TESTING NOVEL NORM INTERVENTIONS FOR PROMOTING PRO-ENVIRONMENTAL CONSUMPTION

by

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DISSERTATION ABSTRACT

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The purpose of the current project was to investigate how a social psychology approach could be used to develop an effective climate-change mitigation tool. A commonly used technique in the social psychology literature for promoting the adoption of pro-environmental behaviors is the norm intervention. In the current project, three methodological changes to the norm-intervention approach were implemented and tested, including 1) broadening the range of types of norm-intervention conditions, 2) including both a pro-environmental and a self-enhancing framing, and 3) communicating how pre-existing motivations to engage in environmentally harmful behaviors can be achieved by adopting a new pro-environmental behavior. Overall, the pro-environmental framing that has been typically used in prior research was the most effective at improving people's pro-environmental behaviors. Norm conditions did not appear to persuade people to change their pro-environmental consumer intentions and behaviors by much. Additionally, it was actually people's values, a dispositional factor, which had the strongest predictive power compared to the study's attempt to modify people's pro-environmental outcomes by varying the situational context. Consistent with previous research, biospheric values positively predicted, and egoistic values negatively predicted, pro-environmental consumer intentions and behaviors consistently across most framing and norm conditions.

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Chapter 1: Introduction

Masses of people today are living lifestyles abundant in consumption, and this consumption is driving the planet towards becoming a more inhospitable place to live (Hoekstra & Wiedmann, 2014; IPCC & Edenhofer, 2014; Ripple et al., 2020). Many of our daily activities, like heating and cooling our homes, driving personal cars, and purchasing food and clothing, result in the generation of massive amounts of greenhouse gas (GHG) emissions (Hertwich & Peters, 2009; IPCC, 2018; Ivanova et al., 2016). These GHGs accumulate in the Earth's atmosphere, leading to warmer global temperatures, rising sea levels, more extreme weather events, and ultimately a planet that is more threatening to the safety and sustainability of human life (IPCC, 2021).

For the last 40 years, the scientific community has called upon the world to develop strategies for mitigating climate change (Ripple et al., 2020). One mitigation strategy is decreasing the demand for GHG-producing goods and services. There is rising interest in how this demand can be reduced by changing people's high-consumption lifestyles (Druckman & Jackson, 2010; Dubois et al., 2019; Girod, van Vuuren, & Hertwich, 2014; Wiedmann, Lenzen, Keyβer, & Steinberger, 2020). In the current project, I develop and test the effectiveness of a psychological intervention aimed at reducing people's consumption by altering their perception of prevailing consumption norms.

A Social Psychology Approach to Improving Pro-environmental Behaviors

Social psychology, as a field with a long history of investigating the predictors of human behaviors and ways of changing them, is well-suited to contributing insights into how effective climate-change strategies can be developed. The field of social psychology already has an established history of testing interventions aimed at encouraging people to adopt more environmentally friendly behaviors. One of the most commonly used approaches is the norm intervention (Bohner & Schlüter, 2014; Carrico & Riemer, 2011; Cialdini, Reno, & Kallgren, 1990; Cialdini et al., 2006; de Groot, Abrahamse, & Jones, 2013; Dwyer, Maki, & Rothman, 2015; Ferraro, Miranda, & Price, 2011; Goldstein, Cialdini, & Griskevicius, 2008; Handgraaf, Van Lidth de Jeude, &

Appelt, 2013; Kallgren, Reno, & Cialdini, 2000; Lapinski, Rimal, DeVries, & Lee, 2007; Melnyk, Herpen, Fischer, & van Trijp, 2011; Nolan et al., 2008; Oceja & Berenguer, 2009; Reese, Loew, & Steffgen, 2014; Reno, Cialdini, & Kallgren, 1993; Schultz et al., 2007; Schultz, Khazian, & Zaleski, 2008; Smith et al., 2012).

"Norms" have been defined as the rules understood by members of a group that guide or constrain group members' behaviors (Cialdini & Trost, 1998) and that are upheld by people's expectations that the rules are endorsed by other members of their group (Bicchieri, 2006). Norm interventions work by altering people's perception of the norms that are endorsed by the people around them. Norms are an effective intervention tool because people are prone toward adapting their behavior to match what they believe others in their group see as normal, effective, or desired ways of behaving (Cialdini & Goldstein, 2004; Miller & Prentice, 2016).

There are several strengths of norm interventions that make them a potentially valuable climate-mitigation tool. First, people's perception of existing norms in their group may be easier to modify than other factors that influence people's environmental behaviors, like their values and beliefs. Values tend to be closely held and stable over time (Hitlin & Piliavin, 2004) and beliefs, even among environmentally conscious individuals, have been found to shift to stay consistent with and justify people's environmentally harmful behaviors (Juvan & Dolnicar, 2014). Norms, however, can be more fluid than values and beliefs, and previous norm interventions have successfully modified people's perception of overarching norms in their group. This relates to the second strength of norm interventions, which is that they have already been found to significantly increase people's willingness to adopt more environmentally friendly practices across a number of different behaviors (e.g., recycling, conserving water, conserving energy, and reusing towels) (Goldstein et al., 2008; Lapinski et al., 2007; Nolan et al., 2008; Schultz, 1999). Finally, norm interventions are low cost and easy to implement to large audiences, which are important characteristics for a climate-mitigation tool given that climate change has a global audience.

Despite these strengths, current norm interventions also have weaknesses. Mainly, their effects appear to be inconsistent across studies, and when effects are found, they are often small in size. For instance, in a review that was conducted on the effects of norm interventions on people's pro-environmental behaviors, the authors found that only 13 of 18 studies that manipulated descriptive norms, and only 3 of 9 studies that manipulated injunctive norms, produced significant changes in people's pro-environmental behaviors (Farrow et al., 2017). A meta-analysis of norm-intervention studies also found that they often produce small effect sizes, especially when normative messages are used (as opposed to field experiments in which participants were put into an environment that nonverbally communicated a norm) (Poškus, 2016). These findings suggest that there is room for the strength and consistency of norm interventions to be improved upon, which may be achieved via methodological updates.

In this introduction, I will identify similarities in the methodological characteristics of currently used norm interventions. Based on an analysis of these shared characteristics, I will suggest potential ways in which methodological improvements could be made to norm-intervention studies. Then, I will describe how these suggested methodological changes are being tested in the current project. But first, I will elaborate on why strategies that reduce the demand for GHG-producing goods and services are a necessary part of our global attempt at mitigating the climate change crisis.

Demand- vs Supply-Sided Mitigation Strategies

At the broadest level, there are two main climate-change mitigation approaches: supply- and demand-sided strategies. The current project is investigating the use of a norm intervention as a demand-sided strategy. Demand-sided strategies involve reducing demand for products and services that generate GHG emissions. Supply-sided strategies, on the other hand, involve reducing the supply of GHGs to the atmosphere by 1) reducing emissions generated by manufacturing processes (e.g., by deriving energy from renewable energy sources), and 2) by expanding

technological innovations that remove GHGs from the atmosphere (e.g., carbon capture) (IPCC, 2018). Supply-sided solutions are enticing because they do not require people having to change their current lifestyles and are compatible with continued economic growth. Despite their appeal, though, they have significant weaknesses that suggest they will not, on their own, be enough to prevent alarming levels of warming from occurring.

For example, there is great uncertainty regarding whether carbon capture technologies can scale quickly enough to remove the amounts of GHGs from the atmosphere that are needed to reduce emissions to zero by 2050 (the current goal set by the Intergovernmental Panel on Climate Change) (IPCC, 2018). Furthermore, to meet operation costs, carbon capture companies sell carbon dioxide to oil companies to be used for 'enhanced oil recovery', a process of injecting CO_2 underground to extract oil more effectively, which results in increased emissions (Kolster et al., 2017). It is unclear whether carbon capture companies can remove the gigatonnes of CO_2 that are currently in the atmosphere in addition to being able to offset the increase in emissions that result from this business practice. As stated by the IPCC (2018), carbon capture "deployed at scale is unproven, and reliance on such technology is a major risk in the ability to limit warming to 1.5°C."

Consumers could also argue for the reliance on supply-sided strategies by asserting that the responsibility for reducing GHG emissions should be on corporations rather than on individuals (Pereira Heath & Chatzidakis, 2012). After all, corporations encourage overconsumption via marketing, and they are the entities that are mostly producing, and profiting from the production of, GHGs. This supply-sided approach would mean that the world has to rely on companies to invest resources, very quickly, into decarbonizing their supply chains (i.e., manufacturing their goods and services in ways that do not produce GHGs). However, our high-consumption lifestyles make corporations' current infrastructures very profitable. Companies have demonstrated less motivation to invest in making changes to improve the sustainability of their manufacturing processes when making these changes was not associated with financial benefits (O'Rourke, 2014). That being so,

current consumption practices likely create little incentive for corporations to make costly investments in restructuring their supply chains, much less at the scale and speed that is necessary to reach net-zero emissions by 2050.

Thus, by themselves, technological innovations and corporate transformations are very unlikely to mitigate the climate crisis. However, in addition to directly offsetting GHG emissions, demand-sided strategies also increase the chances of success for supply-sided strategies when both are implemented concurrently (IPCC, 2018). For instance, if individuals were to collectively reduce their consumption in order to reduce GHG emissions, this could provide the financial incentive that companies need to be motivated to decarbonize their supply chains. This would also give technologies like carbon capture a more reasonable chance of achieving their goal of removing all excess GHGs from the atmosphere by reducing the amount of new emissions.

Demand-sided strategies are increasingly being seen as a necessary part of the climate solution (Creutzig et al., 2018). The current project investigates how a norm intervention can be effectively used as a demand-sided strategy that encourages people to reduce the amount of consumption that they engage in. As mentioned earlier, current norm interventions have inconsistent effects across studies, and when they do produce significant effects, they often result in small effect sizes. To deduce ways in which the methodologies of currently used norm interventions could be improved upon, I reviewed and identified similarities in the methodologies used across many norm-intervention studies. Next, I will review the three shared characteristics that I identified as potential areas where methodological improvements could be made.

Shared Characteristics of Current Norm Interventions

The first methodological characteristic that is similar across norm-intervention studies is that they typically rely on manipulating just two types of norms: descriptive and injunctive norms. Descriptive norms are frequently defined as behaviors that people perceive as being widely adopted by their group, while injunctive norms describe behaviors that people think others believe *ought* to

be widely adopted (Cialdini, Reno, & Kallgren, 1990). In norm-intervention studies, the descriptive norm condition often takes the form of a normative message that informs participants that a majority of other people around them engage in a particular pro-environmental behavior (e.g., "85% of people in your neighborhood recycle"). The injunctive norm condition is often a normative message that informs participants that a majority of other people around them believe that it is *right* to engage in a pro-environmental behavior (e.g., "85% of the people in your neighborhood approve of people who recycle").

These are the two types of norms that are most often manipulated in norm-intervention studies. In a review of 23 norm-intervention studies that were used to promote pro-environmental outcomes, 18 included a descriptive norm condition, 9 included an injunctive norm condition, and 4 included a condition that combined a descriptive and injunctive norm (Farrow et al., 2017). Only one study in the review included a norm-intervention condition that was not either a descriptive or injunctive norm.

This shared characteristic is worth noting as a potential area for improvement because more types of norms exist beyond just descriptive and injunctive norms. Different types of norms have different persuasive powers, and the effectiveness of a norm-intervention condition could depend on the type of norm that is manipulated. In fact, in Farrow et al. (2017), they found that descriptive norms produced significant, positive changes in people's willingness to engage in pro-environmental behaviors more consistently than did injunctive norms. The same pattern was found in a meta-analysis that evaluated how correlational evidence of the relationship between perceived norms and pro-environmental outcomes varied depending on the type of norm (Niemiec, Champine, Vaske, & Mertens, 2020). Descriptive norms more consistently significantly, positively predicted intentions to behave pro-environmentally across a number of behaviors than injunctive norms did. This may be due to the different types of persuasive appeals that are made by each type of norm. While a descriptive norm encourages conformity by communicating which behaviors may

be the most effective, injunctive norms encourage conformity by implying potential social repercussions (Cialdini et al., 2006).

Given that the relationship between norms and pro-environmental outcomes varies depending on the type of norm, it is worthwhile to investigate the efficacy of a broader range of types of norm-intervention conditions. Definitions have been proposed for all of the following norm constructs: descriptive norms, conventions, social norms, and moral norms. The descriptive and social norm conditions are most similar to the conditions that have been previously used in norm-intervention studies, where social norms, as they are defined in the current project, are most similar to injunctive norms. The convention and moral norm conditions, however, have not been tested before as norm-intervention conditions. In the next section, I will elaborate further on how the current project is developing norm-intervention conditions based on each of these norm types and examining their efficacy at promoting the adoption of a pro-environmental behavior.

A second characteristic shared among norm-intervention studies is that they most often contextualize the behavior that they want people to adopt as being in pursuit of, or aligned with, pro-environmental goals. For example, in a study attempting to promote towel reuse among hotel guests, the descriptive norm message read, "Join your fellow guests in helping to save the environment. Almost 75% of guests who are asked to participate in our new resource savings program do help by using their towels more than once" (Goldstein et al., 2008). In a study aimed at reducing plastic bag usage in supermarkets, grocery patrons read an injunctive norm message that said, "Shoppers in this store believe that re-using shopping bags is a worthwhile way to help the environment. Please continue to re-use your bags" (de Groot et al., 2013).

This is called a pro-environmental framing. Researchers have described this framing as a social dilemma that pits one's short-term self-interests against the long-term interests of the group (Nordlund & Garvill, 2003). That is, messages like these encourage people to adopt pro-environmental behaviors with long-term sustainability benefits that are in the short-term less

convenient, less indulgent, and/or less immediately gratifying. This is a potential area for improvement because using a framing that indicates people have to subjugate their self-interest to behave pro-environmentally could be less effective on some individuals, particularly those who do not prioritize pro-environmental values.

Values have been found to be an important, consistent predictor of pro-environmental intentions and behaviors. Biospheric values, which emphasize an appreciation for the natural environment and a desire to protect it, and altruistic values, which emphasize a concern for others and for principles greater than oneself, have been found to significantly, positively predict pro-environmental outcomes across a number of studies (Ghazali et al., 2019; Hansla et al., 2008; Liobikiene & Juknys, 2016; Nordlund & Garvill, 2002; Nordlund & Garvill, 2003; Poortinga et al., 2004). Egoistic values, which indicate a concern with achieving greater resources for oneself, on the other hand, have been found to significantly, negatively predict pro-environmental outcomes (Nordlund & Garvill, 2002; Poortinga et al., 2004). Hedonic values, which indicate a concern for achieving self-related goals of pleasure and gratification, have also been found to be associated with engagement in more environmentally harmful behaviors (Steg et al., 2012).

There is an ongoing question of how to make climate-intervention strategies that appeal both to people who do and do not highly endorse biospheric values (Steg, 2023). In addition to the correlational evidence discussed above, experimental evidence has found that interventions can also be less effective when people are low, versus high, on biospheric values. In Bolderdijk et al. (2013), the researchers experimentally manipulated whether participants were shown a movie discussing the negative environmental consequences of bottled water or a control movie. For people high on biospheric values, the experimental movie improved their intentions to avoid using water bottles, whereas for people low on biospheric values, the experimental movie had no effect on their pro-environmental intentions.

One solution that has been suggested is to frame a pro-environmental behavior so that adopting it is seen as consistent with one's self-interest. This is called a self-enhancing framing. There is some evidence to suggest that this framing may be able to make the idea of adopting a pro-environmental behavior more widely appealing to people with different values. In De Dominicis, Schultz, and Bonaiuto (2017), engaging in energy conservation was contextualized using either a pro-environmental framing or a self-enhancing framing. In the pro-environmental framing condition, participants were told that reducing the amount of energy they used could help reduce their contribution to GHG emissions. In the self-enhancing framing condition, participants were told that reducing the amount of energy they used could help them save money each month. The study found that when a pro-environmental framing was used, people who scored relatively higher on egoistic values reported significantly lower intentions to save energy compared to people who scored relatively higher on altruistic values. However, when a self-enhancing framing was used, there was no significant difference between the two groups. Individuals who scored relatively higher on egoistic values reported similarly high intentions to save energy as individuals who scored relatively higher on altruistic values.

This demonstrates that, when adopting a pro-environmental behavior is seen as consistent with one's self-interest, the behavior can appeal more widely to people with differing values. In the next section of this introduction, I will explain how a self-enhancing framing is being used in the current study to contextualize reducing one's consumption as being consistent with individuals' self-interest. To my knowledge, there has not been a previous study that has investigated the effects of both framing conditions and norm-intervention conditions in the same study. The inclusion of both here allows for the examination of several interaction effects. For instance, since the self-enhancing framing is expected to decrease the perceived conflict between the desire to act in self-interest and the desire to conform with a group norm, then each norm-intervention condition may be more effective when it is preceded by the self-enhancing, versus the pro-environmental framing,

condition. Additionally, there could be a three-way interaction between framing, norm condition, and values such that each norm-intervention condition is stronger when it is preceded by a framing that is consistent with the perceiver's values than when it is preceded by a framing condition that is inconsistent with the perceiver's values. These interaction effects will be discussed further in the hypotheses section.

The third characteristic that is shared among norm-intervention studies is that they do not attempt to address people's motivations to engage in environmentally *un*friendly behaviors. Rather, studies aimed at promoting pro-environmental behaviors suggest that people should adopt these behaviors *in spite of* their current desires to do otherwise. For example, in a study aimed at promoting better recycling habits, participants were given weekly information about the recycling behaviors of their neighbors, which established expectations regarding how much recycling was normative in their neighborhood (Schultz, 1999). There was no mention of the factors associated with people's desire to *not* recycle, like that recycling is seen as confusing and inconvenient (Roy, Berry, & Dempster, 2022), or an attempt to explain how adopting a recycling habit addresses these existing concerns. This lack of mentioning or attempting to address pre-existing motivations is consistent across the methodologies used in many norm-intervention studies (Allcott, 2011; Bohner & Schlüter, 2014; Carrico & Riemer, 2011; Cialdini et al., 2006; Costa & Kahn, 2013; de Groot et al., 2013; Ferraro et al., 2011; Goldstein et al., 2008; Lapinski et al., 2007; Melnyk et al., 2011; Nolan et al., 2008; Reese et al., 2014; Schultz et al., 2008; Smith et al., 2012).

The rationale for this approach seems to be that we can rely on the persuasive appeal of norms, which apply social pressure by demonstrating which behaviors are normative, effective and/or (un)desirable (Cialdini et al., 2006), to override pre-existing motivations. However, relying only on the influence of group norms to change people's behaviors could be less effective on certain individuals, such as those who tend to be less convinced by group pressures to change their habits. Lapinski et al. (2007) found evidence for this in their study in which they aimed to promote

conservation behaviors by exposing people to a pro-conservation descriptive norm ("About 90% of people reported taking steps to conserve in the year prior to the study"). They found that group orientation, defined as the degree to which individuals prioritized group goals over individual goals, moderated the effectiveness of the norm intervention. For people low on group orientation, exposure to the descriptive norm *decreased* intentions to conserve compared to when they were not exposed to the norm. This could be because individuals who are low on group orientation are less susceptible to the influence of groups norms (or may even reject acting in accordance with group norms).

Additionally, even among people who are willing to balance the needs of their group with personal desires, exposure to current norm interventions could be creating competing internal motivations. On the one hand, people may be motivated to adopt a pro-environmental behavior to conform with prevailing group norms, but on the other, they could still desire the benefits of engaging in environmentally harmful habits. For example, two qualitative studies investigated people's perception of what barriers prevent them from engaging in more pro-environmental practices. In studies of recycling and eco-conscious apparel consumption, even among environmentally conscious individuals, there was a limit to how much people said they were willing to self-sacrifice for the sake of achieving group goals (Connell, 2010; Roy et al., 2022). Specifically, people reported that cost and inconvenience were two limiting factors to how much they were willing to engage in these pro-environmental behaviors.

For these reasons, I propose that norm interventions could be more effective if they communicated how adopting a pro-environmental practice is consistent with, or helps people to achieve, their pre-existing goals. For the current project, this requires understanding what goals motivate people's desire to consume. In the next section, I will summarize previous literature findings on which goals are associated with people's consumerism and how this is being applied to construct the self-enhancing framing condition in this study.

To summarize, the three methodological changes that I propose making include, 1) broadening the range of types of norm-intervention conditions, 2) using a self-enhancing framing to contextualize adopting a pro-environmental behavior as being consistent with people's self-interest, and 3) communicating how the goals motivating people's environmentally harmful behaviors can be achieved by adopting a new pro-environmental practice. Next, I will describe how these methodological changes are being implemented in the current project.

Methodological Changes Being Tested in the Current Project

The first methodological change that is being examined in the current project is the inclusion of a broader range of types of norm conditions. The following types of norm-intervention conditions were developed for this project: descriptive norms, conventions, social norms, and moral norms.

To develop these conditions, I first established a definition of norms based on definitions that have been proposed in psychology and sociology. In psychology, norms have been defined as people's perception of which behaviors are typical or desirable in a particular situation in their group (Miller & Prentice, 1996) and as behavioral rules which guide and/or constrain people's social behaviors (Cialdini & Trost, 1998). The sociologist Bicchieri expands on this definition of norms to include that they are also upheld by people's expectations that other members of their group endorse them (Bicchieri, 2006). Based on this previous work, the definition of norms that I am using is *rules that exist in groups regarding which behaviors are appropriate, or inappropriate, to engage in in particular situations where, importantly, these rules are accompanied with and upheld by people's expectations that the rules are endorsed by other members of their group*.

Norms can be differentiated in many respects. Norms can be differentiated based on whether they are perceived as being widely followed, whether people perceive that they are expected by others in their group to follow them, whether people perceive that others *prefer* that they follow the norm, whether consequences exist for *failing* to comply with the norm, and whether

people perceive the norm as appealing to universal moral principles (Bicchieri, 2006, 2014; Cialdini et al., 1990; Elster, 2011; Hechter, 2018). Currently used norm interventions largely rely on differentiating between norms that describe widely followed behavioral rules (descriptive norms) from behavioral rules that are accompanied by social expectations of compliance (injunctive norms). However, these definitions may still be so broad that they conceal from identification more nuanced types of norms. As part of developing the norm-intervention conditions for this project, I first propose distinct definitions for each norm construct that are largely based on the extensive sociological examination performed in Bicchieri (2006). A summary of these definitions is provided below in Table 1.1.

Descriptive norms are rules for behaving a certain way in a particular situation that people perceive as being commonly followed and also expect a sufficient number of other people to follow (Bicchieri, 2006). People conform with a descriptive norm when they expect a majority of other people to also conform and when they have a preference for behaving in a way that is perceived as normal or effective. For example, new clothing fashions can be seen as descriptive norms. People may begin wearing a new type of clothing if they see that a sufficient number of other people are wearing the new clothing type and if they prefer to wear clothing that is seen by others as normal or fashionable. This overlaps with Cialdini & Goldstein's (2004) rationale that people conform their behavior to match descriptive norms because they perceive this behavior as being effective or well-adapted to a given situation.

Conventions are rules for behaving a certain way in a particular situation that people perceive as being commonly followed and that have mutual expectations of compliance (Bicchieri, 2006). Observers expect others to comply, and others also expect the observer to comply, with the behavioral rule in situations when it makes sense to do so. These rules are also typically an attempt to coordinate people's behaviors to achieve a common group goal (Bicchieri, 2006; Hecther, 2018). For example, there is a convention at auctions to raise your hand or sign to make a bid. This is a

convention because it is seen as being commonly followed in a particular situation, coordinates people's behavior to achieve a common goal, and entails mutual expectations of compliance. The attendees at the auction expect anyone interested in making a bid to use the agreed-upon behavioral guideline. Conventions tend to be long-lasting because once a behavior has been established as an effective solution for coordinating people's behaviors, the convention tends to be self-reinforcing. It is in everyone's interest who wants to coordinate their behaviors to achieve a common goal to perform the behavioral solution.

Social norms are rules for behaving a certain way in a particular situation that people perceive as being commonly followed and believe that others *strongly prefer* one to comply with (Bicchieri, 2006). This is different from conventions which do not include beliefs that others strongly prefer that one comply with the norm. With conventions, there is just an expectation that whoever is interested in coordinating with others during a particular type of interaction will follow the conventions that have been established for doing so. However, social norms are behavioral rules people follow *because* they perceive that others prefer that they follow the rule. For example, there is a social norm in some areas of the United States to not put one's elbows on the table during meals. There is not a goal that is achieved by everyone keeping their elbows off the table. It is simply seen as rude to *not* refrain from putting your elbows on the table. Social norms are often rules that go against people's self-interest, but people conform typically to avoid negative social repercussions (e.g., ostracism, ridicule) or gain positive social rewards (e.g., praise, improved status). This definition of social norms, though more nuanced, is conceptually similar to the concept of injunctive norms that has been used as a norm-intervention condition in many previous studies.

Moral norms are rules for behaving a certain way in a particular situation that have many of the characteristics of the previous norms – they are perceived as being widely followed, there are mutual expectations of compliance, people perceive that others *prefer* that they comply with the norm, and transgressions can be met with social consequences – but these rules are also,

importantly, moralized (Bicchieri, 2006). By moralized, I mean that the behavior being constrained or endorsed by a rule is discussed in one's society in terms of the behavior's moral rightness or wrongness. (I do not mean that the behavior itself is objectively right or wrong based on moral principles, but rather only that a consensus has been established among a group of people on whether to *judge* the behavior as right or wrong). There are many behavioral rules that are justified based on judgments about the morality of the behavior in question. For example, a moral norm exists against causing harm to others in many societies, as does a moral norm against engaging in homosexual behaviors (though there is greater variability between societies in the existence of a moral norm for the latter compared to the former) (Vauclair & Fischer, 2011). These rules carry a different weight and influence over people's behaviors because they are moralized. Since individuals' justification for the behavioral rule is that the behavior in question is itself morally right or wrong, people who consider violating the moral norm may anticipate experiencing extreme guilt, and this emotion plays a part in sustaining people's compliance with the norm (Elster, 2011).

In Table 1.1, I provide a summary of the definitions for each of the norm constructs described above. These definitions demonstrate the ability to differentiate between types of norms that go beyond descriptive and injunctive norms. Additionally, each type of norm is associated with a nuanced reason for why people may feel compelled to conform with that norm. Given that each of these types of norms can be well-defined and that the factors motivating compliance varies between them, it is worth comparing how effective they are as norm-intervention conditions.

In the current project, preliminary study 1 was conducted to examine whether there is empirical evidence for the existence of each of these norm constructs. Participants were asked a series of statements assessing the degree to which each of these normative constructs (descriptive norms, conventions, social norms, moral norms) applied to a recent consumption activity that they engaged in. A factor analysis was used to investigate whether statements assessing each of the norm constructs loaded as they were expected to based on these definitions. Preliminary study 1 and its

Table 1.1

Definitions of Types of Norms

Type of Norm	Definition
Descriptive Norms	Rules for behaving a certain way that are perceived as being widely followed, but people do not feel they are expected by others to follow these rules
Conventions	Rules for behaving a certain way that are perceived as being widely followed, that typically achieve a coordination function, and that people expect one another to comply with; tend to be long-lasting
Social Norms (similar to Injunctive Norms)	Rules for behaving a certain way that people perceive as being widely followed and believe that others *strongly prefer* one to comply with; typically go against one's self-interest; possible social consequences
Moral Norms	Rules for behaving a certain way that are perceived as being widely followed, that people expect one another to comply with, that people believe others *strongly prefer* one to comply with, and that are moralized; tend to have sanctions (external and/or internal)

results are described in greater detail in Chapter 2.

