equations in levels and in differences. The estimator then was obtained by a weighted average of the coefficients from a structure of two equations:

$$\mathbf{B} = (\mathbf{X}'\mathbf{Z}(\mathbf{W})^{-1}\mathbf{Z}'\mathbf{X})^{-1}(\mathbf{X}'\mathbf{Z}(\mathbf{W})^{-1}\mathbf{Z}'\mathbf{Y}) \quad (2)$$

$$\mathbf{X} = \begin{bmatrix} \mathbf{X}_d \\ \mathbf{X}_l \end{bmatrix}, \quad \mathbf{Y} = \begin{bmatrix} \mathbf{Y}_d \\ \mathbf{Y}_l \end{bmatrix}$$

$$\mathbf{Z} = \begin{bmatrix} \mathbf{Z}_d & 0 \\ 0 & \mathbf{Z}_l \end{bmatrix}, \quad \mathbf{W} = \begin{bmatrix} \mathbf{W}_d & 0 \\ 0 & \mathbf{W}_l \end{bmatrix} \quad (3)$$

where

- \mathbf{B} was the system GMM estimator matrix,

- \mathbf{X}_d was a matrix of transformed independent variables (*i.e.*, first differences),
- \mathbf{X}_l was the matrix of original regressors (*i.e.*, levels),
- \mathbf{Y}_d indicated the transformed dependent variable,
- \mathbf{Y}_l was the original dependent variable,
- \mathbf{W}_d offered a weighting matrix of the transformed equation,
- \mathbf{W}_l was a weighting matrix of the original equation,
- \mathbf{Z}_d referred to the set of instruments in the transformed equation, and
- \mathbf{Z}_l was the set of instruments in the original equation.

Econometrics literature (e.g., Arellano and Bover, 1995; Blundell and Bond, 1998) has demonstrated that system GMM estimations could increase efficiency because they use not only levels but also differences of lagged variables as instruments. Lagged variables in differences and in levels are orthogonal to error terms; therefore, both variables are relevant instruments (e.g., Arellano and Bover, 1995; Blundell and Bond, 1998; Roodman, 2009). The assumption is that lagged explanatory variables do not correlate with current error terms—that is, $E(x_{mt-s} \cdot \varepsilon_{mt}) = E(x_{mt-s} \cdot \varepsilon_{mt-1}) = 0$ for $s \geq 2$)—so the lagged independent variables are orthogonal to error terms in first differences (Equation 4).

Because the previous regressors and current error terms were not correlated—that is, $E(x_{mt-s} \cdot \varepsilon_{mt}) = E(x_{mt-s-1} \cdot \varepsilon_{mt}) = 0$ for $s \geq 2$)—lagged regressors in differences and current errors in levels were orthogonal (Equation 5).

$$E(x_{mt-s} \cdot \Delta\varepsilon_{mt}) = 0 \text{ for } s \geq 2 \quad (4)$$

$$E(\Delta x_{mt-s} \cdot \varepsilon_{mt}) = 0 \text{ for } s \geq 2 \quad (5)$$

where x_{mt} is an endogenous variable, and ε_{mt} is an error term for movie m in week t .

Accordingly, the model used both lagged levels and lagged differences as instrumental variables. Because the first differences equation eliminated the fixed effects, c_m , neither *PLACE* nor *PLACESQ* correlated with the error term (See Equation 6). Thus, lagged differences of *SCRN* and lagged levels of *SCRN*, *PLACE*, and *PLACESQ* provided instruments in the first differences equation for the endogenous variable *SCRN*:

$$E(w_{mt} \cdot \Delta v_{mt}) = 0 \text{ for all } m \text{ and } t \quad (6)$$

where w_m was a time-invariant variable.

The system GMM estimation described above allowed the current researchers to

- obtain consistent and efficient estimators of the effects of both the number of placements and its square to understand the relationship between product placements and movie performance;
- control for endogeneity because of unobserved heterogeneity from both studios and placing firms; and
- control for a variety of movie-specific factors and an overall time trend.

RESULTS

Product Placements and Saturation

Pertinent to results from the system GMM estimation (See Table 3) are the following:

- The coefficient of the number of product placements was positive and significant, so the number of placements had a positive relationship with revenues—what the authors believe to be a novel finding. The empirical results affirmed that product placement as advertising is positive for consumers.

