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Inbal Stockheim
Danna Tevet
Noam Fenig

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Arison ESG Center, Arison Business School, Reichman University,
HaUniversita Street 8, Herzliya, Israel, esg@runi.ac.il

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Inbal Stockheim

The College of Law and Business

Danna Tevet

Reichman University

Noam Fenig

Reichman University

Inbal Stockheim, The College of Law and Business, Ben Gurion 26, Ramat Gan, Israel. inbalstock@gmail.com

Danna Tevet, Reichman University, Arison School of Business, Reichman University, 8 Ha'universita Street Herzliya, Israel 4610101, dtevet@runi.ac.il

Noam Fenig, Baruch Ivcher School of Psychology, Reichman University, Ha'Universita 8, Herziya, Israel. noam.fenigberman@runi.ac.il

Corresponding Author: Inbal Stockheim, The College of Law and Business, Ben Gurion 26, Ramat Gan, Israel. Email: inbalstock@gmail.com, Tel:+972-52-6656036.

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Abstract

As the environmental crisis deepens, the call for research on sustainable consumption and advocacy grows louder. While some research indicates at a "spillover effect", where eco-friendly behaviors trigger further green actions, findings in this regard are largely inconsistent. Seeking to address these gaps, our research suggests that spillover effects emanate from the enhanced consumption experience and elevated self-perception that result from green consumption. Specifically, the use of eco-friendly products enhances the overall consumption experience, fosters a heightened environmental self-perception, and unveils an uncharted spillover effect: the propensity to advocate for green products.

Across a sequence of four studies, we illustrate how individuals who use products with green attributes, in contrast to non-green alternatives, display a stronger tendency to advocate for these products. We reveal that this phenomenon is mediated by an enhanced consumption experience, subsequently strengthening individuals' self-perception as environmentally conscious. Additionally, we unveil the moderating influence of consumers' perceived autonomy in the consumption decision-making process. Our findings suggest that consumers who believe they autonomously choose to use green products, tend to evaluate their experiences more positively, embrace a stronger green self-perception, and are keener to recommend these products, in contrast to those who are compelled to use them.

Key words: Consumer recommendations, self-perception, green consumption, green attributes, choice autonomy.

Highlights

- Green consumption can—but does not always—trigger further green behavior.
- We explore such green "spillover effects" in the context of product recommendations.
- Green (vs. non-green) attributes elicit a higher likelihood to recommend products.
- The effect is driven by an enhanced experience, which strengthens green self-perceptions.
- The effect is contingent on autonomy in the green consumption decision.

1. Introduction

As consumption becomes a growing threat to our environment, researchers are increasingly seeking to identify means of fostering consumption behaviors that are environmentally friendly, or green (White, Hardisty & Habib, 2019). Indeed, "responsible consumption" was included in the UN's seventeen Social Development Goals (UNDP, 2023).

Studies have identified diverse factors that drive green consumption, including individual traits (Leonidou, Leonidou & Kvasova, 2010; Nguyen, Lobo & Greenland, 2017; Reimers, Magnuson & Chao, 2017; Sreen, Purbey & Sadarangani, 2018); social factors, such as norms related to sustainability and eco-friendliness (Kim & Seock, 2019); and contextual factors, such as characteristics of the consumption situation or the product being consumed (Testa et al., 2021).

Notably, research suggested that green consumption behavior can be self-reinforcing (Tezer & Bodur, 2020). Such consequences, often termed "spillover effects", suggest that participating in a particular action, such as practicing eco-friendly behaviors, can influence the likelihood of engaging in subsequent eco-friendly behaviors (Nilsson, Berquist & Schultz, 2017; Wang et al., 2021). Yet findings in this regard are largely inconsistent, with several studies failing to reproduce such effects (Geiger et al., 2021; Wang et al., 2021). Some research has suggested that a key to understanding these inconsistencies is embedded in consumers' perceived self-perceptions – inferences made by individuals related to understanding their own environmentally conscious identities (Lauren et al., 2019; Van der Werff, Steg & Keizer, 2014; Wang et al., 2021).

In support of this notion, self-perception theory (Bem, 1972) suggests that individuals construct their self-perceptions by observing their own actions and the circumstances in which these actions occur. They rely on external cues to make inferences about their own

sentiments and beliefs. In the context of environmentally friendly consumption, this theory implies that when people engage in pro-environmental practices, they are likely to exhibit positive changes in their environmental behavior. This is because such experiences can lead to a heightened environmental awareness and, consequently, to a more eco-conscious self-perception, as supported by prior research (Cornelissen et al., 2008; Koklic et al., 2019; Wang et al., 2021; Zhang, Ren & Tang, 2023).

Importantly, while some researchers may contend that a green self-perception can be bolstered through positive means, such as by reminding individuals of their previous pro-environmental actions (Geiger et al., 2021; Koklic et al., 2019; Sharma et al., 2022; Tezer & Bodur, 2020; Van der Werff et al., 2014; Wang et al., 2020; Wang et al., 2021) other studies suggest an alternative—negative process. The latter would propose that using environmentally harmful products may trigger feelings of guilt or reactance, ultimately reinforcing the motivation to self-identify as an environmentally conscious individual (Adams, Hurst & Sintov, 2020; Elgaaied, 2012). In this context, our objective is to provide evidence for the positive process, illustrating that green product usage enhances green self-perception, while using a product with environmentally harmful attributes (as opposed to neutral attributes) exerts no influence on green self-perception.

Integrating the aforementioned research on the spillover effects of environmentally conscious behaviors (Mahasuweerachai & Suttikun, 2022; Tezer & Bodur, 2020; Wang et al., 2021; Zhang, Ren & Tang, 2023) with the framework of self-perception theory (Bem, 1972), the current study aims to demonstrate that using a product or participating in a consumption experience that incorporates green attributes, as opposed to neutral or environmentally harmful attributes, will enhance the overall consumption experience, leading to an augmented green self-perception. The result will be a greater propensity to engage in a largely uncharted spillover effect: product recommendations (Hameed, Hussain & Khan, 2022).

