

The Effects of Different Product Types in Sustainable PSAs

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Abstract

This study investigates how automobile tire and aluminum can product types in recycling and upcycling public service announcements (PSAs) influence an individual's engagement intentions, attitudes towards PSA types, and attitudes towards sustainable behaviors. This is executed within this study by building on the theory of congruence to mediate the relationship between product type and PSA Type. The results suggest that students' (Millennials' and Generation Zs') PSA attitudes and behavioral engagement intentions are not influenced by any level of congruence between product types and recycling / upcycling PSA types. Furthermore, the results indicate that, when executing recycling / upcycling PSAs, organizations should use appropriate products within their PSAs but should not rely solely on correct product type within the PSA to sway consumers' attitudes and engagement intentions. Future research should examine other product type / PSA type congruent pairings as well as different populations to see if any influential attitudes and sustainable behavioral intentions occur.

Introduction

Consumers tend to have varying opinions for different product types, and recycling or upcycling, the practice that occurs when a consumer modifies / transforms garbage into a useful item rather than throwing it away (Wilson, 2016), these products can be viewed differently as well based on a number of factors (i.e. durability of the product, how it is used, etc.). When looking at the type of ad (recycling public service announcements versus upcycling public service announcements), varying levels of public service announcement (PSA) engagement intentions, PSA attitudes, and attitudes towards sustainable behaviors could be obtained when PSA type and product type are moderately congruent with one another. When two entities are moderately congruent with one another, the consumer tends to expend larger amounts of cognitive resources to understand the connection within the advertisement which results in greater cognitive retention (Meyers-Levy and Tybout, 1989).

This study will investigate how automobile tire and aluminum can product types in recycling and upcycling PSAs influence an individual's engagement intentions, attitudes towards PSA types, and attitudes towards sustainable behaviors. The results of this study will provide acuity into how varying levels of congruence between product types and sustainable PSAs influence an individual's PSA engagement and sustainable behaviors. Furthermore, this study will also build on the theory of congruence by testing the congruence between types of PSAs and the product types advertised within them. Companies will be able to use the findings from this study to help influence consumer engagement for particular types of PSAs (like recycling or upcycling). In addition, this study will help to explain how individuals in general feel about recycling or upcycling when exposed to different product types in PSAs.

Literature Review

Sustainability in Public Service Announcements

A minimal amount of relevant studies have specifically addressed the use of PSAs within the context of promoting sustainable behaviors (Nolan et al., 2009; Wilson, 2016). According to these relevant studies' findings, a consumer's behavior towards public service announcements in mass media can be changed by using certain persuasion techniques (i.e. removing or disengaging the resistance to change) (Nolan et al., 2009). This shows that, in some contexts, it is possible for PSAs to be used to promote sustainable behaviors (i.e. with certain product types like automobile tires and aluminum cans). Furthermore, research could be conducted for sustainable PSA ads (like one pertaining to recycling and upcycling) by showing that PSAs have the ability to elicit engagement intentions and change in attitudes towards behaviors (like sustainable behaviors).

Additionally, upcycling allows consumers to gain additional value from what would otherwise be trash (Wilson, 2016). When attempting to create products of greater quality, upcycling is valued more so when compared to recycling products. Furthermore, upcycling instills greater value for a product (like a tire or can) when compared to recycling which mainly instills equal or lesser value in a product; thus, validating the reasoning behind comparing recycling PSAs to upcycling PSAs.

Product Types in Public Service Announcements

Research has also looked at environmentally-friendly product types in PSAs (Pickett-Baker and Ozaki, 2008). A consumer's confidence in a sustainable product's performance is tied to his / her pro-environmental beliefs. Products that are inordinately sustainable are difficult to identify although

products manufactured by more sustainable companies are more highly favored by environmentally-conscious consumers (Pickett-Baker and Ozaki, 2008). Furthermore, similar to the observations of this study, consumers are more interested in certain products based on their ideals regarding sustainability (i.e. seeing how product type is influenced by sustainable PSAs). As a result, different types of PSAs may help consumers identify certain products as more sustainable than others.