The second methodological change that is being tested in the current study is the inclusion of a self-enhancing framing condition in addition to a pro-environmental framing condition. The framing condition contextualizes the purpose of adopting a new behavior. A pro-environmental framing contextualizes adopting an environmentally relevant behavior as helping to achieve pro-environmental goals, whereas a self-enhancing framing contextualizes adopting an environmentally relevant behavior as helping to achieve self-interested goals.

The individual effects of framing manipulations and norm-intervention manipulations have been tested separately in past studies. However, the effects of framings jointly with norm-intervention conditions have not been previously investigated. Including both in this study will

allow me to examine whether and how the effectiveness of different norm-intervention conditions varies depending on whether the pro-environmental behavior is framed as being consistent with achieving pro-environmental goals or self-interested goals.

The approach being used in this study to construct the self-enhancing framing is closely related to the third methodological change that is being tested in the current study, which is communicating to participants how adopting a pro-environmental behavior aligns with their pre-existing goals. Specifically, I wanted to understand what goals are associated with people's desires to consume in order to construct a self-enhancing framing that communicates how these goals can be achieved by reducing one's consumption. Past research has shown that people's motivation to consume is associated with their desire to achieve important social goals. For example, people associate increased consumption and materialism with their desires to be accepted by their peers (Banerjee & Dittmar, 2008; Jiang et al., 2015), to avoid social punishment (Isaksen & Roper, 2012; Wooten, 2006), and to gain or display status (Millan & Mittal, 2017; Sivanathan & Pettit, 2010). Thus, the self-enhancing framing being used in the current study will explain how reducing one's consumption is consistent with achieving these social goals.

Because the sample for the current study is being drawn from a population of college students, an area of consumption that is financially accessible to most college students had to be chosen. Specifically, I chose to focus on clothing consumption because, unlike other GHG-intensive consumer activities (like owning multiple homes, using substantial amounts of energy in one's home, or owning a gas versus an electric car), college students are more likely to be able to regularly engage in clothing consumption. The clothing industry has also been widely critiqued for its many detrimental impacts on the environment, including its contribution to GHG emissions (Gwozdz, Nielsen, & Müller, 2017; Huang et al., 2016; Ivanova et al., 2015; Niinimäki et al., 2020; Roy Choudhury, 2014).

The pro-environmental framing condition will contextualize reducing one's clothing consumption as being in pursuit of achieving pro-environmental goals (e.g., "Consumers reducing the number of brand-new clothing items that they purchase is one way that individuals can contribute to decreasing greenhouse gas emissions"). This is similar to the language used to contextualize pro-environmental behaviors in previous norm-intervention studies. The self-enhancing framing condition will contextualize how reducing one's clothing consumption is consistent with pursuing self-interested social goals (e.g., "Other people report feeling unimpressed by seeing people wear brand-new clothing items. Rather, people report that they view people more positively who rarely buy brand-new clothing items."). A complete description of the two framings that are being used is elaborated on in the method section.

Hypotheses

The current project is using a 3 (framing: control, self-enhancing, pro-environmental) by 5 (control, descriptive norm, convention, social norm, moral norm) between-subjects experimental design. For reasons discussed above, the self-enhancing framing is expected to appeal to a broader audience compared to the pro-environmental or control framings. Thus, the first hypothesis is that pro-environmental consumer intentions and behaviors will be higher in the self-enhancing framing compared to the pro-environmental framing or control framing conditions.

H1: Pro-environmental clothing consumption intentions and behaviors will be higher in the self-enhancing framing condition than in the pro-environmental framing and control framing conditions.

The second hypothesis is that there will be an overall effect of norm-intervention condition such that pro-environmental consumer intentions and behaviors will be higher in each of the norm-intervention conditions compared to when no normative information is provided. This would replicate the general finding from previous research that exposure to normative information regarding a pro-environmental behavior encourages people to conform with the norm.

H2: Pro-environmental clothing consumption intentions and behaviors will be higher in each of the norm-intervention conditions (descriptive norm, convention, social norm, and moral norm) compared to the control norm condition.

The self-enhancing framing condition is expected to create less conflict between people's competing motivations to pursue their own self-interest and to conform with group-oriented norms. For this reason, the effectiveness of each norm-intervention condition is expected to be stronger when it is preceded by a self-enhancing framing compared to a pro-environmental or control framing. The third hypothesis is that there will be a significant interaction between framing condition and norm-intervention condition such that the effect of each norm-intervention condition on people's clothing consumption intentions and behaviors will be significantly stronger when paired with a self-enhancing compared to a pro-environmental or control framing.

H3: Framing condition will moderate the effect of each norm-intervention condition on people's pro-environmental clothing consumption intentions and behaviors such that the effect of each norm-intervention condition will be stronger when preceded by the self-enhancing framing compared to the pro-environmental or control framing.

As discussed above, it is expected that there will be a two-way interaction between values and framing condition such that the pro-environmental framing will be more effective on people who are high (versus low) on biospheric and altruistic values, and low (versus high) on egoistic and hedonic values. This is because a pro-environmental framing depicts the decision of whether to adopt a pro-environmental framing as a social dilemma that forces people to choose between their self-interest and the interests of their group. Scoring high on biospheric and altruistic values indicates that participants prioritize goals external to themselves (e.g., protecting the environment and achieving social justice), and scoring low on egoistic and hedonic values indicates that participants deprioritize self-interested goals (e.g., social power and gratification for oneself). Thus, these individuals may be more persuaded by the pro-environmental framing.

However, it is expected that, when a self-enhancing framing is used, there will not be a substantial difference in pro-environmental consumer intentions and behaviors between people low and high on each values dimension. This is because the self-enhancing framing contextualizes adopting a pro-environmental behavior as being aligned with self-interested goals, which is a rationale that is expected to appeal to most people. Thus, this framing is expected to be equally appealing to a wider audience of individuals with differing values.

H4: There will be a two-way interaction between values (biospheric, altruistic, egoistic, and hedonic) and framing condition. When a pro-environmental framing is used, people high, versus low, on biospheric and altruistic values (and low, versus high, on egoistic and hedonic values) will score significantly higher on pro-environmental consumer intentions and behaviors. When a self-enhancing framing is used, there will be no difference in pro-environmental consumer intentions and behaviors between people low and high on each values dimension.

Based on the same rationale, each norm-intervention condition may also be more persuasive when paired with a framing context that appeals to the values of the participant. This is because, in addition to the reason for adopting an environmentally relevant behavior being seen as consistent with one's values, learning that other people around oneself are also engaging in that behavior may bolster one's own intentions to engage in that behavior. Thus, I also expect a three-way interaction between each values dimension, framing condition, and norm-intervention condition such that values will moderate the effectiveness of each norm-intervention condition in the pro-environmental framing condition, but in the self-enhancing framing condition, each norm-intervention condition will be similarly effective on people high and low on each value.

H5: There will be a three-way interaction between values (biospheric, altruistic, egoistic, and hedonic), framing condition, and norm-intervention condition. When a pro-environmental framing or control framing is used, values will moderate the effect of each norm-intervention

condition on people's pro-environmental clothing consumption intentions and behaviors. However, when a self-enhancing framing is used, values will not moderate the effect of each norm-intervention condition.

As mentioned earlier, norm interventions may be less effective on individuals who are less likely to be persuaded by group pressures to change their behaviors. The sixth hypothesis is that the effect of each norm-intervention condition will be moderated by in-group identification where, for people low on in-group identification, there will be less of an improvement in pro-environmental consumer intentions and behaviors in each norm-intervention condition compared to people high on in-group identification.

H6: In-group identification will moderate the effect of norm-intervention condition on people's clothing consumption intentions and behaviors such that the effect of each norm-intervention condition will be stronger when people are high, versus low, on in-group identification.

It is uncertain, though, whether the use of a self-enhancing versus a pro-environmental framing could moderate this effect. That is, it is an open question whether contextualizing a behavior as helping to pursue self-interested goals rather than other-oriented goals can modify the effect of exposure to a norm-intervention condition on people who are low on in-group identification. This is the first exploratory research question that will be examined in this study.

Exploratory Research Question 1: Is there a three-way interaction between in-group identification, framing condition, and norm-intervention condition?

Additionally, I am interested in examining which combination of framing condition and norm-intervention condition produces the strongest improvements in people's pro-environmental clothing consumption intentions and behaviors.

Exploratory Research Question 2: Which combination of framing condition and norm-intervention condition produces the strongest improvements in people's pro-environmental consumer intentions and behaviors compared to the control condition?

Chapter 2: Preliminary Study 1

Purpose

Prior to testing the study's main hypotheses, preliminary study 1 was performed to examine whether there is empirical support for the theoretical definitions of each norm type that I proposed using in Table 1.1. In this phase, participants were asked to write about the last clothing item they acquired. Then, they were given a series of statements assessing the degree to which different normative constructs (descriptive norms, conventions, social norms, moral norms) and non-normative constructs (non-norms, anti-norms, personal rules) applied to the particular clothing item they described. All items are shown in Table 2.1 below.

These items were analyzed using a principal components analysis in order to 1) provide empirical justification for the existence of the theoretically proposed norm constructs in this study, and 2) inform the language that will be used to construct the norm-intervention conditions in the main experimental phase of this study.

Non-norms, anti-norms, and personal rules are not included as norm-intervention conditions in the experimental phase of this project. However, I discuss them here because they were included in the original set of items given to participants and their inclusion adds clarity to differentiating between different types of normative and non-normative constructs.

Method

Participants.

The data for preliminary study 1 was collected from the University of Oregon Psychology/Linguistics Human Subjects Pool between March and June of 2020. The final sample had 492 participants. The average age of the sample was 19.69 (*SD* = 2.35). The sample was approximately 66% female (324 female, 153 male, 8 non-binary, 7 unspecified gender) and 66% white (6 American Indian or Alaska Native, 59 Asian, 12 Black or African American, 52 Hispanic,

Latinx or Spanish origin, 11 Middle Eastern or North African, 3 Native Hawaiian or Other Pacific Islander, 327 white, 9 other ethnicity, 8 not specified).

Procedure and Measures.

Participants were first asked to write about the last clothing item they acquired. Specifically, participants were shown the prompt: "Think of the last clothing item you can remember getting (either through purchasing it or other means). If you have trouble remembering the last one, think of the last clothing item you can remember getting. Describe it in as much detail as you can."

Then, participants were asked to indicate how strongly a set of norm-related and non-norm related statements applied to the clothing item they described getting. These statements were written to capture the degree to which different types of norms (descriptive norm, convention, social norm, moral norm) and non-norm constructs (non-norm, anti-norm, personal rules) applied to the clothing item the participant wrote about. All items are shown in Table 2.1 below.

Results and Discussion

Prior to analysis of the items in Table 2.1, items dn3, conv5, sn5, and mn2 were removed because they were broadly worded about buying clothing in general rather than being specific to the current clothing item participants were prompted to write about. Thus, these items are likely assessing a different construct than the one these items were intended to measure, which was normative and non-normative characteristics regarding the most recent clothing item participants acquired.

First, the items in Table 2.1 were assessed using a confirmatory factor analysis to examine whether a model with items loading onto their expected norm/non-norm constructs fit the data well. Overall, the CFA results suggested inadequate fit of the confirmatory model. There was a significant difference between the model-suggested covariance matrix and the observed covariance matrix, $\chi^2(413) = 1831.92$, $p < .001$. Additionally, the Comparative Fit Index (CFI) was .64, and the Tucker-Lewis Index (TLI) was .60, which are both below the threshold of 0.90 that indicates good

Table 2.1

Norm- and Non-norm Related Items Used in Preliminary Study 1

Construct	Items
Non-norm	**nn1:** I got this clothing item because it was the first thing I saw when I walked into the store or went online to look for clothing. **nn2:** I got this clothing item on impulse without thinking very much about it. **nn3:** I got this clothing item purely by accident (for example, being sent the wrong item). **nn4:** I was unexpectedly given this clothing item as a gift.
Anti-norm	**an1:** This clothing item, or clothing similar to it, is an unconventional thing for me to wear. **an2:** This clothing item, or clothing similar to it, is unusual compared to what other people wear. **an3:** Wearing this clothing item, or clothing similar to it, rebels against expectations about what is acceptable to wear. **an4:** Getting this clothing item, or clothing similar to it, allows me to express my uniqueness.
Personal Rule	**pr1:** My decision to get this clothing item was based only on my personal preferences, meaning it was unrelated to the type of clothing I see people around me wearing. **pr2:** My decision to get this clothing item was based only on my personal preferences, meaning it was unrelated to the expectations people around me have about what clothing is acceptable to wear. **pr3:** This clothing item fits with my personal style. **pr4:** This clothing item fits with personal guidelines I have for myself about what type of clothes I should wear. **pr5:** I decided that getting this clothing item would be a frugal or cost-effective way of spending my money.
Descriptive Norm	**dn1:** This clothing item, or clothing similar to it, is in style right now. **dn2:** This clothing item, or clothing similar to it, is worn by many of my peers. **dn3:** Everybody else seems to frequently get new clothing items. **dn4:** There is no strict expectation from my peers for me to wear clothing similar to the clothing item that I got. **dn5:** Wearing this clothing item will help me successfully achieve one or more of my goals (i.e., career, academic, financial). **dn6:** I got this clothing item for a specific event that I want to make a good impression on others at. **dn7:** Lots of people get clothing similar to the clothing item I got because it is a frugal or cost-effective way of spending money.
Convention	**conv1:** For a long time, people will wear clothing similar to the style of the clothing item that I got. **conv2:** Even if people expect me to wear this type of clothing, no one would judge me if I failed to wear clothing similar to the clothing item that I got. **conv3:** Other people expect me to wear clothing similar to the clothing item that I got. **conv4:** I expect my peers to wear clothing similar to the clothing item that I got. **conv5:** It seems like these days people are expected to frequently get new clothing items.
Social Norm	**sn1:** People would judge me if I failed to wear clothing similar to the clothing item that I got. **sn2:** People would tell me that I am failing to dress appropriately if I failed to wear clothing similar to the clothing item that I got. **sn3:** I got this clothing item for events that I would feel impolite at if I did not wear something similar to the clothing item that I got (e,g., for work, a wedding, a job interview, etc.). **sn4:** I got this clothing item for events that I would feel guilty or shameful at if I did not wear something similar to the clothing item that I got (e.g., for work, a wedding, a job interview, etc.). **sn5:** I find that most of my peers approve of people frequently getting new clothing.
Moral Norm	**mn1:** I think that getting this clothing item or clothing similar to it is good for the economy. **mn2:** I get new clothing items that are recycled (e.g., from a secondhand store, hand-me-downs) because this is good for the environment. **mn3:** Failing to wear this clothing item or clothing similar to it would go against my principles. **mn4:** I feel a moral obligation to wear clothing similar to the clothing item that I got. **mn5:** I got this clothing item to support companies with ethical positions that I agree with.

model fit. The Root Mean Square Error of Approximation (RMSEA) of .09 was also significantly above a threshold of .05 ($p < .001$), which is another indicator that this model had poor fit.

Since the CFA indicated inadequate fit of the confirmatory model, I followed up this analysis with Principal Components Analysis (PCA) to examine how the items grouped together and how these groupings differed from those expected. A Kaiser-Meyer-Olkin (KMO) test was used to assess whether principal components analysis was justified. The overall Measure of Sampling Adequacy (MSA) was 0.85, suggesting that components analysis was appropriate because the items likely load onto at least one shared component.

I performed a PCA with an oblimin rotation and extracted seven components. I used an oblimin rotation because I expected the components to be correlated with each other, and I extracted seven components because this was the originally intended number of variables the items were meant to assess. The resulting pattern matrix showing which component each item was most strongly associated with is shown in Table 2.2 below. Items are bolded underneath the component they loaded onto most strongly. Component loadings under 0.20 are not reported. Each component is labeled based on which type of normative (or non-normative) construct the items seemed to most aptly capture.

The PCA resulted in variables that differed from those expected in a few ways. First, there appear to be two types of social norms – formal and informal – that apply to clothing-acquisition behaviors. The social norm (formal) component captures getting a clothing item to wear for specific events that have formalized rules regarding what type of clothing is appropriate to wear (e.g., for work, a wedding, a job interview). Getting clothing items that are appropriate for these events also appears to be associated with people's desire to make a good impression on others, to avoid feeling impolite, to achieve goals related to one's success, and even to fulfill a felt moral obligation to wear clothing that fits the rules for how to dress on these occasions. This aligns with characteristics of the definition of social norms that I proposed earlier (e.g., rules for behaving a certain way, a belief that

Table 2.2

Item Loadings from Principal Components Analysis

Items	PC1 SN (F)	PC2 DN / Conv	PC3 PR	PC4 SN (I)	PC5 MN	PC6 NN / AN	PC7 Fr
sn4: I got this clothing item for events that I would feel guilty or shameful at if I did not wear something similar to the clothing item that I got (e.g., for work, a wedding, a job interview, etc.).	**0.85**						
dn6: I got this clothing item for a specific event that I want to make a good impression on others at.	**0.79**						
sn3: I got this clothing item for events that I would feel impolite at if I did not wear something similar to the clothing item that I got (e.g., for work, a wedding, a job interview, etc.).	**0.76**						
dn5: Wearing this clothing item will help me successfully achieve one or more of my goals (i.e., career, academic, financial).	**0.71**						
mn4: I feel a moral obligation to wear clothing similar to the clothing item that I got.	**0.36**			0.28			
dn2: This clothing item, or clothing similar to it, is worn by many of my peers.		**0.76**					
dn1: This clothing item, or clothing similar to it, is in style right now.		**0.71**					
conv1: For a long time, people will wear clothing similar to the style of the clothing item that I got.		**0.59**					
conv3: Other people expect me to wear clothing similar to the clothing item that I got.		**0.52**	0.21	0.40			
conv4: I expect my peers to wear clothing similar to the clothing item that I got.		**0.50**			0.22		
an2: This clothing item, or clothing similar to it, is unusual compared to what other people wear. (***negative***)		**-0.39**	0.27		0.37	0.23	
pn2: My decision to get this clothing item was based only on my personal preferences, meaning it was unrelated to the expectations people around me have about what clothing is acceptable to wear.			**0.68**				
pn1: My decision to get this clothing item was based only on my personal preferences, meaning it was unrelated to the type of clothing I see people around me wearing.			**0.64**				
pn3: This clothing item fits with my personal style.		0.28	**0.59**				
pn4: This clothing item fits with personal guidelines I have for myself about what type of clothes I should wear.		0.24	**0.57**			-0.23	
an4: Getting this clothing item, or clothing similar to it, allows me to express my uniqueness.			**0.52**			0.27	
conv2: Even if people expect me to wear this type of clothing, no one would judge me if I failed to wear clothing similar to the clothing item that I got. (***negative***)		0.32		**-0.61**		0.20	
dn4: There is no strict expectation from my peers for me to wear clothing similar to the clothing item that I got. (***negative***)			0.25	**-0.61**			
sn1: People would judge me if I failed to wear clothing similar to the clothing item that I got.	0.34			**0.49**			
mn3: Failing to wear this clothing item or clothing similar to it would go against my principles.	0.27			**0.44**	0.22	0.24	
sn2: People would tell me that I am failing to dress appropriately if I failed to wear clothing similar to the clothing item that I got.	0.33			**0.43**			
mn1: I think that getting this clothing item or clothing similar to it is good for the economy.				-0.22	**0.71**		
mn5: I got this clothing item to support companies with ethical positions that I agree with.					**0.63**		
nn4: I was unexpectedly given this clothing item as a gift.			-0.31		**0.60**		
nn2: I got this clothing item on impulse without thinking very much about it.						**0.78**	
nn1: I got this clothing item because it was the first thing I saw when I walked into the store or went online to look for clothing.	0.26					**0.46**	0.24
an1: This clothing item, or clothing similar to it, is an unconventional thing for me to wear.	0.20	-0.25				**0.43**	
an3: Wearing this clothing item, or clothing similar to it, rebels against expectations about what is acceptable to wear.	0.35	-0.24				**0.43**	
nn3: I got this clothing item purely by accident (for example, being sent the wrong item).	0.20			0.23	0.29	**0.32**	
pn5: I decided that getting this clothing item would be a frugal or cost-effective way of spending my money.							**0.83**
dn7: Lots of people get clothing similar to the clothing item I got because it is a frugal or cost-effective way of spending money.							**0.83**

Note. SN (F) = social norm (formal), SN (I) = social norm (informal), PR = personal rule, DN = descriptive norm, Conv = convention, MN = moral norm, NN = non-norm, AN = anti-norm, FR = frugal

others strongly prefer compliance with the rules, possible social consequences for failing to comply, and compliance can go against self-interest).

The social norm (informal) component captures a general perception that others expect one to wear clothing similar to the clothing item described, that one will receive judgments from others if one fails to do so, and even that failing to wear clothing similar to the clothing item described would go against one's principles. This, again, fits with characteristics of the definition of social norms proposed earlier. I refer to this component as informal, though, because whereas formal social norms for how to dress at work, to a wedding, or for a job interview are typically made explicit by formalized dress codes, rules for how one is expected to dress by others in general are typically not codified by some type of dress code, but rather are often based on perceptions and inferences of others' expectations.

Although the social norm items loaded onto two separate constructs, informal and formal, these two components will be combined into a single social-norm intervention condition in the norm-intervention phase of this study. This is because, firstly, the difference between these two types of social norms is quite nuanced. Thus, it will be difficult to construct two distinct intervention conditions that successfully capture, and psychologically prime in the participant, the subtle differences between these two components. Secondly, combining these two components into a single intervention condition will improve the power of the study, which improves the ability of the study to identify significant differences between intervention conditions if they exist.

The second difference between the variables resulting from the PCA and those intended is that several of the descriptive norm and convention items grouped together to form a single component. One reason for this could be that there were no items assessing an important aspect of the definition of conventions, which is that conventions are typically rules that organize people's behavior in a way that helps to achieve a common group goal. This is likely an important aspect of conventions that further differentiates them from descriptive norms. The descriptive

norm/convention component captures a perception that the clothing item the person described getting is similar to what many others wear, is currently fashionable, that styles similar to this clothing item will be fashionable for a long time, that there are mutual expectations between one and one's peers to wear clothing similar to this clothing item, and that it is not an unusual thing to wear. The items loading onto this component align with aspects of the definitions of both descriptive norms and conventions. Specifically, the items capture both the perception that this behavior is widely followed and 'in style,' (descriptive norms), but also that there are mutual expectations amongst individuals for one another to comply with the rule, and that the rule for behaving this particular way will be long-lasting (conventions). An eight-component solution was also explored to see whether it would allow the descriptive norm and convention items to load onto separate components, but items from both constructs still loaded together.

In order to better differentiate between descriptive norms and conventions when constructing the conditions for the norm-intervention phase of this study, it will be important to emphasize the aspects of descriptive norms and conventions that are most unique from one another. For instance, while the descriptive norm condition should emphasize the typicality of a behavior in one's social group, the convention condition should emphasize that the behavior helps people to achieve a common group goal.

Finally, the moral norm component largely captured getting a clothing item because it fits with broader values (e.g., benefiting the economy, supporting companies' ethical positions). The items assessing a felt moral obligation to wear clothing similar to the clothing item described, or dressing in ways that fit with one's principles, tended to load onto different components. Thus, when constructing the moral norm condition for the norm-intervention phase of this study, I plan to use language that refers to rules for behaving in ways that align with broader, moralized values that could be associated with acquiring new clothing items.

Chapter 3: Study 2 Methods

Sample Size

The minimum needed sample size was determined using an a priori power analysis. The study design was a 3x5 between-subjects experimental design. This resulted in 15 total conditions. A power analysis was conducted to determine the sample size needed to achieve a minimum 80% chance of detecting significant main effects and interaction effects. Power analyses were conducted in R using the `pwr.f2.test` function. For the estimated effect sizes, I used Cohen's conventions for a small effect, which is an f^2 of .02 (or an R^2 of .02) (Cohen, 1988). I used this estimated effect size because an intervention with any smaller of an effect may have less important practical applications.

I performed three separate power analyses for the main effect of norm condition, the main effect of framing condition, and the interaction effect between the two. The interaction effect produced the largest needed sample size. To achieve 80% power for detecting a significant interaction effect between framing and norm condition, the study requires 765 participants, which is approximately 51 participants per condition. This sample size achieves approximately 89% power for detecting a significant main effect of norm-intervention condition and approximately 94% power for detecting a significant main effect of framing condition.

The minimum sample size of 765 participants was reached on May 10, 2023. The stopping rule was to end data collection on June 4, 2023, which was determined based on the timeline for completing the doctoral program requirements. A final sample size of 1,133 participants was collected by this date. For small effect sizes ($f^2 = .02$, $R^2 = .02$), this final sample size achieves 93% power for detecting a significant interaction effect, 97% power for detecting a significant overall effect of norm condition, and 99% power for detecting a significant overall effect of framing condition.

Participants

Data collection took place between November 2022 and June 2023. Participants were recruited from the University of Oregon Psychology/Linguistics Human Subjects Pool (n = 850), the University of Oregon Marketing Subjects Pool (n = 276), and the general University of Oregon student population (n = 7). The current study's methods were granted IRB approval by University of Oregon's Research Compliance Services (IRB ID: 04292020.037).

Participants' demographics are provided in Table 3.1 below and are based on the data prior to multiple imputation (discussed in Chapter 4). This only affected the sample size used to report statistics on age (n = 1,033) and parents' education (n = 1,131). The other demographic variables had complete data available (n = 1,133). The participants in the sample tended to be around 20 years old (M = 19.87), identify with being a woman (59%), identify as White (64%), have parents with a college or master's degree (65%), and identify as somewhat or very liberal (54%).

Procedure and Measures

Participants completed this study online via the Qualtrics survey platform. First, participants read an informed consent document that described the nature of the study, the estimated completion time, and the voluntary nature of participating. They were also told the compensation for participating, which was 0.5 SONA credits for participants from the human subject pools and a $5 Amazon gift card for participants from the general UO student population. Because fictional information was presented to participants as fact to create the perception of new consumption-related norms, they were also informed that they would be unaware of or misled regarding the nature or purposes of the research at some point during the study and that an in-depth explanation of where deception occurred would be given at the end. Participants were invited to continue the study if they were at least 18 years old and agreed with the statements in the informed consent document.

