

Factors Contributing to Adolescents' and Young Adults' Participation in Social Media Challenges: A Survey Study

Amro Khasawneh, Kapil Chalil Madathil, Heidi Zinzow, Patrick Rosopa, Gitanjali Natarajan, Krishnashree Achuthan, Meera Narasimhan

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Abstract

Background: Online challenges, phenomena that are very familiar to adolescents and young adults who spend large portions of time on social media, range from minimally harmful behaviors intended to support philanthropic endeavors to significantly harmful behaviors that may culminate in injury or death.

Objective: This study investigated the beliefs that lead adolescents and young adults to participate in these activities by analyzing the Amyotrophic Lateral Sclerosis (ALS) Ice Bucket Challenge (IBC) to represent the former and the Cinnamon Challenge (CC), the latter.

Methods: We conducted a retrospective quantitative study with a total of 471 participants between the ages of 13 and 35 who either had participated in the ALS IBC or the CC or had never participated in any online challenge. We used binomial logistic regression models to classify those who participated in ALS IBC or CC versus those who didn't with the beliefs from the Integrated Behavioral Model (IBM) as predictors.

Results: Our findings showed that both CC and ALS IBC participants had significantly greater positive emotional responses, value for the outcomes of the challenge, and expectation of the public to participate in the challenge in comparison to individuals who never participated in any challenge. In addition, only CC participants perceived positive public opinion about the challenge and perceived the challenge to be easy with no harmful consequences, in comparison to individuals who never participated in any challenge.

Conclusions: The constructs that contribute to the spread of online challenge vary based on the level of self-harm involved in it and its purpose. We recommend that intervention efforts be tailored to address the beliefs associated with different types of online challenges.

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Original Manuscript

Original Paper

Factors Contributing to Adolescents' and Young Adults' Participation in Social Media Challenges: A Survey Study

Abstract

Background: Online challenges, phenomena that are very familiar to adolescents and young adults who spend large portions of time on social media, range from minimally harmful behaviors intended to support philanthropic endeavors to significantly harmful behaviors that may culminate in injury or death.

Objective: The objective of this study is to investigate the beliefs that lead adolescents and young adults to participate in these activities by analyzing the Amyotrophic Lateral Sclerosis (ALS) Ice Bucket Challenge to represent the former and the Cinnamon Challenge, the latter.

Methods: A retrospective quantitative study was conducted with a total of 471 participants between the ages of 13 and 35 who either had participated in the ALS Ice Bucket Challenge or the Cinnamon Challenge or had never participated in any online challenge. Binomial logistic regression models were used to classify those who participated in ALS Ice Bucket Challenge or Cinnamon Challenge versus those who did not with the beliefs from the Integrated Behavioral Model (IBM) as predictors.

Results: The findings showed that both Cinnamon Challenge and ALS Ice Bucket Challenge participants had significantly greater expectation of the public to participate in the challenge they completed in comparison to individuals who never participated in any challenge ($p < .01$ for Cinnamon Challenge and $p < .01$ for ALS Ice Bucket Challenge). Only Cinnamon Challenge participants had greater value for the outcomes of the challenge ($p < .001$) and perceived positive public opinion about the challenge ($p < .01$), in comparison to individuals who never participated in

any challenge. Only ALS Ice Bucket Challenge participants had significantly greater positive emotional responses than individuals who never participated in any challenge ($p < .001$).

Conclusions: The constructs that contribute to the spread of online challenge vary based on the level of self-harm involved in the challenge and its purpose. Intervention efforts could be tailored to address the beliefs associated with different types of online challenges.

Keywords

Social media challenges; self-harm; behavior; integrated behavioral model; social media; challenge; adolescent; young adult; participation; survey

Introduction

Background

More than 70% of Americans use social media platforms to post personal information, engage with posted content, and connect with others [1–4]. Adolescents and Young adults were among the earliest internet and social media adopters and continue to use these sites at high levels [2,5,6]. Online challenges, or social media challenges, are popular phenomena especially among adolescents and young adults, perhaps because of their frequent use of social networks. In these challenges, participants record themselves engaging in specific activities and share their experience through social media platforms [6,7]. These challenges are ubiquitous and can be found on many social media platforms including YouTube, Instagram, Facebook, and WhatsApp [8,9]. Although the activities involved in online challenges can vary from fun to fatal [10–13], they can generally be classified into two categories: (a) minimal harm challenges, which in some cases support a philanthropic cause such as the Amyotrophic Lateral Sclerosis (ALS) Ice Bucket Challenge [14] or (b) harmful challenges, which entail self-injurious behavior such as the Cinnamon Challenge [15]. Although the ALS Ice Bucket Challenge has faced criticism (e.g., safety concerns and waste of water), it is the most successful and influential fund-raising event to date [14]. In addition to raising more than \$115 million for ALS research [16], it is also credited for increasing public awareness about the disease [17].

In contrast, Cinnamon Challenge involves swallowing a teaspoon of ground cinnamon without drinking any liquid for sixty seconds. The problem is that cinnamon does not dissolve nor

biodegrade in the lungs, as evidenced by animal-based laboratory studies which experienced symptoms ranging from mild multifocal granulomatous inflammation to alveolar lipoproteinosis and alveolar cell hyperplasia [15,18–20]. For humans, the consequences are just as serious because swallowing a large amount of cinnamon can cause pulmonary inflammation, allergic and irritant reactions, and in even more serious situations, hypersensitivity-induced asthma attacks, which can be fatal [15]. However, none of these potentially fatal consequences have stopped adolescents and young adults from participating in Cinnamon Challenge. As of 2013, there are more than 51,100 public YouTube clips of someone accepting this challenge, with some videos garnering more than 19 million views globally [15].

Given the significant amount of controversy concerning these online challenges, there is little research on the factors that lead individuals to participate in such challenges. For example, the extant literature on self-harm focuses primarily on a single challenge and its effect on public health and safety [15,21–23] or on how viewing content showing self-harm could lead to intentional self-harm by modeling the behavior of those we observe [24–26]. Furthermore, the literature on adolescent online risk focuses on the effects of engaging in online sexual and aggressive risk exposure [27,28]. To our knowledge, there is no quantitative research that comprehensively investigates the phenomenon of online challenges and why adolescents and young adults engage in these activities.

In this study, quantitative data was collected to explore adolescents' and young adults' exposure to online challenges, as well as the determinants of their engagement with them through direct participation. The Integrated Behavioral Model (IBM) [29] was used to investigate its generalizability to these online behaviors. It is important to reassess this and other existing behavioral theories in relation to online behaviors, because what may be true about traditional human behaviors may not apply to virtual ones [30].

Integrated Behavioral Model as the Underlying Framework

As seen in Figure 1, IBM suggests that the intention to perform a behavior is driven by three factors: attitude, perceived norms, and personal agency regarding behavior. Attitude, defined as individual preference for a certain behavioral performance, is composed of two dimensions: experiential attitude and instrumental attitude [31–33]. Experiential attitude is an individual's emotional reaction to a behavior. For example, an individual with a positive emotional response towards a specific social media challenge is more likely to engage in it than an individual with a negative

emotional response. Instrumental attitude is cognitively based, meaning that it is affected by a person's beliefs about the outcomes of the behavior depending on the value of those outcomes.

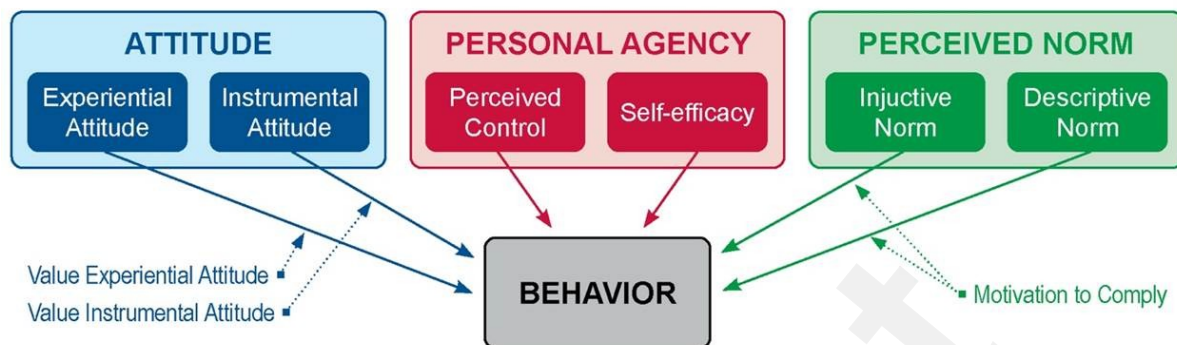


Figure 1. Integrated Behavior Model.

Perceived norms regarding the behavior, the social pressure to perform it, is comprised of injunctive and descriptive norms. Injunctive norms refer to the normative beliefs about others' opinions toward participating in a challenge and the motivation to comply (if others approve or disapprove of the behavior). Descriptive norms refer to common patterns of behavior that lead to expectations of people behaving according to that pattern.

