

Environmental Protection or Self-Interest? The Public Accountability Moderates the Effects of Materialism and Advertising Appeals on the Pro-Environmental Behavior

Min Tan^{1,2}, Mei Li^{1,2}, Hui'e Li^{1,2}, Jin Li^{1,2}, You Chang^{1,2}, Guanfei Zhang^{1,2}, Yiping Zhong^{1,2} 

¹Department of Psychology, Hunan Normal University, Changsha, People's Republic of China; ²Cognition and Human Behavior Key Laboratory of Hunan Province, Changsha, People's Republic of China

Correspondence: Yiping Zhong, Department of Psychology, School of Education Science, Hunan Normal University, No. 36 Lushan Road, Changsha, Hunan, People's Republic of China, Tel/Fax +86 731-88872112, Email ypzhang@hunnu.edu.cn

Background: Previous studies have examined the negative effects of materialism, which refers to the importance of possessing material wealth and image, on the pro-environmental behavior. Recently, a study found that highly materialistic individuals showed more pro-environmental behaviors involving self-benefit (vs other-benefit) appeals. However, previous studies ignored the role of public accountability.

Purpose: This study aimed to explore the relationship between advertising appeals and the pro-environmental behavior of materialistic individuals in public (vs private) situations.

Methods: This study used the material values scale to measure the materialistic extent and employed different advertising pictures. Meanwhile, Study 1 (N=593) used the public cue, and Study 2 (N=622) used the eye cue to manipulate public accountability. Environmental donation was an indicator of the pro-environmental behavior.

Results: Studies 1 and 2 found that the pro-environmental behavior of participants low in materialism was significantly higher than that of participants high in materialism involving other-benefit appeals, while this difference was not significant for pro-environmental behavior involving self-benefit appeals in the private situation. Participants with low and high materialism were not significantly different in the pro-environmental behavior involving self-benefit and other-benefit appeals in the public situation.

Conclusion: The relationship between materialism and pro-environmental behavior involving self-benefit and other-benefit appeals can be moderated by the public accountability. In the private context, self-benefit appeals led materialistic people to engage in more pro-environmental behavior, while in the public context, the effectiveness of self-benefit and other-benefit appeals on the pro-environmental behavior of materialistic individuals was similar.

Keywords: materialism, pro-environmental behavior, advertising appeals, public situation, private situation, social exchange theory

Introduction

As we all know, human activities have led to environmental damage. For example, the massive emission of carbon dioxide affects human health and causes global warming which threatens the living environment of humans and animals. Meanwhile, the over-exploitation and utilization of natural resources have resulted in the depletion of resources, which influences the future survival of life on Earth. This indicates that environmental degradation has become one of the greatest threats to humans and animals, necessitating pro-environmental behavior to solve environmental problems. Pro-environmental behavior requires individuals to restrain from self-interested impulses and material desires.¹ Materialism, which belongs to egoistic values², regards the acquisition of property as the core goal in life and focuses on image.³ Highly materialistic individuals are unaware of the seriousness of environmental problems, prioritizing egoistic considerations, and not caring about others. Consequently, individuals high in materialism exhibit less pro-environmental

behavior.⁴ Numerous studies have shown that higher levels of materialism are associated with less pro-environmental behavior.⁵⁻⁸ In other words, materialistic lifestyles will aggravate environmental stress in the future. However, the pursuit of material enjoyment has become a universal social phenomenon. People have a high tendency towards materialism.⁹ Given the less pro-environmental behavior of materialistic individuals, it is important to improve the pro-environmental behavior of materialistic individuals.

Few studies have explored how to promote the pro-environmental behavior of materialistic individuals.^{10,11} Previous studies have found that advertising campaigns can influence materialism,¹² which suggests that advertising appeals can be used as a strategy to influence the pro-environmental behavior of materialistic individuals. Advertising appeals are the core content of advertising information and are one of the core factors that determine the persuasion effect of advertising.¹³ According to the different beneficiary of support, the literature classifies advertising appeals as “self-benefit” and “other-benefit” appeals.^{11,14,15} Self-benefit appeals emphasize that the donor is the main beneficiary of support, while other-benefit appeals highlight that organizations or others are its main beneficiaries. Self-benefit and other-benefit appeals have different altruistic motives. Self-benefit appeals are motivated by selfishness, while other-benefit appeals are altruistic in nature.¹¹ Ryoo et al showed that, compared with other-benefit appeals, self-benefit appeals can improve the pro-environmental behavior of individuals high in materialism.¹¹ Highly materialistic people take the satisfaction of self-interest as the goal of their behavior,¹⁶ as such individuals high in materialism were willing to protect the environment in self-benefit appeals which benefit them. However, people face different social situations in life, can self-benefit appeals in any situation are more effective than other-benefit appeals to improve the pro-environmental behavior of individuals high in materialism?