Table 3.1

Descriptive Statistics for Demographic Variables

Age		Gender		Ethnicity		Parents' Education		Political Orientation	
n	1033	*n*	1133	*n*	1133	*n*	1131	*n*	1133
M	19.87	Woman	59%	White	64%	College degree	34%	Somewhat liberal	32%
SD	1.95	Man	37%	Mixed Ethnicity	11%	Master's degree	31%	Very liberal	22%
Min	18	Non-binary	2%	Asian	10%	Some college	12%	Neither liberal nor conservative	18%
Max	50	Preferred not to identify	2%	Hispanic or Latinx	9%	Doctorate	10%	Slightly liberal	12%
IQR	2			Black or African American	3%	High school or GED	9%	Slightly conservative	6%
				Other	1%	Middle school or some high school	3%	Somewhat conservative	5%
				Pacific Islander	1%			Other	3%
				American Indian or Alaska Native	0.4%			Very conservative	2%

Participants were then randomly assigned to one of the following framing conditions which contextualized the behavior of reducing brand-new clothing item purchases as either pro-environmental, self-enhancing, or neither:

Pro-environmental framing. "In this study, we are interested in understanding people's clothing-buying habits. Please read the following excerpt related to people's clothing purchases: Our clothing-purchasing habits have a direct effect on the environment. The clothing industry produces substantial greenhouse gas emissions (GHGs) during the manufacturing process. The emission of

GHGs into the earth's atmosphere is the main factor contributing to the ongoing climate change crisis. A few of the consequences of climate change include: the Earth becoming, on average, hotter, sea levels rising, and more frequent severe weather events (e.g., droughts, heat waves, flooding). Consumers choosing to reduce the number of brand-new clothing items that they purchase is one way that individuals can help to slow climate change processes. A reduction in new clothing purchases could help to decrease greenhouse gas emissions by decreasing the demand for new clothing manufacturing.**"**

***Self-enhancing framing*. "**In this study, we are interested in understanding people's clothing-buying habits. Please read the following excerpt related to people's clothing purchases: Clothing retailers in the US have reported a drop in the sales of brand-new clothing items and wanted to know whether this was accompanied by a change in people's attitudes. In 2021, researchers conducted a national survey among people living in the United States to investigate people's views on purchasing and wearing brand-new clothing items. One of the findings from this study was that, on average, people living in the US reported that they feel unimpressed by seeing other people wear brand-new clothing items. Rather, survey responders reported that they view people more positively who rarely buy brand-new clothing items, or when they do buy clothing, purchase it from secondhand shops."

***Control framing condition*.** "In this study, we are interested in understanding people's clothing-buying habits. Pleas press 'next page' to read information about people's clothing-buying habits and answer questions regarding your own clothing-buying habits."

After reading one of the three framing conditions, participants were then randomly assigned to read one of the following five normative messages:

Control norm condition. "A survey was recently conducted among University of Oregon students to understand what UO students' views are on purchasing and wearing brand-new

clothing items. We are interested in collecting follow-up data to this previous study. Please press 'next page' to answer questions regarding your own clothing-buying views and behaviors."

Descriptive norm condition. "A survey was recently conducted among University of Oregon students to understand what UO students' views are on purchasing and wearing brand-new clothing items. When asked about their views on people's clothing-buying habits, a majority of University of Oregon students who responded reported that they themselves have reduced the number of brand-new clothing items that they purchase as of late. Based on responses, it appears to be more typical amongst UO students to purchase clothing from secondhand shops rather than brand-new."

Convention condition. "A survey was recently conducted among University of Oregon students to understand what UO students' views are on purchasing and wearing brand-new clothing items. When asked about their views on people's clothing-buying habits, most of the students who responded reported some amount of awareness that local community landfills often end up being overfilled with clothing. Managing this waste can create a drain on the economic resources of individuals and communities. A majority of University of Oregon students who responded reported that they themselves have reduced the number of brand-new clothing items that they purchase as of late so as to contribute to reducing the amount of clothing that goes to landfills. This practice can help save individuals and communities money on waste management. Based on responses, it appears to be more typical amongst UO students to purchase clothing from secondhand shops because this also helps to reduce the amount of clothing that ends up in landfills."

Social norm condition. "A survey was recently conducted among University of Oregon students to understand what UO students' views are on purchasing and wearing brand-new clothing items. When asked about their views on people's clothing-buying habits, a majority of University of Oregon students who responded reported that they believe that people should reduce the number of brand-new clothing items that they purchase and that failing to do so would be a "faux pas" (i.e., a

social slip-up). Students also reported believing that it is unnecessary to buy brand-new clothing in order to make a good impression on others at special occasions (e.g., for work, a wedding, a job interview, etc.). Based on responses, it appears to be more typical amongst UO students to purchase clothing from secondhand shops because students want to avoid being judged by their peers and feeling guilty for buying brand-new clothing items."

Moral norm condition. "A survey was recently conducted among University of Oregon students to understand what UO students' views are on purchasing and wearing brand-new clothing items. When asked about their views on people's clothing-buying habits, a majority of University of Oregon students who responded reported that they believe that people should reduce the number of brand-new clothing items that they purchase because it is the right thing to do. Based on responses, it appears that most UO students believe that it is more ethical to purchase clothing from secondhand shops. Responders reported thinking that buying clothing from secondhand shops is good for the environment and good for supporting ethically-run local businesses."

Participants were also measured on several covariates, including personal values, in-group identification, interest in clothing, and socially desirable responding. For participants recruited from the Psychology/Linguistics Human Subjects Pool, these measures were included in the pre-screening, which meant participants were measured on these covariates prior to their participation in the main intervention phase of this study. For participants recruited from the Marketing Human Subjects Pool and the general student population, participants responded to these measures after completing the intervention phase of the study.

***Personal Values*.** To assess personal values, I used the values scale from Steg et al. (2012), which assesses values on four different dimensions: biospheric, altruistic, egoistic, and hedonic. On this measure, participants were asked to indicate how important a set of 16 values are to them as "guiding principles in their lives" on a scale from 1 (*opposed to my principles*) to 7 (*extremely important*). The items assessing each value dimension are: biospheric (respecting the earth, unity

with nature, protecting the environment, preventing pollution), altruistic (equality, a world at peace, social justice, helpful), egoistic (social power, wealth, authority, influential, ambitious), and hedonic (pleasures, enjoying life, gratification for oneself).

Aggregated scores were created for biospheric, altruistic, egoistic, and hedonic values by averaging the items on each subscale. Each of the subscales had acceptable to good internal consistency ($\alpha_{Biospheric} = 0.88$, $\alpha_{Altruistic} = 0.78$, $\alpha_{Egoistic} = 0.72$) except for hedonic values, which had a Cronbach's alpha that was slightly below acceptable standards ($\alpha_{Hedonic} = 0.67$). However, dropping any items from the hedonic values subscale only worsened internal consistency so it remained composed of the original four items.

In-group Identification. The degree to which participants identify with University of Oregon students was measured using a 14-item ingroup identification scale from Leach et al. (2008). Responses are on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). This survey assesses five aspects of in-group identification, including solidarity (e.g., "I feel solidarity with other University of Oregon students"), satisfaction (e.g., "I am glad to be a University of Oregon student"), centrality (e.g., "The fact that I am a University of Oregon student is an important part of my identity"), individual self-stereotyping (e.g., "I have a lot in common with the average University of Oregon student"), and in-group homogeneity (e.g., "University of Oregon students are very similar to each other"). An overall ingroup identification score was created by calculating the average across all items. This scale had excellent internal consistency ($\alpha = 0.91$).

Interest in Clothing. To control for individual differences in participants' general interest in clothing, the 20-item Clothing Interest Inventory was included (Schrank, 1973). This measure includes items that assess the degree to which participants are interested in clothing (e.g., "I enjoy clothes like some people do such things as books, music, and movies") and fashion (e.g., "I have no interest in keeping up with the latest fashion trends" (*reverse-coded*)). Responses are given on a 1

(*definitely false*) to 5 (*definitely true*) scale. Scores were aggregated by taking the average across all items. This scale had excellent internal consistency ($\alpha = 0.92$).

***Socially Desirable Responding*.** To control for individual differences in participants' tendency to give socially desirable responses, participants completed the Balanced Inventory of Desirable Responding Short Form (Hart et al., 2015). The short form improves upon the length and language of the original 40-item BIDR while still replicating the original scale's two-factor structure with acceptable fit and reliability. The measure includes 16 items assessing impression management (e.g., "When I hear people talking privately, I avoid listening") and self-deceptive enhancement (e.g., "I never regret my decisions"). Responses are given on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. Aggregated scores were calculated for impression management and self-deceptive enhancement by averaging the items on each subscale. Both subscales scored slightly below acceptable on internal consistency ($\alpha_{\text{Self-Deceptive}} = 0.67$, $\alpha_{\text{Impression}} = 0.65$). However, there were no items that when dropped would improve the internal consistency of either subscale.

Participants were measured on two outcome variables, including pro-environmental clothing consumption intentions and pro-environmental clothing consumption behaviors.

Pro-environmental Clothing Consumption Intentions. The first outcome variable measured participants' intentions to reduce their new clothing item purchases over the next five years. This 8-item survey was developed for the current study. It assesses the degree to which people intend to not buy new clothing in the future, as well as the degree to which people intend to buy secondhand clothing instead of brand-new clothing. The instructions informed participants that each statement was with regards to the prospective clothing purchases that the participant may make in the next five years. All eight items are listed below:

In the next five years…

1. I will purchase very few brand-new clothing items.

2. I will purchase many brand-new clothing items. (*reverse-code*)

3. I will only purchase a brand-new clothing item if it is something that I need for basic functioning.

4. I don't plan on changing the number of brand-new clothing items that I typically buy. (*reverse-code*)

5. When I purchase a clothing item, I will get it from a secondhand shop rather than brand new.

6. When I purchase a clothing item, I will get it brand-new instead of from a secondhand shop. (*reverse-code*)

7. When I need a new clothing item for a special occasion, I will look for it at a secondhand shop instead of buying it brand new.

8. When I need a new clothing item, I will go straight to buying it brand-new and not look for it at a secondhand shop first. (*reverse-code*)

An aggregate consumer intentions score was calculated by taking the average of these eight items. Overall, the measure had good internal consistency ($\alpha = 0.84$).

***Pro-environmental Clothing Consumption Behaviors*.** Participants were presented with the choice to enter themselves into a raffle for the chance to win either 1) a $50 gift card to spend on new clothing items, or 2) a $50 gift card to spend on secondhand clothing items.

Chapter 4: Study 2 Planned Analyses

A pre-registration for this study's planned analyses was submitted on Open Science Framework (https://osf.io/8f3b2) prior to investigation of the data. All analysis code can be found on GitHub (https://github.com/sluopsy/Analysis_Github).

Prior to the main analyses, the data will be investigated for outliers. As stated in my pre-registration, the data will be examined for any obvious outliers that are the result of data entry errors using visualizations and descriptive statistics. If any data errors are identified, there will be an attempt to correct them to their intended value. If it is not possible to infer with great confidence what their intended value is, the data error will be removed.

Also prior to conducting the study's main analyses, I will use multiple imputation to handle missing data. Multiple imputation is a technique for predicting missing values using the other variables in one's study. This is done a researcher-specified number of times to create several "imputed" data sets with their own unique errors. Then, the study's analyses are conducted on each of these imputed data sets and the results are aggregated across them using rules for pooling parameter estimates (e.g., the pooled estimate for a regression coefficient for a particular predictor is the average estimated regression coefficient for that predictor across all imputed models) (van Buuren, 2018). This method of handling missing data has been found to produce less bias in parameter estimates and better power compared to listwise deletion (Peeters et al., 2015). Its implementation has been increasingly encouraged by researchers in the psychology community (Enders, 2017; Van Ginkel et al., 2020; Woods et al., 2023).

One complexity when implementing multiple imputation occurs when one needs to include interaction effects in the imputation model because they are of interest in the substantive model(s). A comparison of methods for conducting multiple imputation with the presence of interaction effects found that a method called *Substantive Model Compatible Fully Conditional Specification* (SMC-FCS) multiple imputation produced the least biased parameter estimates (van Buuren, 2018).

SMC-FCS multiple imputation avoids incompatibilities between one's imputation and substantive models (which can occur when interaction effects are not accounted for in the imputation model) by "specifying a joint model for outcome and covariates for which the conditional distribution of outcome given covariates matches the substantive model and then using the imputation model implied by this joint model" (Bartlett et al., 2015). SMC-FCS multiple imputation will be implemented for this analysis using the `smcfcs` function in R.

Following multiple imputation, I will conduct a linear regression analysis using the `lm` function in R to examine the effects of the study's key predictors on consumer intentions. The categorical predictors in this model will include framing condition, norm condition, the framing by norm interaction effect, and gender. These categorical predictors will be coded using orthogonal contrast codes. The continuous predictors in the model will include biospheric values, altruistic values, egoistic values, hedonic values, in-group identification, self-deceptive enhancement, impression management, interest in clothing, and age. These continuous predictors will be mean centered. The three-way interactions (and also two-way interactions) between framing condition, norm condition, and each of the four values subscales will also be included, as well as the three-way interaction (and two-way interactions) between in-group identification, framing condition, and norm condition. An identical model using a logistic regression analysis and consumer behaviors as the outcome variable will also be conducted using the `glm` function in R.

Hypothesis 1 stated that pro-environmental clothing consumption intentions and behaviors will be higher in the self-enhancing framing condition than in the pro-environmental or control framing conditions. To examine this hypothesis, I will look at the overall effect of framing condition in the model. Then, I will conduct simple effects analyses using the `emmeans` function in R to compare the estimated marginal means (EMMs) for each level of framing condition to one another in order to examine the direction, significance, and effect size of each comparison. Hypothesis 1 will

be supported if the EMM for the self-enhancing condition is significantly higher than the EMM for the pro-environmental and control framing conditions.

Hypothesis 2 stated that pro-environmental clothing consumption intentions and behaviors will be higher in each of the norm-intervention conditions compared to the control norm condition. To examine this hypothesis, I will look at the overall effect of norm condition in the model. Then, I will conduct simple effects analyses to compare the EMMs for each norm-intervention condition (descriptive, convention, social, and moral) to the control norm condition in order to examine the direction, significance, and effect size of each comparison. Hypothesis 2 will be supported if the EMMs for each norm condition are significantly higher than the EMM for the control norm condition.

Hypothesis 3 stated that there will be an interaction between framing and norm condition such that the effect of each norm-intervention condition will be stronger when preceded by the self-enhancing framing compared to the pro-environmental or control framing. To examine this hypothesis, I will use simple effects analyses to compare the effect of each norm-intervention condition within each framing condition where the effect of each norm-intervention condition is defined as the amount that pro-environmental clothing consumption intentions and behaviors change when going from the control norm condition to one of the norm-intervention conditions. Hypothesis 3 will be supported if the effects of each norm-intervention condition are more consistently significant (in the anticipated direction) and produce larger effect sizes in the self-enhancing framing condition than in the pro-environmental or control framing conditions.

Hypothesis 4 stated that there will be a two-way interaction between each of the values (biospheric, altruistic, egoistic, hedonic) and framing condition such that the pro-environmental framing will be more effective on people high, versus low, on biospheric and altruistic values, and low, versus high, on egoistic and hedonic values. When a self-enhancing framing is used, hypothesis 4 predicts there will be no difference between people low and high on each values dimension. To

analyze this hypothesis, I will examine the effects of each framing condition separately for people low (-1SD) and high (+1SD) on each values dimension. Hypothesis 4 will be supported if, in the pro-environmental framing condition, people high on biospheric and altruistic values (and people low on egoistic and hedonic values) score significantly higher on pro-environmental consumer intentions and behaviors compared to people low on biospheric and altruistic values (or high on egoistic and hedonic values). In the self-enhancing framing condition, hypothesis 4 is supported if there is no significant difference between people low and high on each values dimension.

Hypothesis 5 stated that there will be a three-way interaction between each of the values (biospheric, altruistic, egoistic, hedonic), framing condition, and norm-intervention condition such that when a pro-environmental or control framing is used, values will moderate the effect of each norm-intervention condition, but when a self-enhancing framing is used, values will not moderate the effect of each norm-intervention condition. To analyze this hypothesis, I will examine the effect of each norm-intervention condition separately for people low (-1SD) and high (+1SD) on each value within each framing condition. Hypothesis 5 will be supported if there is more consistently a significant, and larger, difference in the effect of each norm-condition between people low and high on each values dimension in the pro-environmental and control framing conditions than in the self-enhancing framing condition.

Hypothesis 6 states that in-group identification will moderate the effect of each norm-intervention condition on pro-environmental clothing consumption intentions and behaviors such that the effect of each norm-intervention condition will be stronger when people are high, versus low, on in-group identification. To analyze this hypothesis, I will examine the effect of each norm-intervention condition separately for people low (-1SD) and high (+1SD) on in-group identification. Hypothesis 6 will be supported if the effects of each norm-intervention condition are more consistently significant (in the anticipated direction) and produce larger effect sizes for people high, compared to low, on in-group identification.

Exploratory research question 1 is whether there will be a three-way interaction between in-group identification, framing condition, and norm-intervention condition. To examine this research question, I will follow up the analysis described for hypothesis 4 by examining the effects of each norm-intervention condition for people high, versus low, on in-group identification separately within each framing condition to examine whether the effects of each norm-intervention condition vary depending on the framing context.

Exploratory research question 2 is a question of which combination of framing condition and norm-intervention condition produces the strongest improvements in people's pro-environmental clothing consumption intentions and behaviors compared to the combination of the control framing and control norm condition. To examine this research question, I will compare the estimated marginal means for every combination of pro-environmental and self-enhancing framing with each norm-intervention condition to the control norm/control framing condition. Given the exploratory nature of the final two research questions and the number of contrasts involved in each, I will apply Sidak's post-hoc correction to the *p*-values and 95%CIs resulting from these comparisons.

Chapter 5: Study 2 Results

Missing Data

Table 5.1 below shows the number and percentage of missing cases for each of the study's key variables. Age had the highest percentage of missing cases (9%), while the remaining variables had less than 2% of cases missing. Missing values on these variables were imputed prior to analyses using the `smcfcs` function in R to implement Substantive Model Compatible Fully Conditional Specification multiple imputation (discussed in the Planned Analysis section). Five imputed data sets were produced to use in the main analyses.

Table 5.1

Number of Missing Scores per Variable

Variable	*N* Missing	% Missing
Age	103	9.09%
Consumer Behaviors	18	1.59%
Self-deceptive Enhancement	15	1.32%
Impression Management	14	1.24%
Biospheric Values	14	1.24%
Egoistic Values	14	1.24%
Altruistic Values	13	1.15%
Hedonic Values	13	1.15%
Gender	0	0%
In-group Identification	0	0%
Clothing Interest	0	0%
Framing Condition	0	0%
Norm Condition	0	0%
Consumer Intentions	0	0%

Note. Total sample size was n = 1,133.

Table 5.2 shows the final sample size per framing by norm condition. Each combination of framing and norm condition had between 64-91 participants, and there was an average of 75 participants per condition.

Table 5.2

Sample Size per Condition

	Framing Condition			
Norm Condition	Control	Pro-environmental	Self-enhancing	Total *n* per Norm
Control	79	73	79	231
Descriptive Norm	71	76	80	227
Convention	66	85	77	228
Social Norm	91	67	64	222
Moral Norm	68	80	77	225
Total *n* per Framing	375	381	377	

Note. Total sample size was n = 1,133.

Descriptive Statistics

To understand how participants tended to score on the key variables, I first examined descriptive statistics. Descriptive statistics for the variables with no missing data are provided in Table 5.3. For variables with missing data, descriptive statistics are provided in Table 5.4 and Table 5.5 across each imputed data set. Descriptive statistics for variables with missing data were similar across imputed data sets.

As shown in the descriptive statistics tables and the histograms in Figure 5.1, scores on each variable tended to be approximately normally distributed and centered around the midpoint of each scale with the exception of biospheric values, altruistic values, hedonic values, and age. Scores on biospheric values, altruistic values, and hedonic values were substantially negatively skewed. This indicates that the sample highly endorsed these values and there was not much representation of

individuals who score below the midpoint on these scales. Age was also substantially positively skewed with the large majority of the sample being between the ages of 18 and 25.

Table 5.3

Descriptive Statistics for Continuous Variables with No Missing Data

Variable	*n*	*M*	*SD*	*Skew*	*Min*	*Max*	*Mdn*
Clothing Interest	1133	3.13	0.80	-0.18	1	5	3.15
In-group Identification	1133	4.64	1.01	-0.27	1	7	4.64
Consumer Intentions	1133	4.41	1.19	-0.16	1	7	4.44

Table 5.4

Descriptive Statistics for Consumer Behaviors across Each Imputed Set

Imputed Set	Original *n*	*# of Imputed*	$n_{\text{NewClothing}}$	$n_{\text{Secondhandclothing}}$
1	1,115	18	608	525
2	1,115	18	605	528
3	1,115	18	606	527
4	1,115	18	606	527
5	1,115	18	603	530

To produce a correlation matrix, the `micombine.cor` function was used in R to pool the correlation estimates across the five imputed data sets. The results are shown in Table 5.6. The largest correlations were between biospheric and altruistic values, $r = 0.66$, hedonic and biospheric values, $r = 0.36$, hedonic and altruistic values, $r = 0.47$, and hedonic and egoistic values, $r = 0.44$. The remaining correlations were 0.30 or lower. Overall, there did not appear to be an issue of high correlations between predictors.

Table 5.5

Descriptive Statistics for Continuous Variables with Missing Data across Each Imputed Set

Imputed Set	Variable	Original *n*	*# of Imputed*	*M*	*SD*	*Skew*	*Min*	*Max*	*Mdn*
1	Biospheric Values	1,119	14	5.85	1.00	-1.08	1	7	6.00
	Altruistic Values	1,120	13	6.21	0.80	-1.91	1	7	6.50
	Egoistic Values	1,119	14	5.00	0.92	-0.39	1	7	5.00
	Hedonic Values	1,120	13	6.05	0.79	-1.44	1	7	6.33
	Self-deceptive Enhancement	1,118	15	3.72	0.85	0.14	1	7	3.72
	Impression Management	1,119	14	4.01	0.85	0.26	1	7	4.00
	Age	1,030	103	19.89	1.93	4.65	18	50	19.18
2	Biospheric Values	1,119	14	5.85	0.99	-1.08	1	7	6.00
	Altruistic Values	1,120	13	6.20	0.81	-1.89	1	7	6.50
	Egoistic Values	1,119	14	4.99	0.92	-0.38	1	7	5.00
	Hedonic Values	1,120	13	6.05	0.80	-1.43	1	7	6.33
	Self-deceptive Enhancement	1,118	15	3.72	0.86	0.15	1	7	3.72
	Impression Management	1,119	14	4.01	0.85	0.26	1	7	4.00
	Age	1,119	14	19.87	1.93	4.68	18	50	19.00
3	Biospheric Values	1,119	14	5.85	1.00	-1.10	1	7	6.00
	Altruistic Values	1,120	13	6.21	0.81	-1.91	1	7	6.50
	Egoistic Values	1,119	14	5.00	0.92	-0.39	1	7	5.00
	Hedonic Values	1,120	13	6.05	0.79	-1.44	1	7	6.33
	Self-deceptive Enhancement	1,118	15	3.72	0.85	0.16	1	7	3.72
	Impression Management	1,119	14	4.01	0.85	0.25	1	7	4.00
	Age	1,119	14	19.90	1.94	4.57	18	50	19.29
4	Biospheric Values	1,119	14	5.85	0.99	-1.10	1	7	6.00
	Altruistic Values	1,120	13	6.21	0.81	-1.90	1	7	6.50
	Egoistic Values	1,119	14	5.00	0.92	-0.40	1	7	5.00
	Hedonic Values	1,120	13	6.06	0.79	-1.45	1	7	6.33
	Self-deceptive Enhancement	1,118	15	3.72	0.85	0.12	1	7	3.72
	Impression Management	1,119	14	4.00	0.85	0.24	1	7	4.00
	Age	1,119	14	19.88	1.94	4.63	18	50	19.00
5	Biospheric Values	1,119	14	5.85	1.00	-1.11	1	7	6.00
	Altruistic Values	1,120	13	6.21	0.81	-1.91	1	7	6.50
	Egoistic Values	1,119	14	4.99	0.92	-0.39	1	7	5.00
	Hedonic Values	1,120	13	6.05	0.79	-1.45	1	7	6.33
	Self-deceptive Enhancement	1,118	15	3.72	0.86	0.15	1	7	3.72
	Impression Management	1,119	14	4.00	0.85	0.26	1	7	4.00
	Age	1,119	14	19.89	1.92	4.69	18	50	19.14

Figure 5.1

Histograms for the Continuous Variables

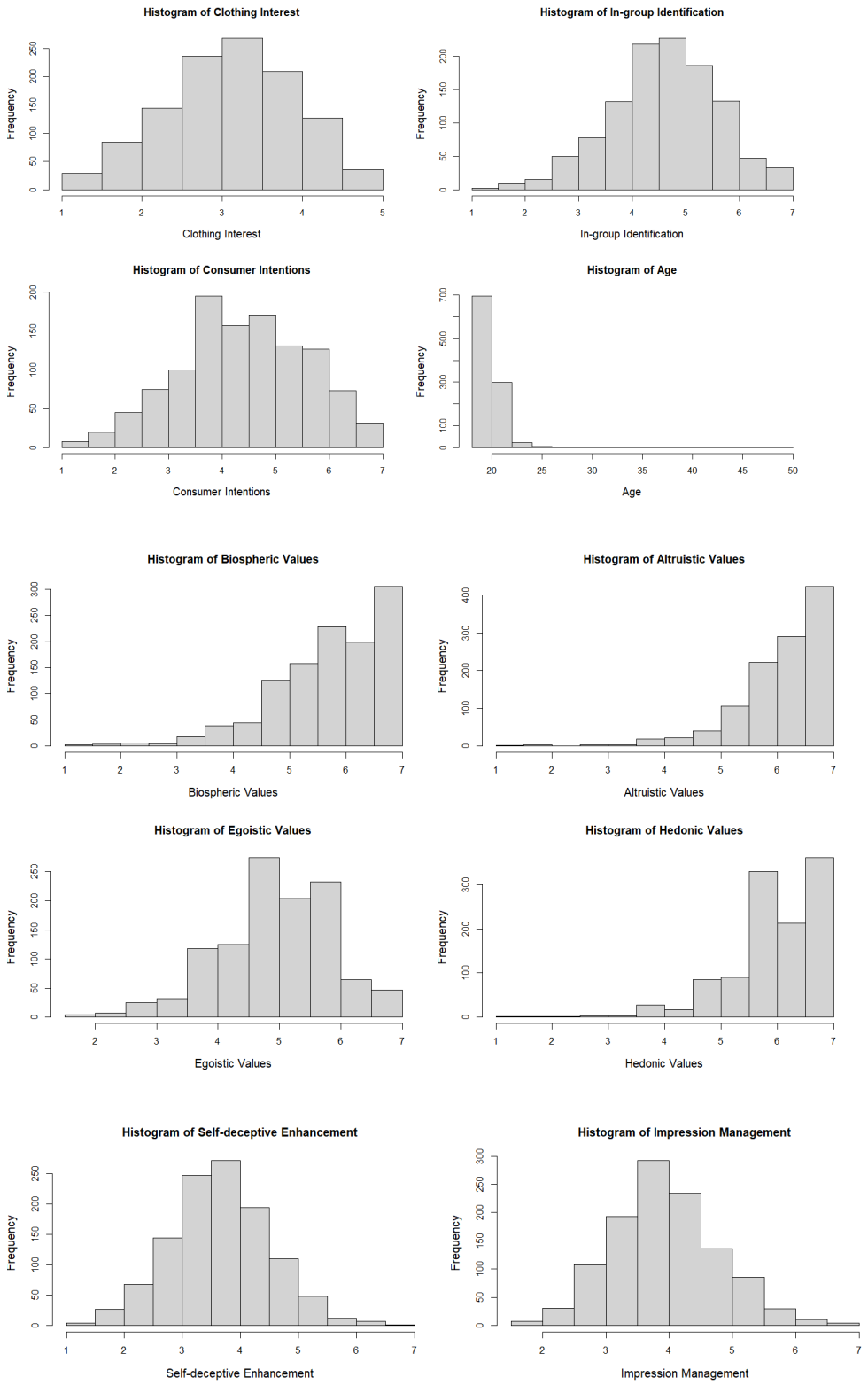


Table 5.6

Pooled Correlation Matrix

	Biospheric	Altruistic	Egoistic	Hedonic	In-group Identification	Clothing Interest	Self-deceptive Enhancement	Impression Management	Age	Consumer Intentions
Biospheric	1.00									
Altruistic	0.66	1.00								
Egoistic	0.16	0.23	1.00							
Hedonic	0.36	0.47	0.44	1.00						
In-group Identification	0.10	0.15	0.14	0.13	1.00					
Clothing Interest	0.14	0.17	0.22	0.15	0.13	1.00				
Self-deceptive Enhancement	-0.02	-0.03	0.20	0.08	0.03	0.05	1.00			
Impression Management	0.05	0.10	-0.05	-0.10	0.01	-0.06	0.30	1.00		
Age	-0.10	-0.16	-0.01	-0.08	-0.16	-0.14	0.18	0.08	1.00	
Consumer Intentions	0.30	0.19	-0.23	-0.03	0.05	0.01	-0.15	0.01	-0.13	1.00

Linear Regression Analysis for Pro-environmental Consumer Intentions

A linear regression analysis was performed to analyze the effects of framing condition, norm condition, values, in-group identification, and the interaction effects between these predictors on pro-environmental consumer intentions while also controlling for socially desirable responding, interest in clothing, gender, and age. To perform the analysis using the multiply imputed data, the `lm` function was used in tandem with the `with` function in R. Together, these functions perform the regression analysis on each of the five imputed data sets when passed the object created by the `smcfcs` function. Then, the `pool` function was used to aggregate the final results across the five individual models. The `mi.anova` function was used to produce an ANOVA table of these pooled results, which is shown in Table 5.7.