Personal agency consists of two constructs: perceived control and self-efficacy. Perceived control refers to personal beliefs about the degree of control over performing the behavior. These beliefs are based on individual perceptions of how environmental factors will make performance of the behavior difficult or easy. Self-efficacy is the individual's certainty in their ability to perform the behavior in addition to their belief that they can overcome each prohibitive condition or obstacle [29].

Objective

The purpose of this study is to use IBM quantitatively to enhance our understanding of how each belief in IBM contributes to adolescents' and young adults' willingness to participate in online challenges. Another purpose of this study is to discern which beliefs are more influential than others. The findings from this study can be used to guide the development of interventions to reduce participation in harmful social media challenges among adolescent and young adult populations. Specifically, this research addressed the following research question:

Research question: What is the effect, if any, of attitudes, perceived norms, and personal agency beliefs on adolescents' and young adults' willingness to participate in Cinnamon Challenge and ALS Ice Bucket Challenge?

To explore our research question, we applied the IBM developed by Montano and Kasprzyk [29] depicted in Figure 1 to our hypotheses listed in Table 1.

Table 1. Research Hypotheses

Hypothesis 1	The experiential attitude is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 2	The instrumental attitude is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 3	The value appointed to experiential attitude items moderates the relationship between experiential attitude and Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 4	The value appointed to instrumental attitude items moderates the relationship between instrumental attitude and Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 5	The injunctive norm is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 6	The descriptive norm is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 7	The motivation to comply moderates the relationship between the injunctive norm and Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 8	The motivation to comply moderates the relationship between the descriptive norm and Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 9	Perceived control is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.
Hypothesis 10	Self-efficacy is positively related to Cinnamon Challenge and ALS Ice Bucket Challenge participation.

Methods

Study Overview

A survey-based study was utilized to investigate the application of IBM in the prediction of social media challenge behavior among adolescents and young adults. The developed survey included measures of the constructs in the IBM similar to the studies reported in the literature [34–36]. The survey was pilot-tested and modified the survey accordingly. Lastly, the survey was deployed to a larger sample to explore the reasons for participation in these challenges, retrospectively.

Measures

The dependent variable, social media participation, was collected at the beginning of the survey. The participants were asked whether they participated in Cinnamon Challenge only, ALS Ice Bucket Challenge only, or never participated in any social media challenge. The classes for the dependent variable were balanced with approximately one third of the participants being in each class. Then, the survey was structured to include three main sections to assess the independent variables—a demographic section, a section related to participation in the Cinnamon Challenge, and a section related to participating in the ALS Ice Bucket Challenge. The demographic section included questions about the participant's age, gender, race/ethnicity, education, Internet usage, and social media challenge participation. The second and third sections assessed the following theoretical constructs related to the Cinnamon Challenge and the ALS Ice Bucket Challenge: attitude, perceived norm, and personal agency. Note that the scale score for each construct was obtained by computing the mean of the relevant items.

Attitude was measured using two sub-constructs, Experiential Attitude and Instrumental Attitude. Experiential Attitude was measured using four items, each using a 7-point Likert scale. Instrumental Attitude was measured using two items, each using a 7-point Likert scale. The value appointed to each item for both Instrumental Attitude and Experiential Attitude was measured using a 7-point bipolar scale.

Perceived Norm was measured using two sub-constructs, Injunctive Norm and Descriptive Norm, each was measured using seven items on a 7-point Likert scale. The Motivation to Comply construct assessed the participants' willingness to comply with other individuals and their beliefs. This construct was measured using seven items, each using a 7-point bipolar scale.

Personal Agency was assessed using two sub-constructs, Perceived Control and Self-Efficacy. Perceived Control was assessed using six items measured on 7-point Likert scales while Self-Efficacy was measured using four 7-point Likert scale items.

The items for these constructs were developed using the strategy suggested by Glanz et al. [37] in two stages. First, a team of researchers used the data from a previous qualitative study on this topic to develop the initial set of items that measured each of the sub-constructs [38]. Then, the survey was pilot tested using a sample of 20 participants. The results of the pilot testing were used to delete the questions that had little to no variance [29] and to improve the clarity of the remaining questions. Internal consistency reliability was calculated for each scale using Cronbach's alpha (see

Table 2). Examples of the specific items that comprise each construct for the Cinnamon Challenge and ALS Ice Bucket Challenge are reported in Multimedia Appendix 1.

Table 2. Construct Reliability Measured using Cronbach's alpha.

Construct	Cinnamon Challenge	ALS Ice Bucket Challenge
Experiential Attitude	0.813	0.667
Instrumental Attitude	0.867	0.686
Value Appointed to Experiential Attitude	0.852	0.667
Value Appointed to Instrumental Attitude	0.922	0.908
Injunctive Norm	0.939	0.917
Descriptive Norm	0.912	0.878
Motivation To Comply	0.88	0.877
Perceived Control	0.698	0.839
Self-efficacy	0.657	0.777

Participants

Qualtrics Research Suite [39] was utilized to deploy the surveys to the participants. Inclusion criteria for the participants were participation in either the Cinnamon Challenge or the ALS Ice Bucket Challenge (not both) or no participation in any social media challenge and within the age range of 13-35 years old at the time of the study (adolescents or young adults only). A total of 471 participants completed the study. Approximately half of the participants, 234 out of 471, were under 18 (adolescents) and the rest, 237 out of 471, were between 18-35 (young adults), with 389 out of 471 (~82%) females. Approximately one third ($n = 153$) of the respondents had participated in the Cinnamon Challenge only, one third ($n = 155$) in the ALS Ice Bucket Challenge only, and the remaining ($n = 163$) had not participated in any social media challenge. More information about the participants is provided in Table 3.

Table 3. Participants Demographics.

Variable		Number	%
Gender	Female	389	82.6
	Male	78	16.6

	Prefer not to answer	4	0.8
Education	Some High School	171	36.3
	High School/GED	155	32.9
	Two-year College Degree	26	5.5
	Some College	58	12.3
	Four-year College Degree	33	7.0
	Master's Degree	21	4.5
	PhD Degree	2	0.4
	Professional Degree (e.g., JD, MD)	5	1.1
Race	White/Caucasian	220	46.7
	African American	132	28.0
	Native American	4	0.8
	Asian	32	6.8
	Pacific Islander	2	0.4
	Hispanic/Latino	55	11.7
	Other	26	5.5
Employment	Full-Time	86	18.3
	Part-Time	87	18.5
	Student	236	50.1
	Retired	2	0.4
	Unemployed	60	12.7
Age	Under 18	234	46.7
	18 - 35 years old	237	50.3
Social Media Participation	Cinnamon Challenge	153	32.5
	ALS Ice Bucket Challenge	155	32.9
	Nothing	163	34.6
Internet usage per day	Less than an hour	16	3.4

	1-2 hours	30	6.4
	2-3 hours	63	13.4
	3-4 hours	98	20.8
	More than 4 hours	264	56.1

Procedure

First, the participants read and signed the informed consent form, then read the introduction to the study and answered the questions about their demographics and social media and Internet usage, followed by a set of screening questions. Any participant who did not meet the inclusion criteria based on the screening questions was not eligible to participate in the study. The screening questions were “Have you participated in any online challenges?” “Which of the following challenges did you participate in?” and “Of the following statements, which one matches what you did in this challenge?”. For the group of participants that never participated in any challenges, they have to state that in the first screening question. For the other two groups, if the challenge and the description did not agree, the participant was not eligible for the study. In addition, the number of participants for each challenge was restricted to have at least 75 adolescents and 75 young adults to ensure having participants from each group. The participants then answered questions to assess the constructs reported in the Measures section (attitude, perceived norms, and personal agency) about the Cinnamon Challenge and the ALS Ice Bucket Challenge. The order of the Cinnamon Challenge and ALS Ice Bucket Challenge sections was randomly assigned to the participants. Figure 2 shows the flowchart of the study procedure. The study was approved by Clemson University’s Institutional Review Board, and all participants read and signed an informed consent form before beginning the study. Each was given a \$10 gift card as compensation for their time.