Wang et al have shown that the pro-environmental behavior of materialistic individuals varies with the behavioral decision situation (public vs private situation) and found that the pro-environmental behavior for altruistic reasons of people high in materialism was similar to that of people low in materialism in the public condition.¹⁰ Meanwhile, A previous study showed that public conditions arouse reputational concerns and could enhance individual charitable donations involving other-benefit appeals.¹⁴ In addition, studies have shown that materialistic people are concerned about public evaluations and pursue popular images.¹⁷ In a public condition, pro-environmental behavior can make materialistic people gain a good image, which is consistent with the goal of materialism. This indirectly indicates that the public situation can counteract the negative effect of materialism on the pro-environmental behavior involving other-benefit appeals. Additionally, in the public (vs private) condition, compared with other-benefit appeals, participants exhibited less pro-environmental behavior involving self-benefit appeals in the public condition.¹⁵ Some studies have shown that when prosocial behavior benefits helpers, it reduces the prosocial reputation people gain from adopting prosocial behavior,^{18,19} suggesting that the social reputational effects of pro-environmental behavior involving self-benefit appeals may be less significant than those involving other-benefit appeals in the public condition. This indicates that materialistic individuals may not make pro-environmental behavior decisions involving self-benefit appeals in the public condition if it is to gain a good reputation. This suggests that self-benefit appeals are less effective than other-benefit appeals to pro-environmental behavior of materialistic people in public conditions. The effect of appeal types on the pro-environmental behavior of materialistic people may vary with the public accountability. In other word, the public accountability can be one of the boundary conditions in materialism and appeal types. However, to the best of our knowledge, previous studies have not considered the role of public conditions in materialism and appeal types. Therefore, two studies aimed to explore the role of advertising appeals on the pro-environmental behavior of materialistic individuals in public (vs private) situations. Study 1 examined the relationship between materialism, advertising appeals, and pro-environmental behavior across situations. Study 2 used subtle clues of public accountability to ensure the robustness of results.

Study 1

The current study examined interactive effects between materialism and advertising appeals in predicting pro-environmental behavior in public (vs private) contexts. Empirical research has also shown that materialistic individuals tend to exhibit more pro-environmental behavior for selfish or self-interested reasons²⁰. Importantly, a study found that self-benefit appeals relatively to other-benefit appeals can enhance the pro-environmental behavior of individuals high in materialism in the private situation.¹¹ As such, in the private condition, the hypothesis is that materialism negatively

predicts the pro-environmental behavior involving other-benefit appeals(H1a), while materialism positively predicts the pro-environmental behavior involving self-benefit appeals(H1b). Individuals high in materialism focus on their own image in public conditions and their pro-environmental behavior for altruistic reasons is not significantly different from that of individuals low in materialism.¹⁰ Researches have shown that altruistic behavior for self-interest reasons does not enhance one's reputation, while helping behavior for altruistic reasons is more socially desirable.^{18,19} As such, in the public condition, the hypothesis is that materialism does not significantly predict pro-environmental behavior involving other-benefit appeals(H2a), while materialism significantly negatively predicts pro-environmental behavior involving self-benefit appeals(H2b).

Materials and Methods

Advertising Appeals

A pretest ($N = 42$, $M_{age} = 19.93$ years, 32 females) was conducted to verify that the two types of appeal were effective. The self-benefit appeals emphasized the benefits of environmental donation to other people (ie, "making the environment better" and "protecting the health of other people"). The self-benefit appeals conversely highlighted the benefits of environmental donation to the donor (ie, "gaining a phone coupon" and "obtaining a worthwhile experience"). The title of advertisements explicitly stated that donation benefits either "you" or "other people" (see [Appendix A](#)).

This was consistent with previous studies in which participants were shown other-benefit and self-benefit appeals in a balanced order and responded to the following questions on a 7-point scale (1 = extremely unlikely, 7 = extremely likely): (1) To what extent is it good for other people? (2) To what degree is it associated with looking out for the interests of other people? (3) To what extent is it good for you? (4) To what degree is it associated with looking out for your own interests? By reverse scoring the first two items and averaging the items of self-benefit ($\alpha = 0.63$) and other-benefit ($\alpha = 0.74$) appeals, the perceived self-interest score was created. Participants rated self-benefit appeals as being more concerned with self-interest than other-benefit appeals ($M_{self} = 4.78$, $M_{other} = 3.34$, $t(41) = 7.25$, $p < 0.001$, Cohen's $d = 2.26$). This indicates that the manipulation of advertising appeal was successful.

Material Values Scale

The material values scale (MVS) was developed by Richins and Dawson to measure materialism and was divided into three dimensions.¹² Li et al deleted five items with factor loading less than 0.4, which became the revised version widely used by Chinese scholars.²¹ The revised version was also used in this study as a tool to measure materialism (see [Appendix B](#)). To test the reliability of the scale, 200 college students were recruited to complete the scale, and 184 responses were valid ($M_{age} = 17.32$, $SD = 0.48$, 37 males). The confirmatory factor analysis was conducted using AMOS 24 software to examine the construct validity of the revised MVS. The results are shown in [Table 1](#) and indicated that the measurement model fit the data reasonably well, but AVE values were less than 0.5 and CR values were close to 0.7. This was consistent with previous studies that AVE values were below than the suggested level of 0.5.²² Some studies believe that AVE less than 0.5 but around 0.3 is acceptable, and CR between 0.61 and 0.70 also has a right degree of interpretation.²³ In summary, the revised MVS lacks the average variance extracted and needs to be further improved, but the composite reliability and Cronbach's alpha indicated acceptable model and internal scale consistency.

Participants and Procedure

A total of 690 participants were recruited from Wenjuanxing which is an online survey platform, and there were 593 valid data by deleting invalid questionnaires (398 females). The age ranged from 17 to 30 years (19.79 ± 2.03 years). There were 299 in the private condition, of which 152 participants were self-benefit appeals. There were 294 in the public condition, of which 140 participants were self-benefit appeals. All the participants were randomly assigned to different conditions. First, participants were told that all information would be kept confidential and participants would be required to complete the material values scale²⁰ (Cronbach's $\alpha = 0.71$). And then, participants viewed either the self-benefit or other-benefit version of the China Green Foundation's donation advertisement. Next, participants assigned to the public condition were informed that the name of the person who made the donation would appear on