Consumer-generated recommendations are important as they are known to have a pivotal role in consumption decisions (Mo, Li & Fan, 2015; Racherla, Mandviwalla & Connolly, 2012; Zhu et al., 2020). Thanks to a willingness to produce online generated recommendations, ordinary consumers can "grab hold of a megaphone" potentially reaching countless others even without having any formal standing as an authority in the domain (McQuarrie, Millet & Phillips, 2013).

Additionally, our study seeks to illustrate that the extent to which consumers perceive the use of green products as resulting from an autonomous choice, rather than an enforced action, moderates the previously mentioned impact of green consumption on the likelihood to recommend green products.

Building upon prior research in consumer decision-making and rooted in the principles of self-determination theory (Ryan & Deci, 2000), it is widely established that consumers highly value autonomy in shaping their consumption decisions and preferences (André et al., 2018; Botti, Iyengar & McGill, 2022; Iyengar & Lepper, 2000; Wertenbroch et al., 2020). Of note, consumers can perceive a behavior to be autonomous even in cases where they don't actively make a choice (Wertenbroch et al., 2020). We therefore propose that when external authorities compel consumers to use green products, the positive spillover effects associated with green product usage—such as an enhanced experience, "greener" perceived self-perception, and a higher propensity to recommend these products— are expected to diminish.

The rest of this paper is organized as follows: The following section, the literature review, offers an overview of previous research on spillover effects, self-perception theory, green product advocacy and choice autonomy. Subsequently, we elaborate on the methodology used and present empirical support for our propositions in a series of four experiments, encompassing various products and consumption contexts.

In the concluding section, we delve into the theoretical and practical implications of our findings, acknowledge the limitations of our current study, and suggest potential avenues for future research.

2. Theoretical Background

2.1. Factors resulting from green consumption: Spillover effects and green self-perception

Many of the factors that influence an individual's tendency to engage in green (as opposed to non-green) consumption are internal. These factors include personal values such as altruism, collectivism and a belief in social justice (Leonidou et al., 2010; Nguyen et al., 2017; Reimers et al., 2017; Sreen et al., 2018; Testa et al., 2013); political orientation (Leonidou et al. 2010; Watkins, Aitken & Mather, 2016); religious beliefs (Sachdeva, 2016); and green self-perception, i.e., the extent to which people perceive themselves as being environmentally friendly (Felix & Braunsberger, 2016). The latter factor is a central focus of the current research and is addressed in further detail below.

In addition to internal characteristics, several studies have identified external or contextual factors affecting consumers' tendency to engage in green (as opposed to non-green) consumption. These factors include social norms (Kim & Seock, 2019), as well as the specific product, the situation in which it is consumed, or the presence of other consumers in the consumption context (Testa et al., 2021).

In particular, researchers have obtained evidence of spillover effects of green consumption. Spillover effects imply that mere use of a green product elicits a greater likelihood of engaging in future pro-environmental behaviors (Lauren et al., 2019; Nilsson et al., 2017; Wang et al., 2021). Yet, evidence of spillover effects of green behavior is largely inconsistent (see Geiger et al., 2021 for a meta-analysis). In fact, several studies have shown

that adoption of a new pro-environmental behavior (e.g., unplugging appliances, reusing shopping bags) has little positive effect—and, in some cases, even negative effects—on people's tendency to engage in subsequent pro-environmental behaviors (Lacasse, 2016; Poortinga, Whitmarsh & Suffolk, 2013; Spence et al., 2010).

A key to resolving prior inconsistencies may lie in the relation between green product use and one's self-perception. In general, one's self-perception can serve a powerful role in driving subsequent behavior. In line with self-perception theory (Bem 1972), individuals draw conclusions about their attitudes, emotions, and internal states by "observing" their own actions and the context in which these actions occur. This process mirrors how an external observer might evaluate them (Bem, 1972; Corlissen et al., 2006; Koklic et al., 2019; Leger & Kang, 2020). Likewise, individuals who engage in environmentally friendly actions may gradually come to "realize" that their pro-environmental, or green behavior, reflects something about their inner selves.

Indeed, in the realm of green consumption, several studies have revealed that prior environmentally friendly actions can shape and encourage future pro-environmental behavior, especially when these actions are linked to an individual's self-perception (Poortinga et al., 2010; Van der Werff, Steg & Keizer, 2013; Van der Werff et al., 2014). Conversely, other research suggested that negative emotions such as guilt or reactance stemming from past environmentally harmful actions can paradoxically enhance the motivation of individuals to identify themselves as environmentally conscious (Adams et al., 2020; Elgaaied, 2012; Lacasse, 2016; Mallett, 2012).

In the current study, we align with the former, more positive perspective, proposing that using a product with green features enhances the consumer's experience and sends a message to the individual that affects his or her self-perception, ultimately leading to an increased perception of having an environmentally friendly self-identity.

In this study, we broaden the current understanding of the relationship between environmental self-perception and the spillover effects of green consumption. We do this by investigating a spillover effect that has received limited attention in previous research but holds the potential to promote eco-friendly behavior—recommending green products to others.

2.2. Green product recommendations

Consumer-generated recommendations have become an indispensable tool to guide and assist in consumption-related decisions, and they are known to influence purchase intentions as well as actual consumption behaviors (Chevalier & Mayzlin, 2006; Zhu & Zhang, 2010). It seems that consumers trust peer recommendations and find these recommendations to be sincere (Perez et al., 2020; Racherla et al., 2012). Given the vast influence of peer-generated recommendations on others' behavior, it seems plausible that encouraging consumers to contribute more recommendations of green products could potentially serve as an effective means of advocating for green consumption.