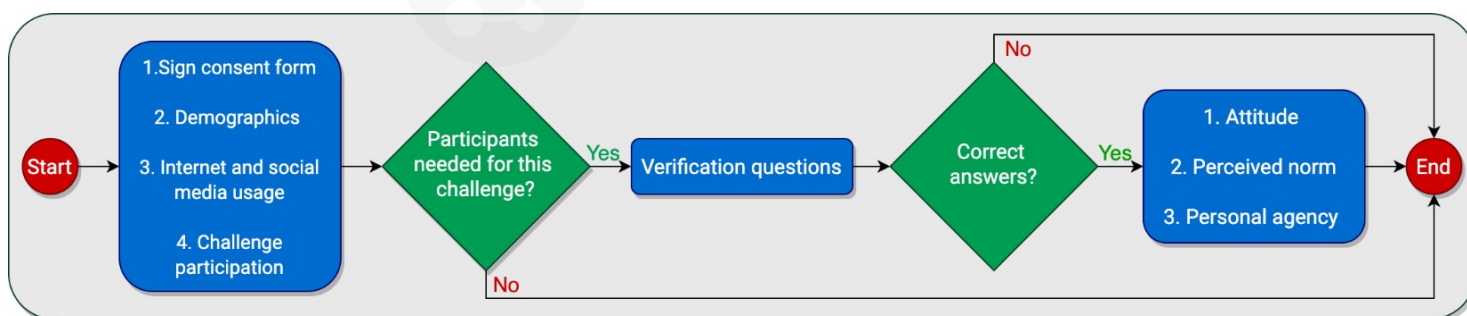


Figure 2. Procedure flow chart.

Data Analysis

To understand whether participation in a social media challenge (i.e., either Cinnamon Challenge or ALS Ice Bucket Challenge) can be predicted from people's attitudes, perceived norms, and personal agency beliefs, binomial logistic regression was used. Participation in a social media challenge is a dichotomous dependent variable (i.e., 1 = "participated" or 0 = "didn't participate") justifying the use of the binomial logistic regression [40]. The binomial logistic regression analysis was performed using SPSS 24.0 to predict Cinnamon Challenge participation first with seven predictors: age group, experiential attitude, instrumental attitude, injunctive norm, descriptive norm, perceived control, and self-efficacy. Four interaction predictors were also added to the model: experiential attitude by value of experiential attitude, instrumental attitude by value of instrumental attitude, injunctive norm by motivation to comply, and descriptive norm by motivation to comply. To ensure greater power to detect significant findings within our multivariate analysis [41], only the interaction terms recommended by the IBM were included in the analysis [29]. Participants who had completed the Cinnamon Challenge and those who did not participate in any challenge were included in this model ($N = 316$).

A second binomial logistic regression model was used to predict ALS Ice Bucket Challenge participation using similar predictors assessing the participants' perception of the ALS Ice Bucket Challenge. Participants who had completed the ALS Ice Bucket Challenge and those who did not participate in any challenge were included in the second model. For each model, fit indices, McFadden's pseudo R^2 , effect size estimates, estimated regression coefficients and their significance, corresponding odds ratios and their confidence intervals were calculated.

All the data were checked to confirm independence of observations, the existence of a linear relationship between an independent variable and the logit transformation of the dependent variable, and the absence of any multicollinearity, significant outliers, high leverage points and highly influential points [40].

Results

Cinnamon Challenge

The results from the direct logistic regression model predicting Cinnamon Challenge participation are presented in Table 4. A test of the full model with all predictors against a constant-only model was statistically significant, $\chi^2 (11, N = 316) = 221.75, p < .001$, indicating that the predictors, as a set, reliably distinguished between people who had participated in the Cinnamon Challenge and

those who had not. The deviance in participating in the Cinnamon Challenge accounted for by these predictors was large with $R^2_L = 0.5$. To test the significance of each predictor, each variable was removed from the model and the change in χ^2 was examined to determine if removal of a variable led to a worsening of the model fit [42,43]. Independent removal of four of eleven predictors significantly harmed the model fit, specifically instrumental attitude ($\Delta\chi^2 = 11.50$, $p < .001$), injunctive norm ($\Delta\chi^2 = 30.43$, $p < .001$), descriptive norm ($\Delta\chi^2 = 6.62$, $p < .01$), and the interaction term injunctive norm by motivation to comply ($\Delta\chi^2 = 8.82$, $p < .01$). Figures 3-5 illustrate the form of these relationships.

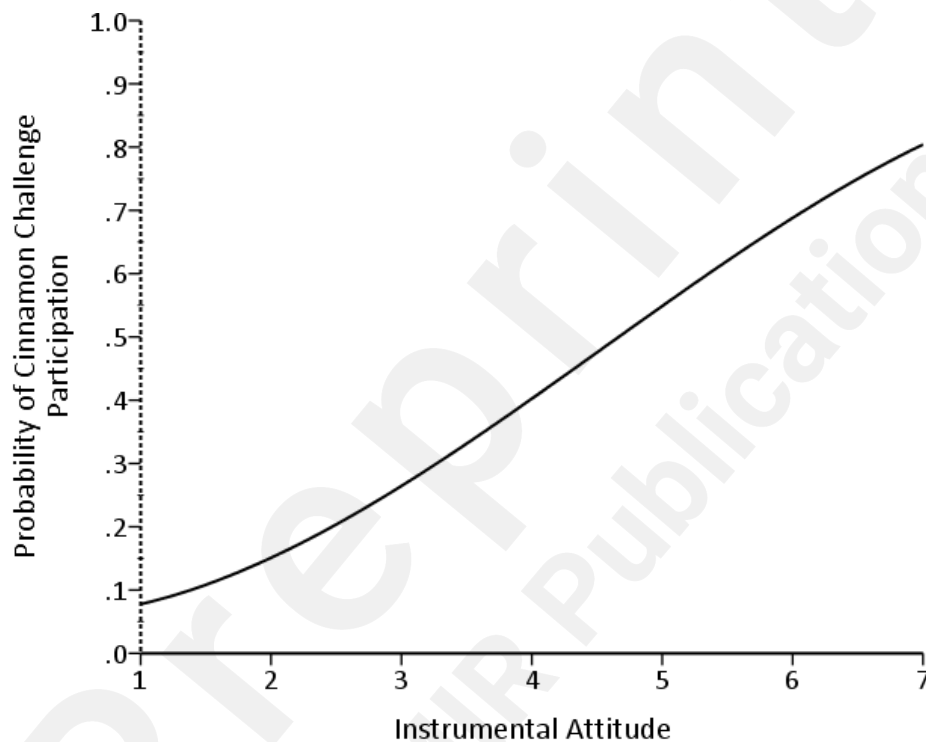


Figure 3. The relationship between instrumental attitude and probability of Cinnamon Challenge participation.

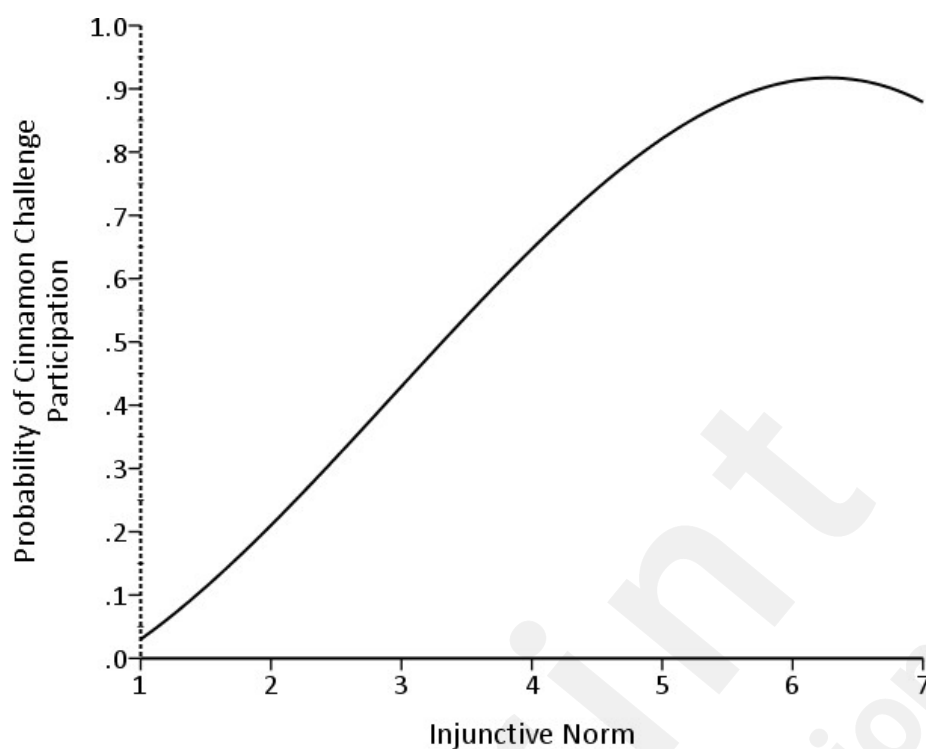


Figure 4. The relationship between injunctive norm and probability of Cinnamon Challenge participation.