Table 1 Results of the Confirmatory Factor Analysis of the Material Values Scale

	Items	Loadings	Indicators
Factor 1	Item2	0.59	$\chi^2=110.62$
AVE=0.32	Item5	0.59	$df=56$
CR=0.69	Item 8	0.60	$\chi^2/df=1.98$
	Item 11	0.43	$p<0.001$
	Item 13	0.57	CFI=0.91
Factor 2	Item3	0.52	IFI=0.91
AVE=0.42	Item6	0.60	GFI=0.92
CR=0.68	Item9	0.79	RMSEA=0.07
	Item1	0.77	Cronbach's α =0.82
Factor 3	Item4	0.55	
AVE=0.32	Item 7	0.53	
CR=0.69	Item 10	0.47	
	Item 12	0.42	

the official website of the China Green Foundation in appreciation of protecting the environment. The participants assigned to the private condition were further informed that their decisions were completely confidential.²⁴ The participants then completed the donation task, in which participants received 200 tokens, which were converted into payment.²⁵ The participants were asked to choose the number of tokens which would donate to the China Green Foundation. The more tokens the participants donated, the less participants were paid. Additionally, the participants completed the manipulation checks for advertising appeals, with the items used in the previous pretest. At the end of the study, the participants completed the demographic measures and were paid accordingly. All participants read the informed consent to the experiment and completed the experiment voluntarily. The software used for data analysis in this study was SPSS 26, and subgroup analysis was used to analyze interactions.

Results

Manipulation Check

In contrast to other-benefit appeals ($M = 3.83$, $SD = 0.75$), the perceived self-interest score of self-benefit appeals ($M = 4.42$, $SD = 0.86$, $t(574.508) = -8.92$, $p < 0.001$, Cohen's $d = -0.74$) was significantly higher, indicating that the manipulation of advertising appeals was successful.

Donation Behavior

The hierarchical regression analyses were performed to test hypothesis in study 1. The main effects were entered in the first step, followed by the two-way interactions. Finally, the three-way interaction was entered.²⁶ The results are presented in Table 2. The result found that materialism was a negative predictor of donation behavior. The two-way interaction between appeal type and materialism was significant. The simple slope test showed that materialism negatively predicted environmental donation behavior involving other-benefit appeals ($\beta = -0.30$, $t = -5.35$, $p < 0.001$, 95% CI $[-57.56, -26.60]$). However, the negative effect involving self-benefit appeals was insignificant ($\beta = -0.05$, $t = -0.83$, $p = 0.409$, 95% CI $[-20.74, 8.47]$).

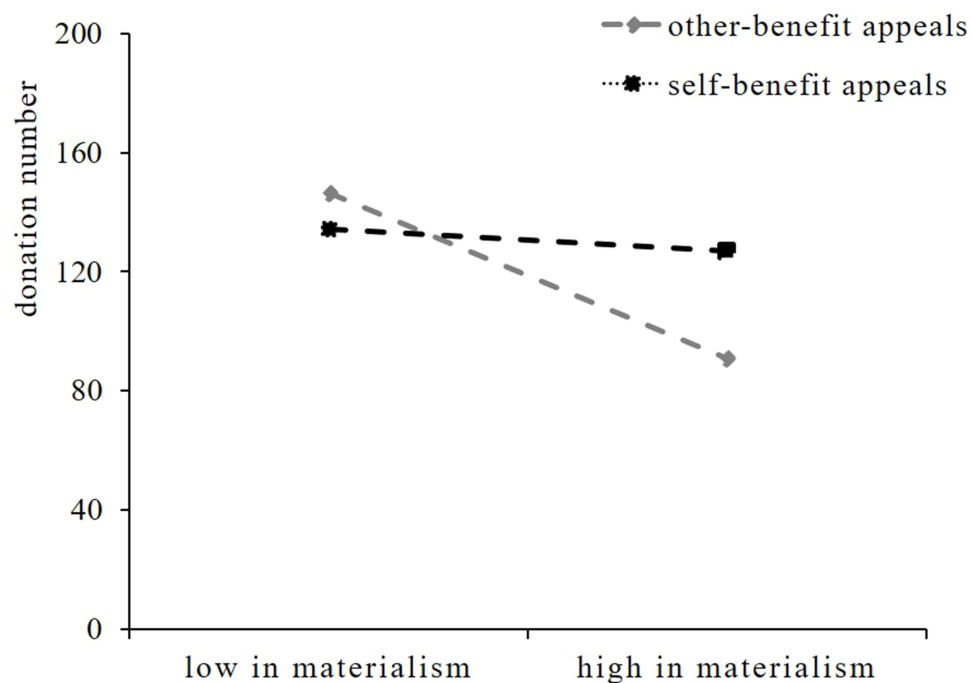
Most importantly, the result found a significant three-way interaction. This indicated that the interaction effect of materialism and appeal type was moderated by accountability. To probe this three-way interaction, the subgroup analysis were carried out.²⁷ The separate regression analyses for subgroups were conducted at public and private conditions. This analysis showed a significant interaction term between materialism and appeal type in the private condition ($\beta = 0.28$, $t = 3.69$, $p < 0.001$, 95% CI $[25.77, 84.75]$). The simple slope analysis showed that the donation number of participants high in materialism was significantly lower than that of participants low in materialism involving other-benefit appeals ($\beta = -0.46$, $t = -6.18$, $p < 0.001$, 95% CI $[-84.44, -43.53]$). However, the effect