- The coefficient of the square of the number of product placements was negative and significant, confirming the inverted U-shaped relationship between the

TABLE 3

Effect of Product Placement on Revenue

Variable	Ln REVENUE
PLACE	0.0983* (0.0098)
PLACESQ	-0.0011* (0.0001)
MAJOR	0.2328* (0.1168)
MAIN	0.4910 (0.2726)
LENGTH	-0.0631* (0.0203)
SCRN	0.0012* (0.0000)
WKLYAD	0.0318* (0.0004)
BUDGET	0.0005 (0.0017)
STAR	0.0001 (0.0001)
SEQUEL	-0.3756* (0.1217)
TREND	-0.1109* (0.0021)
WOM	0.0223* (0.0111)
WOMVOL	0.0014* (0.0004)
INDIE	0.3386* (0.1062)

Note: N = 1,908. Standard errors (SEs) are in parentheses. Additional independent variables include 3 MPAA and 17 genre dummies, not reported here. WKLYAD, BUDGET, and STAR are in millions of dollars. WOMVOL is in thousands.

*Significant at 5%.

number of placements and box office performance.

- Thus, when holding all other factors (star power, etc.) that could affect movie box office performance constant, product placements showed a positive relationship with movie performance, up to a certain point; however, excessive placements related negatively to performance after a saturation point and became a negative for consumers.

- These effects were significant even after controlling for the total length of product placements and the production budget of the movie.

After establishing a significant inverted U-shaped relationship with media performance, the authors next turned to the saturation point for product placements. The estimated inflection point, using the coefficients of *NPLACE* and *NPLACESQ*, was approximately 44. That is, the initially positive relationship between product placements and revenues became negative after 44 placements (See Figure 1).

Considering that the number of product placements averaged about 16, studios generally appeared to keep the number of placements within a reasonable range. However, some movies featured a high numbers of placements, even exceeding 100 in some cases, such that the relationship between product placements and revenue likely was negative in those cases.

Control Variables

The positive and significant coefficients for WOM valence and volume confirmed previous findings that WOM was a driver of movie performance. This finding is important because if WOM did not affect movie performance, then the link by which product placements affected performance would not have existed.

The coefficient of major brands was positive and significant, indicating that the proportion of product placements by major brands related positively to performance. In contrast, the coefficient for main characters was not significant. Together, these findings suggest that consumers placed more importance on product placements featuring