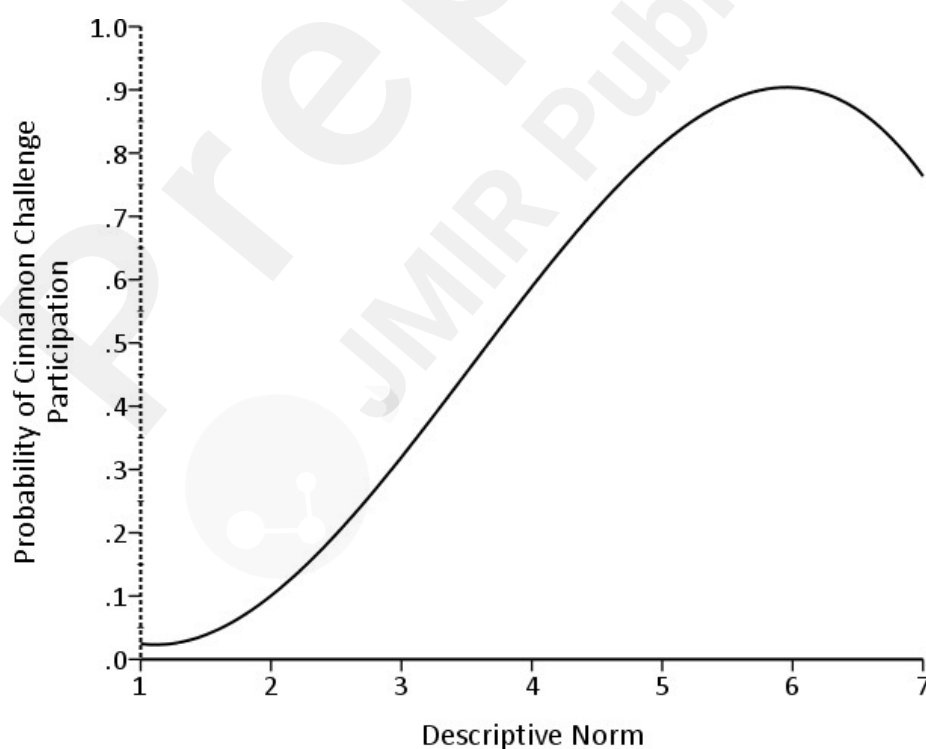


Figure 5. The relationship between descriptive norm and probability of Cinnamon Challenge participation.

To interpret the significant interaction for injunctive norm by motivation to comply, simple slopes

were calculated from the regression coefficients at the mean of motivation to comply and one standard deviation above and below the mean of motivation to comply [42]. This analysis found the slope of injunctive norm and probability to participate at the mean of motivation to comply to be $B = 1.01$, and at one standard deviation above and below the mean of motivation to comply to be $B = 1.80$ and $B = 0.23$, respectively. Figure 6 illustrates the form of this interaction.

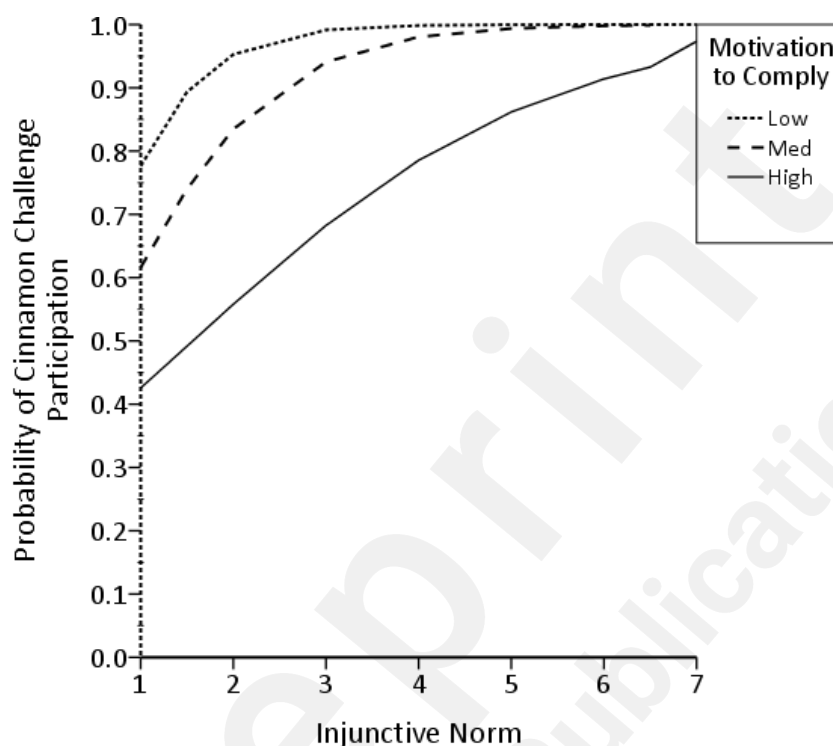


Figure 6. The relationship between injunctive norm and probability of Cinnamon Challenge participation moderated by motivation to comply.

Table 4. Results of Binomial Logistic Regression Model Predicting Cinnamon Challenge participation.

Predictor	<i>B</i>	SE <i>B</i>	$\Delta\chi^2$	OR	95% CI for OR	
					Lower	Upper
Constant	-0.68	0.29	-	-	-	-
Age group ^d	0.12	0.35	0.11	1.12	0.57	2.26
Experiential attitude	-0.31	0.16	3.95	0.73	0.53	1.00
Instrumental attitude	0.42	0.13	11.50 ^c	1.52	1.19	1.96
Injunctive norm	1.15	0.24	30.43 ^c	3.15	2.04	5.15
Descriptive norm	0.57	0.23	6.62 ^b	1.78	1.15	2.80
Perceived control	0.53	0.28	3.85	1.71	1.00	3.00

Self-efficacy	0.25	0.19	1.71	1.30	0.89	1.87
Experiential attitude * value of experiential attitude	-0.09	0.12	0.65	0.91	0.72	1.14
Instrumental attitude * value of instrumental attitude	0.10	0.07	2.40	1.11	0.97	1.27
Injunctive norm * motivation to comply	-0.48	0.16	8.82 ^b	0.62	0.45	0.85
Descriptive norm * motivation to comply	-0.12	0.15	0.7	0.88	0.64	1.17

Notes: ^a $p < .05$, ^b $p < .01$, ^c $p < .001$, Model $\chi^2 = 221.75$, $df = 11$, $N = 316$, $R^2_L = 0.5$. Null -2 Log Likelihood (-2LL) = 437.65, Model -2 LL with predictors = 216.

^d Age group was a dummy-variable where 0 = under 18 years old and 1 = 18 to 35 years old.

Ice Bucket Challenge

A similar approach was used to predict ALS Ice Bucket Challenge participation, with the results being presented in Table 5. The predictors, as a set, reliably distinguished between people who had participated in the ALS Ice Bucket Challenge and those who had not, $\chi^2 (11, N = 318) = 151.05$, $p < .001$ with $R^2_L = 0.34$. Independent removal of two of eleven predictors significantly harmed the model fit, specifically experiential attitude ($\Delta\chi^2 = 20.37$, $p < .001$) and descriptive norm ($\Delta\chi^2 = 9.61$, $p < .01$). Figures 7 and 8 illustrate the form of these relationships.

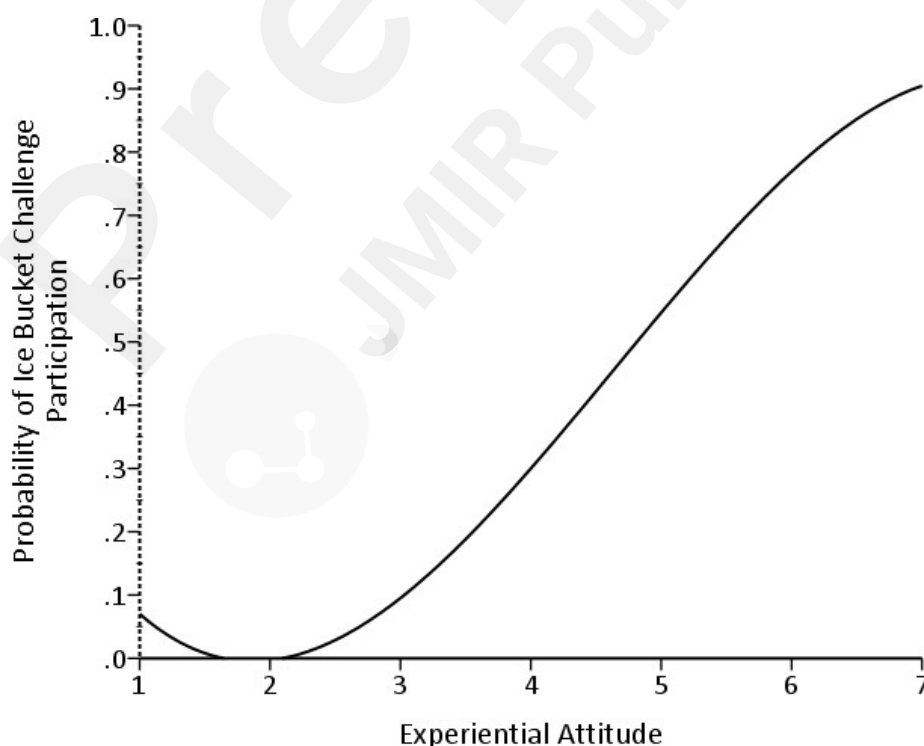


Figure 7. The relationship between experiential attitude and probability of ALS Ice Bucket Challenge participation.