Table 2 Results of the Hierarchical Regression in the Public Cue

Predictors	β	t	p	95% CI
Main effects				
Materialism	-0.18	-4.40	<0.001	[-34.69, -13.29]
Advertising appeals	-0.03	-0.82	0.414	[-13.26, 5.47]
Accountability	0.06	1.39	0.164	[-2.72, 16.01]
Total $R^2 = 0.036$, $F(3, 589) = 7.39^{***}$				
Two-way interaction				
Materialism \times advertising appeals	0.18	3.14	0.002	[12.60, 54.61]
Materialism \times accountability	0.14	2.50	0.013	[5.68, 47.70]
Accountability \times advertising appeals	-0.23	-3.44	0.001	[-50.47, -13.79]
Total $R^2 = 0.082$, $F(6, 586) = 8.70^{***}$				
Three-way interaction				
Materialism \times advertising appeals \times accountability	-0.17	-2.01	0.045	[-84.75, -0.94]
Total $R^2 = 0.088$, $F(7, 585) = 8.07^{***}$				

Notes: Estimated standardized coefficients β , t-values, p-values and 95% confidence intervals. Advertising appeals were coded with 0 for other-benefit appeals and 1 for self-benefit appeals. Accountability were coded with 0 for private condition and 1 for public condition. For materialism, the centered mean of all items of the materialism scale was used. $^{***}p < 0.001$.

disappeared involving self-benefit appeals [$\beta = -0.07$, $t = -0.81$, $p = 0.421$, 95% CI [-30.12, 12.67]] (see Figure 1). In contrast, the interaction between materialism and appeal type was insignificant in the public condition ($\beta = 0.07$, $t = 0.82$, $p = 0.414$, 95% CI [-17.48, 42.32]) (see Figure 2).

**Figure 1** The interaction between materialism and advertising appeal in the private condition for Study 1.

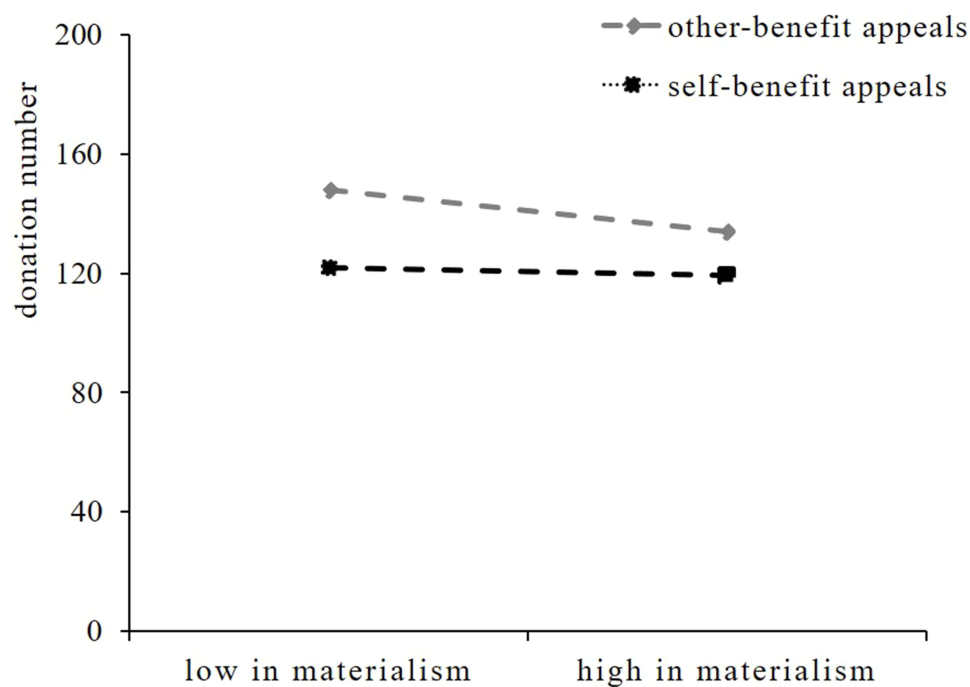


Figure 2 The interaction between materialism and advertising appeal in the public condition for Study 1.

Discussion

Study 1 verified H1a but did not fully verify H1b. Compared with other-benefit appeals, self-benefit appeals could make materialistic individuals engage in more pro-environmental behavior, that is, self-benefit appeals can reduce the negative effect of materialism on pro-environmental behavior but it cannot reverse the negative effect of materialism on pro-environmental behavior. Study 1 also demonstrated that the public situation can reduce the negative effect of materialism on pro-environmental behavior involving other-benefit appeals (H2a). However, these results did not confirm H2b. In the private situation, the higher the degree of materialism, the lower the pro-environmental behavior involving other-benefit appeals, while self-benefit appeals can enhance the pro-environmental behavior of highly materialistic individuals. In the public situation, materialism was not a significant negative predictor of the pro-environmental behavior involving other-benefit and self-benefit appeals. The results suggest that public accountability plays a role in materialism and pro-environmental behavior involving other-benefit and self-benefit appeals. Some studies have shown that subtle public accountability cues (eye cues) can also influence materialistic pro-environmental behavior.¹⁰ To ensure generalizability, the results of Study 1 need to be repeated using eye cues to manipulate public accountability.

Study 2

The current study examined interactive effects among materialism and advertising appeals in predicting pro-environmental behavior in eye (vs flower) cues. The hypotheses are consistent with Study 1.

Materials and Methods

Advertising Appeals

Advertising appeals were consistent with Study 1

Material Values Scale

The material values scale was consistent with Study 1.