A growing body of literature has recently started to delve into consumers' motivations and behaviors related to recommending green products. For instance, one study revealed that individuals who prioritize environmental values are more inclined to recommend green products to others compared to those who do not share or claim to share such values (Allen & Spialek, 2018). In another recent study, it was directly shown that sustainability-related features enhance the satisfaction of hotel guests during their stay, subsequently increasing the likelihood of them sharing positive word of mouth about the hotel (Hameed et al., 2022). Furthermore, in a separate study examining the sentiment of hotel guests' reviews regarding sustainability features, researchers found that although only 6.8% of guests explicitly mentioned these features in their reviews, they tended to express positive sentiments about them. Notably, readers perceived reviews that highlight sustainability features as more

helpful compared to those that did not mention such features (Bigné, Zanfardini & Andreu, 2020; Brazytė, Weber & Schaffner, 2017).

Taken together, these findings point to a relationship between green self-perception and the propensity to post recommendations of green products (Allen & Spialek, 2018; Chen & Peng, 2014) and suggest that consumers generally view green product attributes in a positive light (Bigné et al., 2020; Brazytė et al., 2017; Hameed et al., 2022), which in turn increases their inclination to recommend these products (Hameed et al., 2022). Combining these findings with the spillover effects of green consumption behaviors, we put forward the following hypotheses:

H1: Consuming a product with a green (vs. non-green) attribute will result in a greater likelihood to recommend the product.

H2a: Consuming a product with a green (vs. non-green) attribute will lead to an enhanced consumption experience.

H2b: The enhanced consumption experience mediates the effect of green (vs. non-green) product attributes on likelihood to recommend the product.

H2c: The enhanced consumption experience leads to elevated green self-perception which, in turn, increases the likelihood to recommend the product.

2.3. The role of autonomy

Prior research provides indication that spillover effects of green consumption may depend on consumers' perceptions of choice autonomy (Geiger et al., 2021)—defined by Wertenbroch et al. (2020) as "consumers' ability to make and enact decisions on their own, free from external influences imposed by other agents" (p. 430).

In line with self-determination theory (Ryan & Deci, 2000), individuals inherently possess growth tendencies that serve as the foundation for their self-related motivation and the integration of their personalities (Ryan & Deci, 2000, p. 68). One important motivator

within this framework is the need for autonomy, which revolves around whether individuals embrace a particular behavior because they genuinely perceive it as meaningful and harmonious with their own interests, or alternatively, engage in it solely as a response to external influences like coercion, threats, deadlines, or incentives.

Indeed, consumers typically prefer more, over less, perceived choice freedom and respond more positively to offers involving perceived choice, as opposed to those assigned by external forces (Botti & Iyengar, 2006; Botti, Iyengar & McGill, 2022; Chernev, Böckenholt & Goodman, 2015). Conversely, when people feel that their choice autonomy has been compromised, they may experience psychological reactance—which can lead to contrary attitudes and behaviors toward the source, consequently decreasing willingness to purchase and lowering satisfaction (Brehm, 1966; Clee & Wicklund, 1980; Zemach-Rugar & Fitzsimons, 2005). In line with this idea, studies have shown that regulatory policies that aim to enforce green consumption behaviors without preserving autonomy (e.g., taxation or regulatory bans; Wolff & Schoenherr, 2011) may have undesirable side effects such as the reduction of moral motivation to engage in other pro-environmental behaviors (Nyborg, Howarth & Brekke, 2006). In contrast, positive outcomes are more closely associated with the internalization of values, as exemplified in the case of pro-environmental action (Green-Demers, Pelletier & Menard, 1997).

Taking these ideas together, we propose that the hypothesized spillover effects of green consumption on likelihood to recommend, via consumption experience and green self-perception, are dependent on consumers' recognition that the initial consumption choice is autonomous rather than enforced. More specifically, we offer the following hypotheses:

> **H3a:** A green product attribute will lead to an enhanced consumption experience and to greater likelihood to recommend the product when choice is autonomous but not when it is enforced.

H3b: An enhanced consumption experience will lead to "greener" self-perception and drive an increased likelihood to recommend the product when choice is autonomous but not when it is enforced.

3. The Current Research

3.1. Conceptual model

The current research aims to illustrate the factors leading to an increased likelihood to recommend green products (e.g., Allen & Spialek, 2018; Hameed et al., 2022), namely an enhanced consumption experience which leads to "greener" self- perception. Importantly we suggest that this effect remains valid when consumers view their use of green products as a matter of autonomous personal choice rather than an imposed behavior. The conceptual model presented in Figure 1 illustrates this rationale:

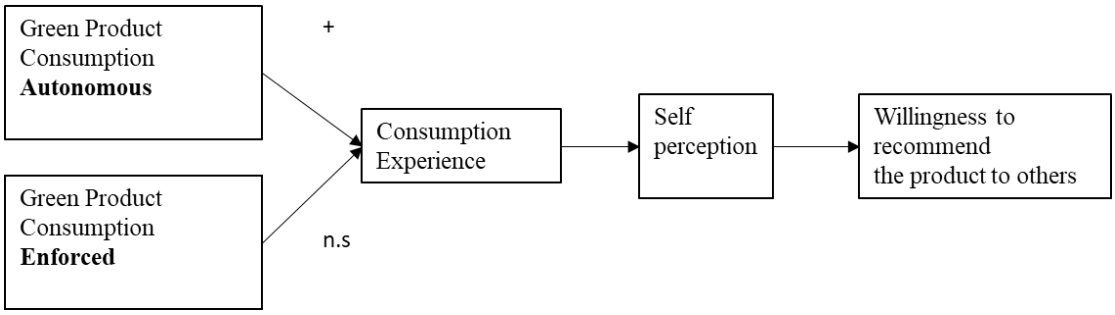

Figure 1 - Conceptual Model

3.2 Materials and methods

In all our experiments we present common everyday consumption scenarios featuring products or services. We randomly assign participants into manipulation conditions and employ a between-subjects design to examine the differences between conditions. Specifically, each condition emphasizes a particular aspect of the product/service describing it as either green, neutral, or environmentally harmful (studies 1,2). We then examine

reported outcomes of these manipulations, including the likelihood to recommend, valence of the consumption experience, as well as reported green self-perception. These procedures help to establish our main effect and serial mediation path, aligning with H1, H2a, H2b and H2c. In studies 3 and 4, we aim to investigate the moderating effect of choice autonomy to confirm hypotheses H3a and H3b.

