Effect of Interactivity on Donation Intention: Mediated Roles of Playfulness, Social Presence, Sympathy, and Perceived Response Efficacy

Zhanming Chen[1]

[1] University of Minnesota

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Correspondence concerning this article should be addressed to Zhanming Chen, Department of Design Innovation, University of Minnesota, 89 Church Street SE, Minneapolis, MN 55455, USA. E-mail: chen8475@umn.edu

Abstract

Personality traits have been shown to be related to many aspects of life. But what about scientific reasoning? We don't really know how these are related. The current study consists of an analysis of 199 U.S. college students enrolled in STEM majors who completed measures of personality traits and scientific reasoning. The results indicated a lot of variability in scientific reasoning.

Keywords: interaction design, advertising, donation, behavior

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As one of the emerging forms of advertising, interactive advertising adds features to traditional advertising that allow consumers to interact with and participate in the advertisements (Bezjian-Avery, Calder, & Iacobucci, 1998). These interactive features provided active control, two-way communication, and a sense of reacting synchronically for the audience during the interaction process (Liu & Shrum, 2002; Lombard & Snyder-Duch, 2001; McMillan & Hwang, 2002). Traditional advertising, such as static image advertisements in shopping malls, provided a one-way channel to deliver marketing information to the audience in a controlled, linear narrative structure. Compared to traditional advertising, interactive advertising has proven to be advantageous in increasing both consumers' attitudes and purchase intention (Macias, 2003) and further enhancing the overall marketing performance (Gu et al., 2022). An example of interactive advertising was the 2015 augmented-reality-based advertisement launched by Coca-Cola in the United States, titled "Next time you're thirsty, drink an ad" (Dipdrop Branding Solution, 2015). During basketball matches, audiences could enjoy a visual experience of a smooth transition from television to mobile devices, as they watched the pouring of Coke Zero from a bottle on the TV screen into a glass in the mobile application. Coca-Cola then offered a coupon code that could be redeemed for a bottle of Coke Zero (The Coca-Cola Company, 2015).

While previous research on interactive advertising focused on its effects on consumption behaviors (e.g., Ahn, Ellie Jin, & Seo, 2024) , the impact of interactive advertising on donation intentions and behaviors has been limitedly explored. In this study, we aim to understand how interactive advertisements influence donation attitudes and behaviors. Therefore, our research question is: how does the level of advertising interactivity affect the audience's donation intentions?

The Present Study

Research has shown that the interactive design features of advertisements (e.g., buttons and body gestures) contribute to higher levels of purchase intention (Ahn et al., 2024; Gu et al., 2022). At the same time, the perceived interactivity of visual materials can positively influence the audience's emotions, such as perceived playfulness, levels of sympathy, and social presence (Hand & Varan, 2009; Ide et al., 2021; Kang, Shin, & Ponto, 2020). Furthermore, the audience's positive emotions, including perceived playfulness, sympathy, and social presence, were separately examined and shown to affect their perceptions related to efficacy and behavioral intentions (Chen, Dai, Yao, & Li, 2019; Kim & Yu, 2015). Additionally, researchers identified perceived response efficacy, a belief that consumers' help can make a meaningful difference for the beneficiaries (Septianto & Paramita, 2021; Sharma & Morwitz, 2016), as an important factor explaining donation behaviors.

Building on the prior research, we propose the following five hypotheses (H1–H5):

- H1. Perceived interactivity of advertisements will be positively related to (a) perceived playfulness, (b) level of sympathy, and (c) social presence.
- H2. Perceived playfulness will be positively related to (a) perceived response efficacy and (b) donation intention.
- H3. Level of sympathy will be positively related to (a) perceived response efficacy and (b) donation intention.
- H4. Social presence will be positively related to (a) perceived response efficacy and (b) donation intention.
- H5. Perceived efficacy will be positively related to donation intention.