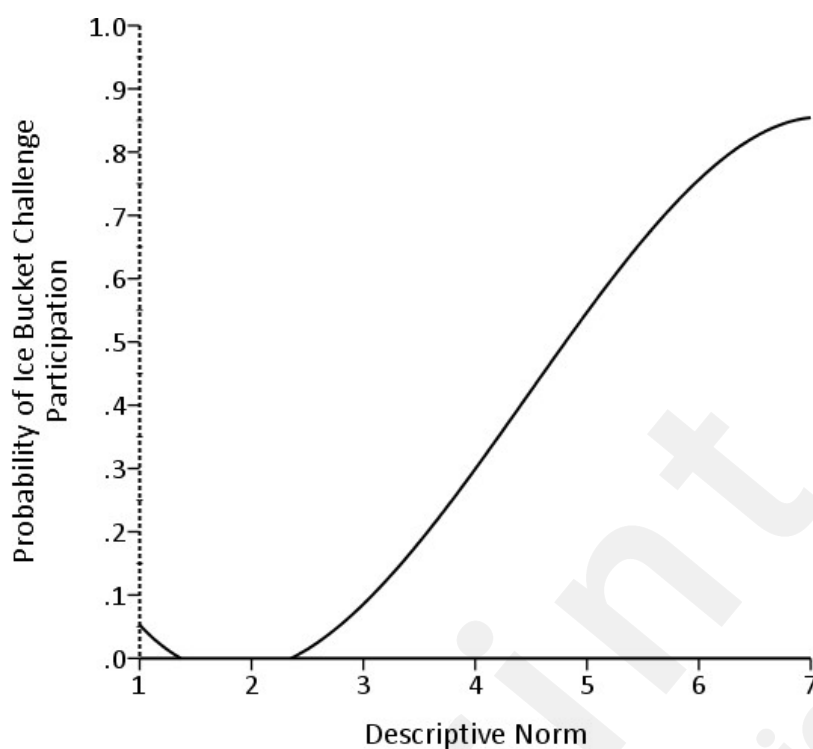


Figure 8. The relationship between descriptive norm and probability of ALS Ice Bucket Challenge participation.

Table 5. Results of Binomial Logistic Regression Model Predicting ALS Ice Bucket Challenge participation

Predictor	B	SE B	$\Delta\chi^2$	OR	95% CI for OR	
					Lower	Upper
Constant	0.05	0.23				
Age group ^d	-0.26	0.30	0.71	0.78	0.43	1.40
Experiential attitude	0.66	0.16	20.37 ^c	1.94	1.44	2.69
Instrumental attitude	-0.25	0.13	3.97	0.78	0.60	1.00
Injunctive norm	0.28	0.18	2.42	1.33	0.93	1.91
Descriptive norm	0.61	0.20	9.61 ^b	1.84	1.25	2.79
Perceived control	-0.05	0.25	0.04	0.95	0.58	1.56
Self-efficacy	0.15	0.20	0.60	1.16	0.79	1.72
Experiential attitude * value of experiential attitude	-0.15	0.14	1.08	0.86	0.65	1.13
Instrumental attitude * value of instrumental attitude	0.05	0.07	0.60	1.05	0.93	1.20

Injunctive norm * motivation to comply	0.06	0.14	0.18	1.06	0.80	1.40
Descriptive norm * motivation to comply	-0.24	0.14	3.02	0.79	0.60	1.03

Notes: ^a $p < .05$, ^b $p < .01$, ^c $p < .001$, Model $\chi^2 = 151.05$, $df = 11$, $N = 318$, $R^2_L = 0.34$. Null -2 Log Likelihood (-2LL) = 440.63, Model -2 LL with predictors = 289.58.

^d Age group was a dummy-variable where 0 = under 18 years old and 1 = from 18 to 35 years old.

Discussion

Overview

To our knowledge this study is the first to quantitatively investigate the theoretical constructs for predicting participation in online challenges using data provided by actual participants. The aim of this study was to investigate the behavioral beliefs of people who have participated in these challenges and compare them to the beliefs of people who did not. Doing so, identified potential factors that were critical to the participants final decision. The results showed the attitude sub-constructs, the perceived norm sub-constructs, perceived, and the interaction between injunctive norm and motivation to comply to be good predictors of Cinnamon Challenge participation. In addition, the experiential attitude and the descriptive norm are good predictors of ALS Ice Bucket Challenge participation.

Cinnamon Challenge

The analysis showed that the attitude and perceived norm sub-constructs (Hypotheses 2, 5, 6) are strong predictors of Cinnamon Challenge participation. This finding is consistent with other studies that used IBM to predict other such behaviors as condom usage, which also found these two constructs to be the strongest predictors [34,44]. As seen in the Results section, the relation between instrumental attitude, injunctive norm, and descriptive norm and probability of participating in the Cinnamon Challenge is proportional. The positive relationship between the instrumental attitude and probability of participation indicates that the more the people perceive enjoyment and rewards involved in the Cinnamon Challenge, the more they were willing to engage in the challenge. This shows that those people thought the challenge was easy with minimal harmful consequences. In addition, the positive relationship between injunctive norm and probability of participation shows that the more perceived attention paid to the challenge by the public, the higher probability of participants engaging in the Cinnamon Challenge since they believe their videos will receive more views. In addition, our findings suggest that there is a positive

relationship between descriptive norm and probability of participating in the Cinnamon Challenge. This relationship means the less attention participants received from people around them warning them about participating in the challenge, the higher the chance was that they would engage in the challenge. Consequently, it appears that the more that peers were engaging in the challenge, the higher the likelihood that participants would engage in the challenge, since they may have believed it is a common behavior that is “okay” to do. These findings are similar to a previous study on criminal behavior highlighting the significant role that culture plays in committing crime or violent behavior [45]. In other words, in a culture where crimes happen frequently, there is a higher chance of more people committing more crimes and violent behaviors in the future.

In addition, testing Hypothesis 7 showed that there is a significant interaction between injunctive norm and motivation to comply. The interaction implies that there is a positive relationship between injunctive norm and probability of participation in Cinnamon Challenge. However, this relationship is stronger for those with low motivation to comply scores. This means that people with low motivation to comply with predominant social norms are more likely to participate in Cinnamon Challenge than those with high motivation to comply. This finding is different than most of the literature on human behavior that suggests the opposite of our finding. This is mainly due to the negative nature of the behavior this study is investigating which involves self-harm. For example, a person with low motivation to comply with their parents is more likely to commit a self-harm behavior than someone with high motivation to comply with their parents.

Analysis of the change in model fit after removing each of the significant predictors indicated that the injunctive norm explains most of the variability in the probability of Cinnamon Challenge participation, followed by instrumental attitude, and descriptive norm, in this order. Thus, interventions to reduce participation in similar challenges in the future should focus on these constructs, with greater emphasis on the injunctive norm since it is the stronger predictor. This could be done by having people adolescents trust send persuasive messages highlighting the consequences of challenge behavior and explaining why they should not engage in these activities [46,47]. In addition, since there is a significant interaction between injunctive norm and motivation to comply, intervention development should consider both of these factors simultaneously. Changing only one of these two factors may lead to an undesired or unintended effect on the other's impact on the challenge participation. The intervention should specifically mention the disapproval of such behaviors from those around us even to those who say they do not comply or

“care” about what others say.

Ice Bucket Challenge

Unlike Cinnamon Challenge participation, only the experiential attitude and descriptive norm significantly predicted ALS Ice Bucket Challenge participation (Hypotheses 2 & 6). In other words, adolescents and young adults primarily participated in this challenge for enjoyment or popularity (getting more views and likes on their social media). They also engaged in the challenge due to perceptions that participation was normative or due to a sense of obligation, due to the large number of participants completing the challenge [48–51]. We believe the other factors were not significant due to the positive nature of the challenge. For example, even people who did not participate in the challenge generally rated it as easy to perform and believed that they were capable of completing it. These beliefs may explain why perceived control and self-efficacy factors were not found to be significant predictors of the ALS Ice Bucket Challenge. In addition, since this challenge in particular was very popular, even people who chose not to participate generally indicated that everyone around them would approve of their participation. This explains why the injunctive norm factor was not found to be a significant predictor of ALS Ice Bucket Challenge participation.

Among the significant predictors of ALS Ice Bucket Challenge participation, the experiential attitude explained the largest amount of variability, followed by descriptive norm. These findings can be used to help develop or market other philanthropic challenges by focusing on making them enjoyable with obvious direct rewards, as well as emphasizing the attention given to them by the public. By developing a challenge that targets these beliefs more than the others in IBM, one could potentially create a philanthropic challenge that goes viral and leaves a health-promoting impact on society with minimal harmful consequences.