The `mi.anova` function calculates the denominator degrees of freedom for multiply imputed data using the formula $K^{-3/M}(M - 1)(1 + \text{ARIV}^{-1})^2$ where K is the numerator degrees of freedom, M is the number of multiple imputations performed, and ARIV is the average relative increase in variance due to the presence of missing data. For an accessible discussion of how these degrees of freedom are calculated, see Grund, Lüdtke, and Robitzsch (2016), and for the original derivation of the degrees of freedom formula, see Li et al. (1991).

Table 5.7

Pooled ANOVA Table for Model Predicting Consumer Intentions

	SS	*df1*	*df2*	*F*	*p*	η^2	η_p^2
Framing Condition	4.45	2	277911.15	1.94	0.144	0.003	0.004
Norm Condition	6.52	4	71957.17	1.41	0.227	0.005	0.005
Biospheric Values	69.70	1	182541.21	60.76	<.001	0.048	0.056
Altruistic Values	1.79	1	4948.63	1.48	0.224	0.001	0.002
Egoistic Values	55.16	1	117647.58	48.03	<.001	0.038	0.044
Hedonic Values	3.39	1	10965.18	2.88	0.090	0.002	0.003
Ingroup Identification	0.80	1	15534.19	0.67	0.413	0.001	0.001
Self-deceptive Enhancement	7.50	1	10820.41	6.41	0.011	0.005	0.006
Impression Management	0.15	1	48583.18	0.12	0.732	0.000	0.000
Clothing Interest	0.01	1	3781093.85	0.01	0.942	0.000	0.000
Gender	4.35	1	2572.87	3.60	0.058	0.003	0.004
Age	5.96	1	71.04	3.63	0.061	0.004	0.005
Framing x Norm	5.70	8	55071.52	0.61	0.767	0.004	0.005
Framing x Biospheric Values	0.74	2	3277.29	0.27	0.761	0.001	0.001
Norm x Biospheric Values	11.75	4	97395.31	2.56	0.037	0.008	0.010
Framing x Altruistic Values	1.29	2	6519.70	0.52	0.592	0.001	0.001
Norm x Altruistic Values	9.15	4	9084.58	1.96	0.098	0.006	0.008
Framing x Egoistic Values	0.48	2	15139.30	0.19	0.831	0.000	0.000
Norm x Egoistic Values	2.16	4	8536.54	0.44	0.776	0.001	0.002
Framing x Hedonic Values	2.18	2	21454.97	0.93	0.396	0.002	0.002
Norm x Hedonic Values	8.19	4	22945.86	1.76	0.133	0.006	0.007
Framing x Ingroup Identification	0.88	2	493256.84	0.38	0.685	0.001	0.001
Norm x Ingroup Identification	1.08	4	363457.46	0.23	0.920	0.001	0.001
Framing x Norm x Biospheric Values	17.32	8	345248.97	1.89	0.057	0.012	0.014
Framing x Norm x Altruistic Values	11.73	8	16665.70	1.26	0.259	0.008	0.010
Framing x Norm x Egoistic Values	11.33	8	28094.95	1.22	0.280	0.008	0.009
Framing x Norm x Hedonic Values	6.00	8	5510.08	0.63	0.757	0.004	0.005
Framing x Norm x Ingroup Identification	13.04	8	13143.09	1.40	0.190	0.009	0.011
Residual	1184.90						

Regression diagnostics were performed by examining the residuals from each of the five individually fitted models. Residuals plots were produced using the `plot` function in R, and a distribution of the residuals was created using `ggplot`. Examinations of the residuals plots across each fitted model indicated no issues with non-linearity or heteroscedasticity. Additionally, residuals appeared to be approximately normally distributed across each model. The `ols_vif_tol` function was used to examine multicollinearity among the predictors in the model. All tolerances were above 0.20 and VIFs were below 5, indicating no issues with multicollinearity.

Main effect of framing condition.

The overall effect of framing condition was not significant in the above model, $F(2, 277911.15) = 1.94$, $p = .144$, $\eta_p^2 = .004$. This does not support hypothesis 1. Because there was an a priori hypothesis regarding how specific levels of framing condition compare to one another, this effect was still followed up by simple effects analyses. Estimated marginal means (EMMs) were calculated using the `emmeans` function in R. Table 5.8 shows the EMMs for each level of framing condition. These EMMs are also visually depicted in Figure 5.2.

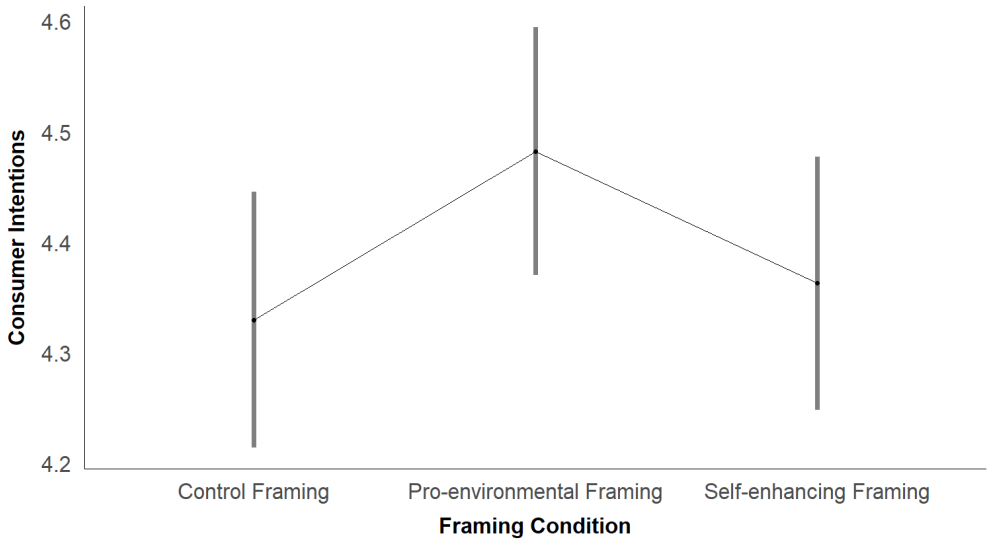
Table 5.8

EMMs for Pro-environmental Consumer Intentions Across Framing Conditions

Framing Condition	*EMM*	*SE*	*df*	*95%CI EMM*
Control Framing	4.33	0.06	1038	[4.21, 4.44]
Pro-environmental Framing	4.48	0.06	1038	[4.37, 4.59]
Self-enhancing Framing	4.36	0.06	1038	[4.25, 4.47]

Figure 5.2

Visualization of EMMs for Pro-environmental Consumer Intentions Across Framings



Note. Bars represent 95%CIs around each EMM.

To compare EMMs across conditions, the `contrast` function was used in R, along with the `confint` and `eff_size` functions to produce confidence intervals and effect sizes. As shown in Table 5.9, unlike what was predicted by hypothesis 1, pro-environmental consumer intentions were descriptively the highest in the pro-environmental framing condition, but its differences from the control framing condition, $t(1038) = 1.87$, $p = .062$, $d = 0.14$, and the self-enhancing framing condition, $t(1038) = 1.46$, $p = .145$, $d = 0.11$, were both non-significant. The difference between the self-enhancing framing and the control framing condition was also non-significant and the effect size was close to zero, $t(1038) = 0.41$, $p = .679$, $d = 0.03$.

Main effect of norm condition.

The main effect of norm condition was not significant in the overall model, $F(4, 71957.17) = 1.41$, $p = .227$, $\eta_p^2 = .005$, which did not support hypothesis 2. Because there was an a priori hypothesis regarding how specific levels of norm condition compare to one another, this effect was

Table 5.9

Comparison of Pro-environmental Consumer Intentions Between Framing Conditions

Contrast of Framing Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
SE vs Control	0.03	[-0.13, 0.19]	0.08	1038	0.41	0.679	0.03
PE vs Control	0.15	[-0.01, 0.31]	0.08	1038	1.87	0.062	0.14
PE vs SE	0.12	[-0.28, 0.04]	0.08	1038	1.46	0.145	0.11

Note. SE = self-enhancing framing, PE = pro-environmental framing

still followed up by simple effects analyses. Table 5.10 shows the EMMs for each level of norm condition, which are also visually depicted in Figure 5.3 below.

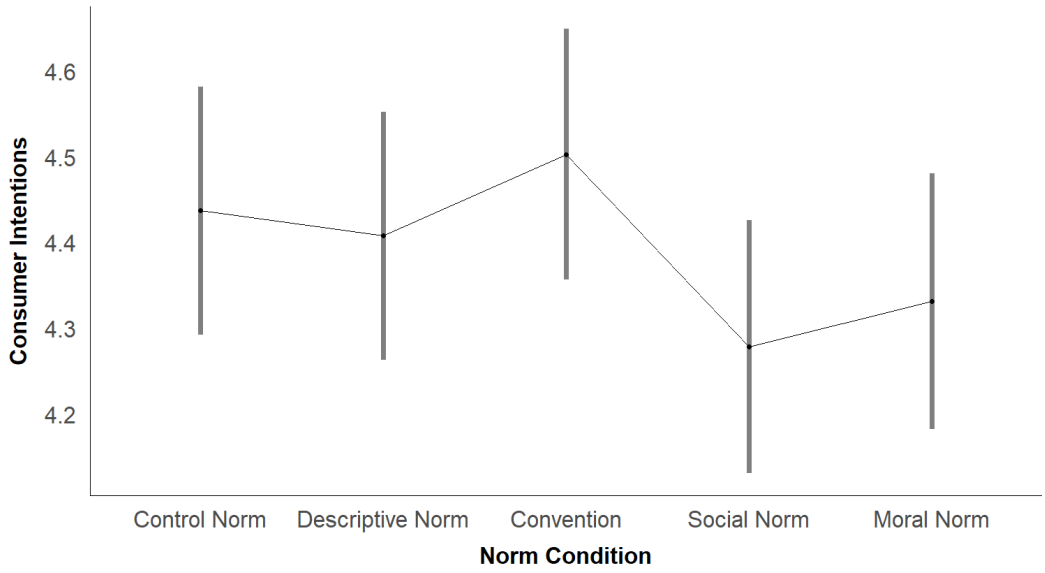
Table 5.10

EMMs for Pro-environmental Consumer Intentions Across Norm Conditions

Framing Condition	*EMM*	*SE*	*df*	*95%CI EMM*
Control Norm	4.43	0.07	1038	[4.29, 4.58]
Descriptive Norm	4.40	0.07	1038	[4.26, 4.55]
Convention	4.50	0.07	1038	[4.36, 4.65]
Social Norm	4.28	0.08	1038	[4.13, 4.42]
Moral Norm	4.33	0.08	1038	[4.18, 4.48]

Figure 5.3

Visualization of EMMs for Pro-environmental Consumer Intentions Across Norms



Note. Bars represent 95%CIs around each EMM.

The effect of each norm-intervention condition was defined as the difference in pro-environmental consumer intentions between each norm-intervention condition (descriptive norm, convention, social norm, and moral norm) and the control norm condition. As shown in Table 5.11, unlike what was predicted by hypothesis 2, pro-environmental consumer intentions were only descriptively higher in the convention condition compared to in the control norm condition, but the difference was non-significant, $t(1038) = 0.68$, $p = .499$, $d = 0.07$. Pro-environmental consumer intentions were non-significantly lower in the social norm, $t(1038) = -1.50$, $p = .134$, $d = 0.15$, and moral norm, $t(1038) = -1.00$, $p = .320$, $d = 0.10$, conditions compared to the control norm condition. The difference in pro-environmental consumer intentions between the descriptive and control norm condition was non-significant and the effect size was close to zero, $t(1038) = -0.29$, $p = .774$, $d = 0.03$.

Table 5.11

Comparison of Pro-environmental Consumer Intentions Between Norm Conditions

Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
Descriptive vs Control	-0.03	[-0.22, 0.17]	0.10	1038	-0.29	0.774	0.03
Convention vs Control	0.07	[-0.13, 0.27]	0.10	1038	0.68	0.499	0.07
Social vs Control	-0.16	[-0.36, 0.05]	0.10	1038	-1.50	0.134	0.15
Moral vs Control	-0.10	[-0.31, 0.10]	0.10	1038	-1.00	0.320	0.10

Even when considered altogether, the difference between the average EMM for all the norm-intervention conditions compared to the EMM for the control norm condition was not significant, $EMM_{Difference}$ = -0.05, $t(1038)$ = -0.67, p = .500. This demonstrates that, overall, the norm-intervention conditions were ineffective at persuading people to change their pro-environmental consumer intentions.

Framing by norm interaction effect.

The framing by norm interaction effect was not significant in the overall model, $F(8, 55071.52) = 0.61$, $p = .767$, $\eta_p^2 = .005$. This finding is inconsistent with what was predicted by hypothesis 3. However, because there was an a priori hypothesis regarding this two-way interaction, simple effects analyses were performed to better understand the nature (or the reason for the lack of) this interaction effect. Table 5.12 displays the EMMs for each combination of framing and norm condition. These EMMs are also visually depicted in Figure 5.4.

To better understand the framing by norm interaction effect, the effect of each norm-intervention condition was examined separately within each framing condition. The results are shown in Table 5.13 below. Although the overall framing by norm interaction effect was non-significant, the pattern of the EMMs initially appeared to be consistent with what was predicted by

Table 5.12

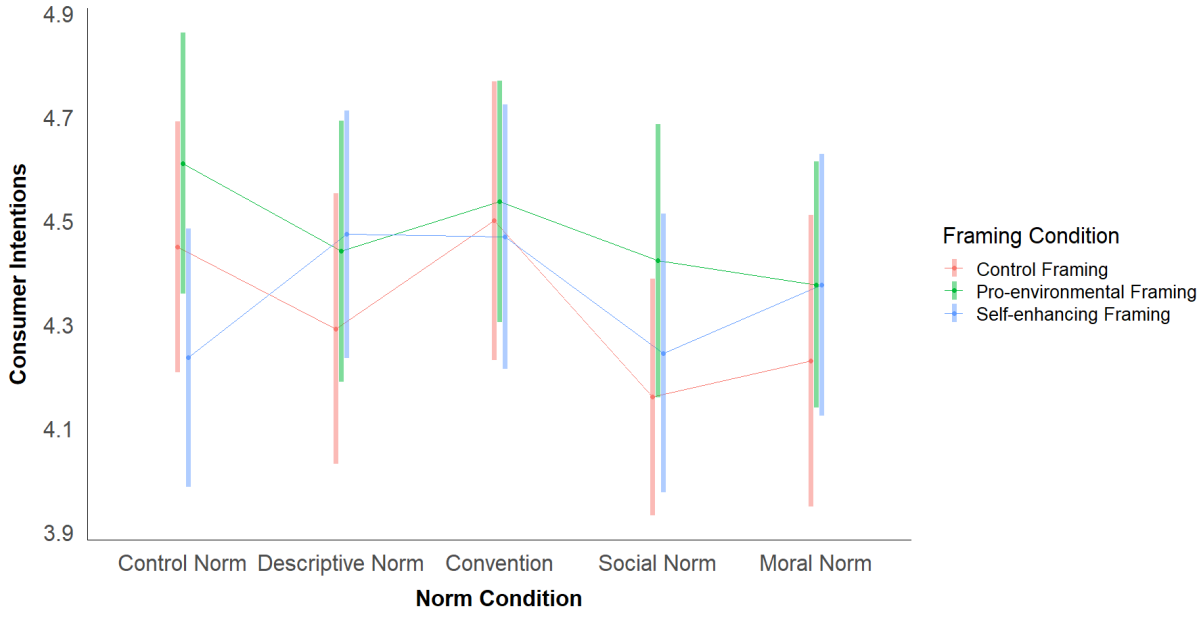
EMMs for Pro-environmental Consumer Intentions Across Framing and Norm Conditions

	Framing Condition			
	Control	Pro-environmental	Self-enhancing	Per Norm Condition
Norm Condition	*EMM* (*SE*)	*EMM* (*SE*)	*EMM* (*SE*)	*EMM* (*SE*)
Control	4.45 (0.12)	4.61 (0.13)	4.24 (0.13)	4.43 (0.07)
Descriptive Norm	4.29 (0.13)	4.44 (0.13)	4.47 (0.12)	4.40 (0.07)
Convention	4.50 (0.14)	4.54 (0.12)	4.47 (0.13)	4.50 (0.07)
Social Norm	4.16 (0.12)	4.42 (0.13)	4.24 (0.14)	4.28 (0.08)
Moral Norm	4.23 (0.14)	4.38 (0.12)	4.38 (0.13)	4.33 (0.08)
Per Framing Condition	4.33 (0.06)	4.48 (0.06)	4.36 (0.06)	

Note. This table displays EMMs resulting from the regression model detailed in Table 5.7. Standard errors are provided in parentheses.

Figure 5.4

Visualization of EMMs for Pro-environmental Consumer Intentions Across Framings and Norms



hypothesis 3. Specifically, it appeared that, in the control framing and pro-environmental framing conditions, exposure to every norm-intervention condition non-significantly worsened pro-environmental consumer intentions, whereas in the self-enhancing framing condition, pro-environmental consumer intentions were non-significantly higher in three of the norm-intervention condition compared to the control norm condition. However, as shown in Figure 5.4, this was potentially due to the fact that the self-enhancing framing's control norm condition started out with an EMM lower than the other two control norm conditions. Thus, this effect was followed up with some additional analyses.

Table 5.13

Effect of Each Norm Condition on Pro-environmental Consumer Intentions Across Framings

Framing Condition	Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
Control	Descriptive vs Control	-0.16	[-0.51, 0.20]	0.18	1038	-0.87	0.384	0.15
	Convention vs Control	0.05	[-0.31, 0.41]	0.18	1038	0.27	0.783	0.05
	Social vs Control	-0.29	[-0.62, 0.04]	0.17	1038	-1.71	0.088	0.27
	Moral vs Control	-0.22	[-0.59, 0.15]	0.19	1038	-1.16	0.246	0.21
PE	Descriptive vs Control	-0.17	[-0.52, 0.19]	0.18	1038	-0.94	0.349	0.16
	Convention vs Control	-0.07	[-0.42, 0.27]	0.17	1038	-0.42	0.671	0.07
	Social vs Control	-0.19	[-0.55, 0.18]	0.19	1038	-1.02	0.310	0.18
	Moral vs Control	-0.23	[-0.58, 0.11]	0.18	1038	-1.33	0.183	0.22
SE	Descriptive vs Control	0.24	[-0.11, 0.58]	0.18	1038	1.36	0.174	0.22
	Convention vs Control	0.23	[-0.12, 0.59]	0.18	1038	1.29	0.198	0.22
	Social vs Control	0.01	[-0.36, 0.38]	0.19	1038	0.05	0.962	0.01
	Moral vs Control	0.14	[-0.21, 0.49]	0.18	1038	0.78	0.435	0.13

Note. PE = Pro-environmental framing, SE = self-enhancing framing

Although the self-enhancing framing context was the only one in which three of the norm-intervention conditions had higher EMMs compared to the control norm condition, this could be less the result of pro-environmental consumer intentions being more improved when paired with

the self-enhancing framing and more to do with the EMM for the control norm condition within the self-enhancing framing condition starting out lower than the EMM for the other two control norm conditions. Thus, this finding was followed up by simple effects analyses comparing the EMMs for the same norm-intervention condition across all three framing contexts.

As shown in Table 5.14, pro-environmental consumer intentions were significantly lower when the control norm was paired with a self-enhancing framing than when the control norm was paired with a pro-environmental framing, $t(1038) = 2.08$, $p = .037$, $d = 0.35$. The other differences in EMMs for each norm-intervention condition between the three framing contexts were non-significant. Thus, unlike what was predicted by hypothesis 3, the strength of each norm-intervention condition does not appear to be greater when paired with a self-enhancing framing context.

Table 5.14

Differences in Pro-environmental Consumer Intentions for Each Norm Condition Across Framings

Norm Condition	Contrast of Framing Conditions	*EMM Difference*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
Control norm	PE vs C	0.16	[-0.19, 0.51]	0.18	1038	0.91	0.364	0.15
	SE vs C	-0.21	[-0.56, 0.13]	0.18	1038	-1.21	0.227	0.20
	PE vs SE	0.38	[0.02, 0.73]	0.18	1038	2.08	0.037	0.35
Descriptive Norm	PE vs C	0.15	[-0.21, 0.51]	0.18	1038	0.81	0.418	0.14
	SE vs C	0.18	[-0.17, 0.53]	0.18	1038	1.02	0.310	0.17
	PE vs SE	-0.03	[-0.38, 0.31]	0.18	1038	-0.18	0.854	0.03
Convention	PE vs C	0.04	[-0.32, 0.39]	0.18	1038	0.20	0.838	0.03
	SE vs C	-0.03	[-0.40, 0.34]	0.19	1038	-0.16	0.872	0.03
	PE vs SE	0.07	[-0.28, 0.41]	0.18	1038	0.38	0.701	0.06
Social Norm	PE vs C	0.26	[-0.08, 0.61]	0.18	1038	1.48	0.138	0.25
	SE vs C	0.08	[-0.27, 0.44]	0.18	1038	0.47	0.637	0.08
	PE vs SE	0.18	[-0.20, 0.55]	0.19	1038	0.93	0.351	0.17
Moral Norm	PE vs C	0.15	[-0.22, 0.51]	0.19	1038	0.78	0.433	0.14
	SE vs C	0.15	[-0.23, 0.52]	0.19	1038	0.76	0.447	0.14
	PE vs SE	0.00	[-0.35, 0.35]	0.18	1038	0.00	0.999	0.00

Note. C = control framing, PE = pro-environmental framing, SE = self-enhancing framing

Values interaction effects.

Biospheric values. In the overall model, biospheric values significantly predicted pro-environmental consumer behaviors, $F(1, 182541.21) = 60.76$, $p < .001$, $\eta_p^2 = .056$. On average, participants high (+1SD above the mean) on biospheric values scored significantly higher on pro-environmental consumer intentions (*EMM* = 4.75, *SE* = 0.06) compared to participants low (-1SD below the mean) on biospheric values (*EMM* = 4.03, *SE* = 0.06), $t(1038) = 7.79$, $p < .001$, $d = 0.67$.

Unlike what was predicted by hypothesis 4, the two-way interaction between biospheric values and framing condition was not significant, $F(2, 3277.29) = 0.27$, $p = .761$, $\eta_p^2 = .001$. The three-way interaction between biospheric values, framing condition, and norm condition was also non-significant, $F(8, 345248.97) = 1.89$, $p = .057$, $\eta_p^2 = .014$, which did not support hypothesis 5. Given the a priori hypotheses regarding each of these effects, though, simple effects analyses were still performed to examine the nature of these interaction effects further. EMMs for pro-environmental consumer intentions at low and high biospheric values across each framing and norm condition are shown in Table 5.15 and Figure 5.5 below.

As shown in Table 5.16 and Figure 5.6, across all framing conditions, participants high on biospheric values scored significantly higher on pro-environmental consumer intentions compared to participants low on biospheric values, all *p*s < .001. In partial support of hypothesis 4, the effect size was larger for the pro-environmental framing condition, $d = 0.75$, compared to the self-enhancing framing condition, $d = 0.59$.