4. Study 1: The Effect of a Green vs. Environmentally Harmful Attribute on Consumption Experience and Likelihood to Recommend

Study 1 had several goals. First, we aimed to show that consumers are more likely to recommend a product with a green attribute than to recommend a similar product with an environmentally harmful attribute (supporting H1). Our second goal was to demonstrate that using a green, compared with an environmentally harmful product, leads to an enhanced consumption experience (supporting H2a). Our third goal was to reveal the mediating role of consumption experience on likelihood to recommend (H2b).

4.1. Method

4.1.1. Participants and design

Sample size was determined using G-Power software (Faul et al., 2007; Faul et al., 2009) for independent sample t-tests with power of 0.95 which indicated a minimum sample size of 176 participants.

One hundred ninety-three participants, recruited from an online panel **(**72% female; M_{age} =36.98, *SD* = 12.52), completed the questionnaire in exchange for $0.5 each. Participants were each randomly assigned to one of two between-subjects conditions, corresponding to different product attributes: green vs. environmentally harmful.

4.1.2. Procedure

Participants were asked to imagine a scenario in which they went on a picnic with a friend and ordered a picnic basket with homemade salads and sandwiches from a local restaurant. All participants read a mixed-valence description of the picnic: we intentionally included both positive and negative descriptions of the picnic to allow participants to form a subjective evaluation of the entire experience. (See Appendix A for the full description of the experience).

Next, participants were presented with information about the content of the picnic basket; these descriptions corresponded to participants' respective conditions. Specifically, participants in the green attribute condition were told that the restaurant had provided disposable plates, bowls and cutlery that are *eco-friendly and fully recyclable*. Participants in the harmful condition were told that the restaurant had provided them with *plastic plates, bowls and cutlery that are harmful to the environment and cannot be recycled.*

Next, building on Zeithaml, Berry and Parasuraman (1996), and on Reichheld (2003), participants rated the extent to which they were likely to recommend the picnic basket to others on a 7-point scale (1 = "definitely won't"; 7 = "definitely will") and evaluated the entire picnic experience (1 = "extremely negative"; 7 = "extremely positive").

As a manipulation check, we asked participants which plates and cutlery were provided with the picnic basket (1 = "eco-friendly and recyclable", 2 = "harmful to the environment and cannot be recycled", 3 = "I don't remember").

Finally, we asked for some demographic information (gender, age, and income level).

4.2. Results

4.2.1. Manipulation check

A Chi square test for the distribution of categorical variables revealed that 98% of the participants in the green condition and 97% of the participants in the harmful condition answered the manipulation check question correctly (χ^2 =182.42, $p < .001$).

4.2.2. Likelihood to recommend

In line with H1, an independent sample t-test demonstrated that participants in the green condition indicated a significantly higher likelihood to recommend the picnic basket (M = 5.76, SD = .96) compared with participants in the harmful condition (M = 4.41, SD = 1.21, $t(191) = 8.55$, $p < .001$).

4.2.3. Consumption experience

In line with H2a, an independent sample t-test indicated that participants in the green condition evaluated the picnic experience more positively (M = 5.72, SD = .78) than did participants in the harmful condition (M = 4.86, SD = .99, $t(191) = -6.73$, $p < .001$).

4.2.4 The mediating role of consumption experience

In line with H2b, a mediation analysis using the PROCESS bootstrapping method (Model 4, with 5,000 resamples; Hayes 2022) confirmed the mediating role of consumption experience in the effect of experimental conditions (green vs. harmful attribute) on participants' likelihood to recommend the picnic basket (a continuous measure). The experimental condition was the independent categorical variable (0=harmful, 1=green), and consumption experience (continuous measure) served as the mediator. First, the effect of experimental conditions on the mediator - consumption experience, was found to be significant (b = .86, SE = .13, 95% CI: [.6103, 1.1159]). Significant effects on likelihood to recommend were also found when experimental conditions (b = .61, SE = .13, 95% CI: [.3574, .8529]) and consumption experience (b = .86, SE = .06, 95% CI: [.7350, .9865]) were present in the model. Finally, findings showed a significant indirect effect through consumption experience (b = .74, SE = .12, *95%* CI: [.5163 to .9983]). The direct effect of experimental condition on likelihood to recommend was also significant (a = .61, SE = .13, 95% CI: [.3574, .8529]). These findings provide evidence for the positive effect of green

product attributes compared to harmful product attributes on consumers' experience which in turn lead to higher likelihood to recommend the product.(H2b)

4.3. Discussion

The results of study 1 support H1, H2a and H2b and provide evidence that green consumption can elicit spillover effects (Giebelhausen et al., 2016; Taufik, Bolderdijk & Steg, 2015; Tezer & Bodur 2020)—while showing that these spillover effects extend to the domain of product recommendations.

It is important to note that the reason for including an environmentally harmful product condition was to eliminate the possibility that the guilt triggered by using such a product would increase individuals' motivation to identify themselves as environmentally conscious, as suggested in prior research (Adams et al., 2020; Elgaaied, 2012; Lacasse, 2016; Mallett, 2012). Our current findings have, to this point, dispelled this notion.