Limitations and Future Work

This study is not without limitations. Only two challenges were used to represent all other similar challenges. This could limit the generalizability of the findings, so future work could investigate the applicability of these findings to other challenges. Moreover, this study was retrospective and cross-sectional in nature, making it hard to draw conclusions about causal relationships between the predictors and outcomes. Future work could study the impact of the constructs in controlled settings by developing interventions and examining their effects on people's willingness to participate in social media challenges.

Conclusions

A theoretical framework was utilized to guide the study design, and to inform the development of theory-driven intervention efforts to change social media challenge participation intention and behavior. The Cinnamon Challenge was used to represent challenges with a harmful impact and ALS Ice Bucket Challenge was used to represent positive impact challenges. The constructs that were critical to the participants' decision to participate were identified. This study provides a good theoretical model to understand the phenomenon of social media challenges. In addition, the findings provide information about which constructs should be the focus of intervention efforts. The content and thrust of those intervention efforts must be based on knowledge of how the specific items making up each construct apply specifically to social media (e.g., the desire to get likes and affirmation; the social norms that are portrayed via media, videos, and images).

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Conflicts of Interest

None declared.

Multimedia Appendix

Multimedia Appendix 1. Items used to measure research constructs.

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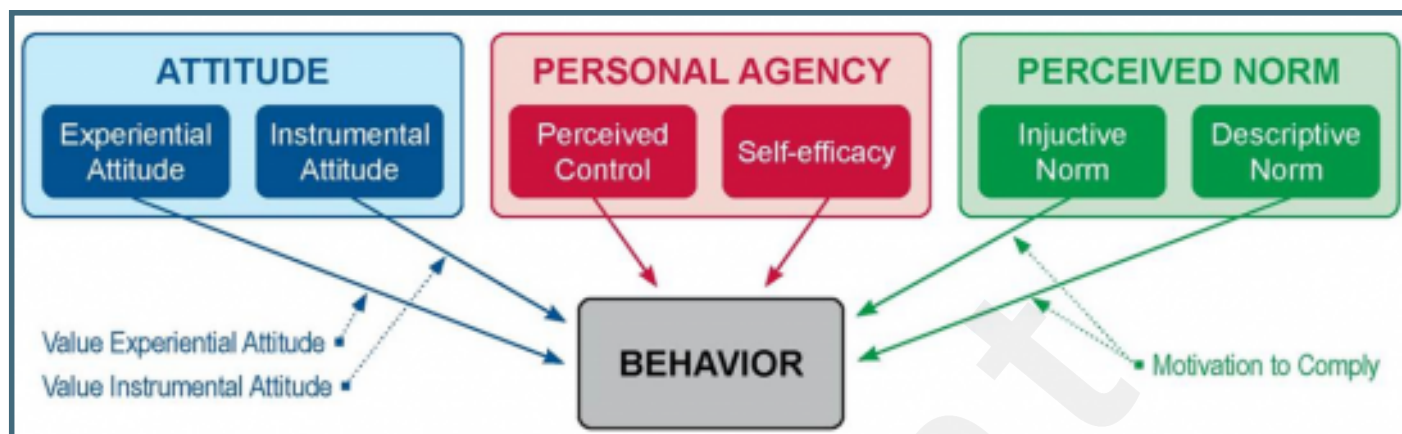
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Supplementary Files

