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Touch, Swipe, And Tilt: Exploring The Impact Of Mobile In-App Advertising Content On Consumer Brand Choice Intention

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INTRODUCTION

Smartphone usage has continued to rise, a total of 142.6 billion apps and games were downloaded in 2022, which represents almost an increase of 40% compared to 2018 (Business of Apps, 2023). Consumers prefer apps when it comes to spending time on smartphones., The mobile app usage grew 6 more minutes from last year to an average of 3 hours and 22 minutes per day in 2022, compared to 52 minutes time spent using mobile browsers (Insider Intelligence, 2022).

The advertising sector has taken note of this trend. The global in-app advertising market size was valued at \$151.1 billion in 2022 and is expected to grow at a Compound Annual Growth Rate (CAGR) of 13.2% from 2023 to 2030 (Grand View Research, 2022). These figures underline the shifting dynamics in mobile advertising, emphasizing the importance of apps as a platform for advertisers to reach their target audiences. Moreover, continuous innovation in mobile ad services, the introduction of buffer-free "Instant-Play" video formats, enriched creatives leveraging mobile device features (e.g., tilt, tap, shake), and new mechanisms like "Rewarded Ads" have all contributed to evolving the in-app mobile ad environment.

Existing mobile advertising literature covers various campaign aspects like suitable products for mobile ads (Bart et al., 2014) and effects of mobile promotions and coupons (Danaher et al., 2015) but lacks analysis on how mobile ad content impacts consumer brand choice intention, a critical factor for campaign success. This article addresses this gap by examining how mobile in-app advertising content influences consumers' brand choice intention. Utilizing mobile interactions to categorize ad creatives from diverse industries, the study analyses a unique dataset of 252 mobile in-app video advertising campaigns from Digital Turbine, covering a range of industries. Through a test-control field experiment involving around 285,000 consumers, it aims to evaluate the relationship between mobile advertising and brand choice intention.

BACKGROUND

Effects of mobile ad interactivity on behavioral outcome metrics are crucial for mobile advertising effectiveness (Grewal et al, 2016). Brasel and Gips (2014) argue that examining interfaces used to access content can be as essential as studying the content itself. They conducted two laboratory studies, revealing that touchscreen interfaces can heighten consumers' perceived psychological ownership and lead to a higher endowment effect compared to mouse

interactions. Consumers tend to choose a less affective alternative over a cognitively superior one when using a touch interface compared to a non-touch interface (Shen et al., 2016).

Grounded cognition studies have explored the effects of body movements (e.g., eye and head movement, touching, posture) on cognition, information processing, and decision making (Barsalou, 2008). Consumers prefer feasible products when looking down, whereas their demand shifts towards desirable products when looking up (Van Kerckhove et al., 2015). In a lab experiment, Ardelet (2020) demonstrated that the mobile device tilt angle affects purchase intention when it aligns with the advertised product orientation.

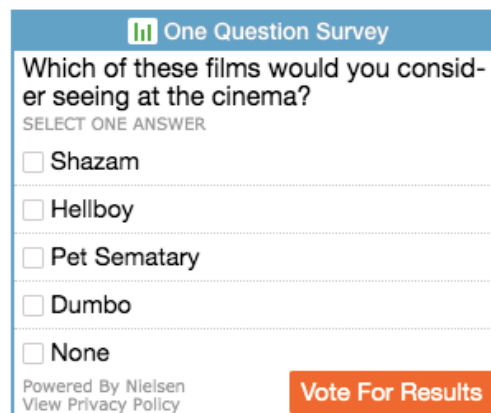
METHODOLOGY

Field Experiments

Our data set is from an international mobile in-app advertising platform, Digital Turbine. It is one of the leading mobile ad platforms integrated with 50% of the top publishers on both IOS and Android. Agency is specialised in rewarded ads which means user watches ads willingly to get extra in-app incentives. Rewarded ads are preferred by the advertisers because completion rates are higher comparing other mobile ad types. The data captures consumers' brand choice among a sample of 284,758 consumers. 160,894 consumers were confronted with a mobile ad while playing a game, while the remaining 123,864 consumers (43% of the sample) did not view the ad. After some time, a pop-up question asked consumers to indicate which brand would they buy ("Which of the following brands would you consider buying in your next purchase?") among a set of alternative brands. The question appeared after a minimum of 1 minute to a maximum of 198 days (Mean = 7 days, Median = 3 days).