- easily-recognized brands (versus generic or fake brands) than on

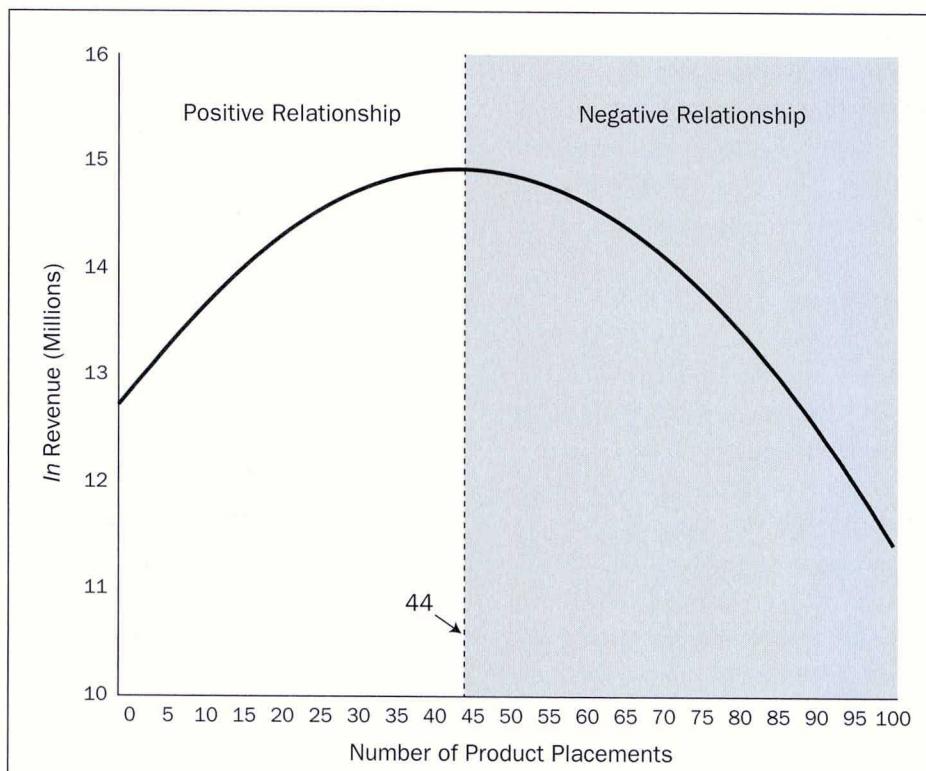


Figure 1 Inverted U-Shaped Relationship Between Product Placement and Revenue

- product placements featuring a main character (versus secondary characters).

Perhaps product placements appeared more seamlessly incorporated into movie storylines if they involved easily-recognized brands; this result also is consistent with the notion that product placements increase realism.

As expected, the other control variables that had significant positive relationships with movie performance, were

- advertising
- the number of screens
- independent movies.

The coefficient of the length of product placements was negative and significant, so total screen time for all placements had a negative relationship with performance.

Star power and production budget were not statistically significant.

The coefficient of sequel movies was negative and significant.

The trend coefficient was negative and significant, meaning performance decreased over time, as expected.

Outlier Analysis

To check the robustness of the current findings, the researchers conducted an outlier analysis. The skewness (kurtosis) of the number of placements and total length of placements were 3.051 (12.038) and 3.133 (13.101), respectively; that is, the variables skewed to the right (See Figure 2). To determine whether or not the results were affected by outliers, the researchers also ran the model after *Winsorizing* the number of placements or the total placement length. Winsorizing is a method to reduce the effect of potentially spurious outliers to ensure that extreme observations do not drive the results (e.g., Rego, Morgan, and Fornell, 2013; Tuli, Bharadwaj, and Kohli, 2010). For the current research, the authors