In addition to the overall three-way interaction effect being non-significant, the pattern of the EMMs also did not support the prediction made by hypothesis 5. It appeared that, in all framing conditions, the pattern of the effects of each norm-intervention condition varied between people low and high on biospheric values. Additionally, high biospheric individuals scored higher than low biospheric individuals across most conditions (see Table 5.15 and Figure 5.5). When the two groups

Table 5.15

EMMs for Consumer Intentions at Low and High Biospheric Values across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	3.89 (0.20)	5.01 (0.20)	4.34 (0.19)	4.88 (0.21)	3.74 (0.22)	4.73 (0.23)	3.99 (0.12)	4.87 (0.12)
Descriptive Norm	3.83 (0.23)	4.75 (0.24)	4.27 (0.20)	4.62 (0.21)	4.20 (0.23)	4.75 (0.21)	4.10 (0.13)	4.71 (0.13)
Convention	3.68 (0.22)	5.32 (0.24)	3.86 (0.21)	5.21 (0.20)	4.15 (0.22)	4.79 (0.23)	3.90 (0.12)	5.11 (0.13)
Social Norm	4.12 (0.20)	4.20 (0.20)	4.07 (0.18)	4.77 (0.21)	3.87 (0.24)	4.62 (0.26)	4.02 (0.12)	4.53 (0.13)
Moral Norm	4.31 (0.32)	4.15 (0.23)	3.85 (0.19)	4.91 (0.91)	4.26 (0.26)	4.49 (0.21)	4.14 (0.15)	4.52 (0.12)
Per Framing Condition	3.96 (0.11)	4.69 (0.10)	4.08 (0.09)	4.88 (0.09)	4.05 (0.10)	4.67 (0.10)		

Note. This table reports EMMs for pro-environmental consumer intentions at low (-1SD) biospheric values and high (+1SD) biospheric values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.5

Visualization of EMMs for Consumer Intentions at Low and High Biospheric Values

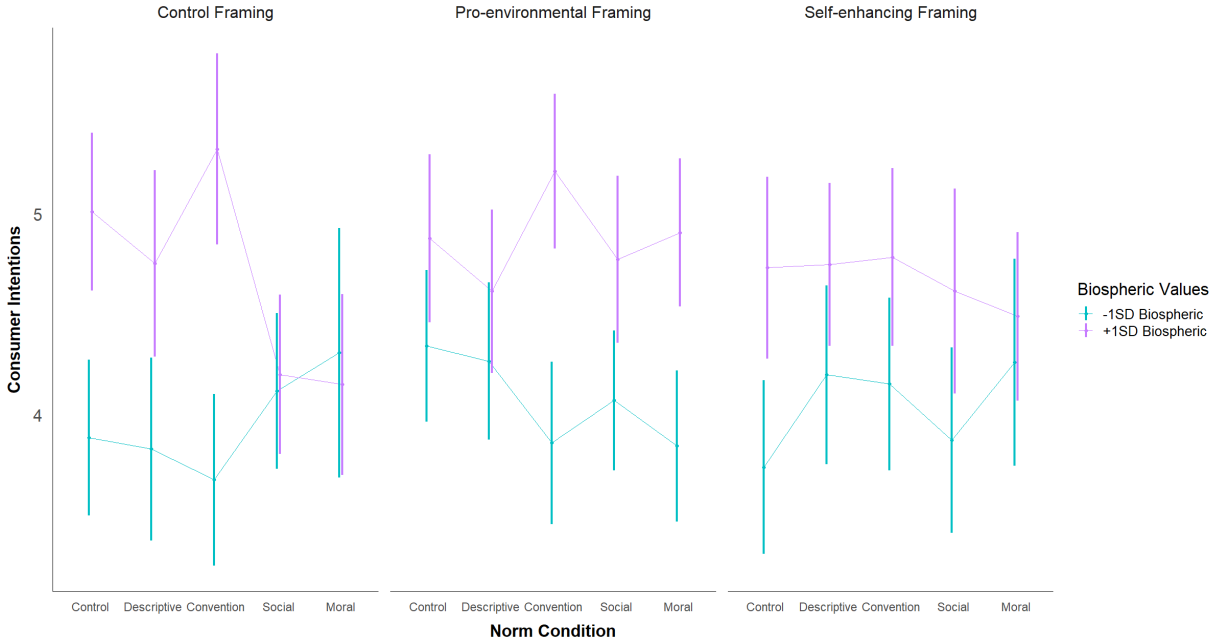


Table 5.16

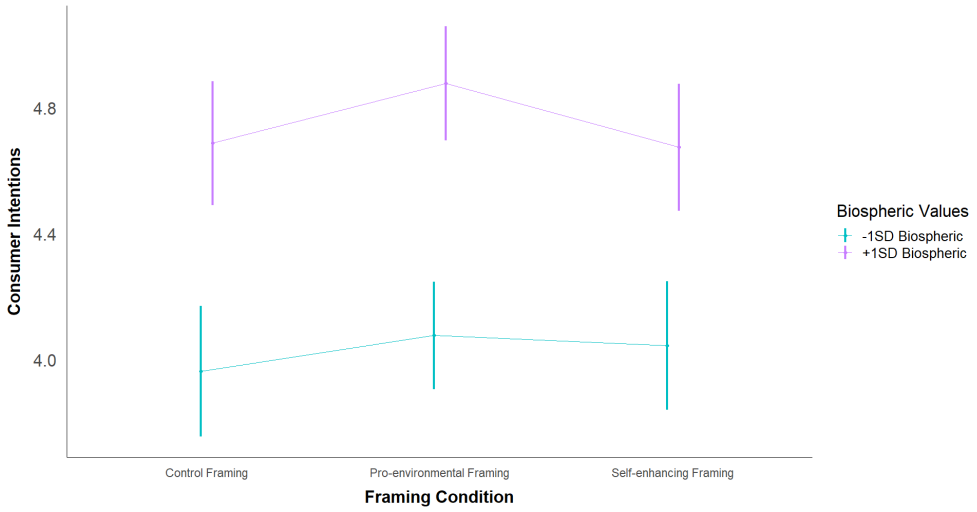
Comparison of Consumer Intentions across People Low and High on Biospheric Values Across Framings

Contrast	*EMM Difference*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
C framing: High Bio - Low Bio	0.72	[0.39, 1.06]	0.17	1038	4.29	<.001	0.68
PE framing: High Bio - Low Bio	0.80	[0.53, 1.07]	0.14	1038	5.83	<.001	0.75
SE framing: High Bio - Low Bio	0.63	[0.29, 0.97]	0.17	1038	3.67	<.001	0.59

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.6

EMMs for Consumer Intentions for People Low and High on Biospheric Values Across Framings



did score similarly to each other, it was because there was a decrease in pro-environmental consumer intentions among people high on biospheric values.

Table 5.17 below displays the results of examining the three-way interaction between biospheric values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on biospheric values. The only significant effects occurred for individuals high on biospheric values

in the control framing condition, and it was due to the social and moral norm conditions significantly reducing pro-environmental consumer intentions, *p*s ≤ .005, *d*s ≥ 0.76.

Table 5.17

Effect of Each Norm on Consumer Intentions at Low and High Biospheric Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*EMM Diff*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*d*
Control	-1SD Biospheric	Descriptive vs Control	-0.06	[-0.66, 0.54]	0.31	1038	-0.19	.853	0.05
		Convention vs Control	-0.21	[-0.79, 0.37]	0.29	1038	-0.71	.475	0.20
		Social vs Control	0.23	[-0.32, 0.78]	0.28	1038	0.83	.407	0.22
		Moral vs Control	0.42	[-0.31, 1.16]	0.37	1038	1.13	.258	0.40
	+1SD Biospheric	Descriptive vs Control	-0.26	[-0.87, 0.35]	0.31	1038	-0.84	.403	0.24
		Convention vs Control	0.31	[-0.30, 0.93]	0.31	1038	0.99	.321	0.29
		Social vs Control	-0.81	[-1.37, -0.25]	0.28	1038	-2.86	.004	0.76
		Moral vs Control	-0.86	[-1.46, -0.26]	0.30	1038	-2.83	.005	0.81
PE	-1SD Biospheric	Descriptive vs Control	-0.08	[-0.62, 0.47]	0.28	1038	-0.27	.785	0.07
		Convention vs Control	-0.48	[-1.04, 0.07]	0.28	1038	-1.72	.087	0.45
		Social vs Control	-0.27	[-0.78, 0.24]	0.26	1038	-1.04	.299	0.25
		Moral vs Control	-0.50	[-1.03, 0.04]	0.27	1038	-1.83	.067	0.47
	+1SD Biospheric	Descriptive vs Control	-0.26	[-0.85, 0.32]	0.30	1038	-0.89	.375	0.25
		Convention vs Control	0.34	[-0.23, 0.90]	0.29	1038	1.16	.248	0.31
		Social vs Control	-0.10	[-0.69, 0.49]	0.30	1038	-0.35	.730	0.10
		Moral vs Control	0.03	[-0.53, 0.59]	0.28	1038	0.10	.917	0.03
SE	-1SD Biospheric	Descriptive vs Control	0.46	[-0.17, 1.09]	0.32	1038	1.44	.150	0.43
		Convention vs Control	0.41	[-0.20, 1.02]	0.31	1038	1.33	.183	0.39
		Social vs Control	0.13	[-0.50, 0.77]	0.32	1038	0.41	.680	0.12
		Moral vs Control	0.52	[-0.15, 1.19]	0.34	1038	1.53	.125	0.49
	+1SD Biospheric	Descriptive vs Control	0.02	[-0.60, 0.63]	0.31	1038	0.05	.958	0.02
		Convention vs Control	0.05	[-0.58, 0.68]	0.32	1038	0.17	.869	0.05
		Social vs Control	-0.12	[-0.80, 0.57]	0.35	1038	-0.33	.739	0.11
		Moral vs Control	-0.24	[-0.86, 0.37]	0.31	1038	-0.77	.439	0.23

Note. PE = pro-environmental, SE = self-enhancing

Altruistic values. In the overall model, altruistic values did not significantly predict pro-environmental consumer intentions, $F(1, 4948.63) = 1.48$, $p = .224$, $\eta_p^2 = .002$. On average, participants high (+1SD above the mean) on altruistic values scored non-significantly higher on pro-

environmental consumer intentions (*EMM* = 4.47, *SE* = 0.07) compared to participants low (-1SD below the mean) on altruistic values (*EMM* = 4.31, *SE* = 0.07), $t(1038) = 1.23$, $p = .220$, $d = 0.15$.

Unlike what was predicted by hypothesis 4, the two-way interaction between altruistic values and framing condition was not significant, $F(2, 6519.70) = 0.52$, $p = .592$, $\eta_p^2 = .001$. The three-way interaction between altruistic values, framing, and norm condition was also non-significant, $F(8, 345248.97) = 1.89$, $p = .259$, $\eta_p^2 = .010$, which did not support hypothesis 5. Because there were a priori hypotheses regarding each of these interaction effects, simple effects analyses were still performed to examine the nature of these interactions further. EMMs for pro-environmental consumer intentions at low and high altruistic values across each framing and norm condition are shown in Table 5.18 and Figure 5.7.

Table 5.18

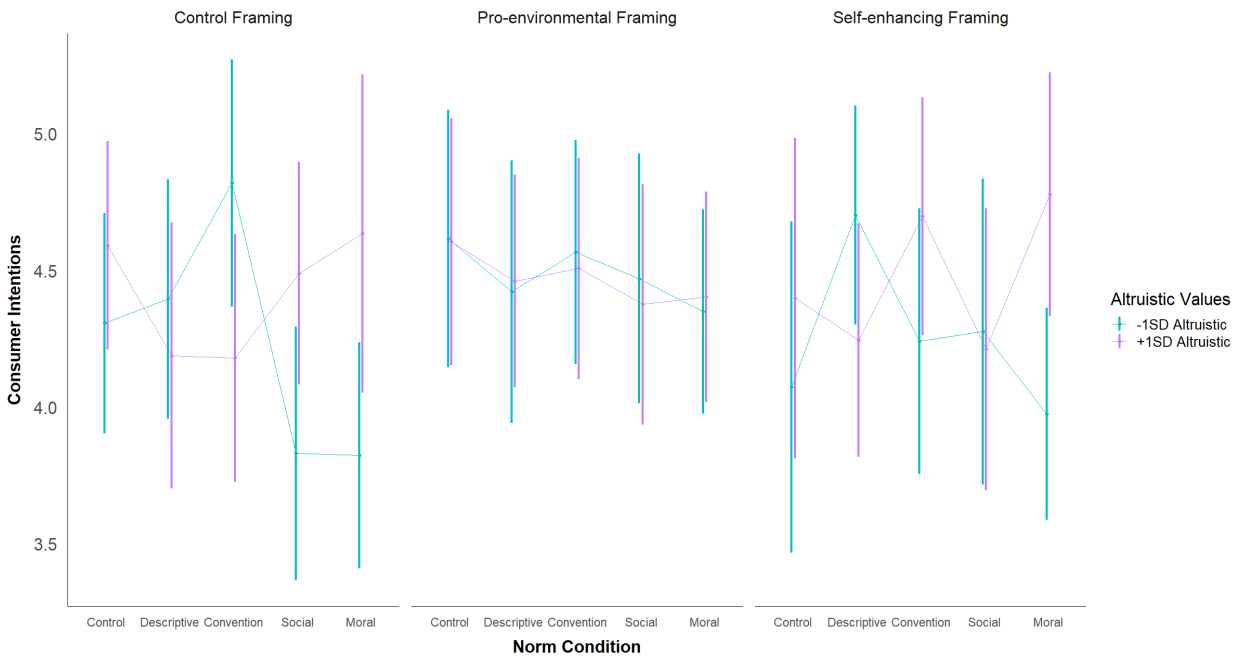
EMMs for Consumer Intentions at Low and High Altruistic Values Across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	4.31 (0.21)	4.59 (0.19)	4.62 (0.24)	4.61 (0.23)	4.07 (0.31)	4.40 (0.30)	4.33 (0.14)	4.53 (0.14)
Descriptive Norm	4.40 (0.22)	4.19 (0.25)	4.42 (0.24)	4.46 (0.20)	4.70 (0.20)	4.25 (0.22)	4.51 (0.13)	4.30 (0.13)
Convention	4.82 (0.23)	4.18 (0.23)	4.57 (0.21)	4.51 (0.21)	4.24 (0.25)	4.70 (0.22)	4.54 (0.13)	4.46 (0.13)
Social Norm	3.83 (0.24)	4.49 (0.21)	4.47 (0.23)	4.38 (0.22)	4.28 (0.29)	4.21 (0.26)	4.19 (0.15)	4.36 (0.13)
Moral Norm	3.82 (0.21)	4.64 (0.30)	4.35 (0.19)	4.40 (0.20)	3.98 (0.20)	4.78 (0.23)	4.05 (0.12)	4.16 (0.14)
Per Framing Condition	4.24 (0.10)	4.42 (0.11)	4.49 (0.10)	4.47 (0.10)	4.25 (0.11)	4.47 (0.11)		

Note. This table reports EMMs for pro-environmental consumer intentions at low (-1SD) altruistic values and high (+1SD) altruistic values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.7

Visualization of EMMs for Consumer Intentions at Low and High Altruistic Values



As shown in Table 5.19, there was no significant difference in pro-environmental consumer intentions between people high and low on altruistic values in any of the three framing conditions. Additionally, unlike what was predicted by hypothesis 4, the difference between the two groups was actually descriptively the smallest in the pro-environmental framing condition.

Table 5.19

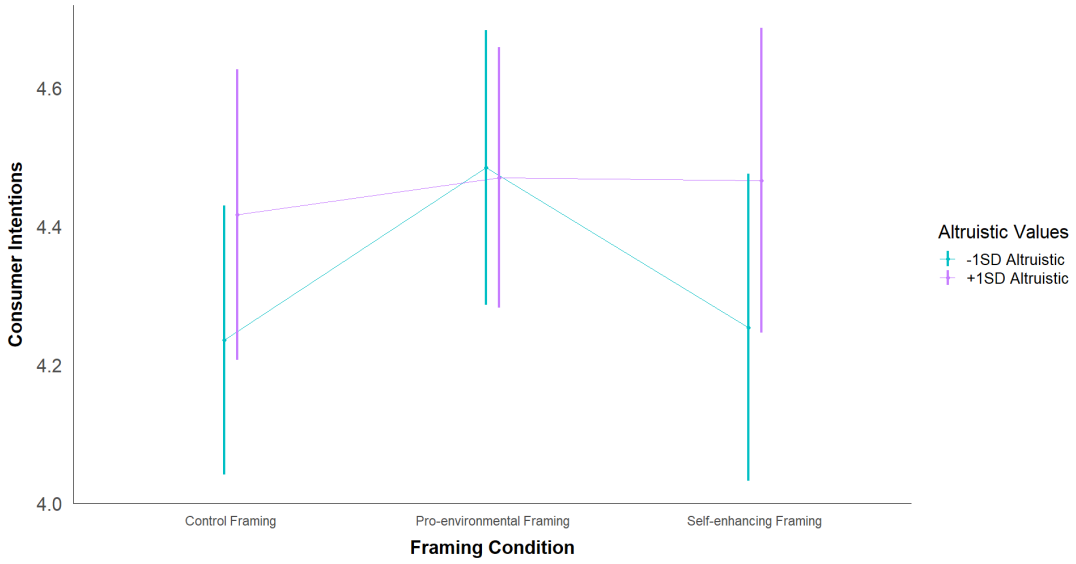
Comparison of Consumer Intentions Across People Low and High on Altruistic Values Across Framings

Contrast	*EMM Diff*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
C framing: High Alt – Low Alt	0.18	[-0.15, 0.51]	0.17	1038	1.07	0.284	0.17
PE framing: High Alt – Low Alt	-0.01	[-0.33, 0.30]	0.16	1038	-0.09	0.928	0.01
SE framing: High Alt – Low Alt	0.21	[-0.17, 0.59]	0.19	1038	1.10	0.272	0.20

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.8

EMMs for Consumer Intentions at Low and High Altruistic Values Across Framings



Interestingly, although biospheric and altruistic values are both considered self-transcendent values, their interactions with the framing and norm conditions produced different patterns of effects. Although the three-way interaction effect was non-significant, the pattern of the effects of each norm-intervention condition appeared to be most similar between people high and low on altruistic values in the pro-environmental framing condition compared to the other two framing conditions (see Table 5.18 and Figure 5.7).

Table 5.20 displays the results of examining the three-way interaction between altruistic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on altruistic values. The effects of each norm-intervention condition were non-significant across all framing conditions for both people high and low on altruistic values.

Table 5.20

Effect of Each Norm on Consumer Intentions at Low and High Altruistic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*d*
Control	-1SD Altruistic	Descriptive vs Control	0.09	[-0.51, 0.68]	0.30	1038	0.29	0.772	0.08
		Convention vs Control	0.51	[-0.09, 1.12]	0.31	1038	1.66	0.097	0.48
		Social vs Control	-0.48	[-1.09, 0.14]	0.31	1038	-1.53	0.127	0.45
		Moral vs Control	-0.48	[-1.06, 0.09]	0.29	1038	-1.64	0.101	0.45
	+1SD Altruistic	Descriptive vs Control	-0.40	[-1.02, 0.21]	0.31	1038	-1.29	0.199	0.38
		Convention vs Control	-0.41	[-1.00, 0.18]	0.30	1038	-1.36	0.173	0.38
		Social vs Control	-0.10	[-0.66, 0.45]	0.28	1038	-0.36	0.719	0.10
		Moral vs Control	0.04	[-0.65, 0.74]	0.35	1038	0.12	0.902	0.04
PE	-1SD Altruistic	Descriptive vs Control	-0.19	[-0.86, 0.48]	0.34	1038	-0.57	0.570	0.18
		Convention vs Control	-0.05	[-0.67, 0.57]	0.32	1038	-0.16	0.877	0.05
		Social vs Control	-0.15	[-0.80, 0.51]	0.33	1038	-0.44	0.663	0.14
		Moral vs Control	-0.27	[-0.87, 0.33]	0.31	1038	-0.87	0.385	0.25
	+1SD Altruistic	Descriptive vs Control	-0.14	[-0.74, 0.45]	0.30	1038	-0.48	0.634	0.14
		Convention vs Control	-0.10	[-0.70, 0.50]	0.31	1038	-0.32	0.748	0.09
		Social vs Control	-0.23	[-0.86, 0.40]	0.32	1038	-0.72	0.471	0.22
		Moral vs Control	-0.20	[-0.79, 0.39]	0.30	1038	-0.67	0.502	0.19
SE	-1SD Altruistic	Descriptive vs Control	0.63	[-0.10, 1.36]	0.37	1038	1.69	0.091	0.59
		Convention vs Control	0.17	[-0.60, 0.94]	0.39	1038	0.43	0.669	0.16
		Social vs Control	0.20	[-0.62, 1.03]	0.42	1038	0.49	0.628	0.19
		Moral vs Control	-0.10	[-0.81, 0.62]	0.37	1038	-0.27	0.789	0.09
	+1SD Altruistic	Descriptive vs Control	-0.15	[-0.88, 0.57]	0.37	1038	-0.42	0.677	0.14
		Convention vs Control	0.30	[-0.44, 1.03]	0.37	1038	0.80	0.424	0.28
		Social vs Control	-0.19	[-0.97, 0.59]	0.40	1038	-0.47	0.639	0.17
		Moral vs Control	0.38	[-0.34, 1.10]	0.37	1038	1.04	0.301	0.36

Note. PE = pro-environmental, SE = self-enhancing

Egoistic values. In the overall model, egoistic values significantly predicted pro-environmental consumer behaviors, $F(1, 117647.58) = 48.03$, $p < .001$, $\eta_p^2 = .044$. On average, participants high (+1SD above the mean) on egoistic values scored significantly lower on pro-environmental consumer intentions (*EMM* = 4.12, *SE* = 0.05) compared to participants low (-1SD below the mean) on egoistic values (*EMM* = 4.66, *SE* = 0.05), $t(1038) = -6.93$, $p < .001$, $d = 0.51$.

The two-way interaction effect between egoistic values and framing condition was non-significant, $F(2, 15139.30) = 0.19$, $p = .831$, $\eta_p^2 = .000$. Similarly to the analyses with biospheric and altruistic values, the three-way interaction between egoistic values, framing, and norm condition was also non-significant, $F(8, 28094.95) = 1.22$, $p = .280$, $\eta_p^2 = .009$. These results did not support hypotheses 4 and 5. Given the a priori hypotheses, though, simple effects analyses were still performed to examine the nature of these interactions further. EMMs for pro-environmental consumer intentions at low and high egoistic values across each framing and norm condition are shown in Table 5.21 and Figure 5.9.

Table 5.21

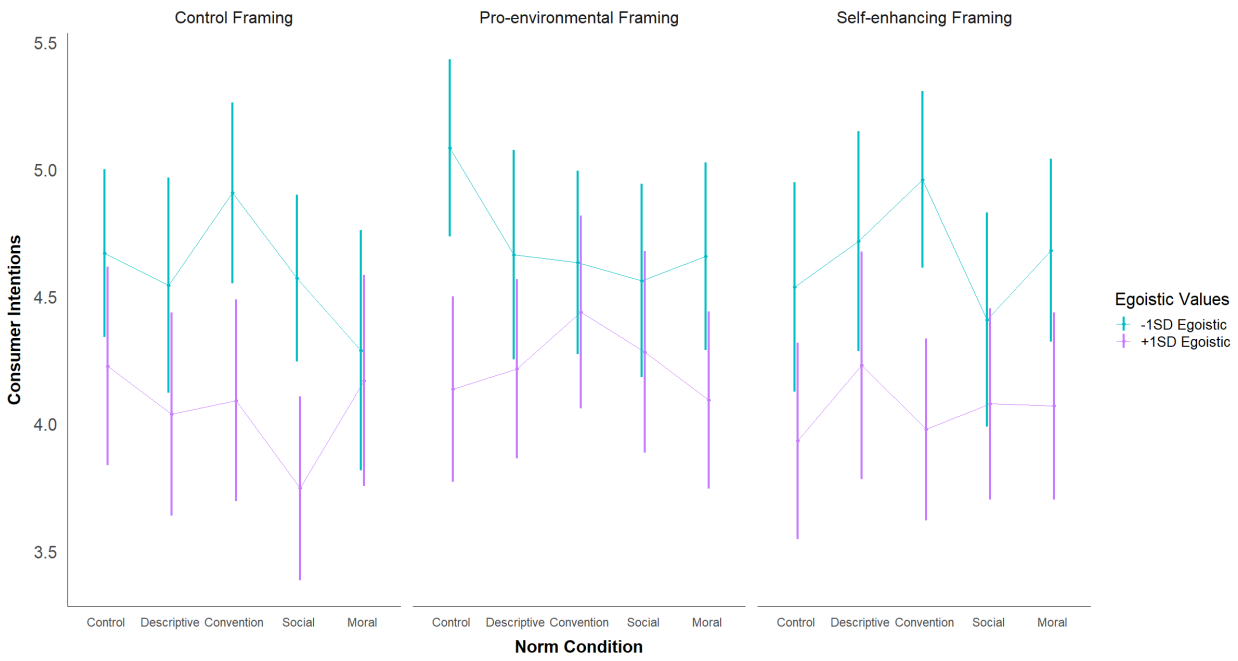
EMMs for Consumer Intentions at Low and High Egoistic Values Across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	4.67 (0.17)	4.23 (0.20)	5.08 (0.18)	4.14 (0.19)	4.54 (0.21)	3.93 (0.20)	4.76 (0.11)	4.10 (0.11)
Descriptive Norm	4.54 (0.22)	4.04 (0.20)	4.67 (0.21)	4.22 (0.18)	4.72 (0.22)	4.23 (0.23)	4.64 (0.12)	4.16 (0.12)
Convention	4.91 (0.18)	4.09 (0.20)	4.63 (0.18)	4.44 (0.19)	4.96 (0.18)	3.98 (0.18)	4.83 (0.10)	4.17 (0.11)
Social Norm	4.57 (0.17)	3.75 (0.18)	4.56 (0.19)	4.28 (0.20)	4.41 (0.21)	4.08 (0.19)	4.52 (0.11)	4.04 (0.11)
Moral Norm	4.29 (0.24)	4.17 (0.21)	4.66 (0.19)	4.09 (0.18)	4.68 (0.18)	4.07 (0.19)	4.54 (0.12)	4.11 (0.11)
Per Framing Condition	4.60 (0.09)	4.06 (0.09)	4.72 (0.09)	4.23 (0.08)	4.66 (0.09)	4.06 (0.09)		

Note. This table reports EMMs for pro-environmental consumer intentions at low (-1SD) egoistic values and high (+1SD) egoistic values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.9

Visualization of EMMs for Consumer Intentions at Low and High Egoistic Values



As shown in Table 5.22 and Figure 5.10, across all framing conditions, participants high on egoistic values expressed significantly lower pro-environmental consumer intentions compared to participants high on egoistic values, all *ps* < .001. Additionally, unlike what was predicted by hypothesis 4, the effect size was slightly larger in the self-enhancing condition, $d = 0.56$, compared to in the pro-environmental framing condition, $d = 0.46$.

In addition to the overall three-way interaction effect being non-significant, the pattern of the EMMs also did not support the prediction made by hypothesis 5. As shown in Table 5.21 and Figure 5.9, it appeared that, in all framing conditions, the pattern of the effects of each norm-intervention condition varied between people low and high on egoistic values. Additionally, low egoistic individuals tended to score higher than high egoistic individuals across most conditions, and when the two groups did score similarly to each other, it was because there was a decrease in pro-environmental consumer intentions among people low on egoistic values.