In total, we observe 250 mobile advertising campaigns, across 24 countries between 2018 and 2021. Table 1 presents the campaign summary statistics. Participants might get exposed to ads multiple times within a campaign. Dataset includes the number of impressions, impression dates and times as well as the date and time of the brand choice intention question asked. We derived the recency of ad exposure and question asked from the available data.

Both exposed and control group participants were shown a single question survey (for example, see Figure 2) in the app. We used this survey to measure the brand choice intention on binary level (Bart et al., 2014).



The image shows a mobile survey interface. At the top, there is a blue header with a green bar icon and the text "One Question Survey". Below the header, the question is "Which of these films would you consider seeing at the cinema?". Underneath the question, it says "SELECT ONE ANSWER". There are five radio button options: "Shazam", "Hellboy", "Pet Sematary", "Dumbo", and "None". At the bottom left, it says "Powered By Nielsen" and "View Privacy Policy". At the bottom right, there is an orange button that says "Vote For Results".

Figure 2. Single item brand choice intention questionnaire

Table 1: Campaign Summary Statistics

Summary Statistics	Value
Number of campaigns	250
Number of brands	142
Average number of participants per campaign (SD)	1072 (1380)
Average impression number for exposure per campaign (SD)	4.2 (17.3)
Low-involvement products (vs. high) (%)	72%
Industry (%)	
Alcohol	2%
Automotive	6%
Consumer packaged goods	34%
Finance	5%
Government and non-profit	3%
Restaurant	4%
Technology and communications	15%
Entertainment	21%
Health and pharmaceutical	1%
Retail	8%
Region (%)	
Africa	23%
Europe	29%
Latin America	8%
Middle East	40%

Mobile Advertising Content Data

In-app ads mainly consist of two parts: the body part and the end-card. The body part is the starting portion of the ad and is often a video. Brands may use their TV ad creatives in the body part for consistency across channels or incorporate mobile device features. The end-card directly follows the body part and contains various elements, including extra videos, call-to-action buttons, game elements, and interactive product catalogues (see Figure 1 for an example of an end-card that enables interaction through swiping).



Figure 1. End-card example

To identify and define the three ad types (browse, play, and interact) for categorizing each mobile in-app ad in our dataset, we followed a long literature on ad content (Resnik and Stern 1977, Anderson et al. 2013, Liaukonyte et al. 2015, Tucker 2015, Anderson et al. 2016, Lee et al. 2018, Tsai and Honka 2021) and grounded cognition theory. Based on these definitions, we selected 21 ad content elements to code from advertising literature and adapted them to the mobile medium accordingly. The coding effort took into account all 250 unique mobile ad creatives. All ads were coded based on these items by four independent trained coders. Our final model is illustrated in Figure 3.

