

Testing Moderation and Moderated Mediation of Intent in an Advertising-Adoption Link

Jonathan Lee, University of La Verne, USA

Pamela Miles Homer, California State University, Long Beach, USA

INTRODUCTION

Consumers' stated purchase intentions are one of the primary inputs that marketing managers use to forecast future sales and to determine how the actions they take will impact consumers' purchasing behavior (Morwitz 2014). Purchase intentions are often used to measure consumer demand for new products using concept and product tests. Marketing managers also use purchase intentions as a leading indicator of future demand for their products, and to assess how their marketing actions will impact those future sales.

One approach to forecasting a new product's sales is based on a potential consumer's intention to buy. The importance of intentions as indicators of purchase behavior is perhaps most attributed to Fishbein and Ajzen's seminal attitude→intention→behavior framework (1975). More recently, extant literature in the social sciences has given considerable attention to intentions and the relationship between intentions and actual behavior. For example, Morwitz et al. (2007) provide a comprehensive analysis of the relationship between purchase intentions and behavior while others have taken a modeling perspective (Shugan and Swait 2000; Sun and Morwitz 2010). The basic premise behind using intention measures as indicators for purchase behavior is that there is some useful information contained in these measures that reflect consumers' likelihood of purchasing the new product. Contrary to past efforts that specify intent as a mediator, we propose and test an alternative perspective that treats intent as a moderated mediator.

Predicting movie box office revenues offers a unique opportunity to study the relationships among advertising, intentions, and demand, including potential moderator and mediator effects. Specifically, rather than intentions acting simply as a mediator of the advertising → box office gross relationship, we argue that the intentions → box office link is also moderated by affect, prescreening liking. Conditional process analysis (Hayes 2018) is used to examine how intent mediation is moderated by affect based on the attitudinal tracking data.

CONCEPTUAL FRAMEWORK

Our primary theoretical framework as outlined above is presented in Figure 1 (Model 3). We also analyze two additional models deemed plausible based on past research. The first specifies intent as a simple moderator between advertising expenditures and gross box office sales and the second is consistent with the traditional intent → behavior framework.

We present different relationships specified in Figure 1, by examining the mechanism of how advertising influences box office gross. Past research across multiple industries has explored the relationship between advertising expenditures and sales with mixed results (Kamal and Wilcox 2014; Wilcox et al. 2009; Zhou et al. 2003). Most relevant, a number of studies have established a significant link between advertising expenditures and box-office gross (Elberse and Anand 2007; Gunter 2018; Rao et al. 2017; Zufryden 1996). The fact that almost 90% of a movie's advertising budget is allocated in the weeks leading up to the theatrical launch (Elberse and Anand 2007) shows the importance of prerelease advertising. The number of screens on which a movie is released has been recognized as one of the most significant factors related to box office sales (Elberse and Eliashberg 2003; Joshi and Hanssens 2010; Neelamegham and Chintagunta 1999). Thus, prerelease advertising spending should be

considered as an endogenous factor as movies that are expected to generate high box office grosses tend to receive more advertising dollars and wider distribution. That is, advertising spending is likely to be determined by expected box office revenues.

As advertising opportunities increase and new media platforms emerge, the study of the relationship between advertising expenditures and purchase intentions has also evolved (Eisend and Tarrahi 2016). Berger and Mitchell (1989) show that advertising repetition impacts the traditional attitude-behavior relationship such that advertising can have a direct impact on intention with little or no effect on attitude. More recently, the basic advertising to intent relationship has been explored across multiple domains. For example, mobile advertising increases retail purchase intentions (Bues et al. 2017; Martins et al. 2019) and Facebook advertising enhances brand image and ultimately consumer purchase intentions (Dehghani and Tumer 2015). In a market research study, Morwitz (2014) discusses how marketing actions can change purchase intentions and ultimately change behavior.