Table 5.22

Comparison of Consumer Intentions Across People Low and High on Egoistic Values Across Framings

Contrast	*EMM Difference*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
C framing: High Ego - Low Ego	-0.54	[-0.81, -0.28]	0.13	1038	-4.03	<.001	0.51
PE framing: High Ego - Low Ego	-0.49	[-0.74, -0.24]	0.13	1038	-3.84	<.001	0.46
SE framing: High Ego - Low Ego	-0.60	[-0.87, -0.34]	0.14	1038	-4.43	<.001	0.56

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.10

EMMs for Consumer Intentions at Low and High Egoistic Values Across Framings

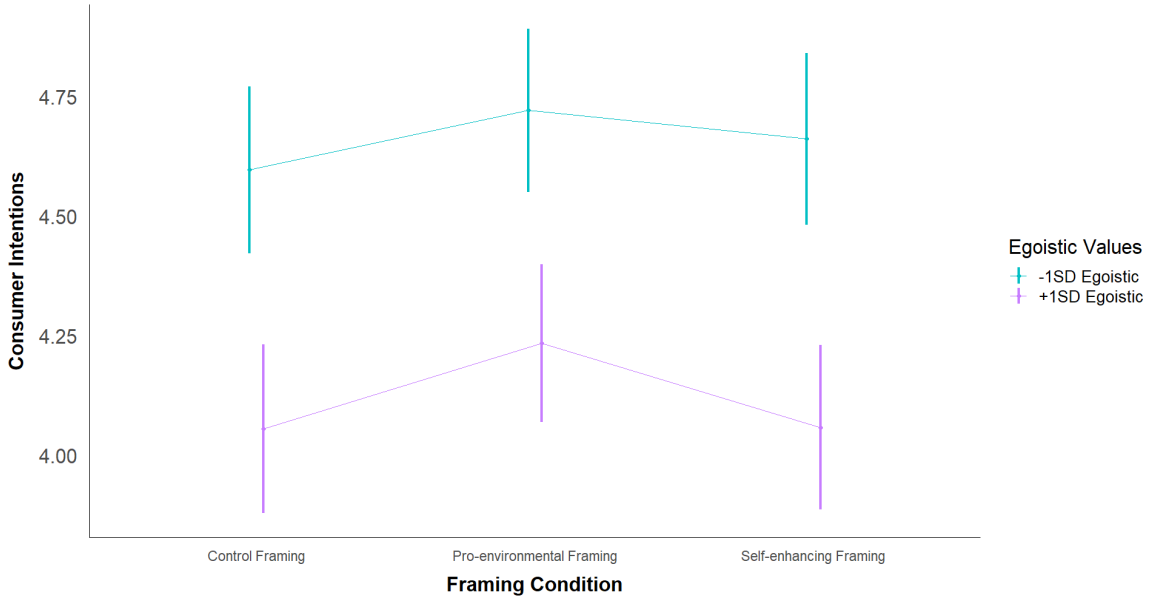


Table 5.23 displays the results of examining the three-way interaction between egoistic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on egoistic values. The only significant effect occurred for individuals low on egoistic values in the pro-environmental framing condition and was due to the social norm significantly decreasing pro-environmental consumer intentions, p = .045, d = 0.49.

Table 5.23

Effect of Each Norm on Consumer Intentions at Low and High Egoistic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*d*
Control	-1SD Egoistic	Descriptive vs Control	-0.13	[-0.66, 0.41]	0.27	1038	-0.47	0.640	0.12
		Convention vs Control	0.24	[-0.25, 0.72]	0.25	1038	0.96	0.336	0.22
		Social vs Control	-0.10	[-0.56, 0.36]	0.24	1038	-0.42	0.674	0.09
		Moral vs Control	-0.38	[-0.96, 0.19]	0.29	1038	-1.31	0.192	0.36
	+1SD Egoistic	Descriptive vs Control	-0.19	[-0.75, 0.37]	0.28	1038	-0.66	0.507	0.18
		Convention vs Control	-0.13	[-0.69, 0.42]	0.28	1038	-0.48	0.634	0.13
		Social vs Control	-0.48	[-1.01, 0.05]	0.27	1038	-1.77	0.076	0.45
		Moral vs Control	-0.06	[-0.62, 0.51]	0.29	1038	-0.20	0.844	0.05
PE	-1SD Egoistic	Descriptive vs Control	-0.42	[-0.96, 0.12]	0.27	1038	-1.53	0.126	0.39
		Convention vs Control	-0.45	[-0.95, 0.05]	0.25	1038	-1.78	0.076	0.42
		Social vs Control	-0.52	[-1.03, -0.01]	0.26	1038	-2.00	0.045	0.49
		Moral vs Control	-0.43	[-0.93, 0.08]	0.26	1038	-1.66	0.097	0.40
	+1SD Egoistic	Descriptive vs Control	0.08	[-0.43, 0.59]	0.26	1038	0.31	0.757	0.07
		Convention vs Control	0.30	[-0.22, 0.83]	0.27	1038	1.13	0.259	0.28
		Social vs Control	0.15	[-0.39, 0.68]	0.27	1038	0.53	0.595	0.14
		Moral vs Control	-0.04	[-0.55, 0.46]	0.26	1038	-0.17	0.868	0.04
SE	-1SD Egoistic	Descriptive vs Control	0.18	[-0.42, 0.78]	0.31	1038	0.58	0.560	0.17
		Convention vs Control	0.42	[-0.12, 0.96]	0.28	1038	1.53	0.126	0.40
		Social vs Control	-0.13	[-0.72, 0.46]	0.30	1038	-0.43	0.670	0.12
		Moral vs Control	0.14	[-0.40, 0.69]	0.28	1038	0.52	0.604	0.14
	+1SD Egoistic	Descriptive vs Control	0.30	[-0.30, 0.90]	0.31	1038	0.97	0.331	0.28
		Convention vs Control	0.04	[-0.48, 0.57]	0.27	1038	0.17	0.867	0.04
		Social vs Control	0.15	[-0.39, 0.69]	0.28	1038	0.53	0.597	0.14
		Moral vs Control	0.14	[-0.40, 0.67]	0.27	1038	0.50	0.617	0.13

Note. PE = pro-environmental, SE = self-enhancing

Hedonic values. In the overall model, hedonic values did not significantly predict pro-environmental consumer behaviors, $F(1, 10965.18) = 2.88$, $p = .090$, $\eta_p^2 = .003$. On average, participants high (+1SD above the mean) on hedonic values scored non-significantly lower on pro-environmental consumer intentions (*EMM* = 4.31, *SE* = 0.05) compared to participants low (-1SD below the mean) on hedonic values (*EMM* = 4.46, *SE* = 0.06), $t(1038) = -1.70$, $p = .089$, $d = 0.14$.

As with biospheric, altruistic, and egoistic values, the two-way interaction effect between hedonic values and framing condition, $F(2, 21454.97) = 0.93$, $p = .396$, $\eta_p^2 = .002$, and the three-way interaction between hedonic values, framing, and norm condition, $F(8, 5510.08) = 0.63$, $p = .757$, $\eta_p^2 = .005$, were both non-significant. Given the a priori hypotheses regarding each of these effects, simple effects analyses were still performed to examine the nature of these interaction effects further. EMMs for pro-environmental consumer intentions at low and high hedonic values across each framing and norm condition are shown in Table 5.24 and Figure 5.11.

Table 5.24

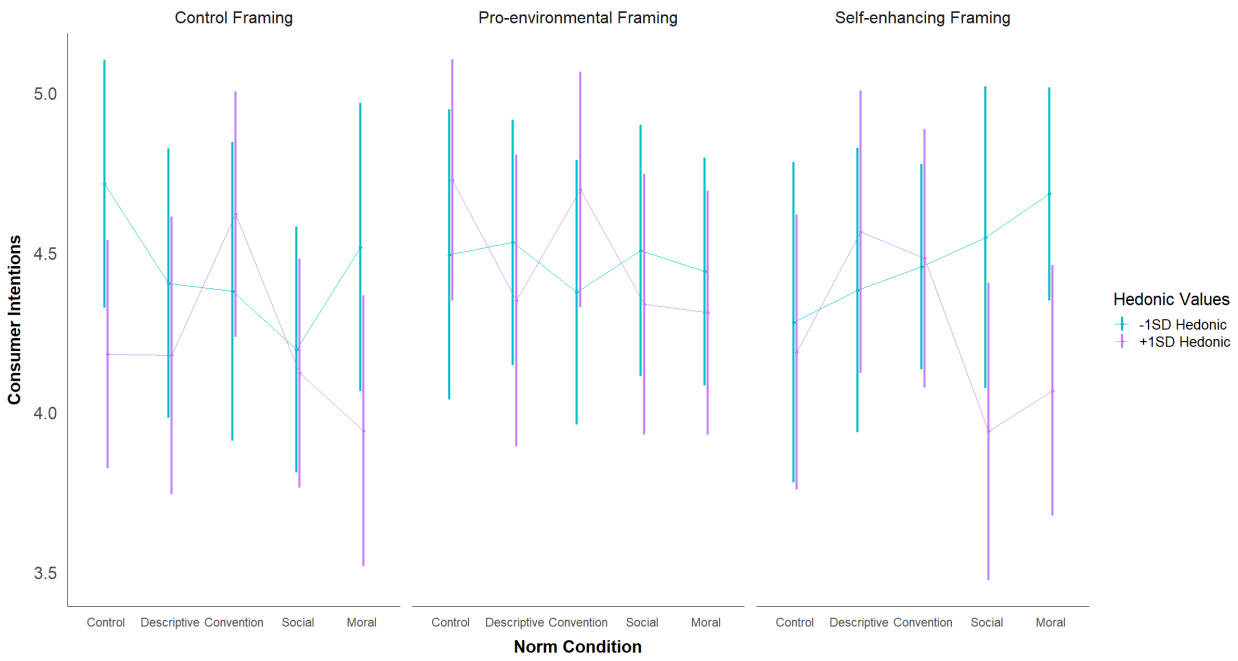
EMMs for Consumer Intentions at Low and High Hedonic Values across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	4.72 (0.20)	4.18 (0.18)	4.49 (0.23)	4.73 (0.19)	4.28 (0.26)	4.19 (0.22)	4.50 (0.13)	4.37 (0.11)
Descriptive Norm	4.41 (0.21)	4.18 (0.22)	4.53 (0.20)	4.35 (0.23)	4.38 (0.23)	4.57 (0.23)	4.44 (0.12)	4.36 (0.13)
Convention	4.38 (0.24)	4.62 (0.20)	4.38 (0.21)	4.70 (0.19)	4.46 (0.16)	4.48 (0.21)	4.40 (0.12)	4.60 (0.11)
Social Norm	4.20 (0.20)	4.12 (0.18)	4.51 (0.20)	4.34 (0.21)	4.55 (0.24)	3.94 (0.24)	4.42 (0.12)	4.13 (0.12)
Moral Norm	4.52 (0.23)	3.94 (0.22)	4.44 (0.18)	4.31 (0.20)	4.68 (0.17)	4.07 (0.20)	4.55 (0.11)	4.11 (0.12)
Per Framing Condition	4.44 (0.10)	4.21 (0.09)	4.47 (0.09)	4.49 (0.09)	4.47 (0.10)	4.25 (0.10)		

Note. This table reports EMMs for pro-environmental consumer intentions at low (-1SD) hedonic values and high (+1SD) hedonic values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.11

Visualization of EMMs for Consumer Intentions at Low and High Hedonic Values



As shown in Table 5.25, there was no significant difference in pro-environmental consumer intentions between people low and high on hedonic values in any of the framing conditions. Additionally, unlike what was predicted by hypothesis 4, the size of the difference between the two groups was smaller in the pro-environmental framing condition than in the self-enhancing framing condition.

In addition to the overall three-way interaction effect being non-significant, the pattern of the EMMs also did not support the prediction made by hypothesis 5. As shown in Table 5.24 and Figure 5.11, it appeared that, in all framing conditions, the pattern of the effects of each norm-intervention condition varied between people low and high on hedonic values. There was no consistent pattern in how the groups tended to score compared to one another across conditions.

Table 5.25

Comparison of Consumer Intentions Across People Low and High on Hedonic Values Across Framings

Contrast	*EMM Difference*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*Cohen's d*
C framing: High Hed - Low Hed	-0.23	[-0.52, 0.05]	0.14	1038	-1.62	0.106	0.22
PE framing: High Hed - Low Hed	0.02	[-0.27, 0.30]	0.14	1038	0.10	0.917	0.01
SE framing: High Hed - Low Hed	-0.22	[-0.53, 0.08]	0.16	1038	-1.42	0.156	0.21

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.12

EMMs for Consumer Intentions at Low and High Hedonic Values Across Framings

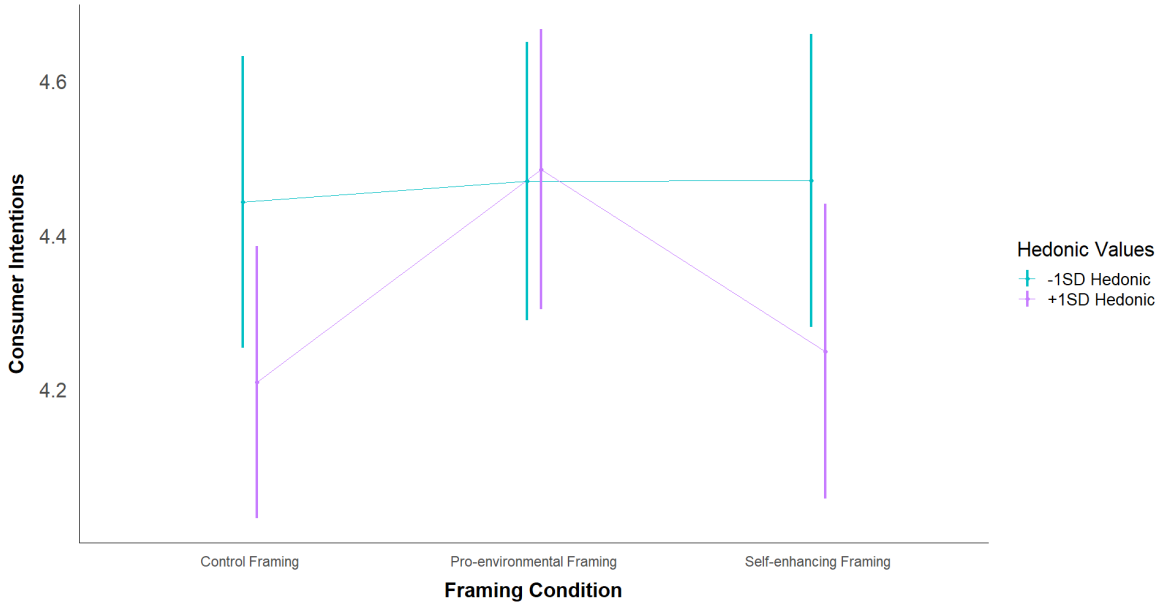


Table 5.26 displays the results of examining the three-way interaction between hedonic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on hedonic values. Across all framing conditions, there were no significant effects of any of the norm-intervention conditions for people both high and low on hedonic values.

Table 5.26

Effect of Each Norm on Consumer Intentions at Low and High Hedonic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*p*	*d*
Control	-1SD Hedonic	Descriptive vs Control	-0.31	[-0.88, 0.26]	0.29	1038	-1.07	0.286	0.29
		Convention vs Control	-0.34	[-0.94, 0.27]	0.31	1038	-1.09	0.277	0.32
		Social vs Control	-0.52	[-1.07, 0.03]	0.28	1038	-1.86	0.063	0.49
		Moral vs Control	-0.20	[-0.79, 0.40]	0.30	1038	-0.66	0.511	0.19
	+1SD Hedonic	Descriptive vs Control	0.00	[-0.57, 0.56]	0.29	1038	-0.01	0.989	0.00
		Convention vs Control	0.44	[-0.09, 0.96]	0.27	1038	1.64	0.101	0.41
		Social vs Control	-0.06	[-0.56, 0.45]	0.26	1038	-0.23	0.818	0.06
		Moral vs Control	-0.24	[-0.79, 0.31]	0.28	1038	-0.85	0.395	0.22
PE	-1SD Hedonic	Descriptive vs Control	0.04	[-0.56, 0.63]	0.30	1038	0.13	0.899	0.04
		Convention vs Control	-0.12	[-0.73, 0.50]	0.31	1038	-0.38	0.707	0.11
		Social vs Control	0.01	[-0.59, 0.61]	0.31	1038	0.04	0.966	0.01
		Moral vs Control	-0.05	[-0.63, 0.52]	0.29	1038	-0.18	0.857	0.05
	+1SD Hedonic	Descriptive vs Control	-0.38	[-0.97, 0.21]	0.30	1038	-1.25	0.210	0.35
		Convention vs Control	-0.03	[-0.56, 0.50]	0.27	1038	-0.11	0.910	0.03
		Social vs Control	-0.39	[-0.94, 0.16]	0.28	1038	-1.38	0.168	0.36
		Moral vs Control	-0.42	[-0.95, 0.12]	0.27	1038	-1.52	0.128	0.39
SE	-1SD Hedonic	Descriptive vs Control	0.10	[-0.57, 0.77]	0.34	1038	0.29	0.770	0.09
		Convention vs Control	0.17	[-0.43, 0.77]	0.31	1038	0.57	0.570	0.16
		Social vs Control	0.27	[-0.42, 0.95]	0.35	1038	0.76	0.448	0.25
		Moral vs Control	0.40	[-0.19, 0.99]	0.30	1038	1.33	0.182	0.38
	+1SD Hedonic	Descriptive vs Control	0.38	[-0.24, 0.99]	0.31	1038	1.20	0.229	0.35
		Convention vs Control	0.29	[-0.29, 0.88]	0.30	1038	0.98	0.327	0.27
		Social vs Control	-0.25	[-0.88, 0.39]	0.32	1038	-0.77	0.443	0.23
		Moral vs Control	-0.12	[-0.70, 0.47]	0.30	1038	-0.40	0.688	0.11

Note. PE = pro-environmental, SE = self-enhancing

In-group identification effects.

The overall effect of in-group identification was not significant, $F(1, 15534.19) = 0.67$, $p = .413$, $\eta_p^2 = .001$. On average, participants high (+1SD above the mean) on in-group identification scored non-significantly higher on pro-environmental consumer intentions (*EMM* = 4.42, *SE* = 0.05)

compared to participants low (-1SD below the mean) on in-group identification (*EMM* = 4.36, *SE* = 0.05), $t(1038) = 0.83$, $p = .409$, $d = 0.05$.

Unlike what was predicted by hypothesis 6, the two-way interaction effect between in-group identification and norm condition was not significant, $F(4, 363457.46) = 0.23$, $p = .920$, $\eta_p^2 = .001$. Given the a priori hypothesis, simple effects analyses were performed to examine the nature of these interaction effects further.

As shown in Table 5.27 and Figure 5.13 below, the effects of each norm-intervention condition were similar for people low and high on in-group identification across all of the norm-intervention conditions.

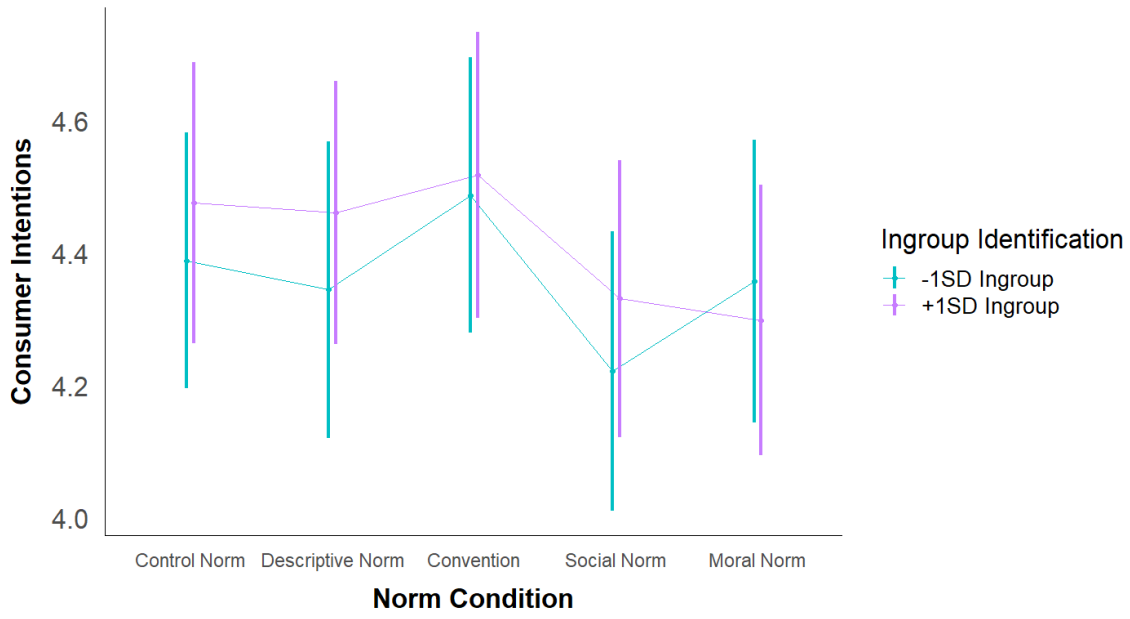
Table 5.27

Effect of Each Norm on Consumer Intentions at Low and High In-group Identification

Level of In-group Identification	Contrast	*EMM Diff*	*95% EMM Difference*	*SE*	*df*	*t*	*p*	*d*
-1SD In-group Identification	Descriptive vs Control	-0.04	[-0.34, 0.25]	0.15	1038	-0.30	.767	0.04
	Convention vs Control	0.10	[-0.18, 0.38]	0.14	1038	0.68	.495	0.09
	Social vs Control	-0.17	[-0.45, 0.12]	0.14	1038	-1.15	.249	0.16
	Moral vs Control	-0.03	[-0.32, 0.26]	0.15	1038	-0.21	.831	0.03
+1SD In-group Identification	Descriptive vs Control	-0.01	[-0.30, 0.27]	0.15	1038	-0.10	.919	0.01
	Convention vs Control	0.04	[-0.26, 0.34]	0.15	1038	0.27	.785	0.04
	Social vs Control	-0.15	[-0.44, 0.15[	0.15	1038	-0.96	.337	0.14
	Moral vs Control	-0.18	[-0.47, 0.12]	0.15	1038	-1.19	.235	0.17

Figure 5.13

EMMs for Consumer Intentions at Low and High In-group Identification Across Norms



Exploratory analyses.

Given the exploratory nature of the last two research questions and the number of multiple comparisons involved, Sidak-adjusted *p*-values and 95%CIs were calculated for these simple effects analyses. To examine the first exploratory research question, I investigated the three-way interaction effect between in-group identification, framing, and norm condition. The three-way interaction between in-group identification, framing, and norm condition was not significant in the overall model, $F(8, 13143.09) = 1.40$, $p = .190$, $\eta_p^2 = .011$. To further unpack the nature of this interaction, the EMMs at low and high in-group identification across each norm and framing condition were examined. These EMMs are shown in Table 5.28 and Figure 5.14.

Table 5.28

EMMs for Consumer Intentions at Low and High In-group Identification across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	4.26 (0.16)	4.63 (0.18)	4.62 (0.18)	4.61 (0.19)	4.28 (0.17)	4.19 (0.19)	4.39 (0.10)	4.48 (0.11)
Descriptive Norm	4.31 (0.22)	4.28 (0.18)	4.38 (0.19)	4.50 (0.18)	4.34 (0.18)	4.60 (0.16)	4.34 (0.11)	4.46 (0.10)
Convention	4.60 (0.20)	4.40 (0.19)	4.61 (0.17)	4.46 (0.18)	4.25 (0.18)	4.69 (0.21)	4.49 (0.11)	4.52 (0.11)
Social Norm	4.15 (0.15)	4.17 (0.17)	4.50 (0.19)	4.35 (0.19)	4.01 (0.21)	4.48 (0.19)	4.22 (0.11)	4.33 (0.11)
Moral Norm	4.13 (0.20)	4.33 (0.18)	4.34 (0.18)	4.41 (0.18)	4.61 (0.18)	4.15 (0.19)	4.36 (0.11)	4.30 (0.10)
Per Framing Condition	4.29 (0.08)	4.36 (0.08)	4.49 (0.08)	4.47 (0.08)	4.30 (0.08)	4.42 (0.08)		

Note. This table reports EMMs for pro-environmental consumer intentions at low (-1SD) in-group identification and high (+1SD) in-group identification across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.14

Visualization of the EMMs for Consumer Intentions at Low and High In-group Identification

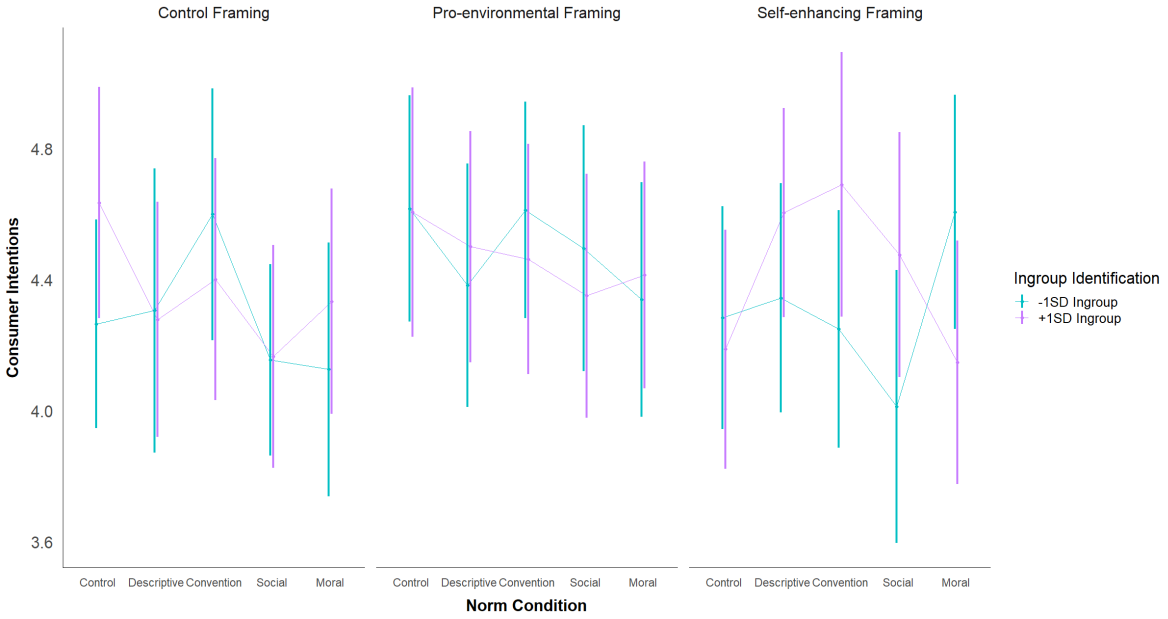


Table 5.29 examines the effect of each norm-intervention condition across each framing condition separately for participants low and high on in-group identification. The effects of each norm-intervention condition were most similar between people high and low on in-group identification in the pro-environmental framing condition and the most dissimilar in the self-enhancing framing condition.

In the control framing condition, the most notable difference between participants low and high on in-group identification was in the effect of the convention condition. For people low on in-group identification, the convention non-significantly increased pro-environmental consumer intentions compared to the control norm condition, p_{Sidak} = .811, d = 0.31, and non-significantly decreased pro-environmental consumer intentions for people high on in-group identification, p_{Sidak} = .975, d = 0.22.

In the pro-environmental framing condition, for both people high and low on in-group identification, most of the norm conditions resulted in non-significantly lower pro-environmental consumer intentions compared to the control condition.

In the self-enhancing framing condition, for people high on in-group identification, the descriptive norm, p_{Sidak} = .532, d = 0.39, and convention conditions, p_{Sidak} = .434, d = 0.47, increased pro-environmental consumer intentions, though their effects were both non-significant. For people low on in-group identification, the moral norm non-significantly improved consumer intentions, p_{Sidak} = .829, d = 0.30.

To examine the second exploratory research question, each combination of pro-environmental and self-enhancing framing with each of the norm-intervention conditions was compared to the control framing/control norm condition. The EMMs for each condition were given earlier in the chapter in Table 5.12 and shown in Figure 5.4.