However, while we have clarified this point, we also recognize that when a product is explicitly labelled as harmful, consumers may naturally view it less favourably and be less inclined to recommend it, in comparison to a product described as beneficial. Therefore, in our upcoming study, we introduced a neutral attribute condition, where the product is depicted as having neither harmful nor beneficial environmental effects.

5. Study 2: The Effects of Green (vs. Neutral or Harmful) Attributes on Consumption Experience, Green Self-perception, and Likelihood to Recommend

The aims of Study 2 were as follows: First, we sought to reinforce the findings of Study 1 by conducting another examination of H1, H2a and H2b, only this time, using a different consumption scenario. In this case, we added a neutral product, one without either green or harmful attributes, for a more comprehensive assessment. Second, and crucially, we

aimed to elucidate the role of green self-perception in the relationships between green consumption, experience, and likelihood to recommend (H2c).

5.1. Method

5.1.1. Participants and design

Sample size was determined using G-Power software (Faul et al., 2007; Faul et al., 2009) for one-way fixed effects ANOVA with power of 0.95 which determined a minimum sample size of 252 participants.

Three-hundred and four participants of an online panel **(**63% male; M_{age} =38.05, *SD* = 12.56) completed the questionnaire in exchange for $0.5 each. Participants were each randomly assigned to one of three product attribute conditions—green, neutral (control), or harmful—in a between-subjects design.

5.1.2. Procedure

All participants were given the following description of a consumption experience: "Imagine that you are traveling and need to do your laundry in a foreign city. You find a laundromat close to where you are staying. You buy a detergent pack at the laundromat's vending machine."

Then, each participant read a description of the detergent corresponding to his or her experimental condition. Participants in the green condition were told the detergent was "*eco-friendly and phosphate-free, packaged in a recyclable pack"*. Participants in the harmful condition were told the detergent was "*polluting, high in phosphates, and packaged in a plastic pack"*. Participants in the neutral (control) condition were told the detergent was one they "*recall seeing in the supermarket recently*".

Next, all participants read a description of their experience at the laundromat, comprising both positive and negative elements, as in the previous study. Again, the purpose

of this mixed description was to give participants an opportunity to subjectively evaluate their overall experience at the laundromat (see Appendix A for the complete text of the scenario).

Participants were then asked to rate, on a 7-point scale (1 = "definitely won't"; 7 = "definitely will") the extent to which they were likely to recommend the laundromat to friends following their experience. Then, we asked them to evaluate their experience at the laundromat (i.e., their "consumption experience") on a scale of 1-7 (1 = "extremely negative"; 7 = "extremely positive").

Finally, we asked participants two questions pertaining to their green self-perception, building on prior measures that have been used to examine environmental self-identity and behavior (Lacasse, 2016; van der Werff et al., 2014), and in line with the approach of Kleine et al., (1993), who refer to an overall self-perception as composed of both thoughts and acts. Specifically, we asked participants to rate, on 7-point scales (1 = "not at all"; 7 = "very much so"), the extent to which they perceived themselves as individuals who care about the environment, and the extent to which they perceived themselves as being willing to take proactive measures to protect the environment. The items were highly correlated (r = .548, p < .001) and were averaged into a single variable.

5.2. Results

5.2.1. Likelihood to Recommend

An ANOVA test revealed an effect of experimental conditions on participants' likelihood to recommend the laundromat (F(2,301) = 3.24, p = .041, η2 = .021). As expected, participants in the green condition were more likely to recommend the laundromat (M_{green} = 5.71, SD = 1.15) than were those in the harmful condition ($M_{harmful}$ = 5.25, SD = 1.54, p = .012). Interestingly, the control and harmful conditions did not differ ($M_{control}$ = 5.43, SD = 1.23, p = .316).

5.2.2. Consumption experience

An additional ANOVA revealed a significant effect of experimental conditions on the consumption experience ($F(2,301) = 5.41$, $p = .005$, $\eta 2 = .035$). As expected, participants in the green condition evaluated their experience at the laundromat more positively ($M_{green} = 5.77$, $SD = 1.07$) than did participants in the other two conditions ($M_{harmful} = 5.29$, $SD = 1.41$, $p = .004$; $M_{control} = 5.31$, $SD = 1.03$, $p = .006$). Here, again, there was no significant difference between the harmful and the control conditions ($p = .876$).

5.2.3 Effect of experimental conditions on green self-perception

An ANOVA test revealed a significant effect of experimental conditions on participants' green self-perception ($F(2,301) = 3.58$, $p = .029$, $\eta 2 = .023$), such that those in the green condition had a higher score ($M_{green} = 5.81$, $SD = .85$) than did those in the harmful condition ($M_{harmful} = 5.55$, $SD = .94$, $p = .051$) and in the control condition ($M_{control} = 5.47$, $SD = 1.03$, $p = .011$). Again, the control and harmful conditions did not differ ($p = .551$).

5.2.4. Mediation analyses

We conducted two separate mediation analyses using the PROCESS bootstrapping method (Model 4, with 5,000 resamples; Hayes, 2022), to examine the effect of the experimental conditions on likelihood to recommend through the mediator (H2b). In our analyses, experimental conditions (i.e., product attributes) were coded as 1 – control; 2 – green; 3 – harmful. First, we found a significant indirect effect of experimental conditions on likelihood to recommend the product through consumption experience.

The effect was significant for the green condition ($b = .31$, $SE = .10$, 95% CI: [.1169, .5213]) but not for the harmful condition ($b = -.02$, $SE = .12$, 95% CI: [-.2600, .2031]). The direct effect was insignificant for both green ($a = -.03$, $SE = .15$, 95% CI: [-.3239, .2612]) and harmful attributes ($a = -.17$, $SE = .15$, 95% CI: [-.4603, .1218]).