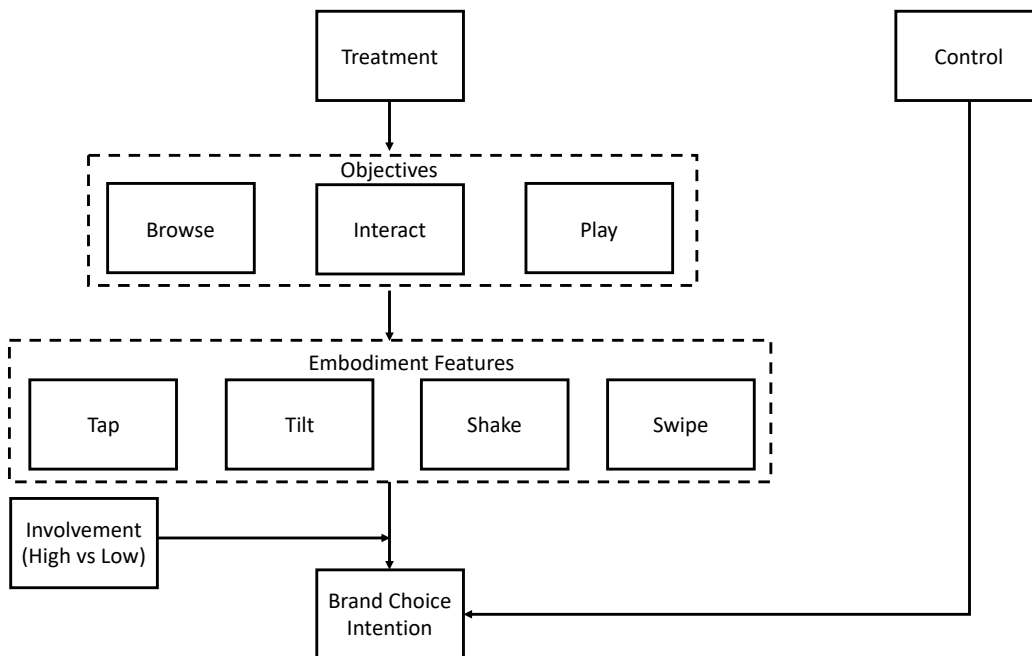


Figure 3. Conceptual Model of the Study

Data Analysis

A first exploration of the data shows that consumers exposed to mobile advertising are more likely to select the brand displayed in the ad. As illustrated in Figure 4, there's a statistically significant increase in the number of individuals opting for the brand following exposure to its advertisement. This suggests that the advertisement enhances the brand's appeal with a notable

increase. It's worth noting that these findings are derived from an extensive dataset, encompassing close to 3 million observations across 250 distinct ad campaigns. The data robustly underscores the efficacy of mobile advertisements in steering consumer brand choices.

In the analysis presented in Table 3, the implications of Product Type Involvement on consumer behavior are meticulously scrutinized, invoking the random-effect logit model as per Andrews et al. (2016). The essence of this table is to delve deeper into the nuances of how different interactive features—defined here as "Embodiment"—impact Purchase Intention.

$$\text{Logit model (Andrews et al., 2016): } \text{PurchaseIntention}_{ci} = \frac{\exp(U_{ci})}{1 + \exp(U_{ci})}$$

$$U_{ci} = \alpha + \sum_{k=1}^K \beta_{0+k} \text{Embodiement}_{k,i} + \sum_{h=1}^H \beta_{K+h} \text{Controls}_{h,i} + \varepsilon_{ci}$$

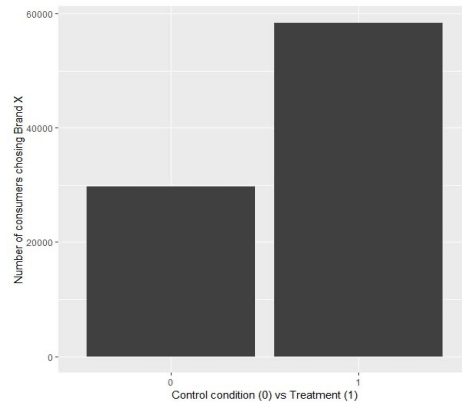


Figure 4. First insights on the impact of mobile ads on brand choice

The findings in Table 3 reveal several key insights into factors influencing brand choice intention. Exposure to an ad significantly increases brand choice intention ($b = 0.291$, $p < 0.001$), and the number of ad impressions also has a slight positive effect ($b = 0.003$, $p < 0.001$). However, the recency of ad exposure negatively impacts brand choice intention ($b = 0.000$, $p = 0.016$). The 'Browse' feature negatively affects brand choice intention ($b = -0.039$, $p < 0.001$), whereas the 'Play' feature positively influences it ($b = 0.165$, $p < 0.001$), and the 'Interact' feature shows no significant effect ($b = -0.016$, $p = 0.276$).

'Involvement' alone does not significantly impact brand choice intention ($b = 0.070$, $p = 0.778$); however, its interaction with other features shows more complex effects. Positive interactions are observed between 'Browse' and 'Involvement' ($b = 0.026$, $p = 0.003$) and 'Interact' and 'Involvement' ($b = 0.201$, $p < 0.001$), suggesting these features are more effective

for high-involvement products. Conversely, the interaction between 'Play' and 'Involvement' is strongly negative ($b = -0.414$, $p < 0.001$), indicating reduced effectiveness of gameplay for high-involvement products.