Table 5.29

Effect of Each Norm at Low and High In-group Identification Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*EMM Difference*	*95%CI EMM Difference*	*SE*	*df*	*t*	*Sidak-adjusted p*	*d*
Control	-1SD In-group	Descriptive vs Control	0.04	[-0.70, 0.79]	0.27	1038	0.15	1.000	0.04
		Convention vs Control	0.33	[-0.36, 1.03]	0.25	1038	1.32	0.811	0.31
		Social vs Control	-0.11	[-0.71, 0.49]	0.22	1038	-0.50	1.000	0.10
		Moral vs Control	-0.14	[-0.84, 0.56]	0.26	1038	-0.54	0.999	0.13
	+1SD In-group	Descriptive vs Control	-0.36	[-1.05, 0.34]	0.26	1038	-1.39	0.760	0.33
		Convention vs Control	-0.23	[-0.94, 0.48]	0.26	1038	-0.90	0.975	0.22
		Social vs Control	-0.47	[-1.15, 0.21]	0.25	1038	-1.88	0.389	0.44
		Moral vs Control	-0.30	[-0.98, 0.38]	0.25	1038	-1.20	0.877	0.28
PE	-1SD In-group	Descriptive vs Control	-0.23	[-0.94, 0.47]	0.26	1038	-0.91	0.973	0.22
		Convention vs Control	0.00	[-0.67, 0.66]	0.24	1038	-0.02	1.000	0.00
		Social vs Control	-0.12	[-0.83, 0.59]	0.26	1038	-0.47	1.000	0.11
		Moral vs Control	-0.28	[-0.97, 0.41]	0.25	1038	-1.09	0.923	0.26
	+1SD In-group	Descriptive vs Control	-0.11	[-0.83, 0.62]	0.26	1038	-0.40	1.000	0.10
		Convention vs Control	-0.14	[-0.86, 0.58]	0.26	1038	-0.55	0.999	0.13
		Social vs Control	-0.25	[-0.99, 0.48]	0.27	1038	-0.94	0.967	0.24
		Moral vs Control	-0.19	[-0.90, 0.52]	0.26	1038	-0.73	0.993	0.18
SE	-1SD In-group	Descriptive vs Control	0.06	[-0.62, 0.74]	0.25	1038	0.24	1.000	0.06
		Convention vs Control	-0.03	[-0.73, 0.66]	0.25	1038	-0.14	1.000	0.03
		Social vs Control	-0.27	[-1.02, 0.48]	0.27	1038	-0.99	0.955	0.25
		Moral vs Control	0.32	[-0.36, 1.01]	0.25	1038	1.29	0.829	0.30
	+1SD In-group	Descriptive vs Control	0.42	[-0.26, 1.09]	0.25	1038	1.69	0.532	0.39
		Convention vs Control	0.50	[-0.25, 1.26]	0.28	1038	1.82	0.434	0.47
		Social vs Control	0.29	[-0.44, 1.01]	0.27	1038	1.09	0.926	0.27
		Moral vs Control	-0.04	[-0.76, 0.68]	0.26	1038	-0.15	1.000	0.04

Note. PE = pro-environmental framing, SE = self-enhancing framing, Sidak-adjusted *p*-values and 95%CIs reported.

As shown in Table 5.30, participants in the pro-environmental framing/control norm condition (*EMM* = 4.61, *SE* = 0.13) reported higher pro-environmental consumer intentions compared to participants in the control framing/control norm condition (*EMM* = 4.45, *SE* = 0.12), but the difference was not significant, p_{Sidak} = .989, *d* = 0.15. Additionally, participants in the pro-environmental framing/convention condition (*EMM* = 4.54, *SE* = 0.12) also reported higher pro-environmental consumer intentions than participants in the control framing/control norm condition, but the difference was again non-significant, p_{Sidak} = 1.000, *d* = 0.08.

Of the norm conditions that were prefaced by a framing context, the self-enhancing framing/control condition (*EMM* = 4.24, *SE* = 0.13) and the self-enhancing framing/social norm condition (*EMM* = 4.24, *SE* = 0.14) had the lowest EMMs, though neither was significantly different from the control framing/control norm condition.

Table 5.30

Comparison of Consumer Intentions in Each Combination of Framing/Norm Condition Compared to the Control Framing/Control Norm Condition

Contrast with the Control Framing/Control Norm Condition	*EMM Difference*	*95%CI EM Mean Difference*	*SE*	*df*	*t*	*Sidak-adjusted p*	*Cohen's d*
PE + Control Norm	0.16	[-0.34, 0.66]	0.18	1038	0.91	0.989	0.15
PE + Descriptive Norm	-0.01	[-0.51, 0.49]	0.18	1038	-0.04	1.000	0.01
PE + Convention	0.09	[-0.39, 0.57]	0.17	1038	0.51	1.000	0.08
PE + Social Norm	-0.03	[-0.54, 0.48]	0.18	1038	-0.14	1.000	0.02
PE + Moral Norm	-0.07	[-0.56, 0.41]	0.17	1038	-0.42	1.000	0.07
SE + Control Norm	-0.21	[-0.71, 0.28]	0.18	1038	-1.21	0.924	0.20
SE + Descriptive Norm	0.02	[-0.46, 0.51]	0.17	1038	0.14	1.000	0.02
SE + Convention	0.02	[-0.48, 0.52]	0.18	1038	0.11	1.000	0.02
SE + Social Norm	-0.20	[-0.72, 0.31]	0.18	1038	-1.11	0.955	0.19
SE + Moral Norm	-0.07	[-0.57, 0.43]	0.18	1038	-0.41	1.000	0.07

Note. PE = pro-environmental framing, SE = self-enhancing framing, Sidak-adjusted *p*-values and 95%CIs reported.

Logistic Regression Analysis for Pro-environmental Consumer Behaviors

A logistic regression analysis was performed to analyze the effects of framing condition, norm condition, values, in-group identification, and the interaction effects between these predictors, on consumer behaviors while also controlling for socially desirable responding, interest in clothing, gender, and age. To perform this analysis with the multiply imputed data, the `glm` and `with` functions were used in R. The results were pooled across the individual models using the `micombine.chisquare` function, which are shown in Table 5.31.

Main effect of framing condition.

The overall effect of framing condition was significant in the logistic regression model, $F(2, 11621.44) = 5.91$, $p = .003$. This main effect was followed up by simple effects analyses. Scores on consumer behaviors were coded such that a 1 meant that the participant chose to enroll themselves in the raffle for a $50 gift card to spend on secondhand clothing (the pro-environmental consumer behavior option) and a 0 meant that the participant chose to enroll themselves in the raffle for a $50 gift card to spend on new clothing.

To aid in interpretability, when producing the marginal effects tables, the scale of the outcome variable was converted from log odds to probabilities. A higher estimated marginal probability (EMP) indicates that the probability of participants choosing the pro-environmental consumer behavior option was higher in that particular condition. In tables reporting comparisons between two conditions, an odds ratio is reported where an odds ratio greater than 1 indicates that the odds were higher in the first, compared to the second listed, condition and an odds ratio less than 1 indicates that the odds were higher in the second condition compared to the first.

The EMPs for each level of framing condition are shown in Table 5.32. These EMPs are also visualized in Figure 5.15 below.

Table 5.31

Pooled ANOVA Table for Model Predicting Consumer Behaviors

	F	*df1*	*df2*	*p*
Framing Condition	5.91	2	11621.44	.003
Norm Condition	0.42	4	1795.26	.797
Biospheric Values	23.76	1	18929.79	< .001
Altruistic Values	2.33	1	15316.29	.127
Egoistic Values	59.35	1	3235.10	< .001
Hedonic Values	0.02	1	345328.62	.893
Ingroup Identification	0.01	1	8926.29	.938
Self-deceptive Enhancement	6.93	1	1151271.30	.008
Impression Management	6.59	1	25780.06	.010
Clothing Interest	0.28	1	44602.45	.595
Gender	-0.01	1	981.23	1.000
Age	3.03	1	77.38	.086
Framing x Norm	0.85	8	11802.27	.554
Framing x Biospheric Values	1.95	2	31941.74	.142
Norm x Biospheric Values	0.87	4	2157.91	.478
Framing x Altruistic Values	5.11	2	289927.89	.006
Norm x Altruistic Values	2.35	4	10056.48	2.35
Framing x Egoistic Values	2.35	2	5639.24	.095
Norm x Egoistic Values	0.45	4	1739.09	.774
Framing x Hedonic Values	0.32	2	10144.25	.729
Norm x Hedonic Values	0.49	4	73732.36	.742
Framing x Ingroup Identification	0.11	2	18834.69	.901
Norm x Ingroup Identification	0.24	4	9488.21	.916
Framing x Norm x Biospheric Values	0.80	8	1981.71	.604
Framing x Norm x Altruistic Values	1.33	8	49675.93	.221
Framing x Norm x Egoistic Values	0.67	8	1320.93	.721
Framing x Norm x Hedonic Values	0.76	8	24721.97	.635
Framing x Norm x Ingroup Identification	0.42	8	830.24	.909

Table 5.32

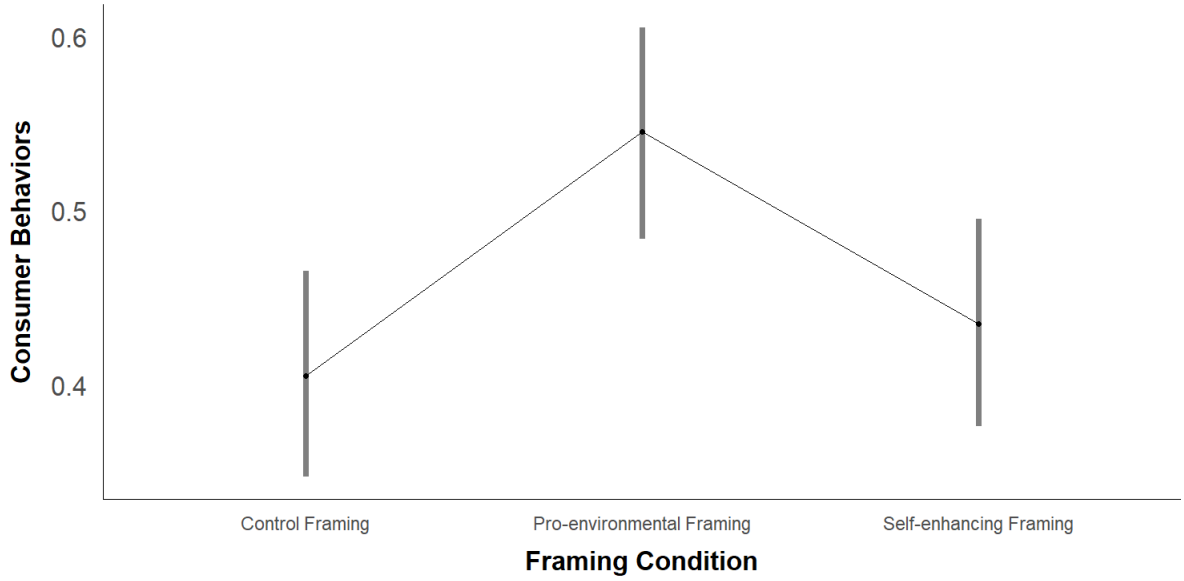
EMPs for Consumer Behaviors Across Framing Conditions

Framing Condition	*EM Probability*	*SE*	*95%CI EM Probability*	*Odds Ratio*
Control Framing	0.41	0.03	[0.35, 0.47]	0.69
Pro-environmental Framing	0.55	0.03	[0.48, 0.61]	1.22
Self-enhancing Framing	0.44	0.03	[0.38, 0.50]	0.79

Note. Consumer behaviors was coded 0 = new clothing, 1 = secondhand clothing

Figure 5.15

Visualization of EMPs for Consumer Behaviors Across Framings



Conditions were compared to one another using the `contrast` function, which, when given the results of a logistic regression model, compares the log-odds of each condition and reports the final difference as an odds ratio. As shown in Table 5.33, the effect of framing condition was similar to the pattern of effect that was observed when in the analysis of pro-environmental consumer intentions. Unlike what was predicted by hypothesis 1, the odds of choosing to engage in a pro-environmental consumer behavior were significantly higher in the pro-environmental framing

condition compared to the control framing condition, *OR* = 1.76, *z* = 3.25, *p* = .001, and compared to the self-enhancing framing condition, *OR* = 1.56, *z* = 2.52, *p* = .012. The odds of choosing the pro-environmental consumer behavior option were not significantly different in the self-enhancing framing compared to the control framing condition, *OR* = 1.13, *z* = 0.71, *p* = .479.

Table 5.33

Comparison of Consumer Behaviors Between Framing Conditions

Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Self-enhancing vs Control	1.13	[0.80, 1.59]	0.20	0.71	.479
Pro-environmental vs Control	1.76	[1.25, 2.48]	0.31	3.25	.001
Pro-environmental vs Self-enhancing	1.56	[1.10, 2.20]	0.27	2.52	.012

Main effect of norm condition.

The main effect of norm condition was not significant in the overall model, $F(4, 1795.26) = 0.42$, $p = .797$. This did not support hypothesis 2. However, because there was an a priori hypothesis regarding how specific levels of norm condition compare to one another, this effect was still followed up by simple effects analyses. The EMPs for each level of framing condition are shown in Table 5.34. These EMPs are also visualized in Figure 5.16 below.

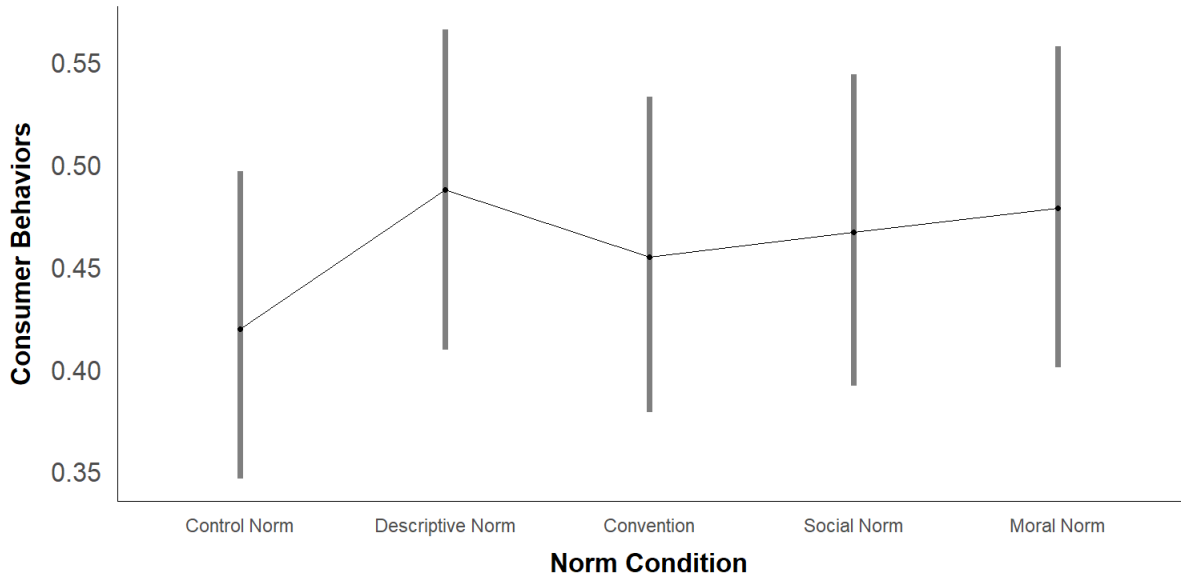
Table 5.34

EMPs for Consumer Behaviors Across Norm Conditions

Framing Condition	*EM Probability*	*SE*	*95%CI EM Probability*	*Odds Ratio*
Control Norm	0.42	0.04	[4.29, 4.58]	0.72
Descriptive Norm	0.49	0.04	[4.26, 4.55]	0.96
Convention	0.46	0.04	[4.36, 4.65]	0.85
Social Norm	0.47	0.04	[4.13, 4.42]	0.89
Moral Norm	0.48	0.04	[4.18, 4.48]	0.92

Figure 5.16

Visualization of EMPs for Consumer Behaviors Across Norms



Although the odds of choosing the pro-environmental consumer behavior option were descriptively higher in each of the norm-intervention conditions compared to the control norm condition, none of these differences were significant (see Table 5.35).

Table 5.35

Comparison of Consumer Behaviors Between Norm Conditions

Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Descriptive vs Control	1.31	[0.85, 2.04]	0.30	1.22	0.224
Convention vs Control	1.15	[0.75, 1.78]	0.26	0.65	0.518
Social vs Control	1.21	[0.79, 1.87]	0.27	0.87	0.386
Moral vs Control	1.27	[0.82, 1.97]	0.28	1.06	0.288

Even when the norm-intervention conditions were considered altogether, the difference

between the odds of choosing the pro-environmental consumer behavior option across all of the norm-intervention conditions was not significantly different from the odds of choosing the pro-environmental consumer behavior in the control norm condition, $OR = 1.24$, $z = 1.21$, $p = .230$. These findings suggest that, overall, the norm-intervention conditions were ineffective at persuading people to choose the pro-environmental consumer behavior option.

Framing by norm interaction effect.

Unlike what was predicted by hypothesis 3, the framing by norm interaction effect was not significant in the overall model, $F(8, 11802.27) = 0.85$, $p = .554$. Because there was an a priori hypothesis regarding this two-way interaction, simple effects analyses were still performed to better understand the nature of this interaction effect. The EMPs for each combination of framing and norm condition are shown in Table 5.36. These EMPs are also visualized in Figure 5.17.

Table 5.36

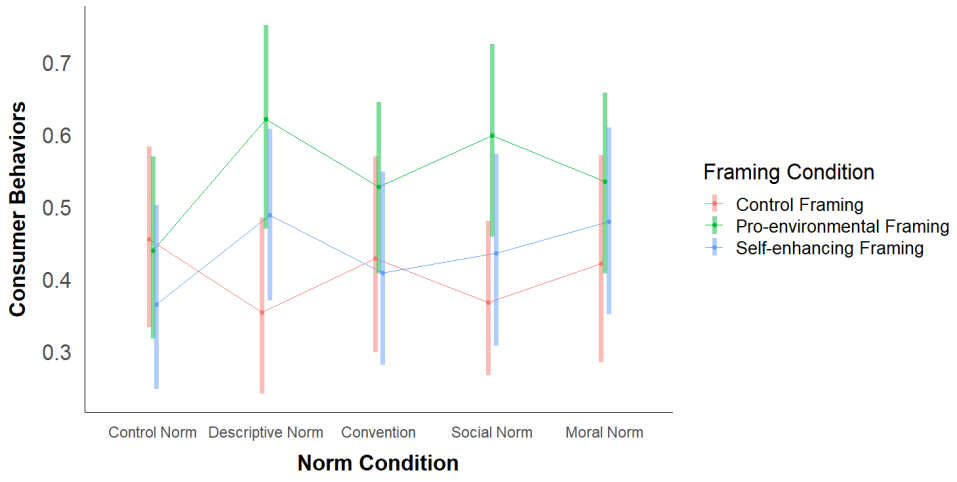
EMPs for Consumer Behaviors Across Framing and Norm Conditions

	Framing Condition			
	Control	Pro-environmental	Self-enhancing	Per Norm Condition
Norm Condition	*EM Prob* (*SE*)	*EM Prob* (*SE*)	*EM Prob* (*SE*)	*EM Prob* (*SE*)
Control	0.46 (0.07)	0.44 (0.07)	0.37 (0.07)	0.42 (0.04)
Descriptive Norm	0.35 (0.06)	0.62 (0.07)	0.49 (0.06)	0.49 (0.04)
Convention	0.43 (0.07)	0.53 (0.06)	0.41 (0.07)	0.46 (0.04)
Social Norm	0.37 (0.06)	0.60 (0.07)	0.44 (0.07)	0.47 (0.04)
Moral Norm	0.42 (0.08)	0.54 (0.07)	0.48 (0.07)	0.48 (0.04)
Per Framing Condition	0.41 (0.03)	0.55 (0.03)	0.44 (0.03)	

Note. Estimated marginal probabilities from the logistic regression model detailed in Table 5.31 (DV = Consumer Behaviors). Standard errors provided in parentheses. Consumer behaviors was coded 0 = new clothing, 1 = secondhand clothing.

Figure 5.17

Visualization of EMPs for Consumer Behaviors Across Framings and Norms



As shown in Table 5.37, there was no significant effect of any of the norm-intervention conditions within any of the three framing conditions. In the pro-environmental framing and self-enhancing framing conditions, the direction of the effects of each norm-intervention condition were at least in the desired direction, though they were non-significant. In the control framing condition, each norm-intervention condition resulted in descriptively worse pro-environmental consumer behaviors, though the effects were all non-significant.

In Table 5.38, the EMPs for each norm-intervention condition were compared across framing conditions. There did appear to be a significant difference in pro-environmental consumer behaviors in two of the norm conditions. For the descriptive norm condition, the odds of choosing the pro-environmental consumer behavior option were significantly higher when the descriptive norm was prefaced by a pro-environmental framing than when it was prefaced by no framing context, $OR = 2.99$, $p = .009$. Additionally, for the social norm condition, the odds of choosing the pro-environmental consumer behavior option were significantly higher when the social norm was prefaced by a pro-environmental framing than when it was prefaced by no framing context, $OR = 2.57$, $p = .011$.

Table 5.37

Effect of Each Norm on Consumer Behaviors Across Framings

Framing	Contrast of Norms	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control	Descriptive vs Control	0.66	[0.31, 1.38]	0.25	-1.11	0.266
	Convention vs Control	0.90	[0.42, 1.93]	0.35	-0.28	0.782
	Social vs Control	0.69	[0.35, 1.39]	0.24	-1.03	0.301
	Moral vs Control	0.87	[0.40, 1.92]	0.35	-0.34	0.735
PE	Descriptive vs Control	2.09	[0.94, 4.67]	0.86	1.80	0.072
	Convention vs Control	1.43	[0.70, 2.90]	0.52	0.98	0.326
	Social vs Control	1.91	[0.88, 4.11]	0.75	1.64	0.100
	Moral vs Control	1.47	[0.71, 3.05]	0.55	1.03	0.305
SE	Descriptive vs Control	1.66	[0.79, 3.47]	0.62	1.34	0.180
	Convention vs Control	1.20	[0.54, 2.64]	0.48	0.45	0.653
	Social vs Control	1.34	[0.61, 2.94]	0.54	0.73	0.464
	Moral vs Control	1.60	[0.74, 3.45]	0.63	1.19	0.232

Note. PE = Pro-environmental framing, SE = self-enhancing framing

Table 5.38

Differences in Consumer Behaviors for Each Norm Condition Across Framings

Norm Condition	Contrast of Framings	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control norm	PE vs Control	0.94	[0.45, 1.94]	0.35	-0.17	0.863
	SE vs Control	0.69	[0.32, 1.47]	0.27	-0.96	0.335
	PE vs SE	1.36	[0.64, 2.92]	0.53	0.79	0.428
Descriptive Norm	PE vs Control	2.99	[1.31, 6.81]	1.26	2.61	0.009
	SE vs Control	1.74	[0.84, 3.60]	0.64	1.50	0.135
	PE vs SE	1.72	[0.78, 3.77]	0.69	1.35	0.178
Convention	PE vs Control	1.49	[0.71, 3.14]	0.57	1.05	0.293
	SE vs Control	0.92	[0.41, 2.05]	0.38	-0.20	0.839
	PE vs SE	1.62	[0.77, 3.41]	0.61	1.27	0.203
Social Norm	PE vs Control	2.57	[1.24, 5.35]	0.96	2.53	0.011
	SE vs Control	1.33	[0.65, 2.74]	0.49	0.78	0.438
	PE vs SE	1.93	[0.88, 4.27]	0.78	1.63	0.103
Moral Norm	PE vs Control	1.58	[0.72, 3.46]	0.63	1.13	0.257
	SE vs Control	1.26	[0.56, 2.84]	0.52	0.56	0.575
	PE vs SE	1.25	[0.60, 2.62]	0.47	0.59	0.555

Note. PE = pro-environmental framing, SE = self-enhancing framing

Values interaction effects.

Biospheric values. Similarly to the analysis with consumer intentions, biospheric values significantly predicted consumer behaviors, $F(1, 18929.79) = 23.76$, $p < .001$. On average, the odds of choosing the pro-environmental consumer behavior option were significantly higher for people high on biospheric values compared to people low on biospheric values, $OR = 2.74$, $z = 4.80$, $p < .001$, 95%CI[1.82, 4.14].

Also consistent with the consumer intentions analysis, there was no significant two-way interaction between biospheric values and norm condition, $F(4, 2157.91) = 0.87$, $p = .478$, or three-way interaction between biospheric values, framing condition, and norm condition was non-significant, $F(8, 1981.71) = 0.80$, $p = .604$. Simple effects analyses were performed to examine the nature of these interaction effects further. EMPs for these contrasts are shown in Table 5.39 and are also visually depicted in Figure 5.18.

Although the overall two-way interaction between biospheric values and framing condition was not significant, the pattern from the simple effects analysis appears to be consistent with hypothesis 4. In the pro-environmental framing and control framing conditions, participants high on biospheric values had significantly higher odds of choosing the pro-environmental consumer behavior option compared to participants low on biospheric values, ORs ≥ 2.55, *p*s ≤ .015. However, in the self-enhancing framing condition, there was no significant difference between the two groups, and the odds ratio indicated the smallest difference between the two groups of the three comparisons, $OR = 1.76$, $p = .133$ (see Table 5.40 and Figure 5.19).

In addition to the overall three-way interaction effect being non-significant, the pattern of the EMMs also did not support the prediction made by hypothesis 5. It appeared that, in all framing conditions, the pattern of the effects of each norm-intervention condition varied between people low and high on biospheric values. Additionally, high biospheric individuals scored higher or not substantially different than low biospheric individuals across most conditions (see Table 5.39 and

Table 5.39

EMPs for Consumer Behaviors at Low and High Biospheric Values Across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	0.41 (0.10)	0.50 (0.10)	0.31 (0.09)	0.58 (0.11)	0.43 (0.12)	0.30 (0.11)	0.38 (0.06)	0.46 (0.07)
Descriptive Norm	0.15 (0.08)	0.62 (0.12)	0.38 (0.11)	0.81 (0.09)	0.49 (0.11)	0.49 (0.11)	0.32 (0.06)	0.66 (0.07)
Convention	0.28 (0.10)	0.59 (0.13)	0.33 (0.10)	0.72 (0.08)	0.33 (0.11)	0.49 (0.13)	0.31 (0.06)	0.61 (0.07)
Social Norm	0.26 (0.09)	0.49 (0.10)	0.41 (0.09	0.76 (0.09)	0.36 (0.12)	0.51 (0.14)	0.34 (0.06)	0.59 (0.07)
Moral Norm	0.44 (0.18)	0.40 (0.12)	0.37 (0.10)	0.69 (0.09)	0.24 (0.11)	0.73 (0.11)	0.35 (0.08)	0.61 (0.07)
Per Framing Condition	0.30 (0.05)	0.52 (0.05)	0.36 (0.04)	0.72 (0.04)	0.37 (0.05)	0.51 (0.06)		

Note. This table reports EMPs for consumer behaviors (0 = new clothing, 1 = secondhand clothing) at low (-1SD) biospheric values and high (+1SD) biospheric values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.18

Visualization of EMPs for Consumer Behaviors at Low and High Biospheric Values

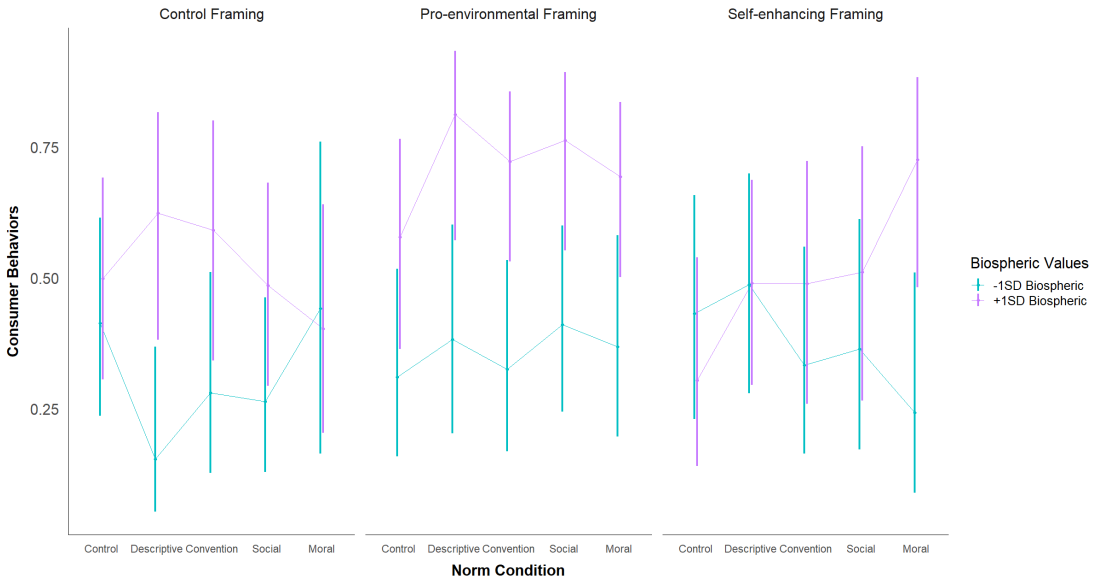


Figure 5.18). When the two groups did score similarly to each other, it was because there was a decrease in pro-environmental consumer intentions among people high on biospheric values.