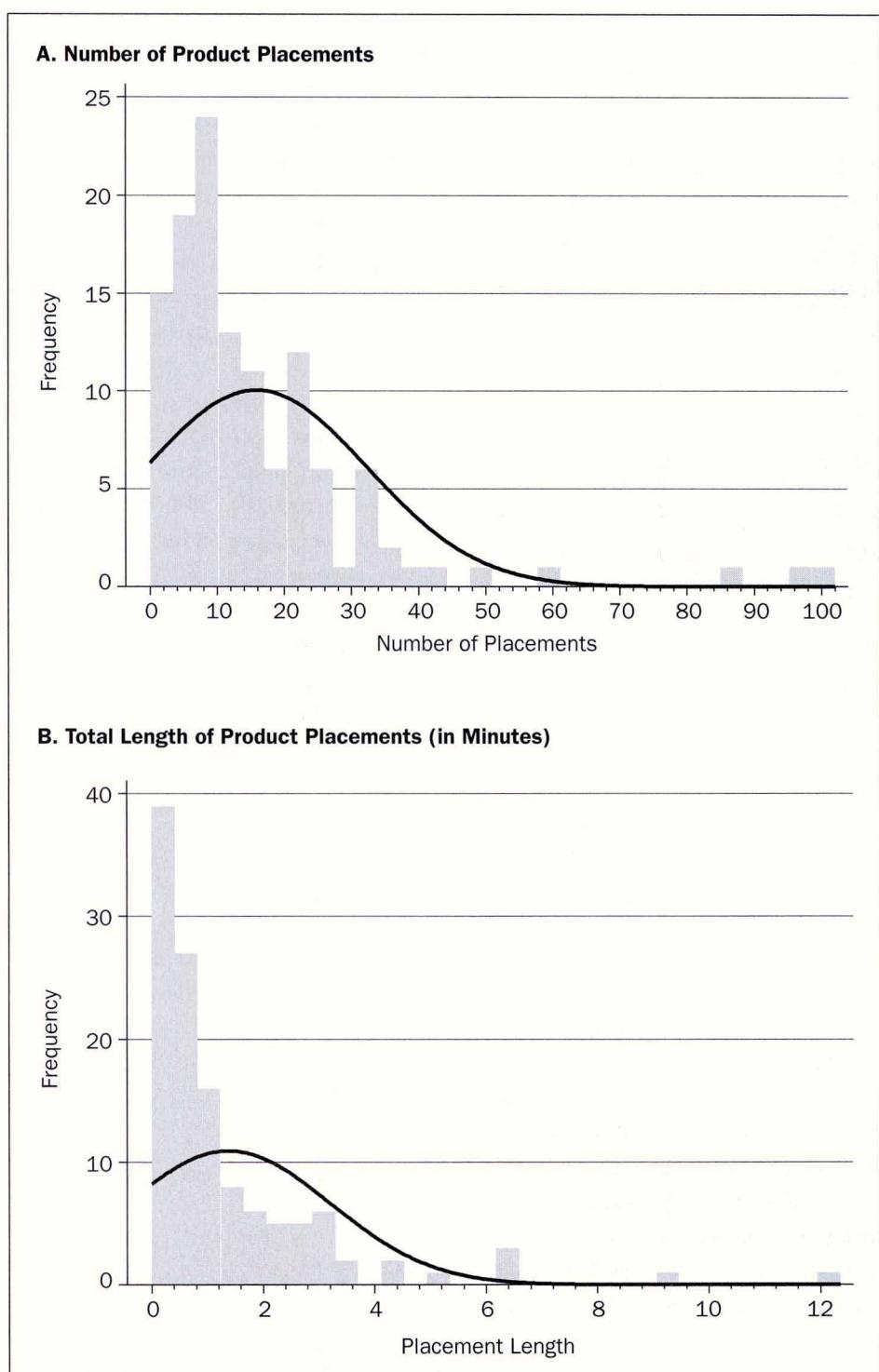


Figure 2 Frequency Distribution

Winsorized at the 99th percentile, meaning that any number of placements or total placement length above the 99th percentile were set to be equal to the 99th percentile.

As to the results from the system GMM estimation with these data; they remained similar and were robust to outliers (See Table 4).

TABLE 4

Effect of Product Placement on Revenue (Winsorized at 1%)

Variable	Ln REVENUE	
PLACE	0.0967*	(0.0097)
PLACESQ	-0.0011*	(0.0001)
MAJOR	0.2415*	(0.1146)
MAIN	0.4627	(0.2696)
LENGTH	-0.0660*	(0.0238)
SCRN	0.0012*	(0.0000)
WKLYAD	0.0318*	(0.0004)
BUDGET	0.0006	(0.0016)
STAR	0.0001	(0.0001)
SEQUEL	-0.3829*	(0.1221)
TREND	-0.1108*	(0.0021)
WOM	0.0223*	(0.0111)
WOMVOL	0.0014*	(0.0004)
INDIE	0.3389*	(0.1063)

Note: N = 1,908. Standard errors (SEs) are in parentheses. Additional independent variables included 3 MPAA and 17 genre dummies, not reported here. WKLYAD, BUDGET, and STAR are in millions of dollars. WOMVOL is in thousands.

*Significant at 5%.

Does Low Budget or Low Quality Drive the Results?

An alternative explanation for the inverted U-shaped relationship might be that movies with more product placements tend to be low budget or low quality, and studios actively seek financial resources from paid placements. Such low-budget, low-quality movies generally perform poorly at the

box office—this study revealed a positive (though not significant) coefficient of production budget and a positive, significant coefficient for WOM valence as proxy for quality (See Table 3)—so these movies could be driving the negative quadratic coefficient (See Equation 1, p. 7).

Empirical evidence, however, does not support the above explanation:

- In the correlation pattern among product placements, production budget, and WOM valence as a proxy for quality (See Table 5 and Figure 3), the correlations between the number of placements and either production budget or WOM valence would be negative if low budget or low quality induced the inverted U-shaped relationship.

Instead, these correlations were both positive (though not statistically significant), offering no evidence that low-budget or low-quality

movies included more product placements than their high-budget or high-quality counterparts.

- Production budget and WOM valence (*i.e.*, quality) were included in the regression, so the significant inverted U-shaped relationship between product placements and performance persisted after controlling for these factors (See Table 3).
- The instrumental variable approach (system GMM estimator) accounted for unobserved movie-specific heterogeneity, such as movie quality (See Equations 2 and 3, p. 9). The estimation results came after addressing the endogeneity of product placements because of potential correlations among production budgets, movie quality, and other unobserved factors.