Participants and Procedure

A total of 700 participants were recruited from Wenjuanxing and Credamo which are online survey platforms. There were 622 valid data (330 females, $M_{age}=29.61$, $SD=5.83$). A total of 312 participants were randomly assigned to the private condition in the private condition, of which 159 participants were self-benefit appeals. The remaining participants were in the public condition, of which 158 participants were self-benefit appeals. All the participants were randomly assigned to different conditions. In addition to the different conditions of accountability, the procedures and measures used in Study 2 were similar to those used in Study 1. After completing the material values scale (Cronbach's $\alpha=0.90$), participants were exposed to different manipulations of public accountability. The participants who assigned to the public condition were exposed to a picture of an eye and told "welcome to the psychology experiment" before the donation task. The participants who assigned to the private condition looked at a picture of a flower and were also told, "welcome to the psychology experiment" accordingly (see [Appendix C](#)).²⁸ Next, the participants viewed the picture of either self-benefit or other-benefit appeal and then completed the donation task used in Study 1. In conclusion, the participants answered the manipulation check questions for the two types of appeal and demographic measures. All participants were paid to participate in the study. Specially, all participants read the informed consent to the experiment and completed the experiment voluntarily.

Results

Manipulation Check

The independent samples *t*-test for the type of appeal showed that the main effect of appeal type was significant ($t(591.098) = -16.37$, $p < 0.001$, Cohen's $d = -1.35$). The perceived self-interest score of self-benefit appeals ($M = 4.74$, $SD = 1.53$) was higher than that of other-benefit appeals ($M = 2.95$, $SD = 1.18$), indicating that the manipulation of the advertising appeals was successful.

Donation Behavior

The results repeated the hierarchical analysis used in study 1. Specifically, On the first step the three main effects were entered. On the second step the three two-way interaction were entered. On the third step the three-way interaction was examined. As seen in [Table 3](#), the result found that materialism negatively predicted donation behavior. Importantly, the

Table 3 Results of the Hierarchical Regression in the Eye Cue

Predictors	β	<i>t</i>	<i>p</i>	95% CI
Main effects				
Materialism	-0.14	-3.49	0.001	[-13.42, -3.75]
Advertising appeals	0.07	1.76	0.079	[-0.83, 14.98]
Accountability	0.03	0.69	0.493	[-5.14, 10.66]
Total $R^2 = 0.025$, $F(3, 618) = 5.34^{**}$				
Two-way interaction				
Materialism \times advertising appeals	0.10	1.92	0.056	[-0.22, 19.01]
Materialism \times accountability	0.16	2.91	0.004	[4.63, 23.84]
Accountability \times advertising appeals	-0.07	-0.95	0.344	[-23.24, 8.12]
Total $R^2 = 0.045$, $F(6, 615) = 4.86^{***}$				
Three-way interaction				
Materialism \times advertising appeals \times accountability	-0.16	-2.14	0.033	[-40.13, -1.74]
Total $R^2 = 0.052$, $F(7, 614) = 4.84^{***}$				

Notes: Estimated standardized coefficients β , *t*-values, *p*-values and 95% confidence intervals. Advertising appeals were coded with 0 for other-benefit appeals and 1 for self-benefit appeals. Accountability were coded with 0 for private condition and 1 for public condition. For materialism, the centered mean of all items of the materialism scale was used. $^{**}p < 0.01$, $^{***}p < 0.001$.

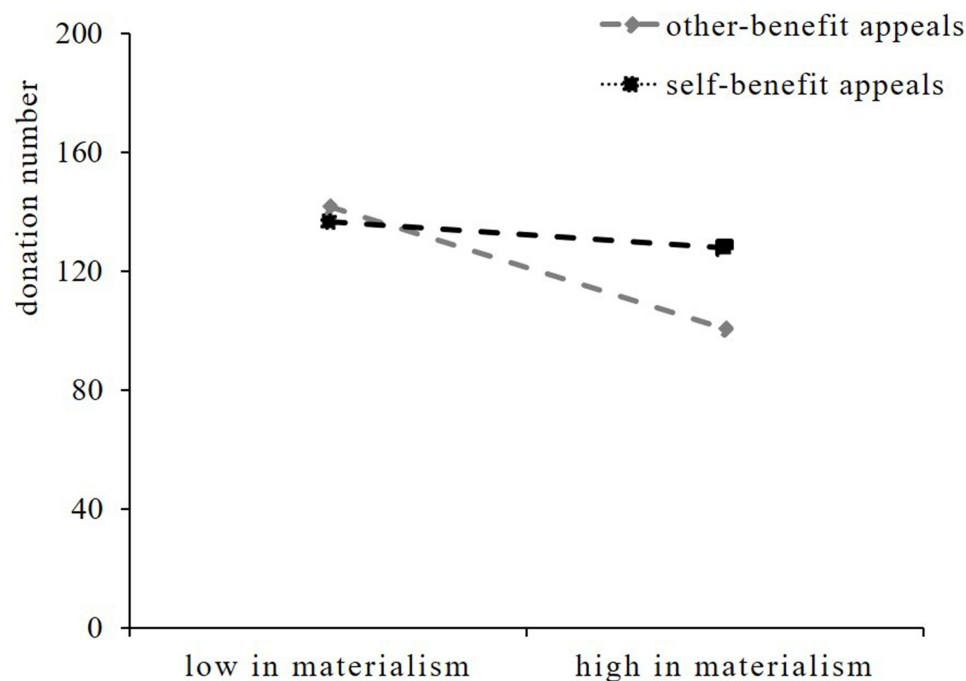


Figure 3 The interaction between materialism and advertising appeal in the private condition for Study 2.

results showed a significant three-way interaction and the subgroup analysis further was carried out. Consistent with Study 1, in the private condition, the interaction between materialism and advertising appeals had a significant predictive effect on environmental donation ($\beta = 0.21$, $t = 2.85$, $p = 0.005$, 95% CI [5.97, 32.71]). The simple slope test showed that the donation of participants low in materialism was significantly higher than that of participants high in materialism involving other-benefit appeals ($\beta = -0.37$, $SE = 5.02$, $t = -4.90$, $p < 0.001$, 95% CI [-34.51, -14.68]), while the difference between the donations of individuals high and low in materialism involving self-benefit appeals was insignificant ($\beta = -0.09$, $SE = 4.57$, $t = -1.15$, $p = 0.252$, 95% CI [-14.27, 3.77]) (see Figure 3). In contrast, the interaction between materialism and appeal type was insignificant in the public condition ($\beta = -0.02$, $t = -0.23$, $p = 0.821$, 95% CI [-15.41, 12.23]) (see Figure 4).