Theoretical Framework: The Theory of Congruence

The Theory of Congruence

Congruence occurs when “two or more objects, entities, people, or groups share essential characteristics” (Kulkarni et al., 2008). The level of congruence can vary between certain entities based on the similarity that is found within an individual’s conceptual schemas (i.e. mental constructs in an individual’s mind that allow him or her to organize and understand data pertaining to certain ideas). For example, lemons and laptop computers may have a lower level of congruence when compared to lemons and limes, because lemons and limes are likely to be more closely related to one another (i.e. they may have similar conceptual schemas).

Furthermore, it has been established that consumers’ impressions for a given product can be influenced by the level of congruence that is established between stimuli that are related to two given, presented products (Meyers-Levy & Tybout, 1989; Kamins & Gupta, 1994) which is the premise behind this PSA-oriented study being conducted. Lastly, moderate incongruence (or congruent entities with moderate inconsistencies) leads to greater favorable evaluations for a given product when looking at the inconsistencies between to moderately incongruent product-oriented stimuli (Meyers-Levy & Tybout, 1989; Kamins & Gupta, 1994).

Congruence Versus Incongruence

Between schemas, there are varying levels of congruence (i.e. high congruence, mild incongruence, and high incongruence) (Mandler, 1982). These varying levels of congruence can influence a consumer’s affective response via both salience and strength (Meyers-Levy & Tybout, 1989). Furthermore, moderate incongruence (i.e. a handful of attributes that may be considered independent from an individual’s expected schema) has been shown to potentially retain higher positive product evaluations than the pairing of two highly congruent entities due to the application of additional cognitive resources needed to establish the congruity within the individual’s mind (Jagre et al., 2001; Meyers-Levy & Tybout, 1989). An individual rectifies incongruences for moderate incongruence by, both, cognitively elaborating on the entities being paired and not changing either of the current schemas established for each entity. Lastly, high incongruence has been proven to obtain negative judgements for a product or entity while high congruence has been proven to obtain minimally positive judgements.

Congruence in Prior Research

The Theory of Congruence has been used to investigate topics on sustainability (e.g. Meyers-Levy & Tybout, 1989; Dahln, 2005), but this area of study is still underdeveloped; especially when looking at PSAs that promote sustainability and upcycling.

When explaining Mandler’s (1982) theory on the level of congruity between products and product categories, when using moderate incongruence, an individual will fix an incongruent pairing by

heightening his or her amount of cognitive elaboration and, as a result, moderate incongruence will create greater, more favorable assessments for two paired items or concepts when compared to two highly congruent paired items or concepts (Meyers-Levy & Tybout, 1989). Additionally, these findings explain how the theory of congruence works as well as explaining how product information is evaluated by consumers for particular product categories.

How Congruence Applies To This Study

While altering the product type (automobile tires versus aluminum cans) within the PSA type (recycling versus upcycling), mediating both of the independent variables with congruence is essential so that researchers can assess the level of match between both product type and the type of PSA. When the type of PSA is highly congruent with the product type (upcycling PSA featuring an automobile tire) versus highly incongruent with the product type (recycling PSA featuring an automobile tire) the amount of cognition that a consumer puts forth to encode the message can differ for the attitudes towards the PSA and attitudes towards sustainable behaviors (Meyers-Levy & Tybout, 1989; Dahlén, 2005).

There is expected to be a two-way interaction between product type (automobile tires vs. aluminum cans), ad type (recycling PSA vs. upcycling PSA), and the level of congruence (high congruence, moderate incongruence, and high incongruence). When consumers view an upcycling PSA about automobile tires, it may cause them to upcycle their old tires into a new, higher-quality product rather than buying new ones, therefore:

H1: When the congruence between the automobile tire product type and upcycling PSA ad type are highly congruent (compared to the recycling PSA), the attitude towards the ad (PSA) and sustainable behaviors will be positively influenced and ad (PSA) engagement intentions will decrease.

Additionally, when consumers view a recycling PSA about automobile tires, it may cause them to discard their old tires and buy new ones, because recycling will result in a new product that is of equal or lesser value, therefore:

H2: When the congruence between the automobile tire product type and recycling PSA ad type are highly incongruent (compared to the upcycling PSA), the attitude towards the ad (PSA) and sustainable behaviors will be negatively influenced and ad (PSA) engagement intentions will increase.