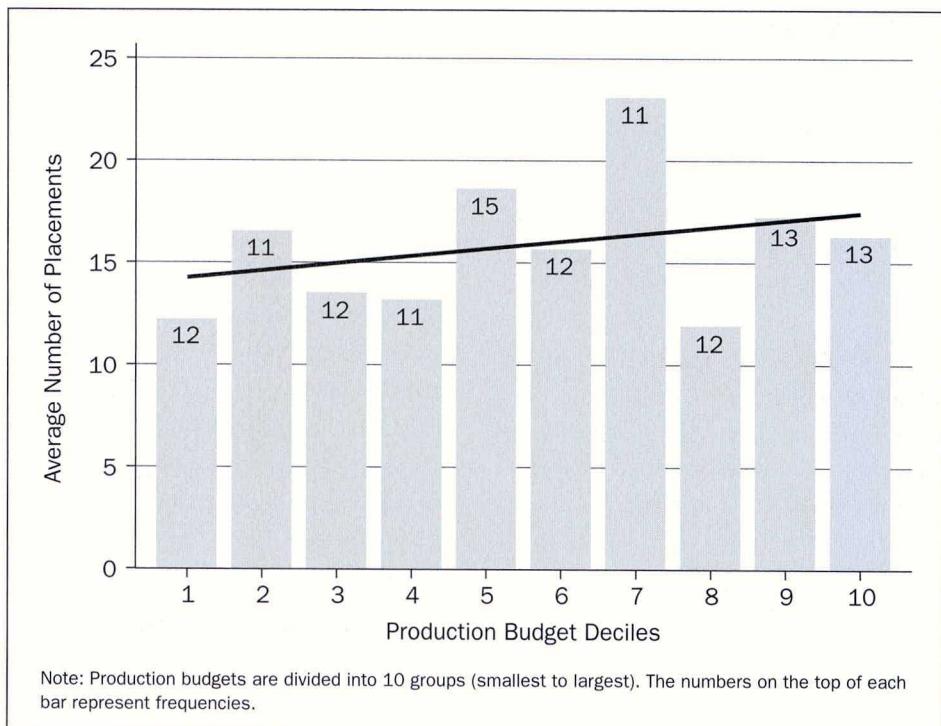
Together, the above three findings indicate that low budgets or quality of

TABLE 5

Correlations

Place	Budget
Budget	0.0336
WOM	0.1340 -0.0930

Note: p > 0.05 for all correlations.

**Figure 3** Average Number of Product Placements by Production Budget

movies did not drive the inverted U-shaped relationship.

Are Product Placements and WOM Related?

The authors have argued that the significant relationship between product placements and programing performance likely reflected WOM, holding all other factors (star power, etc.) that could affect movie-performance constant. In other words, if product placements enhance realism and increase consumers' overall enjoyment of the film as the literature shows, then consumers should express more positive WOM. If this is true, then a significant relationship between the number of product placements and WOM, as measured by online consumer ratings, should exist.

To verify this relationship, the authors ran the following regression model on the 122 movies used in the previous analysis:

$$\ln WOM_m = \beta_0 + \beta_1 PLACE + \beta_2 X_{4,m} + \eta_{1,m} \quad (7)$$

For each movie m :

- WOM was word of mouth valence as measured by the consumer rating (using its natural logarithm, because of its skewed distribution); and
- PLACE was the number of placements.

Furthermore, X_4 was a vector of movie-specific variables:

- the proportion of placements by major brands (MAJOR), as a proxy for brand familiarity;
- the proportion of placements used by main characters (MAIN);
- total screen time for all product placements in a movie (LENGTH), as a control for product placement intensity;
- total advertising spending (AD);
- star power (STAR);
- production budget (BUDGET);

- a dummy variable that indicates whether the movie is a sequel (SEQUEL); and
- dummy variables for the MPAA ratings (MPAA), 17 genres (GENRE), and independent films (INDIE).

All sources are the same as in previous analyses.