A vast amount of literature has explored the direct intent → behavior relationship based on the attitude → intent → behavior framework. More recently, researchers have explored the impact of various conditional factors. For example, a meta-analysis across different settings reveals that intentions predict sales more strongly for existing versus new products, for durable versus non-durable goods, for short versus long time horizons, and for specific brand versus product category intentions (Morwitz et al. 2007). However, to our knowledge, few have considered intent as a moderated mediator. Past literature supports that measuring intentions just prior to purchase provides a better prediction of actual purchase as compared to when intentions are measured at an earlier time (Morwitz 1997). It is similarly reasonable to assume that attitudes and intentions measured immediately prior to a movie's release are more likely to be diagnostic of a consumer's actual behavior as measured by box office gross (Chintagunta and Lee 2012). In response, we argue that consumer evaluations assessed at pre-screening events moderate the intent → opening box office relationship. We propose a moderated mediator model where consumer intentions mediate the relationship between advertising expenditures and box office sales. In addition, incorporating pre-screening liking as a moderator between intent and box office sales improves overall model fit and sales predictability.

METHOD

The data used in our study is the film tracking data of 52 movies released by one of the major US studios, collected by a marketing research company in the movie industry. Advertising spending data is obtained from AdSpender and the opening box office data are based on IMDb, which include all major theater chains and independent theaters in the US. We then adjust box office revenues for the seasonality and the number of opening theaters to address endogeneity issues (Chintagunta and Lee 2012). To measure purchase intent, the company conducts a telephone survey with randomly chosen households with sample size of approximately 400 respondents each period. A set of questions about new movies as well as movies currently playing in the market is asked typically starting from 4 weeks prior to opening to 2 weeks after the opening. The same set of questions are asked 3 times a week to a different set of respondents primarily to track potential viewers' intent to view. Based on the binary measure

(yes/no), we obtain the aggregate-level intent over time with other demographic variables.

A statistical model of intent mediation and moderation is specified below, where advertising spending (X) affects opening box office revenues mediated or moderated by intent. The modeled mediation is likely contingent and hence moderated, in that the process operates differently for different people or in different contexts. Therefore, we test a moderated mediation effect, which is conditional process analysis (Hayes 2018; Preacher et al. 2007). From pre-screening views before release, studios obtain viewers' liking after watching the movie. Since it is a direct input prior to release, we test the contingent moderation of audience liking (L) on the mediation effect of intent (I) to opening box office sales (Y). Specifically, as illustrated in Figure 1, we test three alternative models (M1, M2, M3).

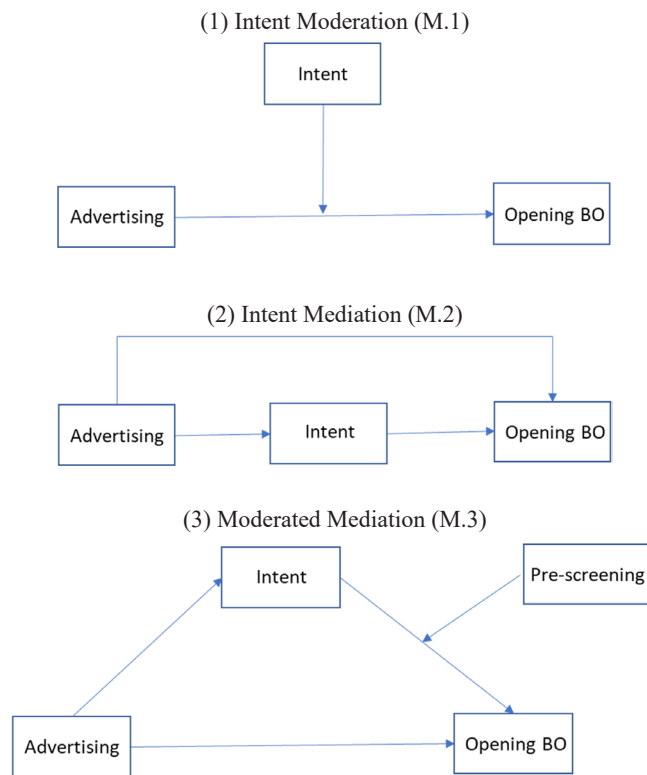


Figure 1: Diagram of Conceptual Models

M1: Intent moderation

$$Y = i_y + b_1X + b_2I + b_3XI + e_y \quad (1)$$

M2: Intent mediation

$$I = i_I + aX + e_I \quad (1)$$

$$Y = i_y + cX + bI + e_y \quad (1)$$

M3: Intent mediation moderated by pre-screening evaluation

$$I = i_I + aX + e_I \quad (1)$$

$$Y = i_y + cX + b_1I + b_2L + b_3IL + e_y \quad (1)$$

RESULTS

Intent moderation

When the strength of the relationship between two variables is dependent on a third variable, *moderation* is said to occur. As shown in Figure 1(1), a moderator (intent), interacts with advertising in predict-