Lastly, consumers usually recycle aluminum can product types, however, when consumers view an upcycling PSA about aluminum cans, it may cause them to upcycle their used cans rather than recycling them (since upcycling results in a new, higher-quality product as opposed to recycling and higher levels of cognitive elaboration will be used to understand the moderately incongruent connection between upcycling and the aluminum can product type), therefore:

H3: When the congruence between the aluminum can product type and upcycling PSA ad type will be moderately incongruent, the attitude towards the ad (PSA) and sustainable behaviors will be positively influenced and ad (PSA) engagement intentions will increase.

Furthermore, because of what was stated above, it is expected that the level of congruence (high congruence, moderate incongruence, and high incongruence) will mediate the effects of product type (automobile tires vs. aluminum cans) and ad type (recycling PSA vs. upcycling PSA) on PSA engagement intentions, attitudes towards the PSA, and attitudes towards sustainable behaviors. Therefore, it is proposed that:

H4: The impact of product type (automobile tires vs. aluminum cans) and ad type (recycling PSA vs. upcycling PSA) on attitude towards the ad, attitude towards sustainable behaviors, and engagement intentions will be mediated by the level of congruence.

Methods

This study will be conducted using a 2 (recycling-themed PSA versus upcycling-themed PSA) x 2 (automobile tires versus aluminum cans), between-subjects, factorial design via an online experiment.

Participants

According to a G*Power analysis, a total sample size of 132 participants is required for this study. After accounting for participants who may not fully complete the entire survey, the study will consist of 160 participants (N=160) with 40 participants per condition. Participants will be recruited through the Research Participant Pool that is provided by the Department of Advertising and Public Relations at the University of Texas at Austin. Furthermore, students are appropriate for this study, because this population encompasses both Millennial and Generation Z consumers; both of whom tend to be highly engaged in sustainable attitudes and behaviors.

Procedure and Stimulus

Once IRB approval is achieved and pretesting is completed to establish valid measures, the main study will be distributed via Qualtrics. Consent will be required by participants, and then they will be asked to respond to a series of questions about Attitudes Towards Sustainable Behaviors (Bickart & Ruth, 2012) and PSA Engagement Intentions (Rodgers, 2004). Participants will, then, be shown one of four randomly-assigned stimulus PSA advertisements; consisting of a PSA recycling or upcycling advertisement that is featuring either used tires or aluminum cans being portrayed as trash (please view Figure 1). After the exposure of the ad, the participants will be given a set of post-stimulus questions consisting of their attitudes towards the PSA (MacKenzie & Lutz 1989), congruence between the product type and PSA type (Russell, 2002), Attention to the PSA / Involvement in the Message (Laczniak, Muehling, & Grossbart, 1989; Wheeler, Petty, & Bizer, 2005), Attitudes Towards Sustainable Behaviors (Bickart & Ruth, 2012), and PSA Engagement Intentions (Rodgers, 2004). Lastly, the survey will conclude by asking participants a set of demographic-based questions, followed by a debrief that explains the purpose of the study. Furthermore, attention-checking questions will be inserted in various scales to ensure valid responses from survey participants.