Method

We conducted a between-subjects online experiment with two groups: high-interactivity and low-interactivity (controlled group). The stimuli is designed as an ad that encourages participants to donate winter clothing to a local homeless girl. For interactive features, participants could either interact with the ad using a drag-and-drop feature to "donate" three pieces of clothing (i.e., high-interactivity) or watch the animation of the giving process of the three pieces of clothing (i.e., low-interactivity).

The current study was **NOT** preregistered. Simulated data and codes are available at OSF and GitHub.

Participants and Procedure

The total sample in the current study consists of 600 US adults recruited from Amazon MTurk ($M_{\text{age}} = 38.85$, $SD_{\text{age}} = 8.01$). They were evenly assigned to one of the two conditions. The experiment begins with a consent process, and each participant interacts with the stimuli, followed by an online questionnaire including measures for variables and demographic questions. The questionnaire also includes measures for graphic qualities to ensure the differences of it between two groups are not significant, and three focus questions to make sure participants are answering the questions with their focus.

The eligible criteria of participants include being adults, living in the US, being comfortable speaking English, and having access to a laptop and Internet to complete the tasks and survey using a web browser. Each participant are compensated a $25 Amazon gift card.

Here is a table of the detailed breakdown of participants' demographic information:

Table 1. Participants' demographic information breakdown.

Table 1

Demographic Breakdowns of Participants

Item	Category	Frequency	Percentage
Gender	Female	191	31.83%
	Male	163	27.17%
	Non-binary or third gender	187	31.17%
Race	White	90	15%
	Black or African American	93	15.5%
	American Indian or Alaska Native	103	17.17%
	Asian	109	18.17%
	Native Hawaiian or Pacific Islander	88	14.67%
Income	Less than $10,000	40	6.67%
	$10,000 - $19,999	56	9.33%
	$20,000 - $29,999	44	7.33%
	$30,000 - $39,999	50	8.33%
	$40,000 - $49,999	47	7.83%
	$50,000 - $59,999	42	7%
	$60,000 - $69,999	44	7.33%
	$70,000 - $79,999	56	9.33%
	$80,000 - $89,999	52	8.67%
	$90,000 - $99,999	51	8.5%
	$100,000 - $149,999	51	8.5%
	More than $150,000	43	7.17%
Education	Less than high school	80	13.33%
	High school graduate	84	14%
	2 year degree	88	14.67%

Table 1 continued

Item	Category	Frequency	Percentage
	4 year degree	84	14%
	Professional degree	66	11%
	Doctorate	83	13.83%

Measures

Perceived Graphics Quality. As a manipulation check, participants completed a three-item, 7-point Likert scale (Kang et al., 2020), in which they were asked questions that assesses their perceived graphics quality (Cronbach's alpha = -0.02).

Perceived Interactivity. Participants completed a five-item, 7-point Likert scale (Wu, 2005; Yim, Chu, & Sauer, 2017), in which they were asked to answer questions that assesses their perceived interactivity (Cronbach's alpha = 0.85).

Social Presence. Participants completed a ten-item, 7-point Likert scale (Higgins, Zibrek, Cabral, Egan, & McDonnell, 2022), in which they were asked to answer questions that assesses their social presence (Cronbach's alpha = 0.84).

Sympathy. Participants completed a 10-item, 7-point Likert scale (Baberini, Coleman, Slovic, & Västfjäll, 2015), in which they were asked to answer questions that assesses their sympathy (Cronbach's alpha = 0.91).

Perceived Playfulness. Participants completed a four-item, 7-point Likert scale (Kang et al., 2020), in which they were asked to answer questions that assesses their perceived playfulness (Cronbach's alpha = 0.81).

Perceived Response Efficacy. Participants completed a four-item, 7-point Likert scale (Cryder, Loewenstein, & Scheines, 2013; Sharma & Morwitz, 2016), in which they were asked to answer questions that assesses their perceived response efficacy (Cronbach's alpha = 0.81).

Donation Intention. Participants completed a three-item, 7-point Likert scale (Li & Yin, 2022), in which they were asked to answer questions that assesses their donation intention (Cronbach's alpha = 0.81).