Discussion

Study 2 again demonstrated that the public accountability can moderate the interaction between materialism and advertising appeals, which is consistent with the results of Study 1. Meanwhile, Study 2 used different manipulations of the public accountability and employed different sample. Therefore, Study 2 broadens the generalizability of the results.

General Discussion

This study examined the relationship of advertising appeals and pro-environmental behavior of materialistic individuals across social context. There separately discuss the effects of materialism on the pro-environmental behavior involving appeal type in different social situations.

Consistent with H1a, the results of Study 1 and 2 showed that in the private condition, individuals high in materialism exhibited lower pro-environmental behavior involving other-benefit appeals. This is consistent with previous studies showing that people high in materialism are self-centered and less likely to prioritize protecting the environment and others, and show less pro-environmental behavior.¹⁶ However, these results do not provide empirical support for H1b. Self-benefit appeals cannot make materialism become a positive predictor for pro-environmental behavior, but self-benefit appeals can reduce the negative effect of materialism on the pro-environmental behavior. This may be because

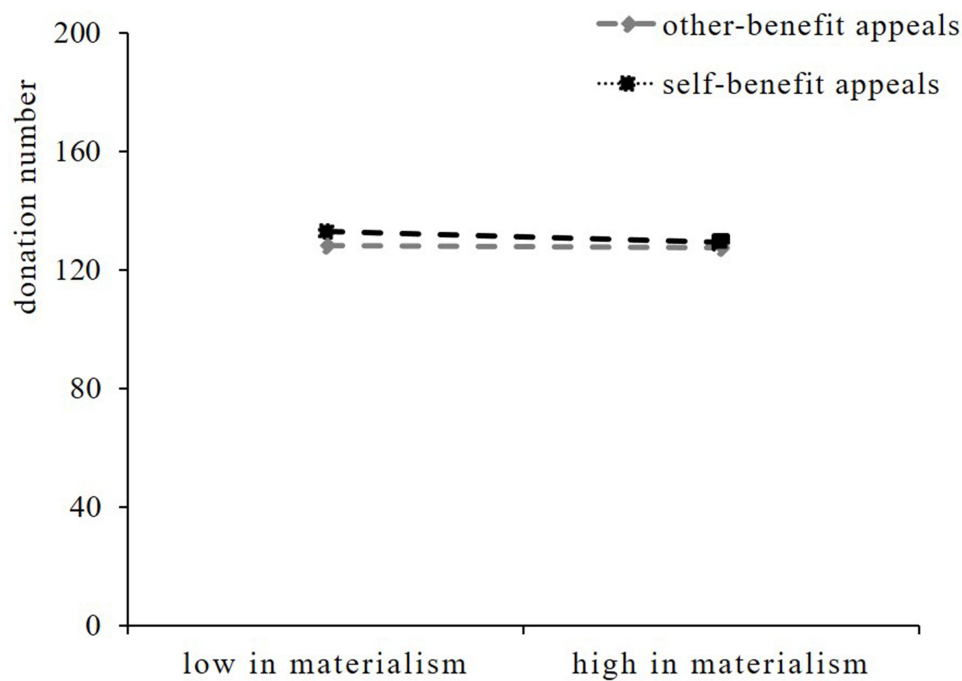


Figure 4 The interaction between materialism and advertising appeal in the public condition for Study 2.

self-benefit appeals highlight the self-interest of environmental donation, which can meet the external needs of people high in materialism, and partly reduce the conflict between materialism and pro-environmental behavior. In other words, self-benefit appeals effectively counteract the low level of pro-environmental behavior for materialistic individuals in private conditions.

In contrast, regarding the public condition, the results of Studies 1 and 2 were also in line with those of H2a. The results further found that the negative effect of materialism on the pro-environmental behavior disappears, involving other-benefit appeals. The publicity of pro-environmental behavior induces external motivation, that is, it can help one obtain a better reputation, which is consistent with image-oriented individuals high in materialism. Pro-environmental behavior requires self-sacrifice, but consequently helps one gain a good reputation or improve their social status in the future.^{29,30} This indicates that materialistic individuals pay money to protect the environment to gain a good reputation and social approval.

However, our results did not provide evidence for H2b: in the public condition, as with other-benefit appeals, the results found that individuals who were high and low in materialism had similar levels of pro-environmental behavior involving self-benefit appeals. A possible explanation is that although pro-environmental behavior involving self-benefit appeals is not conducive for materialistic individuals to gain a better social reputation, it does not damage their reputation, because making pro-environmental behavior decisions is socially acceptable.³¹ In other words, exhibiting pro-environmental behavior in the public condition may help maintain the original reputation of materialistic individuals. The results showed that both self-benefit and other-benefit appeals have similar effects on the pro-environmental behavior of materialistic individuals. However, other-benefit (vs self-benefit) appeals are more in line with the goals of people high in materialism of gaining a good reputation than just maintaining the original one. From a reality perspective, using other-benefit appeals as a boosting strategy in public conditions is more economical and practical.