We also found a significant indirect effect of experimental conditions on likelihood to recommend the product through green self-perception (the second mediator), such that the

effect was significant for the green condition (*b* = .21, *SE* = .09, 95% CI: [.0508, .3997]) but again, not for the harmful condition (*b* = .05, *SE* = .09, 95% CI: [.-1097, .2276]). Once again, there was no direct effect of experimental conditions on likelihood to recommend (green: *a* = -.07, *SE* = .17, 95% CI: [-.2602, .4006], harmful: *a* = -.24, *SE* = .17, 95% CI: [-.5651, .0938]).

Finally, we ran a serial mediation analysis (H2c full path) using the PROCESS bootstrapping method (Model 6, with 5,000 resamples; Hayes, 2022). The analysis confirmed the serial mediation of both consumption experience and green self-perception in the effect of experimental conditions on likelihood to recommend.

The entire indirect mediation path (product attributes > experience>green self-perception>likelihood to recommend) was supported, in line with H2c, where the effect of the green condition was significant (*b* = .05, *SE* = .02, 95% CI: [.0117, .1012]), but not the effect of the harmful condition (*b* = -.003, *SE* = .02, 95% CI: [-.0349, .0407]).

5.3. Discussion

The results of Study 2 support H1, and lend robustness to the results of Study 1, by showing that consumers are more likely to recommend a product associated with a green attribute than to recommend a similar product associated with either *a neutral* or harmful attribute. Additionally, the presence of a green attribute positively affected the consumption experience (H2a), which in turn, strengthened the consumer's green self-perception—and these effects enhanced likelihood to recommend the product (H2b, H2c).

The latter findings are in line with previous research showing that a positive consumption experience can influence consumers' perception of their own self-identity (Kleine, et al., 1993). Notably, our findings expand prior research on factors that influence one's green self-perception (e.g., Van der Werff et al. 2014; Whitmarsh & O'Neill, 2010), by suggesting that mere consumption of a green product—and the positive experiences associated with such consumption—may strengthen a person's green self-perception.

Interestingly, our findings suggest that consumers were no less likely to recommend a service (a laundromat) with an environmentally harmful attribute (highly polluting detergent) than to recommend a service with a neutral attribute (detergent one may recall seeing in the supermarket). Likewise, usage of an environmentally harmful product did not have a positive effect on consumers' green self-perception, as compared with usage of a neutral product. Again, as in Study 1, our findings challenge prior research showing that people who use environmentally harmful products become more environmentally conscious as a mechanism to reduce their feelings of guilt (Lacasse, 2016).

6. Study 3: The Effect of Decision Autonomy on Consumption Experience and Likelihood to Recommend

Having established the hypothesized relationships between consumption of a green (vs. non-green) product, consumption experience, green self- perception, and likelihood to recommend the product (H1, and H2a, H2b, H2c), the primary focus of this study was to investigate how decision autonomy acts as a moderating factor in these relationships. For further analysis we focus on a scenario in which all participants used a green product. In accordance with H3a, we expected that consumers who perceived themselves as having *chosen* to use the green product would evaluate their consumption experience more favorably, and would be more likely to recommend the product, compared with consumers who perceived they had been obligated to use the product. We note that, according to the findings of Tezer and Bodur (2020), individuals can perceive their consumption behavior as autonomous when they do not *actively* make a choice—provided they do not feel that the behavior has been forced upon them.

6.1. Method

6.1.1. Participants and design

Sample size was determined using G-Power software (Faul et al., 2007; Faul et al., 2009) for independent sample t-tests with power of 0.95 which determined a minimum sample size of 176 participants.

Two-hundred participants were recruited from an online panel (M_{age} = 38.59, *SD* = 14.40; 58% females). They completed the survey in return for £0.4 each. Participants were each randomly assigned into one of two between-subjects conditions, corresponding to the manner in which the consumption decision was made (perceived decision autonomy: choice vs. enforced).

6.1.2. Procedure

Participants were given a description of staying in a hotel room while out of town. They were told they had taken a shower in the hotel's bathroom and had dried off using a hotel towel that felt *different* compared to regular hotel towels.

Participants were then presented with an additional description of the towel, corresponding to their experimental condition. Participants in the choice condition were told that "after they had finished showering, they reached for a towel and noticed two sets of towels on the counter, from which they decided to *choose* the towel with a sign that read "made from 100% recycled cotton to reduce waste and protect the environment". In contrast, participants in the enforced condition were told they observed a sign on the counter saying: "Due to city regulations, guests *must* use towels made from 100% recycled cotton to reduce waste and protect the environment". As in previous studies, we provided positive and negative descriptions of the entire hotel experience (e.g., the room is spacious, but the lighting is somewhat dim; see Appendix A for the detailed mixed-valence description).

Next, participants were asked to report, on 7-point scales, the likelihood that they would recommend the hotel to others (1 = "extremely unlikely"; 7 = "extremely likely") and

their evaluation of their overall experience at the hotel (1 - “extremely negative”; 7 - “extremely positive”).

6.2. Results

6.2.1. Likelihood to Recommend

We used an independent sample t-test to examine the effect of choice (vs. enforced) condition on likelihood to recommend. As expected, participants in the choice condition indicated a higher likelihood to recommend the hotel ($t_{(198)}$ = -3.12; M = 4.91, SD = 1.03), compared with participants in the enforced condition M = 4.41, SD = 1.21, p = .002, d = -.441).

6.2.2. Consumption experience

We used an independent sample t-test to examine the effect of choice (vs. enforced) condition on the reported experience. Participants in the choice condition rated their experience with the hotel more positively ($t_{(198)}$ = -2.54, M = 4.99, SD = .98) than did participants in the enforced condition (M = 4.63, SD = 1.03, p = .012, d = -.360).