Figure 1. Survey Stimuli



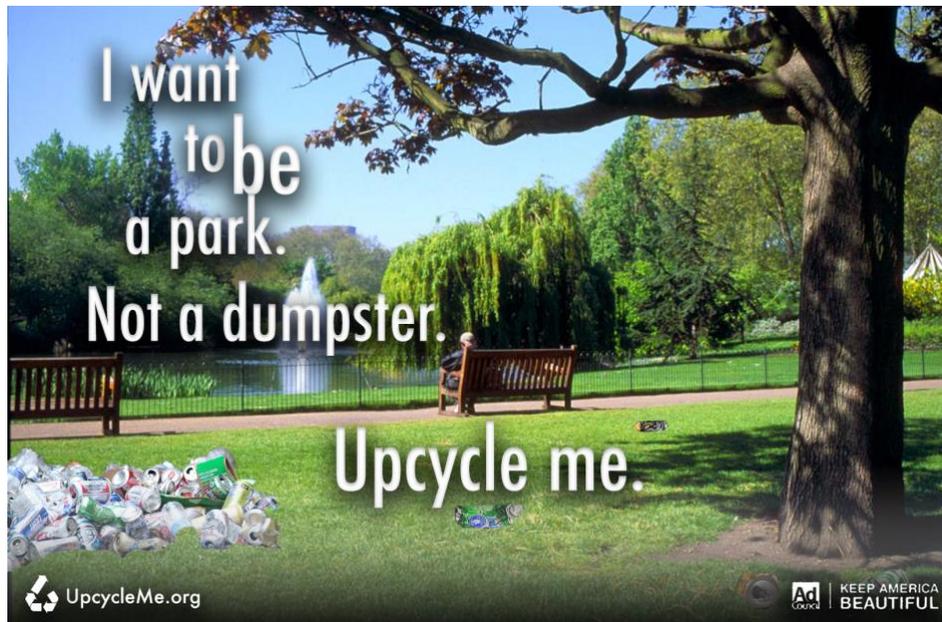
Product Type: Aluminium Cans / PSA Type: Recycle



Product Type: Automobile Tires / PSA Type: Recycle



Product Type: Automobile Tires / PSA Type: Upcycle



Product Type: Aluminium Cans / PSA Type: Upcycle

Variables

Product type (automobile tires vs. aluminum cans) (IV) and ad type (recycling PSA vs. upcycling PSA) (IV) will be used to measure differences in PSA engagement intentions (DV), attitudes towards the PSA (DV), and attitudes towards sustainable behaviors (DV) with congruence (between ad type and product type) acting as a mediating variable. Attention to the Ad / Involvement in the Message will be controlled by using the measure as well as using a prompt to tell the consumer to move to a quiet location to reduce other outside stimuli that would cause cognitive resources to be expended.

Measurement

Attitude Towards the PSA. The respondents' attitudes towards the presented public service announcement was measured using an adapted version of Mackenzie and Lutz's (1989) 4-item semantic-differential scale: Bad (1) to Good (5), Negative (1) to Positive (5), Unfavorable (1) to Favorable (5), and Unpleasant (1) to Pleasant (5) (score = 5).

Attitude Towards Sustainable Behaviors. The respondents' attitudes towards sustainable behaviors were measured using an adapted version of Bickart and Ruth's (2012) 6-item semantic-differential scale: Low Quality (1) to High Quality (5), Unappealing (1) to Appealing (5), Something I Dislike Very Much (1) to Something I Like Very Much (5), Unpleasant (1) to Pleasant (5), Negative (1) to Positive (5), and Unfavorable (1) to favorable (5) (score = 5).

Attention to the PSA. The cognitive resources that a respondent indicates having allocated to a given public service announcement was measured using an adapted version of Laczniak, Muehling, and Grossbart's (1989) 5-item Likert scale. Items include "How much attention did you pay to the presented PSA?", "How much did you concentrate on the presented PSA?", "How involved were you in the presented PSA?", "How much thought did you put into evaluating the presented PSA?", and "How much did you notice the presented PSA?" and range from Not at all (score = 1) to Absolutely (score = 5).

Involvement in the Message (Processing Effort). The self-expressed amount of cognitive effort a person has put into reading a message and thinking about it was measured using an adapted version of Wheeler, Petty, and Bizer's (2005) 4-item Likert scale. Items include "To what degree did you pay attention to the message?", "Did you think deeply about the information contained in this message?", "How much effort did you put into reading the message?", and "How personally involved did you feel with the issue you read about?" and range from Not at all (score = 1) to Absolutely (score = 5).

Product/PSA Type Congruence. The extent to which a viewer believes that the role played by a PSA type (recycling versus upcycling) is relevant to the advertisement's product was measured using an adapted version of Russell's (2002) 3-item "Ad Medium/Type Connection" Likert scale. Items include "The type of PSA used to communicate this ad played an important role in the presented, advertised product", "Without the references to type of PSA used to communicate this ad, the presented, advertised product would be different", and "The type of PSA used to communicate this ad was connected to the presented, advertised product" and range from Not at all (score = 1) to Absolutely (score = 5).