As with the previous analysis, given the host of factors (star power, etc.) that can affect WOM (and hence movie performance), the X_4 vector was included so the derived relationship between product placements and WOM held the aforementioned factors constant.

Again, the number of product placements may be endogenous because of unobserved movie-specific heterogeneity. Because the dependent variable was time-invariant, the current authors used an instrumental variable approach using studio dummies as instruments to deal with this potential endogeneity. Each studio's specific financial situation affects product-placement decisions. However, when deciding which movie to watch or when evaluating movies, consumers rarely consider studios (Luan and Sudhir, 2010). Therefore, studio dummies would be uncorrelated with WOM but correlated with product placements, making them relevant instrumental variables. The model was estimated by generalized method of moments (GMM) with robust standard errors (SEs).

The coefficient of product placements was positive and significant (See Table 6). That is, product placements had a significant positive relationship with WOM when holding the other factors constant. Among the control variables, MAJOR, MAIN, LENGTH, and STAR were not significant, nor was the INDIE dummy variable. AD and SEQUEL had positive, significant relationships, whereas BUDGET had a negative, significant relationship.

Together with the positive and significant relationship found between WOM

TABLE 6

Effect of Product Placement on Word of Mouth

Variable	Ln WOM
PLACE	0.0034* (0.0014)
MAJOR	0.0039 (0.0557)
MAIN	-0.0028 (0.0565)
LENGTH	-0.0075 (0.0055)
AD	0.0033* (0.0015)
BUDGET	-0.0016* (0.0004)
STAR	-0.00001 (0.0001)
SEQUEL	0.1720* (0.0396)
INDIE	0.0016 (0.0405)

Note: N = 122. SEs are in parentheses. Additional independent variables include 3 MPAA and 17 genre dummies, not reported here. AD, BUDGET, and STAR are in million dollars.

* Significant at 5%.

and programing performance in the previous analyses, as well as the established positive relationship between the two in the literature (e.g., Bruce *et al.*, 2012; Craig *et al.*, 2015; Duan *et al.*, 2008; Moon *et al.*, 2009), this finding is important. This finding provides a link by which product placements affect programing performance.

CONCLUSION AND IMPLICATIONS

Product placements are big business for both the placed brands and the media programing in which they appear. Extant research mainly has addressed the effects of product placements on consumers' attitudes (McCarty and Lowrey, 2012); this study went a step further to examine how product placements relate to the performance of the media context (*i.e.*, movies) through word of mouth about the movies, by drawing on a complementary view of advertising.

The current empirical analysis demonstrates that, on average, product placements are considered a positive for

**Firms that produce media programing and those
that place advertising in such media can enjoy
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media-performance outcome, up to a certain point. That is, when holding all other factors (star power, etc.) constant, product placements increase consumer benefit (experience) when they are not excessive, resulting in a positive relationship with movie performance. This finding elucidates the heretofore unknown relationship between product placements and programing performance.

Additionally, the results revealed a positive relationship between the proportion of placements by major, familiar brands and movie performance, suggesting some important managerial implications:

- Firms that produce media programing and those that place advertising in such media can enjoy a win-win situation from product placements, especially if those placements involve major brands that are familiar to consumers.
- However, too much of this positive can become negative. As the number of placements passes a saturation point (44, as the current study demonstrated), the relationship with movie performance turns negative. In particular, programing firms that give in to the temptation to allow too many placements may suffer weaker programing performance when holding all other factors constant. The average number of placements in the current sample

was 16, suggesting that movie studios might understand both the positive and the potential negative effects of product placements.

- Studios should continue to limit the number of product placements to a reasonable boundary and avoid excessive placements (e.g., more than 50), which generally appear associated with poorer box office performance.

LIMITATIONS AND FUTURE RESEARCH

This investigation of the relationship between product placements and media programing used the number of placements as a focal variable. A lack of data prevented the incorporation of the congruence or fit of placed advertisements with the movie. In addition to the number or length of product placements, the seamlessness of the product placement with the flow of the movie may be an important factor. Secondary data about the fit between advertising and media programing are difficult to obtain, but assessments of fit would represent valuable additions to this research stream.

Moreover, the models in this study included advertising, but only that conducted by the studio, because no data about cross-promotional advertising by the placed brands were available. Further research might find a way to include this relationship. 

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