ing box office sales if the regression weight of advertising varies as a function of intent. To test the moderation by intent, a term is included in the regression model that allows advertising effect to be a function of intent. Table 1 shows the regression coefficients along with their standard errors, t - and p -values, and 95% confidence intervals.

All models are estimated using PROCESS macro (Hayes 2018). As shown in Table 1(1), there is a significant direct effect of advertising on opening box office sales. Importantly, the coefficient of the advertising x intent interaction term ($b = 2.325$) is statistically different from zero ($p < .01$). So, we can conclude that the effect of advertising on box office sales is moderated by intent. That is, the advertising effect depends on the likelihood to watch the movie in the opening week. This moderation component of the model explains about 3.6% of the variance in opening box office sales, as calculated from the difference in R^2 for the model that includes the term ($R^2 = .976$) compared to the model that excludes it ($R^2 = .940$). This may be thought of as a measure of the “size” of the moderation effect (Hayes 2018), though reducing effect size to a single number may oversimplify the complexity and subjectivity of this problem (Darlington and Hayes 2016). By inserting binary values of intent into M1, one gains insight into how the differences in opening box office sales are a function of intent. Based on these calculations, it appears that viewers with lower intent show weaker responses when reached by advertising. However, among those at the higher end of the intent continuum, the opposite is observed.

Intent mediation

Regarding the mediating role of intent, we empirically test a causal process that involves a mediation component. Mediator variables function as the conduits through which causal effects operate.

Table 1: Estimation Results (M.1-M.3)

(1) Intent Moderation						
M.1	coeff	s.e.	t	p-value	LLCI	ULCI
constant	1.440	0.735	1.961	0.056	-0.037	2.917
advertising	0.391	0.043	8.998	0.000	0.304	0.478
intent	-30.387	14.817	-2.051	0.046	-60.178	-0.596
intent x advertising	2.325	0.858	2.710	0.009	0.600	4.049
$R^2 = .976 / \text{MSE} = .007$						
(2) Intent Mediation						
M.2	coeff	s.e.	t	p-value	LLCI	ULCI
(A → I)						
constant	-0.707	0.163	-4.347	0.000	-1.033	-0.380
advertising	0.045	0.010	4.683	0.000	0.026	0.064
$R^2 = .305 / \text{MSE} = .001$						
constant	-0.004	0.537	-0.007	0.995	-1.083	1.076
advertising	0.475	0.032	14.753	0.000	0.410	0.540
intent	9.753	0.398	24.491	0.000	8.953	10.553
$R^2 = .973 / \text{MSE} = .008$						
(3) Moderated Mediation						
M.3	coeff	s.e.	t	p-value	LLCI	ULCI
(A → I)						
constant	-0.707	0.163	-4.347	0.000	-1.033	-0.380
advertising	0.045	0.010	4.683	0.000	0.026	0.064
$R^2 = .305 / \text{MSE} = .001$						
constant	0.160	0.303	0.529	0.600	-0.449	0.769
advertising	0.455	0.019	24.498	0.000	0.417	0.492
intent	4.935	0.830	5.945	0.000	3.265	6.606
pre-screening	1.135	0.164	6.938	0.000	0.806	1.463
intent x pre-screening	4.981	1.929	2.582	0.013	1.100	8.862
Index of moderated mediation = .22 (.10)						
$R^2 = .992 / \text{MSE} = .002$						

When some causal variable X transmits an effect on Y through a mediator M , it is said that X affects Y indirectly through M . In this case, we are interested in the estimation and interpretation of the direct effect of advertising and indirect effects. That is, we estimate the components of the indirect effect, that is, the effect of advertising on intent as well as the effect of intent on opening box office sales. Thus, we estimate the total effect of advertising on box office sales as well. The simple mediation model is shown in Figure 1(2). Since there are two consequent variables, two linear models are required, where i_x and i_y are regression constants, e_x and e_y are errors in the estimation of intent and box office sales, respectively. These two pathways of influence sum to yield the total effect of advertising. The direct and indirect effects of advertising spending on box office sales are estimated by the proposed mediator, intent, that is regressed on advertising, and box office sales are regressed on both intent and advertising.