At the campaign level, 'Consumer Packaged Goods' ($b = 0.612$, $p = 0.022$) and 'Government and Non-profit' ($b = 1.143$, $p = 0.036$) show positive effects on brand choice intention compared to the baseline of 'Alcohol'. Other industries, such as 'Technology', show marginal significance ($b = 0.645$, $p = 0.054$), while regional variations are non-significant.

Table 3. Mobile ad features effects on brand choice intentions

	Estimates	S.E	z-value	p-value	
Intercept	-1.502	0.243	-6.173	0.000	***
Exposure (Control vs Exposed)	0.291	0.022	13.517	0.000	***
# of Impressions	0.003	0.000	8.952	0.000	***
Recency	0.000	0.000	-2.411	0.016	*
Browse	-0.039	0.008	-4.687	0.000	***
Interact	-0.016	0.015	-1.090	0.276	
Play	0.165	0.014	11.782	0.000	***
Involvement	0.070	0.247	0.281	0.778	
Interactions					
Browse x Involvement	0.026	0.009	2.965	0.003	**
Interact x Involvement	0.201	0.031	6.561	0.000	***
Play x Involvement	-0.414	0.024	-17.080	0.000	***
Other Parameters					
<i>Regions (Base value: Africa)</i>					
Europe	0.076	0.063	1.201	0.230	
Latam	-0.066	0.074	-0.901	0.368	
Middle East	0.072	0.056	1.276	0.202	
<i>Industry (Base value: Alcohol)</i>					
Automotive	-0.163	0.408	-0.400	0.689	
Consumer Packaged goods	0.612	0.267	2.295	0.022	*
Entertainment	-0.168	0.303	-0.554	0.579	
Finance	0.205	0.407	0.503	0.615	
Government and Non-profit	1.143	0.546	2.094	0.036	*
Health and Pharmaceutical	0.545	0.572	0.952	0.341	
Restaurant	0.494	0.386	1.279	0.201	
Retail	-0.154	0.291	-0.528	0.597	
Technology	0.645	0.334	1.931	0.054	.
Akaike information criterion	295364.6				
Bayesian information criterion	295616.6				
Log-likelihood	-147658.3				

DISCUSSION

The findings of our study with the 250 fields experiments shed light on the dynamics of mobile advertising and its effect on consumer brand choice. The significance of mobile advertising in

influencing brand choice is evident. This implies that brands investing in mobile advertising are likely to see an uplift in brand choice preferences among exposed consumers.

The interactivity features, a core component of mobile ads, have a varied effect on purchase intention. Some features such as 'Tilt to play' manifest a strong influence on purchase intention, while others, such as 'Tilt to interact', show the opposite. The effectiveness of features like 'Tap to browse' and 'Drag to play' is minimal, suggesting that brands need to be careful when incorporating interactive features into their ad campaigns. Furthermore, the involvement of the product type is pivotal in determining how consumers interact with these features.

Moreover, our analysis shows that not all interactivity boosts consumer engagement or purchase intention. Some features that appear intuitive may not necessarily lead to increased brand appeal. This highlights the need for brands to continually reassess and adjust their advertising strategies based on empirical evidence, rather than solely on intuition or prevailing industry trends. The context in which the advertisement is placed plays a crucial role in its effectiveness. Since our data primarily consisted of mobile gaming apps for ad placements, interactive and gamified features proved more effective.

IMPLICATIONS

Our study builds upon the constantly growing mobile advertising literature by offering a new mobile ad content classification and additional evidence on mobile advertising effectiveness. Specifically, insights into product type effects and mobile device feature impacts on campaign effectiveness are notable contributions to the literature. Furthermore, brands must be selective when embedding interactive features in their advertisements. They should consider the consumer's user state and the congruence between the ad's interactivity and the product, as we discovered that not all interactive features produce the desired outcomes. Brands should customize their ads based on the product's level of involvement. High-involvement products may benefit from more immersive interactive features, whereas low-involvement products might necessitate a different strategy. As evidenced by the variability in ATE across field experiments, the context in which the advertisement is placed significantly affects its effectiveness. Our data primarily comprised mobile gaming apps for ad placement, making interactive and gamified features more effective. Brands should avoid a one-size-fits-all approach and must tailor their strategies based on the specific context and target audience.

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