Theoretical Contributions and Practical Implications

This study makes several theoretical contributions to the literature. Social exchange theory holds that individuals are rational and choose options with tangible or intangible benefits.³² People who perform pro-environmental behavior involving other-benefit appeals in private situations will not receive rewards for themselves, while those who perform

pro-environmental behavior involving self-benefit appeals will receive them. Similarly, in the public, pro-environmental behavior motivated by altruistic motives (vs self-interested motives) is more conducive to gaining a good reputation, and people will exhibit more pro-environmental behavior involving other-benefit appeals. As a result, people favor self-benefit appeals in private conditions and other-benefit appeals in public. From the perspective of exchange, the more valuable the outcome of an action, the more likely it is to be performed.³³ This suggests that materialistic individuals engage in pro-environmental behavior only when donator receive awards in exchange relationships with environmental protection organizations. For materialistic individuals, in an private situation, pro-environmental behavior involving other-benefit appeals is purely altruistic and cannot provide benefits. However, self-benefit appeals can help them get rewards and encourage them to adopt more pro-environmental behaviors. In the public situation, pro-environmental behavior involving other-benefit appeals gives materialistic individuals a positive reputation effect. This is in line with the principle of reciprocal exchange, and the effort is rewarded.

This study has several practical implications. The results show that self-benefit appeals in the private condition act as an intervention or marketing strategy to promote the pro-environmental behavior of materialistic individuals. Non-profit organizations or public service advertising can highlight what the giver can get, such as “you will have a coupon.” The results also show that materialism does not negatively predict pro-environmental behavior involving both self-benefit and other-benefit appeals in the public condition. However, to achieve more economic and affordable for non-profit organizations, organizations for environmental support should emphasize other benefits in public context. Environmental protection organizations or marketers should not rely on one type of advertising appeal, but should adjust advertising strategies to the social situation.

Limitations and Future Research

Appropriate designs have been used in this study; however, it had some limitations. First, the two studies were conducted online, which did not confirm our results in real situations, and lacked the application of field research. Therefore, field studies could be conducted in the future to further verify the stability and effectiveness of the results.

Second, this study focused on the relationship of materialism, appeal type and pro-environmental behavior across situations, two studies did not examine the causality of these variables, that is, using the experimental method. Therefore, future research is required. Third, this study used environmental donation as an indicator of individual pro-environmental behavior, which includes green consumption, recycling, cooperation, and other behaviors conducive to the environment.³⁴ These results may not be generalizable to other types of pro-environmental behaviors. Future research should extend these results to other types of such behaviors. Finally, the results found that the effects of materialism and advertising appeals on the pro-environmental behavior were moderated by the public accountability, but the variances explained by the interactions were relatively small. This is consistent with previous studies which the large effect sizes of interactions are difficult to observe in the social sciences.^{35–37} Another possible explanation is there are many factors that affect pro-environmental behavior, and the three-way interaction in this study can only explain the pro-environmental behavior by a small effect. Therefore, the variables with greater influence on pro-environmental behaviors can be explored in future studies.

Conclusion

Public accountability is the moderator of the interaction between materialism and advertising appeal. Self-benefit (vs other-benefit) appeals can make materialistic individuals take more pro-environmental behavior in private situation, while materialistic individuals tend to engage in more pro-environmental behaviors involving self-benefit and other-benefit appeals in the public situation.

Ethical Approval

The Institutional Review Board of the Hunan Normal University in Hunan approved the study (2021-299).

Acknowledgments

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This research was funded by the Major Program of the Chinese National Social Science Foundation (grant number 17ZDA326).

Disclosure

The authors report no conflicts of interest in this work.