6.2.3. Mediation analysis

A mediation analysis using the PROCESS bootstrapping method (Model 4, with 5,000 resamples; Hayes 2022) confirmed an indirect effect of decision autonomy (enforced = 0; choice = 1) through consumption experience on participants’ likelihood to recommend the hotel. The effect of choice autonomy on the mediator - consumption experience, was significant (b = .36, SE = .14, 95% CI: [.0814, .6433]). Findings showed a significant indirect effect of choice autonomy through consumption experience on likelihood to recommend (b = .32, SE = .13, 95% CI: [.0729, .5784]). The direct effect was no longer significant (a = .18 SE = .10, 95% CI: [-.0197, .3790]).

6.3. Discussion

Study 3 showed that, in line with H3a, a green product attribute will lead to an enhanced consumption experience and to greater likelihood to recommend the product when choice is autonomous but not when it is enforced. Thus, lack of choice autonomy appears to diminish the positive effect of green attributes on the enhanced product experience, acting as a moderating variable in this relationship.

7. Study 4: The Effect of Decision Autonomy on Likelihood to Recommend through Enhanced Experience and Green Self-perception

The aim of Study 4 was to show that an enhanced consumption experience will lead to a "greener" self-perception and drive an increased likelihood to recommend the product when choice is autonomous but not when it is enforced (H3b).

7.1. Method

7.1.1. Participants and design

Sample size was determined using G-Power software (Faul et al., 2007; Faul et al., 2009) for independent sample t-tests with power of 0.95 which determined a minimum sample size of 176 participants.

One hundred ninety-six participants were recruited from an online panel (M_{age} = 37.43, *SD* = 11.11, 64.3% males). Participants completed the survey in return for $0.5 each. As in Study 3, participants were each randomly assigned to one of two between-subject conditions, corresponding to different autonomy conditions: choice vs. enforced.

7.1.2. Procedure

Participants read a scenario, like the one used in Study 2, in which they were told to imagine buying a detergent pack at a laundromat vending machine. Participants in the choice condition were told "the laundromat uses several types of detergents, but they *chose to buy* an eco-friendly phosphate-free detergent that comes in a recyclable pack". Participants in the

enforced condition were told that, "due to city environmental regulations, they *must* buy a pack of eco-friendly phosphate-free detergent, which comes in a recyclable pack".

Next, participants were asked to report, on 7-point scales, their experience at the laundromat (1 = "extremely negative"; 7 = "extremely positive") and the likelihood that they would recommend the laundromat to others (1 = "I definitely won't"; 7 = "I definitely will").

Next, we asked participants to rate, on seven-point scales, the extent to which they perceived themselves as caring about the environment, and as taking proactive actions to protect the environment (1 - "not at all"; 7 - "very much so"). These two items were averaged into a single measure of green self-perception (r = .525, p < .001). Finally, participants reported their age, gender, and income.

7.2. Results

7.2.1. Likelihood to recommend

An independent sample *t*-test revealed that participants in the choice condition were significantly more likely to recommend the laundromat than were participants in the enforced condition ($t_{(194)}$ = 2.76, M_{choice} = 5.87, SD_{choice} = .944; $M_{enforced}$ = 5.45, $SD_{enforced}$ = 1.16, p = .006, d = 394).

7.2.2. Consumption experience

Another independent sample *t*-test revealed that participants in the choice condition rated their consumption experience at the laundromat significantly more positively than did participants in the enforced condition ($t_{(194)}$ = 2.82, M_{choice} = 5.97, SD_{choice} = .963; $M_{enforced}$ = 5.58, $SD_{enforced}$ = .988, p = .005, d = .402).

7.2.3. Green self- perception

A third independent sample *t*-test revealed that participants in the choice condition reported significantly higher ratings of their green self-perception than did participants in the

enforced condition ($t_{(194)}$ = 2.64, M_{choice} = 5.77, SD_{choice} = .927; $M_{enforced}$= 5.38, $SD_{enforced}$ =1.115, p = .009, d = .377).

7.2.4. Serial mediation analyses

We conducted two separate mediation analyses using the PROCESS bootstrapping method (Model 4, with 5,000 resamples; Hayes 2022), to examine the effect of the experimental conditions (choice autonomy: 0 = enforced, 1 = choice) on likelihood to recommend through each of the mediators – consumption experience and green self-perception. First, we found a significant indirect effect of experimental conditions on likelihood to recommend the product through consumption experience (the first mediator) (*b* = .26, *SE* = .10, 95% CI: [.0739, .4501]). The direct effect was insignificant (*a* = .15, *SE* = .12, 95% CI: [-.0856, .3919]). We also found a significant indirect effect of experimental conditions on likelihood to recommend the product through green self-perception (the second mediator), (*b* = .25, *SE* = .09, 95% CI: [.0676, .4273]) but again there was no direct effect of experimental conditions on likelihood to recommend (*a* = .17, *SE* = .12, 95% CI: [-.0692, .4053]).

Finally, we ran a serial mediation analysis using the PROCESS bootstrapping method (Model 6, with 5,000 resamples; Hayes 2022). The analysis confirmed serial mediation roles of both consumption experience and green self-perception in the effect of experimental conditions on likelihood to recommend (consumption choice > experience>green self-perception>likelihood to recommend). The effect was fully mediated by consumption experience (*b* = .09, *SE* = .04, 95% CI: [.0260, .1719]). The direct effect of consumption choice on likelihood to recommend was insignificant (*a* = .08. *SE* = .11, 95% CI: [-.1342, .2963]).

7.3. Discussion

The results of Study 4 provide further robustness to the findings of Study 3, showing that, in line with H3a, a green product attribute led to an enhanced consumption experience and to greater likelihood to recommend the product when choice was autonomous but not when it is enforced. Furthermore, these results corroborate H3b, indicating that the enhanced consumption experience led to "greener" self-perception and drove an increased likelihood to recommend the product/service when choice was autonomous but not when it was enforced.