Figures

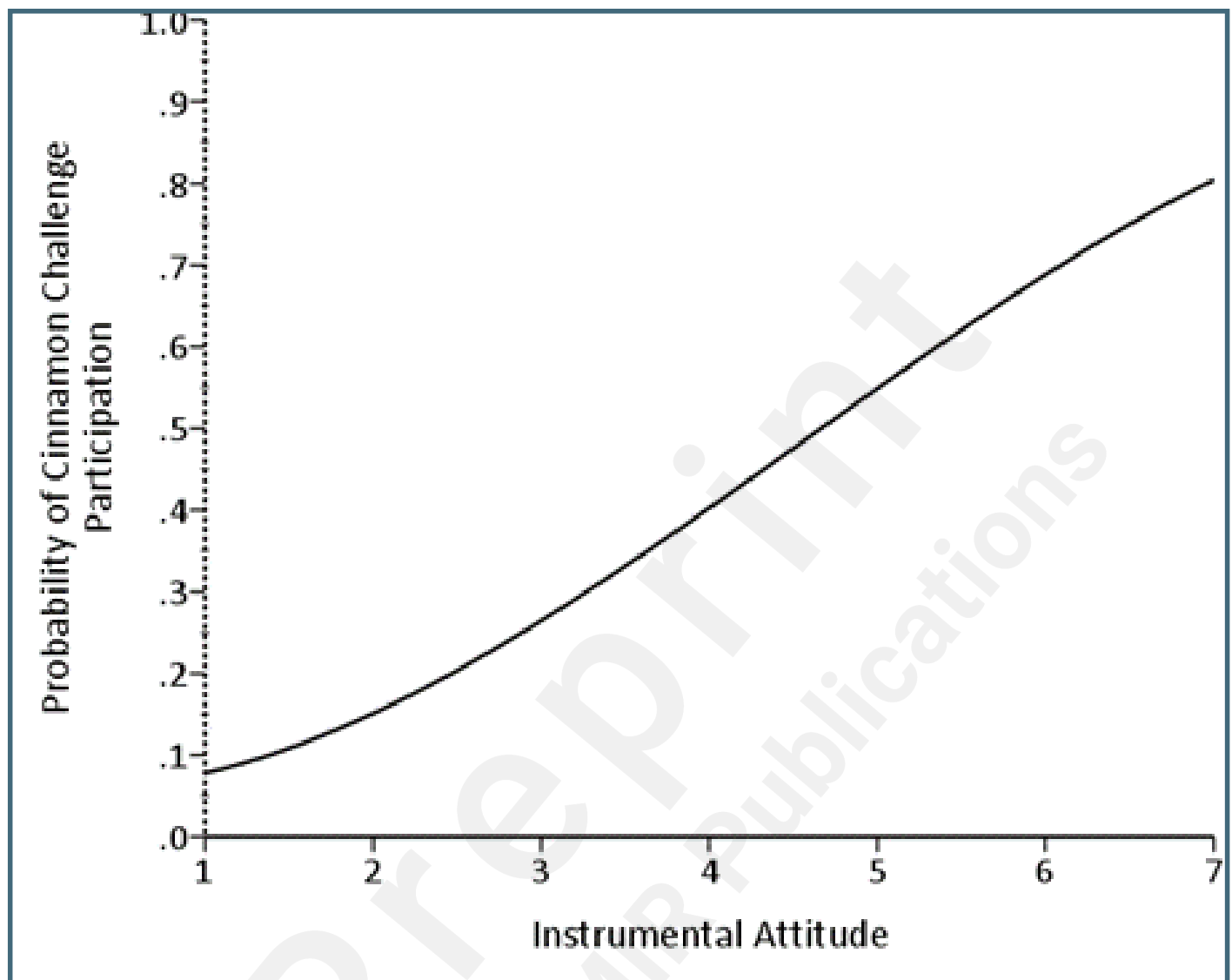
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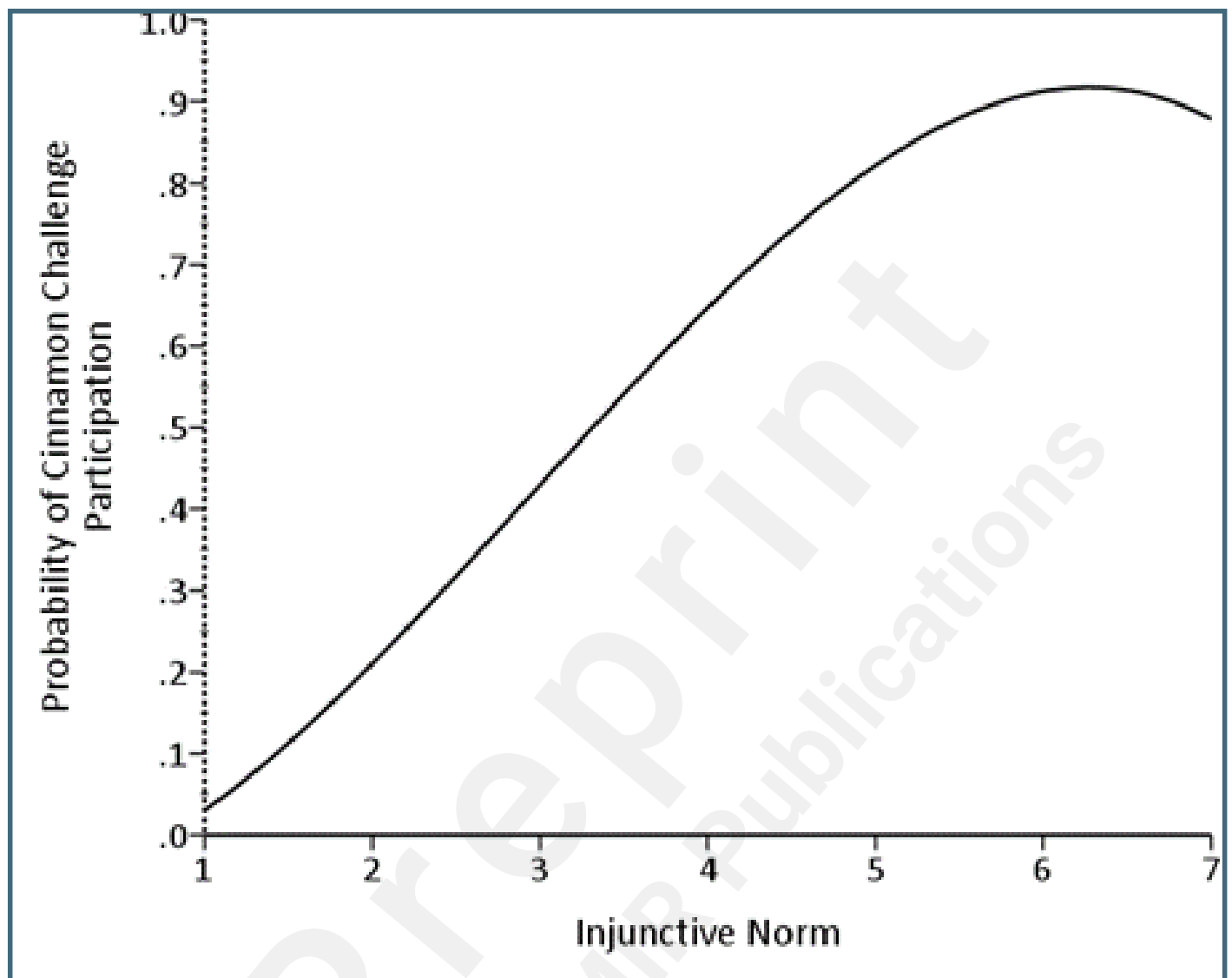
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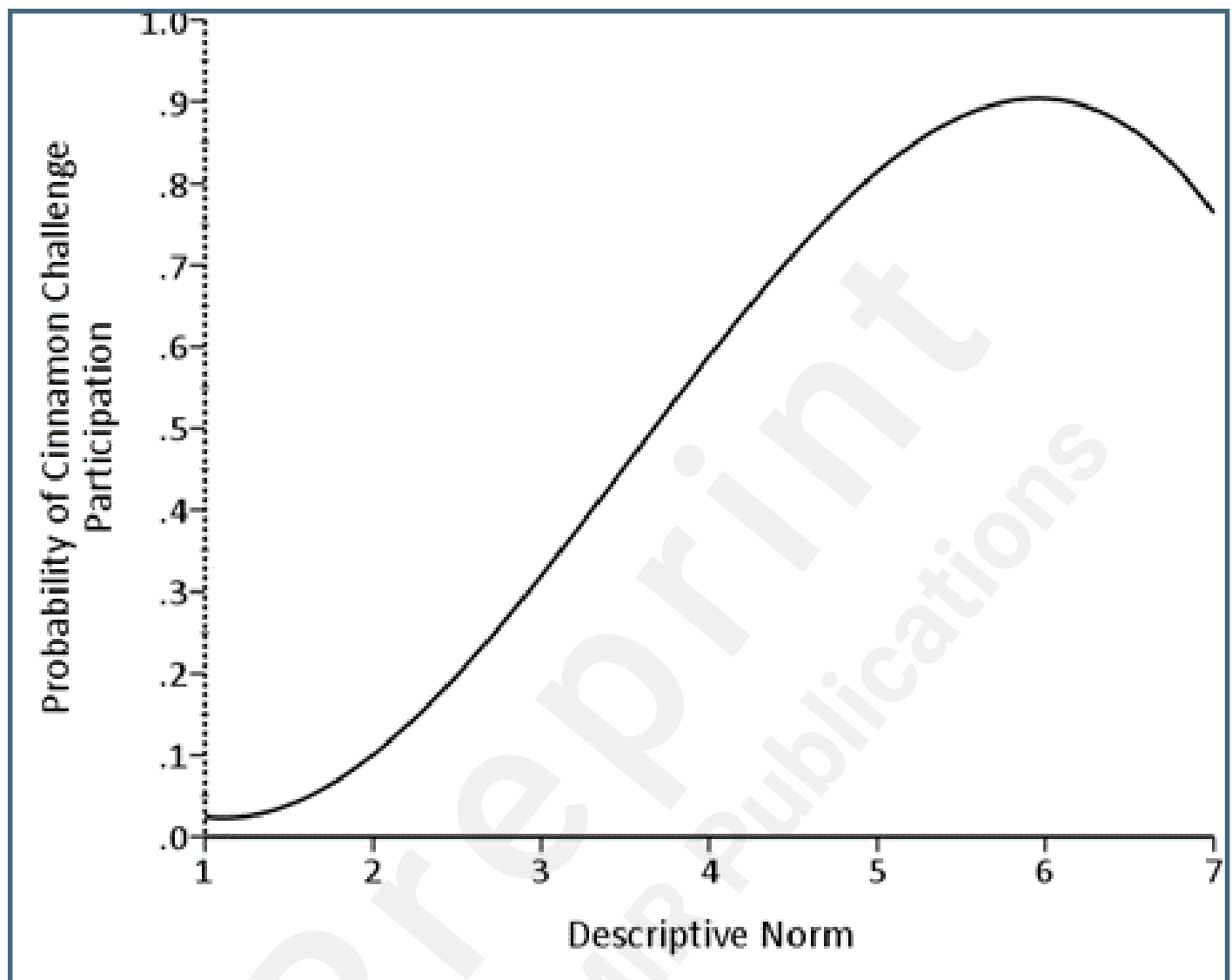
The relationship between instrumental attitude and probability of Cinnamon Challenge participation.