References

1. Chuang Y, Xie X, Liu C. Interdependent orientations increase pro-environmental preferences when facing self-interest conflicts: the mediating role of self-control. *J Environ Psychol*. 2016;46:96–105. doi:10.1016/j.jenvp.2016.04.001
2. Grouzet FM, Kasser T, Ahuvia A, et al. The structure of goal contents across 15 cultures. *J Pers Soc Psychol*. 2005;89(5):800–816. doi:10.1037/0022-3514.89.5.800
3. De Groot JJ, Steg L. Mean or green: which values can promote stable pro-environmental behavior? *Conserv Lett*. 2009;2(2):61–66. doi:10.1111/j.1755-263X.2009.00048.x
4. Burroughs JE, Rindfleisch A. Materialism and well-being: a conflicting values perspective. *J Consum Res*. 2002;29(3):348–370. doi:10.1086/344429
5. Bauer MA, Wilkie JE, Kim JK, Bodenhausen GV. Cuing consumerism: situational materialism undermines personal and social well-being. *Psychol Sci*. 2012;23(5):517–523. doi:10.1177/0956797611429579
6. Ku L, Zaroff C. How far is your money from your mouth? The effects of intrinsic relative to extrinsic values on willingness to pay and protect the environment. *J Environ Psychol*. 2014;40:472–483. doi:10.1016/j.jenvp.2014.10.008
7. Gu D, Gao S, Wang R, et al. The negative associations between materialism and pro-environmental attitudes and behaviors: individual and regional evidence from China. *Environ Behav*. 2020;52(6):611–638. doi:10.1177/0013916518811902
8. Bakırtaş H, Buluşa GC, Bakırtaş İ. The effects of materialism and consumer ethics on ecological behavior: an empirical study. *Eur J Sustain Dev*. 2014;3(4):125–134. doi:10.14207/EJSD.2014.V3N4P125
9. Lee JA, Soutar GN, Daly TM, et al. Schwartz values clusters in the United States and China. *J Cross Cult Psychol*. 2011;42(2):234–252. doi:10.1177/0022022110396867
10. Wang L, Gu D, Jiang J, et al. The not-so-dark side of materialism: can public versus private contexts make materialists less eco-unfriendly? *Front Psychol*. 2019;10:790. doi:10.3389/fpsyg.2019.00790
11. Ryoo Y, Sung Y, Chechelnyska I. What makes materialistic consumers more ethical? Self-benefit vs. other-benefit appeals. *J Bus Res*. 2020;110:173–183. doi:10.1016/j.jbusres.2020.01.019
12. Richins ML, Dawson SJ. A consumer values orientation for materialism and its measurement: scale development and validation. *J Consum Res*. 1992;19(3):303–316. doi:10.1086/209304
13. Pang J, Bi S. Effects of congruency between advertising appeal and country-of-origin stereotype on brand attitude. *Acta Psychol Sin*. 2015;47(3):406–416.
14. White K, Peloza J. Self-benefit versus other-benefit marketing appeals: their effectiveness in generating charitable support. *J Mark*. 2009;73(4):109–124. doi:10.1509/jmkg.73.4.109
15. Green T, Peloza J. Finding the right shade of green: the effect of advertising appeal type on environmentally friendly consumption. *J Advert*. 2014;43(2):128–141. doi:10.1080/00913367.2013.834805
16. Kasser T. Materialistic values and goals. *Annu Rev Psychol*. 2016;67:489–514. doi:10.1146/annurev-psych-122414-033344
17. Christopher AN, Schlenker BR. Materialism and affect: the role of self-presentational concerns. *J Soc Clin Psychol*. 2005;23(2):260–272. doi:10.1521/jscp.23.2.260.31022
18. Yoon Y, Gürhan-Canli Z, Schwarz N. The effect of corporate social responsibility (CSR) activities on companies with bad reputations. *J Consum Psychol*. 2006;16(4):377–390. doi:10.1080/00913367.2013.834805
19. Lin-Healy F, Small DA. Nice guys finish last and guys in last are nice: the clash between doing well and doing good. *Soc Psychol Personal Sci*. 2013;4(6):692–698. doi:10.1177/1948550613476308
20. Liobikienė G, Liobikas J, Brizga J, et al. Materialistic values impact on pro-environmental behavior: the case of transition country as Lithuania. *J Clean Prod*. 2020;244:118859. doi:10.1016/j.jclepro.2019.118859
21. Jing L, Yongyu G. Revision of material value scale in Chinese college students. *Stud Psychol Behav*. 2009;7(4):280.
22. Anshel MH, Kang M, Miesner M. The approach-avoidance framework for identifying athletes' coping style as a function of gender and race. *Scand J Psychol*. 2010;51(4):341–349. doi:10.1111/j.1467-9450.2009.00796.x
23. Jardon CM, Martos MS. Intellectual capital as competitive advantage in emerging clusters in Latin America. *J Intellect Cap*. 2012;13(4):462–481. doi:10.1108/14691931211276098
24. Yao Q, Wu Z, Zhang C, et al. Effect of power on conspicuous prosocial behavior. *Acta Psychol Sin*. 2020;52(12):1–15. doi:10.3724/SP.J.1041.2020.001
25. Vesely S, Klöckner CA. How anonymity and norms influence costly support for environmental causes. *J Environ Psychol*. 2018;58:27–30. doi:10.1016/j.jenvp.2018.07.013
26. Dawson JF, Richter AW. Probing three-way interactions in moderated multiple regression: development and application of a slope difference test. *J Appl Psychol*. 2006;91(4):917–926. doi:10.1037/0021-9010.91.4.917

27. Kwong JY, Leung K. A moderator of the interaction effect of procedural justice and outcome favorability: importance of the relationship. *Organ Behav Hum Decis Process*. 2002;87(2):278–299. doi:10.1006/obhd.2001.2966
28. Wang J. The pursuit of fame at the expense of profit: the influence of power motive and social presence on prosocial behavior. *Acta Psychol Sin*. 2020;52(1):55–65. doi:10.3724/SP.J.1041.2020.00055
29. Milinski M, Semmann D, Krambeck H-J, et al. Stabilizing the Earth's climate is not a losing game: supporting evidence from public goods experiments. *Proc Natl Acad Sci*. 2006;103(11):3994–3998.
30. Kohlova MB, Urban J. Buy green, gain prestige and social status. *J Environ Psychol*. 2020;69:101416. doi:10.1016/j.jenvp.2020.101416
31. Wang L, Wei F, Zhang X-A. Why does energy-saving behavior rise and fall? A study on consumer face consciousness in the Chinese context. *J Bus Ethics*. 2019;160(2):499–513. doi:10.1007/s10551-018-3944-9
32. Hamon R, Bull KS. What do you have to offer me?": a relationship building activity for demonstrating social exchange theory. *Fam Sci Rev*. 2016;21:26–40. doi:10.26536/FSR.2016.21.01.03
33. Homans GC. *Social Behavior: Its Elementary Forms*. New York: Harcourt, Brace, & World; 1961.
34. Stern PC. New environmental theories: toward a coherent theory of environmentally significant behavior. *J Soc Issues*. 2000;56(3):407–424. doi:10.1111/0022-4537.00175
35. Allen MS, Greenlees I, Jones M. An investigation of the five-factor model of personality and coping behaviour in sport. *J Sports Sci*. 2011;29(8):841–850. doi:10.1080/02640414.2011.565064
36. Lee JJ, Chaudhry A, Tekleab AG. An interactionist perspective on employee performance as a response to psychological contract breach. *Pers Rev*. 2014;43(6):861–880. doi:10.1108/PR-10-2012-0173
37. Zhou ZE, Meier LL, Spector PE. The role of personality and job stressors in predicting counterproductive work behavior: a three-way interaction. *Int J Select Assess*. 2014;22(3):286–296. doi:10.1111/ijasa.12077

Psychology Research and Behavior Management

Dovepress

Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>