PSA Engagement Intentions. A consumer's likelihood of engaging in a call-to-action that is present in a public service announcement was measured using an adapted version of Rodger's (2004) 3-item semantic-differential scale: I am unlikely to engage (1) to I am likely to engage (5), I would not like more information (1) to I would like more information (5), and I'm not interested in engaging in the presented PSA (1) to I'm interested in engaging in the presented PSA (5) (score = 5).

Lastly, four questions related to age, gender, education, and race will measure the demographics.

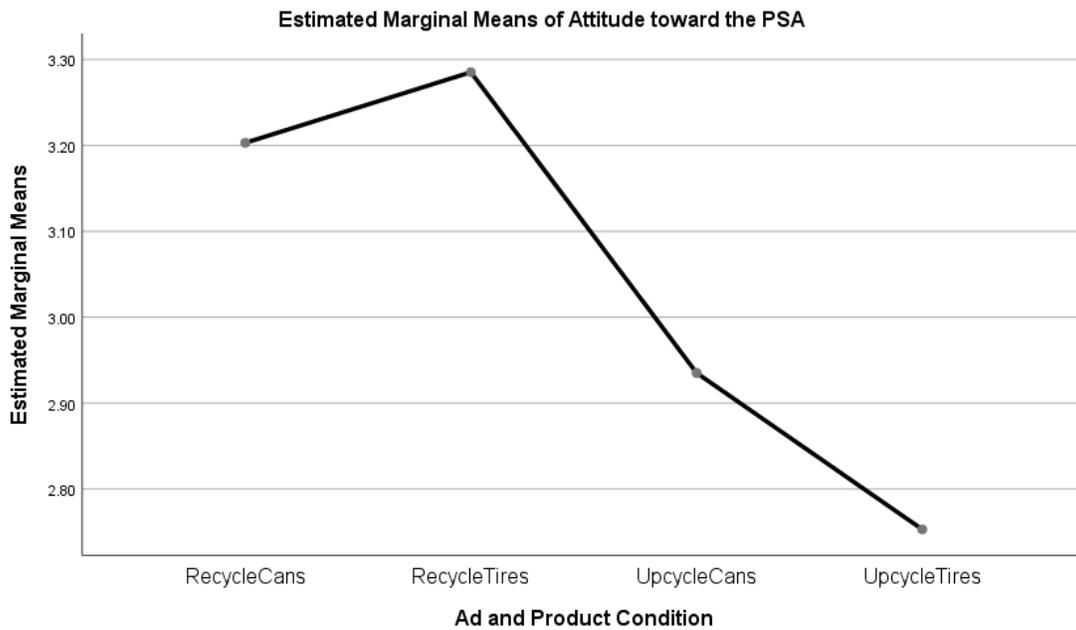
Results

Hypotheses 1 through 3 were concerned with group differences between three key dependent variables. To accommodate the three related variables a multiple analysis of variance (MANOVA) was used to analyze the differences among and between groups. An initial test for equality of covariance was performed to make sure the three dependent variables were not equal across groups (Box's M = 17.82, $p = .498$). Next an overall multivariate test was conducted between the type of ad (upcycle or recycle) and the product type (tires or cans). The multivariate test for ad type was significant ($F = 4.34$, $p < .005$) indicating a main effect for ad type, but there was no significant main effect for product type or the interaction between the two. Further investigation into the main effect for ad type indicated a significant difference ($p < .05$) for the recycle cans group ($M = 3.20$, $SD = .87$) on the upcycle tires group ($M = 2.75$, $SD = .74$) as well as the recycle tires group ($M = 3.28$, $SD = .85$) on the upcycle tires group ($p < .01$) for measures of attitude toward the PSA. These results indicate do not support hypotheses 1 through 3. . A descriptive table of group means (Table 1) as well as a line graph of group differences for attitude toward the PSA (Figure 1) can be found below.