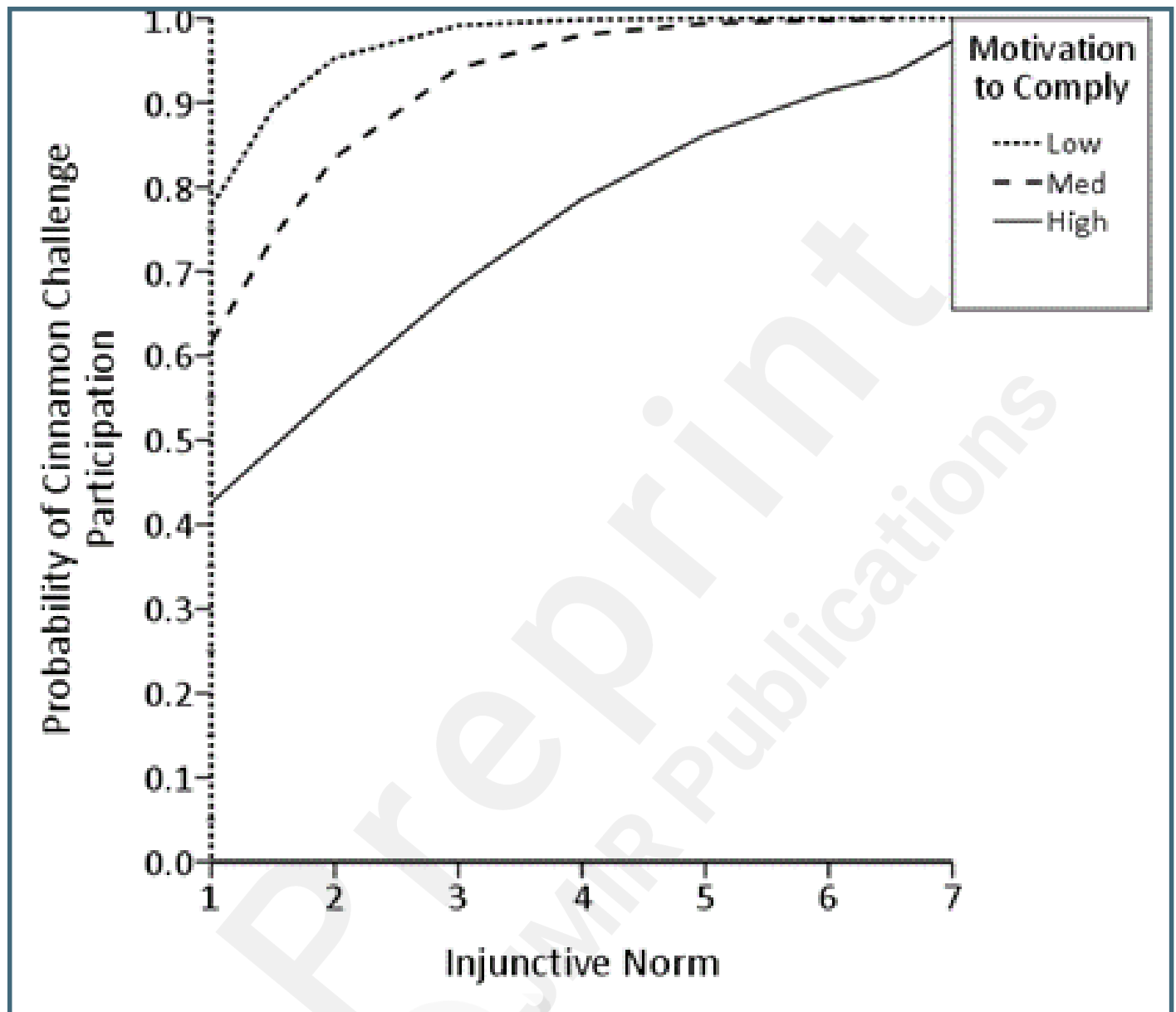
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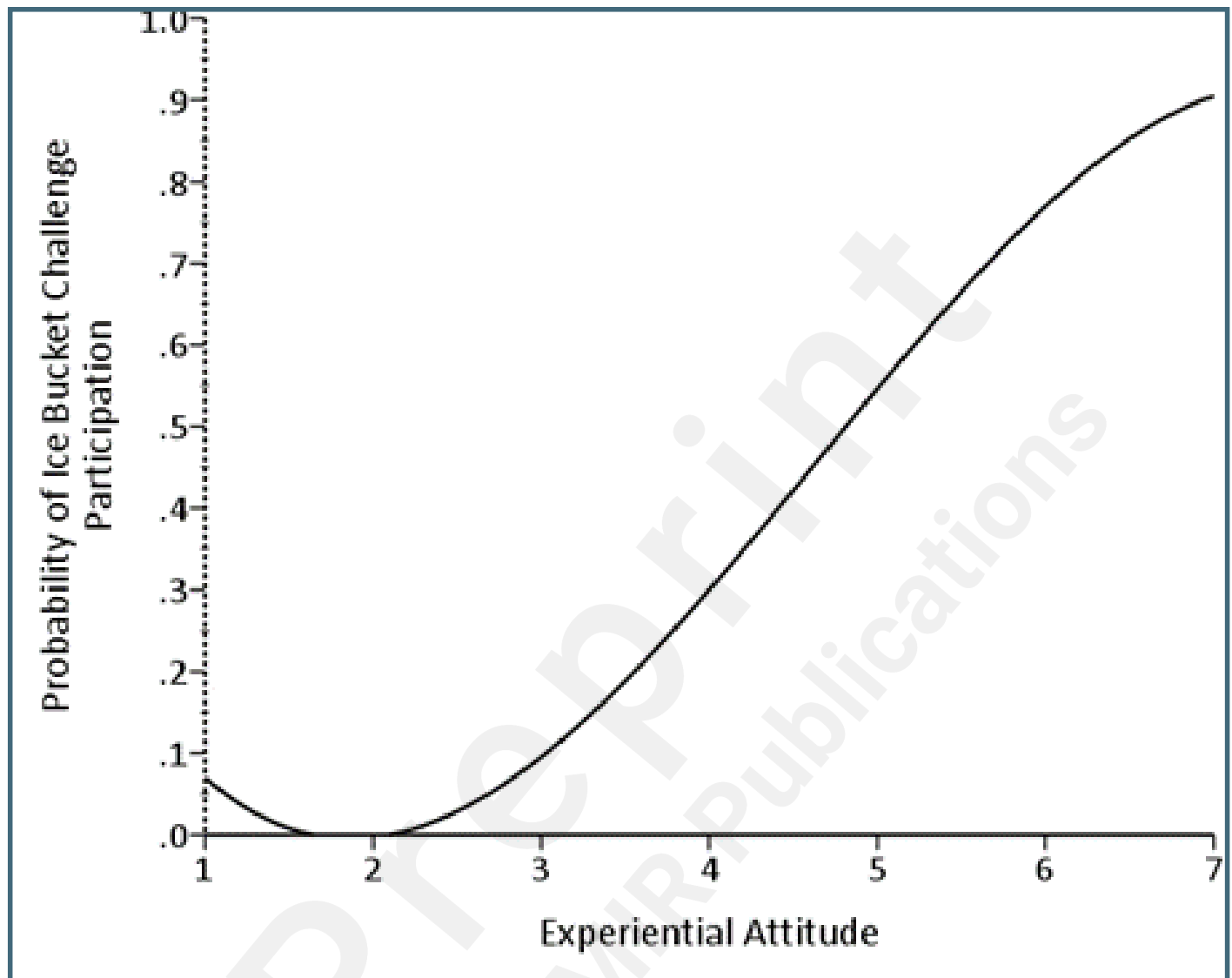
The relationship between descriptive norm and probability of Cinnamon Challenge participation.



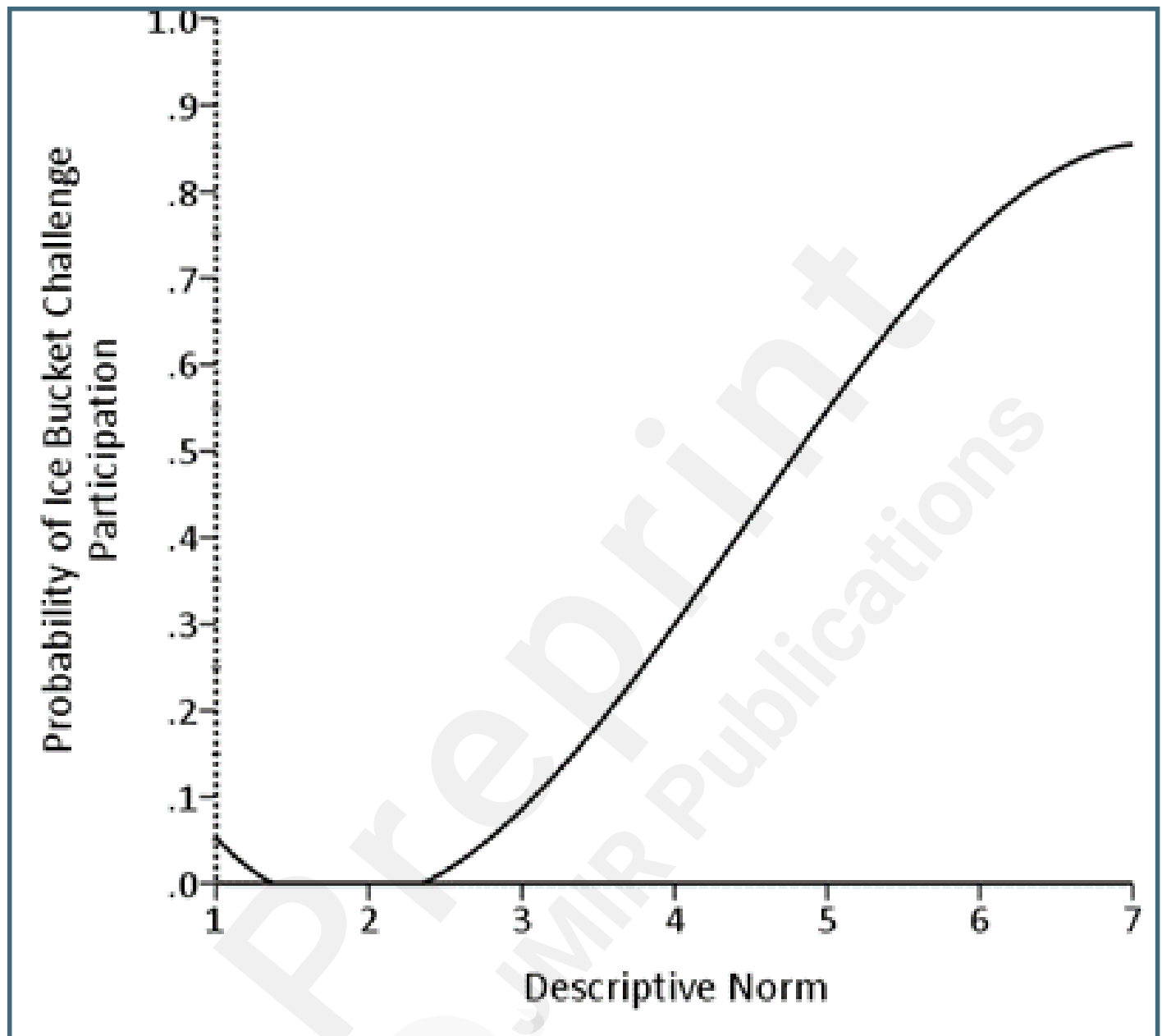
The relationship between injunctive norm and probability of Cinnamon Challenge participation moderated by motivation to comply.



The relationship between experiential attitude and probability of ALS Ice Bucket Challenge participation.



The relationship between descriptive norm and probability of ALS Ice Bucket Challenge participation.



Multimedia Appendixes

Items used to measure research constructs.

URL: <https://asset.jmir.pub/assets/df2046cfde85cce00d277c40ea91c870.pdf>