Data analysis

We used R (Version 4.5.1; R Core Team, 2024) and the R-packages *apaTables* (Stanley, 2021), *base* (Version 4.5.1; R Core Team, 2024), *devtools* (Version 2.4.6; Wickham, Hester, Chang, & Bryan, 2025), *dplyr* (Version 1.1.4; Wickham, François, Henry, Müller, & Vaughan, 2023, 2023), *faux* (Version 1.2.3; DeBruine, 2025, 2025), *ggplot2* (Version 4.0.0; Wickham, 2016, 2016), *groundhog* (Version 3.2.3; Simonsohn & Gruson, 2025, 2025), *knitr* (Version 1.50; Xie, 2015), *labelled* (Version 2.16.0; Larmarange, 2025, 2025), *missMethods* (Version 0.4.0; Rockel, 2022, 2022), *papaja* (Version 0.1.4; Aust & Barth, 2025, 2025), *psych* (Version 2.5.6; William Revelle, 2025, 2025), *summarytools* (Version 1.1.4; Comtois, 2025, 2025), *tinylabels* (Version 0.2.5; Barth, 2025, 2025), and *usethis* (Version 3.2.1; Wickham, Bryan, Barrett, & Teucher, 2025) for all our analyses.

Results

Manipulation Tests

A series of regression analyses and mediation analyses were performed using SPSS. The results revealed that one of the emotions and cognition factors (sympathy) and perceived response efficacy serially mediate the effect of perceived interactivity on donation intention while playfulness and social presence directly influences donation intention. We

also found that the perceived facial expressions of the beneficiaries influence consumers' donation intention through perceived playfulness and sympathy. The final model is presented in Figure 1.

Discussion & Implications. Our results suggest interactive features (e.g., buttons and gestures) could increase donation intention especially by enhancing cognitive assessment of consumers' efficacy. Unlike previous studies, our study highlighted the positive emotional heuristics (happy face leading to playfulness and donation intention). Considering the context of ad that highlights the suffering of the victims, this finding may imply the positive emotional experiences become very important in the context of interactive advertisement. Our study extends the understanding of advertising in the domain of donation behaviors by advocating the use of interactive features.

Overall, the graphic quality of the stimuli for two participant groups are well perceived ($M_{\text{graphic quality}} = 5.68$, $SD_{\text{graphic quality}} = 0.89$). The results from a Welch's independent samples t-test indicated no significant differences between the two groups, $t(597.16) = -1.43$, $p = 0.153$ (see Figure 1).

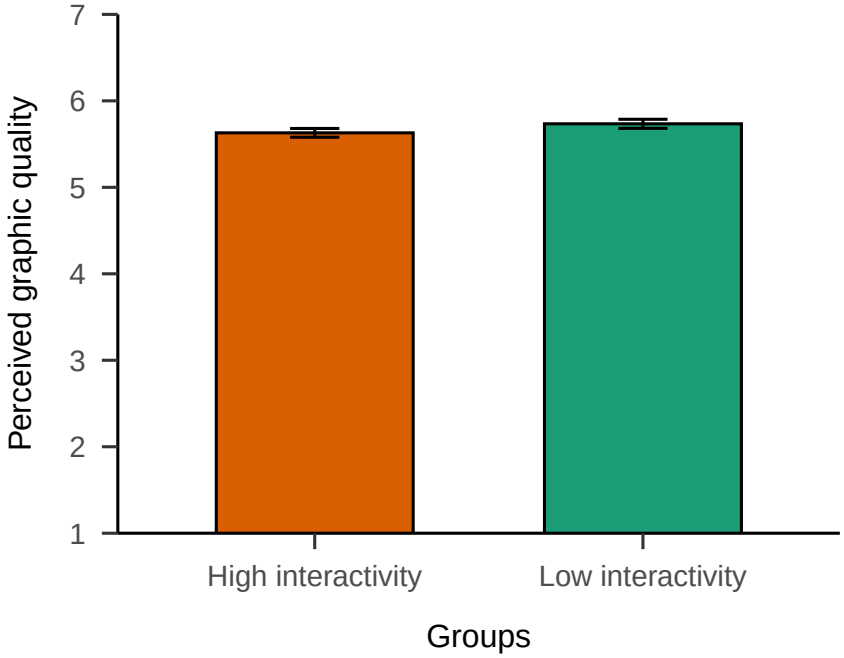

Figure 1. Perceived graphic quality of stimuli.