Table 1. Descriptive Statistics for each Dependent Variable on each group condition

	Condition	Mean	Std. Deviation	N
Attitude toward the PSA	Recycle Cans	3.20	0.87	55
	Recycle Tires	3.26	0.85	52
	Upcycle Cans	2.93	0.97	54
	Upcycle Tires	2.75	0.74	56
Attitude toward	Recycle Cans	4.21	0.65	55

Sustainable Behavior	Recycle Tires	4.04	0.67	52
	Upcycle Cans	4.26	0.84	54
	Upcycle Tires	4.16	0.70	56
Engagement Intentions	Recycle Cans	3.41	0.89	55
	Recycle Tires	3.50	0.85	52
	Upcycle Cans	3.48	1.08	54
	Upcycle Tires	3.42	0.97	56



To address mediation variables the authors used the Hayes PROCESS method in place of the more traditional causal steps approach (Baron & Kenny, 1986). The PROCESS method addresses and

accounts for the same pathways as its predecessor to detect indirect effects, but it is not contingent on the direct pathway being significant. This method is ideal for the current study, because it is able to maintain statistical power through a decrease of Type 1 error. This more modern method has also been utilized in a number of recent studies with a variety of variable types and quantities (Jensen, King, Carcioppolo, & Davis, 2012; Osberg, Billingsley, Eggert, & Insana, 2012; Jones, Willness, & Madey, 2014). Similar to how a single multiple regression would be superior to multiple single regressions, the PROCESS model allows for a better story to be told through the data at hand. Multiple single mediation models were run in SPSS using the PROCESS macro, specifically model 4, and included models for 4 groups for each consequent variable of interest described above with congruency as the mediating variable for each. A bootstrap sampling procedure was also utilized with 5,000 samples and a 95% confidence interval for all indirect effects instead of a point estimate through the Sobel test which can be problematic due to statistical power loss (Hayes, 2017).

Although the indirect effect of congruence on engagement intentions was not found to be significant for any of the conditions, congruency was found to have an indirect effect for the Recycling/Tires ($B = 0.38$, $t(192) = 2.85$, $p < 0.005$) and Upcycling/Cans ($B = 0.41$, $t(192) = 3.02$, $p < .005$) groups for attitude toward the PSA as well as the Recycling/Tires ($B = 0.32$, $t(192) = 3.03$, $p < 0.005$) and Upcycling/Cans ($B = 0.37$, $t(192) = 3.14$, $p < 0.005$) groups for attitude towards sustainable behaviors. A full report of all indirect effects can be found in Table 2.

Table 2. Bootstrap Coefficients, Standard Errors, and Confidence Intervals for Significant Mediation Effects

	<i>b</i> (<i>SE</i>)	95% CI for Bootstrap
Recycle Cans		
Attitudes Toward the PSA	.0488(.0353)	-.0067, .1297
Attitudes Towards Sustainability	.0374(.0307)	-.0061, .1136
Engagement Intentions	.0381(.0344)	-.0114, .1224
Recycle Tires		

Attitudes Toward the PSA	.0683(.0384)	.0088, .1573
Attitudes Towards Sustainability	.0613(.0384)	.0062, .1533
Engagement Intentions	.0560(.0438)	-.0069, .1587
Upcycle Cans		
Attitudes Toward the PSA	-.0900(.0471)	-.1956, -.0148
Attitudes Towards Sustainability	-.0752(.0445)	-.1822, -.0094
Engagement Intentions	-.0720(.0508)	-.1905, .0080
Upcycle Tires		
Attitudes Toward the PSA	-.0249(.0342)	-.0943, .0456
Attitudes Towards Sustainability	-.0194(.0296)	-.0899, .0314
Engagement Intentions	-.0190(.0320)	-.0984, .0313

Notes: 5,000 bootstrap samples with 95% CI. Significant indirect effects in bold.

Discussion

The results of this study indicate that students' (Millennials' and Generation Zs') PSA attitudes and behavioral engagement intentions are not influenced by any level of congruence between product types (aluminum cans and automobile tires) that are salient within recycling and upcycling PSA types. Future research should investigate additional product types that may also be salient within certain PSA types and niche markets. Additionally, populations such as sustainability-oriented interest groups and older generations (like Generation X and Baby Boomers) should be examined to see if any influences on attitudes and sustainable behavioral intentions emerge.

Furthermore, the results indicate that, when executing recycling / upcycling PSAs, organizations should use appropriate products within their PSAs but should not rely solely on correct product type within the PSA to sway consumers' attitudes and engagement intentions.

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