Based on the results in Table 1(2), multiplying two path coefficients yields the indirect effect, $0.045 \times 9.753 = 0.439$. So, one unit change in advertising is estimated to differ by 0.439 units in the dependent variable, box office sales. Advertising increases intent to view (positive $A \rightarrow I$ coefficient), which in turn translates into greater box office revenues (positive $I \rightarrow Y$). This indirect effect is statistically different from zero, as revealed by a 95% bootstrap confidence interval that is significantly higher than zero (0.28 to 0.62 in the PROCESS output). Regardless of the level of intent, the direct effect of advertising (0.475) is statistically significant ($p < .0001$) with a 95% confidence interval from 0.41 to 0.54, as in the previous model. The total effect of advertising on opening box office sales is derived by summing the direct and indirect effects, $0.475 + 0.439 = 0.914$. The significant mediation effect in advertising is consistent with the findings from hierarchy of effects model studies in advertising (Barry 2002; Wijaya 2012).

Intent mediation moderated by pre-screening evaluation

Next, we test a moderated mediation model when the mediation path is moderated by the third variable, evaluations from pre-screening of the movie. As before, we use a mediation model in which advertising (X) leads to higher intent to view (M), then affects opening box office sales (Y). Incorporating viewers' evaluations after screening (W), which is the only "after-trial" input before release, allows us to test a complex causal model referred to as conditional process modeling (Hayes 2018). That is, the effect of intent is hypothesized in this model as contingent on the pre-screening evaluations of the movie on box office sales for viewers with positive or negative ratings. A conceptual diagram corresponding to this process is shown in Figure 1(3). This is a conditional process model containing a mediation process ($X \rightarrow M \rightarrow Y$) combined with moderation of the $M \rightarrow Y$ effect by W . It translates into a set of two equations as in equation (3) above. The regression coefficients and model summary can be found in Table 1(3).

As before, advertising spending significantly enhances intent and also has a significant direct effect on opening box office revenues, as reported by Chintagunta and Lee (2012). Furthermore, the effect of intent on box office sales is indeed contingent on pre-screening evaluations, as evidenced by the statistically significant interaction between intent and evaluations ($=4.981$, $p < .05$). The separate coefficients for intent and evaluations are conditional effects given their product in the model. The effect of intent on box office sales is positive and statistically different from zero ($=4.935$, $p < .00$), and the regression coefficient for pre-screening evaluation is also significant ($=1.135$, $p < .00$). Combined with the interaction effect, this implies that, among viewers equal in advertising and ex-

pressed intent, they are more likely to go to movies that they gave a positive pre-screening evaluation than those moviegoers who did not express an intent to view. The weight for the moderator, pre-screening evaluation, is called the index of moderated mediation (Hayes 2015). The index value (0.22) can be interpreted as the slope coefficient. If the slope is flat (index = 0), it means that the indirect effect is not related to the moderator. In our case, it is clear that the indirect effect depends on the moderator, and thus the mediation is moderated.

CONCLUSION

Much attention has been devoted to the study of the intent \rightarrow behavior relationship in the social science literatures. However, relatively few researchers have considered intent as a moderated mediator. We propose and empirically test three alternative frameworks using movie box office revenues to estimate the relationships among advertising, intentions, and sales, including potential moderator and mediator effects. Our findings clearly support that intent serves as a moderated mediator between advertising and box office sales where prescreening liking is the moderator.

To the extent that movie releases resemble other new product introductions, this suggests that the role of intent in the adoption process deserves to be reexamined/expanded. In addition, researchers need to consider other moderator variables including prelaunch promotional efforts besides advertising, digital marketing, and social media prelaunch buzz. We acknowledge that the data have some limitations (e.g., the intent measure is dichotomous) which suggest future research opportunities. For example, the reported pattern of effects may not hold across other types of products and settings, something to consider for future investigation.

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