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8. General Discussion

8.1. Conclusions

Previous literature found that mere use of a product containing a green attribute can trigger subsequent green behaviors – this is often termed as the spillover effect (e.g., Tezer & Bodur, 2020; Van der Werff et al., 2014). But evidence of this has been inconsistent, with several studies failing to reproduce such effects (e.g., Geiger et al., 2021). In an attempt to address these disparities, and in line with propositions based on self-perception theory (Bem, 1972), one goal of this research was to show that the occurrence of a spillover effect is contingent upon a consumer's "greener" self-perception.

Importantly, whereas spillover effects have previously been mentioned with regard to subsequent purchasing behavior (e.g., Lanzini & Thøgersen, 2014; Wang et al., 2022), and other environmentally friendly actions such as waste sorting (Wang et al., 2020), the present research sets its focus on an often-disregarded type of spillover effect - consumer likelihood to recommend green products (Studies 1 and 2).

A third objective of this research, grounded in self-determination theory (Ryan & Deci, 2000), sought to demonstrate that spillover effects, such as recommending green products, manifest primarily when the decision to consume them is perceived to be autonomously driven. This perception can either enhance the formation of desired green self-

perception effects or diminish them when the use of a green product is chosen vs. enforced, as explored in Studies 3 and 4.

8.2. Theoretical Contribution

Our research contributes to the existing literature in several significant ways. First, we illustrate that the spillover effect stemming from the usage of green products can impact consumers' likelihood to recommend green products to others. This aspect of consumer behavior, despite its importance to consumption decisions, has received limited research attention in the context of green consumption, with only a few exceptions, such as the studies conducted by Allen & Spialek (2018) and Chitra (2007), as noteworthy examples.

Furthermore, we emphasize the significance of green product advocacy (Rahadian et al., 2020; Wu & Chiang, 2023) as a central tool for promoting potentially desired customer behaviors.

Secondly, our results shed light on the connections between green product usage and green self-perception. Consistent with self-perception theory (Bem, 1972; Corlissen et al., 2006; Koklic et al., 2019; Leger & Kang, 2020), individuals construct perceptions of themselves from their own experiences, which serve as external cues to infer their internal attitudes, particularly concerning green product consumption (Whitmarsh & O'Neill, 2010). We demonstrated that these perceptions can indeed motivate green product advocacy.

Thirdly, we contribute to the literature on choice autonomy (Wertenbroch et al., 2020). In line with self-determination theory (Ryan & Deci 2000), we demonstrate that externally enforced behavior, compared to behavior driven by personal choice, is less likely to elicit favorable consumption experiences as well as a green self-perception, thereby attenuating the consumer's likelihood of recommending the green consumption experience.

8.3. Implications for managers and consumers

Consumers and policy makers stand to gain from green product advocacy and the potential that it would propagate further environmentally conscious behaviors amidst its target audiences. Green product advocacy could potentially contribute to bridging the intention-behavior gap, which pertains to the disparity between what consumers express regarding their environmental concerns and their actual actions (Sultan et al., 2020).

But policy makers should be aware that using externally induced policies such as taxes, fines or regulations may compromise consumers' perceptions of autonomy, thus reducing consequent desired effects on consumers. Indeed, prior studies have found that such policies may have negative side effects, leading to increases in environmentally harmful consumption in domains not targeted by the regulations (Nyborg et al., 2006).

Companies and organizations catering to consumers can mold their brand image, media exposure, and strategic initiatives by emphasizing the idea that consumers have the liberty to choose and use eco-friendly products at their own discretion. They can achieve this by offering test kits and trial options, effectively taking the initial step towards consumer engagement. This approach helps bridge the gap between consumers' intentions and actual behaviors when it comes to adopting green products and services, as it plants the notion that subsequent purchases might occur. In this way, consumers can eventually become advocates who actively promote these products, a phenomenon referred to as "Megaphone Effect" (McQuarrie et al., 2013).

8.4. Limitations and Future Research

Our research proposes a method to induce product recommendations, but it does not explore how these recommendations can effectively encourage recipients to adopt subsequent green consumption behaviors. This topic falls outside the boundaries of our current study but presents an important avenue for future research. In this regard, it is worth noting previous

research that showed how recommendations based on environmental aspects are perceived as more helpful and have a greater impact on readers' purchase intentions compared to reviews that concentrate on other product characteristics (Bigné et al., 2020).

Second, whereas our research points to the momentary change elicited by green consumption experiences on one’s green self-perception, it does not assume that such effects are enduring or result in stable attitudes over time. A significant avenue for future research could involve examining the depth and persistence of changes in self-perception and identifying which effects, if any, remain over time. Furthermore, exploring the variety of prosocial behaviors that may emerge due to altered green self-perceptions would also be valuable.

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Appendix A

Study 1: Mixed-valence experience description

The food is excellent, and the restaurant included complimentary walnuts and pumpkin seeds to add to the salad. However, they forgot to add extra napkins and didn't send any sugar with the hot tea flask. You finish your meal, relax in the park, and finally head back home.

Study 2: Mixed-valence experience description

You load your clothes into one of the machines and sit on a vacant sofa, waiting for the machine to finish. The sofa is really comfortable, and you sink in. You take out a book from your bag and start reading it, but the background music is too loud and distracts you from your book. After a while your laundry is ready.

Study 3: Mixed-valence experience description

After a long day, you decide to check into a hotel. As you enter the room, you notice the room is spacious, but the lighting is somewhat dim. You decide to take a much-needed shower and are pleased to see that the bathroom counter is stocked with high-quality shampoo, conditioner, and body wash. However, as you start to shower, you find that the water pressure is slightly low.