According to the results from a Welch's independent samples t-test that compares the perceived interactivity of the stimuli between the high-interactivity group ($M_{\text{high interactivity}} = 5.66$, $SD_{\text{high interactivity}} = 0.71$) and the low-interactivity group ($M_{\text{low interactivity}} = 2.36$, $SD_{\text{low interactivity}} = 0.78$), there are significant differences between the two groups, $t(592.02) = 54.40$, $p < .001$ (see Figure 2).

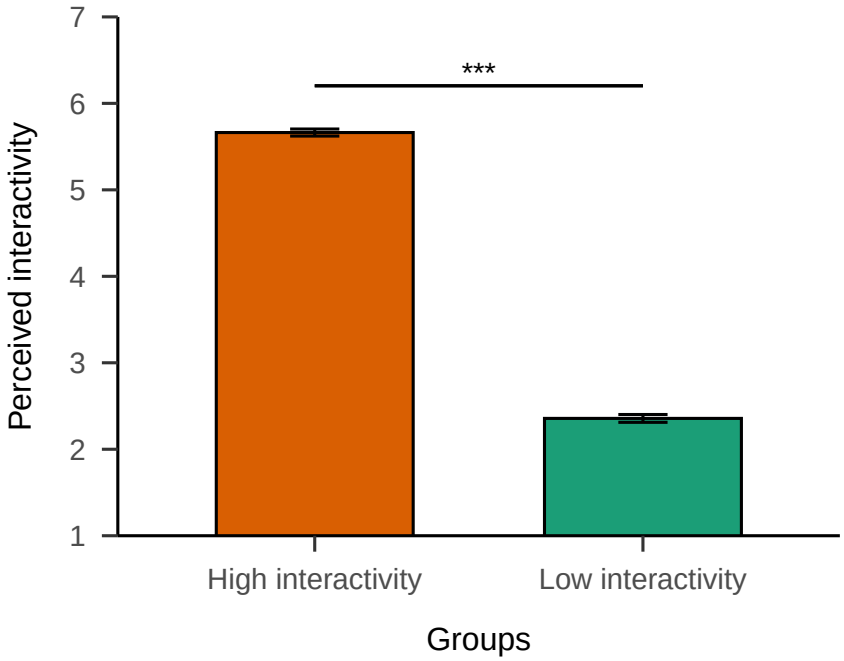

Figure 2. Perceived interactivity of stimuli.

Hypotheses Validation

A Pearson correlation test was also conducted to test the hypotheses. All hypotheses were supported (see the table below).

Table 2

Hypotheses Test Results

Hypothesis	Pairs	t	p
H1a	Interactivity-Playfulness	34.35	< .001

Table 2 continued

Hypothesis	Pairs	t	p
H1b	Interactivity-Sympathy	43.98	$< .001$
H1c	Interactivity-Social presence	37.32	$< .001$
H2a	Playfulness-Response efficacy	33.10	$< .001$
H2b	Playfulness-Donation intention	32.43	$< .001$
H3a	Sympathy-Response efficacy	40.76	$< .001$
H3b	Sympathy-Donation intention	40.80	$< .001$
H4a	Social presence-Response efficacy	34.20	$< .001$
H4b	Social presence-Donation intention	35.40	$< .001$
H5	Response efficacy-Donation intention	34.12	$< .001$

Discussion

The purpose of this study was to examine how perceived interactivity relates to donation intention in advertisement design. The results supported our hypotheses, indicating that this relationship is mediated by perceived playfulness, sympathy, social presence, and response efficacy. Consequently, these findings suggest that advertisers and marketers should prioritize interactive features to effectively encourage donation intentions. Future research should explore which design elements can effectively improve perceived interactivity.

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