Table 5.40

Comparison of Consumer Behaviors Across People Low and High on Biospheric Values Across Framings

Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
C framing: High Bio - Low Bio	2.55	[1.20, 5.40]	0.98	2.44	0.015
PE framing: High Bio - Low Bio	4.60	[2.42, 8.72]	1.50	4.67	<.001
SE framing: High Bio - Low Bio	1.76	[0.84, 3.68]	0.66	1.50	0.133

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.19

EMPs for Consumer Behaviors at Low and High Biospheric Values Across Framings

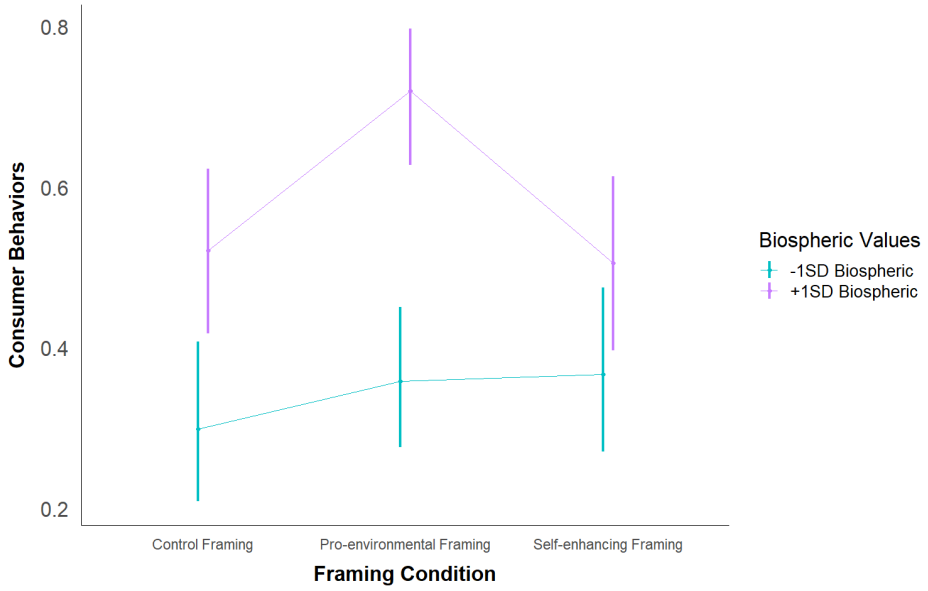


Table 5.41 below displays the results of examining the three-way interaction between biospheric values, framing condition, and norm condition by breaking down the effect of each

norm-intervention condition across each framing condition separately for participants low and high on biospheric values. The only significant effect occurred for individuals high on biospheric values in the self-enhancing framing condition and was due to the moral norm condition significantly improving their odds of choosing the pro-environmental consumer behavior option, *OR* = 6.06, *p* = .014.

Table 5.41

Effect of Each Norm on Consumer Behaviors at Low and High Biospheric Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control	-1SD Biospheric	Descriptive vs Control	0.26	[0.06, 1.07]	0.19	-1.86	0.063
		Convention vs Control	0.55	[0.15, 2.00]	0.36	-0.90	0.367
		Social vs Control	0.51	[0.15, 1.71]	0.31	-1.09	0.274
		Moral vs Control	1.12	[0.23, 5.52]	0.91	0.14	0.888
	+1SD Biospheric	Descriptive vs Control	1.67	[0.47, 5.94]	1.08	0.79	0.431
		Convention vs Control	1.45	[0.39, 5.36]	0.97	0.56	0.575
		Social vs Control	0.95	[0.30, 3.05]	0.56	-0.09	0.930
		Moral vs Control	0.68	[0.19, 2.40]	0.44	-0.60	0.547
PE	-1SD Biospheric	Descriptive vs Control	1.38	[0.40, 4.78]	0.87	0.50	0.614
		Convention vs Control	1.07	[0.31, 3.65]	0.67	0.11	0.913
		Social vs Control	1.55	[0.49, 4.91]	0.91	0.74	0.460
		Moral vs Control	1.30	[0.38, 4.42]	0.81	0.42	0.677
	+1SD Biospheric	Descriptive vs Control	3.17	[0.73, 13.71]	2.37	1.55	0.122
		Convention vs Control	1.90	[0.57, 6.34]	1.17	1.05	0.295
		Social vs Control	2.35	[0.64, 8.57]	1.55	1.29	0.196
		Moral vs Control	1.66	[0.50, 5.45]	1.01	0.83	0.406
SE	-1SD Biospheric	Descriptive vs Control	1.25	[0.34, 4.57]	0.83	0.34	0.735
		Convention vs Control	0.66	[0.18, 2.47]	0.44	-0.62	0.534
		Social vs Control	0.75	[0.19, 3.00]	0.53	-0.40	0.689
		Moral vs Control	0.42	[0.09, 1.89]	0.32	-1.13	0.259
	+1SD Biospheric	Descriptive vs Control	2.19	[0.61, 7.96]	1.44	1.20	0.232
		Convention vs Control	2.19	[0.53, 8.97]	1.58	1.09	0.277
		Social vs Control	2.39	[0.56, 10.14]	1.76	1.18	0.239
		Moral vs Control	6.06	[1.44, 25.46]	4.44	2.46	0.014

Note. PE = pro-environmental, SE = self-enhancing

Altruistic values. In the overall model, altruistic values did not significantly predict consumer behaviors, $F(1, 15316.29) = 2.33$, $p = .127$. The odds of choosing the pro-environmental consumer behavior option were not significantly higher for people high on altruistic values compared to people low on altruistic values, $OR = 1.44$, $z = 1.53$, $p = .127$, 95%CI[0.90, 2.29].

Unlike in the consumer intentions analysis, there was a significant two-way interaction between altruistic values and framing condition, $F(2, 289927.89) = 5.11$, $p = .006$. The three-way interaction between altruistic values, framing condition, and norm condition was still non-significant, $F(8, 49675.93) = 1.33$, $p = .221$. Simple effects analyses were performed to examine the nature of these interaction effects further. EMPs for these contrasts are shown in Table 5.42 and are also visually depicted in Figure 5.20.

Table 5.42

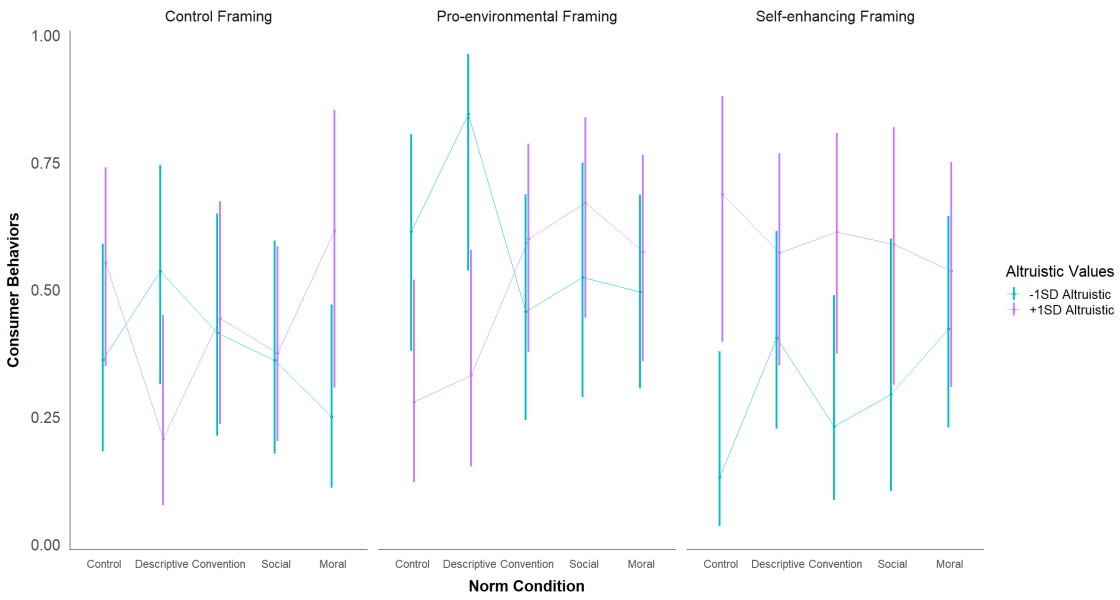
EMPs for Consumer Behaviors at Low and High Altruistic Values across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	0.36 (0.11)	0.55 (0.10)	0.61 (0.12)	0.28 (0.11)	0.13 (0.08)	0.69 (0.13)	0.34 (0.07)	0.50 (0.08)
Descriptive Norm	0.54 (0.12)	0.21 (0.10)	0.84 (0.10)	0.33 (0.11)	0.41 (0.10)	0.57 (0.11)	0.62 (0.08)	0.36 (0.07)
Convention	0.41 (0.12)	0.44 (0.12)	0.46 (0.12)	0.60 (0.11)	0.23 (0.10)	0.61 (0.12)	0.36 (0.07)	0.55 (0.07)
Social Norm	0.36 (0.11)	0.37 (0.10)	0.52 (0.13)	0.67 (0.11)	0.29 (0.14)	0.59 (0.14)	0.39 (0.08)	0.55 (0.07)
Moral Norm	0.25 (0.09)	0.62 (0.15)	0.50 (0.10)	0.57 (0.11)	0.42 (0.11)	0.54 (0.12)	0.38 (0.06)	0.58 (0.08)
Per Framing Condition	0.38 (0.05)	0.43 (0.06)	0.60 (0.06)	0.49 (0.06)	0.28 (0.05)	0.60 (0.06)		

Note. This table reports EMPs for consumer behaviors (0 = new clothing, 1 = secondhand clothing) at low (-1SD) altruistic values and high (+1SD) altruistic values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.20

Visualization of EMPs for Consumer Behaviors at Low and High Altruistic Values



Although the two-way interaction effect between altruistic values and framing condition was non-significant, participants high on altruistic values did have significantly higher odds of choosing the pro-environmental consumer behavior option compared to participants low on altruistic values in the self-enhancing framing condition, *OR* = 3.81, *p* = .002 (see Table 5.43 and Figure 5.21). This is inconsistent with what was predicted by hypothesis 4.

Table 5.43

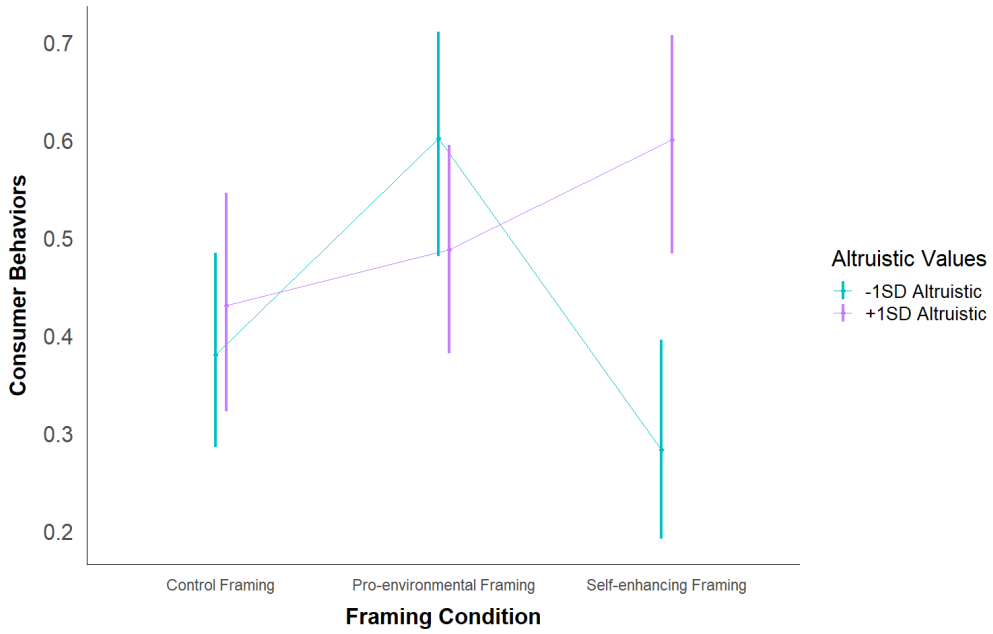
Comparison of Consumer Behaviors Across People Low and High on Altruistic Values

Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
C framing: High Alt - Low Alt	1.23	[0.59, 2.59]	0.47	0.55	0.580
PE framing: High Alt - Low Alt	0.63	[0.29, 1.38]	0.25	-1.16	0.248
SE framing: High Alt - Low Alt	3.81	[1.63, 8.92]	1.65	3.08	0.002

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.21

EMPs for Consumer Behaviors at Low and High Altruistic Values Across Framings



In addition to the overall three-way interaction effect being non-significant, the pattern of the EMMs also did not support the prediction made by hypothesis 5. As shown in Table 5.42 and Figure 5.20, it appeared that, in all framing conditions, the pattern of the effects of each norm-intervention condition varied between people low and high on altruistic values. In the self-enhancing framing condition, high altruistic individuals tended to score higher than low altruistic individuals. The patterns were unsystematic in the other two framing conditions.

Table 5.44 displays the results of examining the three-way interaction between altruistic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on altruistic values. For participants high on altruistic values in the pro-environmental framing condition, exposure to the social norm condition significantly improved their odds of choosing the pro-environmental consumer behavior option, $OR = 5.25$, $p = .018$.

Table 5.44

Effect of Each Norm on Consumer Behaviors at Low and High Altruistic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control	-1SD Altruistic	Descriptive vs Control	2.04	[0.55, 7.56]	1.36	1.06	0.287
		Convention vs Control	1.25	[0.33, 4.75]	0.85	0.33	0.744
		Social vs Control	1.00	[0.26, 3.81]	0.68	-0.01	0.995
		Moral vs Control	0.59	[0.15, 2.26]	0.40	-0.77	0.439
	+1SD Altruistic	Descriptive vs Control	0.21	[0.05, 0.86]	0.15	-2.17	0.030
		Convention vs Control	0.64	[0.18, 2.27]	0.41	-0.68	0.495
		Social vs Control	0.48	[0.15, 1.61]	0.30	-1.18	0.238
		Moral vs Control	1.30	[0.29, 5.82]	0.99	0.34	0.734
PE	-1SD Altruistic	Descriptive vs Control	3.41	[0.56, 20.78]	3.14	1.33	0.183
		Convention vs Control	0.53	[0.14, 2.04]	0.36	-0.93	0.355
		Social vs Control	0.69	[0.17, 2.74]	0.49	-0.52	0.600
		Moral vs Control	0.62	[0.18, 2.15]	0.39	-0.76	0.449
	+1SD Altruistic	Descriptive vs Control	1.28	[0.30, 5.41]	0.94	0.34	0.736
		Convention vs Control	3.85	[0.99, 14.96]	2.67	1.95	0.051
		Social vs Control	5.25	[1.32, 20.84]	3.69	2.36	0.018
		Moral vs Control	3.48	[0.91, 13.32]	2.38	1.82	0.069
SE	-1SD Altruistic	Descriptive vs Control	4.51	[0.88, 23.07]	3.76	1.81	0.071
		Convention vs Control	1.99	[0.33, 12.13]	1.84	0.75	0.455
		Social vs Control	2.75	[0.42, 18.20]	2.65	1.05	0.293
		Moral vs Control	4.84	[0.92, 25.47]	4.10	1.86	0.062
	+1SD Altruistic	Descriptive vs Control	0.61	[0.14, 2.74]	0.47	-0.65	0.518
		Convention vs Control	0.72	[0.16, 3.35]	0.57	-0.42	0.678
		Social vs Control	0.65	[0.13, 3.41]	0.55	-0.50	0.614
		Moral vs Control	0.53	[0.11, 2.43]	0.41	-0.82	0.412

Note. PE = pro-environmental, SE = self-enhancing

Egoistic values. In the overall model, egoistic values significantly predicted consumer behaviors, $F(1, 3235.10) = 59.35$, $p < .001$. On average, the odds of choosing the pro-environmental consumer behavior option were significantly lower for people high on egoistic values compared to people low on egoistic values, $OR = 0.26$, $z = -7.29$, $p < .001$, 95%CI[0.18, 0.38].

Similarly to the consumer intentions analysis, there was no significant two-way interaction between egoistic values and framing condition, $F(2, 5639.24) = 2.35$, $p = .095$, or three-way interaction between egoistic values, framing condition, and norm condition, $F(8, 1320.93) = 0.67$, $p = .721$. Simple effects analyses were performed to examine the nature of these interaction effects further. EMPs for these contrasts are shown in Table 5.45 and are also visually depicted in Figure 5.22.

Table 5.45

EMPs for Consumer Behaviors at Low and High Egoistic Values across Framings and Norms

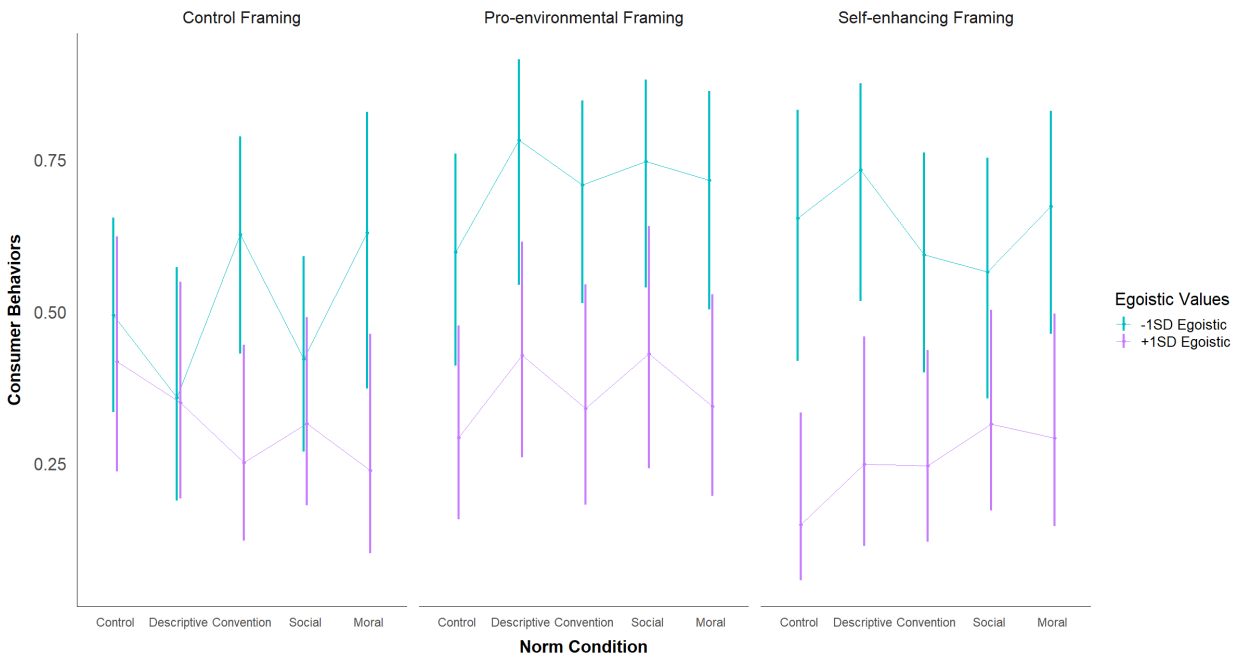
	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	0.49 (0.08)	0.42 (0.10)	0.60 (0.09)	0.29 (0.08)	0.65 (0.11)	0.15 (0.07)	0.58 (0.06)	0.27 (0.05)
Descriptive Norm	0.36 (0.10)	0.35 (0.09)	0.78 (0.10)	0.43 (0.09)	0.73 (0.09)	0.25 (0.09)	0.64 (0.07)	0.34 (0.06)
Convention	0.63 (0.10)	0.25 (0.08)	0.71 (0.09)	0.34 (0.10)	0.59 (0.10)	0.25 (0.08)	0.64 (0.05)	0.28 (0.05)
Social Norm	0.42 (0.08)	0.32 (0.08)	0.75 (0.09)	0.43 (0.11)	0.57 (0.11)	0.31 (0.09)	0.59 (0.06)	0.35 (0.05)
Moral Norm	0.63 (0.12)	0.24 (0.09)	0.72 (0.09)	0.34 (0.09)	0.67 (0.10)	0.29 (0.09)	0.67 (0.06)	0.29 (0.05)
Per Framing Condition	0.51 (0.05)	0.31 (0.04)	0.71 (0.04)	0.37 (0.04)	0.65 (0.05)	0.25 (0.04)		

Note. This table reports EMPs for consumer behaviors (0 = new clothing, 1 = secondhand clothing) at low (-1SD) egoistic values and high (+1SD) egoistic values across framing and norm conditions. Standard errors are reported in parentheses.

Across all framing conditions, participants low on egoistic values scored significantly higher on pro-environmental consumer behaviors compared to participants high on egoistic values, $ps \leq .006$ (see Table 5.46 and Figure 5.23). Unlike what was predicted by hypothesis 4, this difference

Figure 5.22

Visualization of EMPs for Consumer Behaviors at Low and High Egoistic Values



was larger in the self-enhancing framing condition compared to the pro-environmental framing condition.

Table 5.46

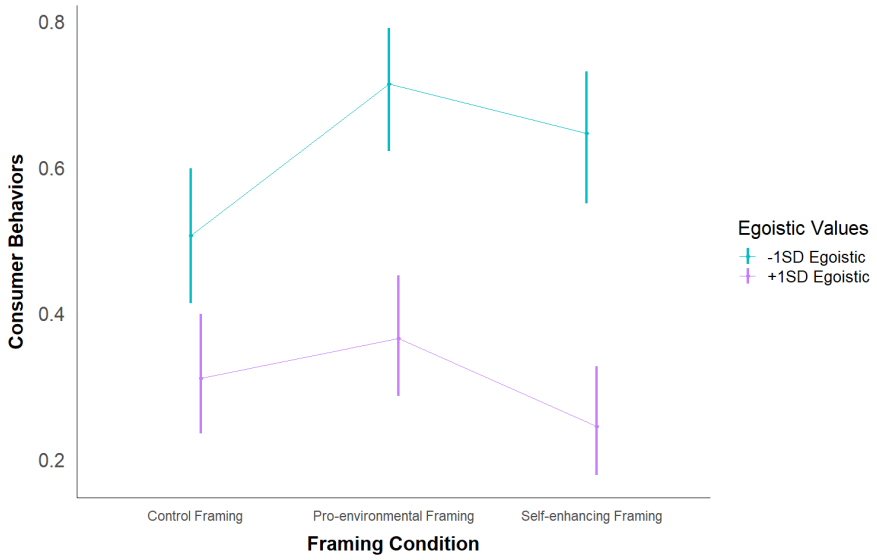
Comparison of Consumer Behaviors Across People Low and High on Egoistic Values across Framings

Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
C framing: High Ego - Low Ego	0.44	[0.25, 0.79]	0.13	-2.77	0.006
PE framing: High Ego - Low Ego	0.23	[0.13, 0.42]	0.07	-4.79	<.001
SE framing: High Ego - Low Ego	0.18	[0.09, 0.34]	0.06	-5.30	<.001

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.23

EMPs for Consumer Behaviors at Low and High Egoistic Values Across Framings



Although the overall three-way interaction effect between egoistic values, framing condition, and norm condition was non-significant, the pattern of the effects of each norm-intervention condition did appear to be more similar between people low and high on egoistic values in the pro-environmental framing condition compared to in the other two framing conditions (see Table 5.45 and Figure 5.22). However, people low on egoistic values still scored consistently higher on pro-environmental consumer behaviors across most of the conditions compared to people high on egoistic values.

Table 5.47 displays the results of examining the three-way interaction between egoistic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on egoistic values. The effects of each norm-intervention condition were non-significant across all framing contexts for both people low and high on egoistic values.

Table 5.47

Effect of Each Norm on Consumer Behaviors at Low and High Egoistic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control	-1SD Egoistic	Descriptive vs Control	0.57	[0.19, 1.71]	0.32	-1.00	0.319
		Convention vs Control	1.72	[0.61, 4.83]	0.91	1.03	0.303
		Social vs Control	0.75	[0.29, 1.91]	0.36	-0.61	0.544
		Moral vs Control	1.74	[0.50, 6.03]	1.10	0.87	0.382
	+1SD Egoistic	Descriptive vs Control	0.75	[0.23, 2.41]	0.45	-0.48	0.630
		Convention vs Control	0.47	[0.14, 1.57]	0.29	-1.23	0.218
		Social vs Control	0.64	[0.21, 1.95]	0.36	-0.78	0.436
		Moral vs Control	0.44	[0.12, 1.65]	0.30	-1.22	0.223
PE	-1SD Egoistic	Descriptive vs Control	2.42	[0.64, 9.16]	1.64	1.30	0.194
		Convention vs Control	1.63	[0.53, 5.00]	0.93	0.86	0.390
		Social vs Control	1.99	[0.61, 6.55]	1.21	1.13	0.257
		Moral vs Control	1.70	[0.52, 5.53]	1.02	0.88	0.378
	+1SD Egoistic	Descriptive vs Control	1.81	[0.60, 5.41]	1.01	1.06	0.290
		Convention vs Control	1.25	[0.39, 3.95]	0.73	0.37	0.708
		Social vs Control	1.82	[0.57, 5.87]	1.09	1.01	0.314
		Moral vs Control	1.26	[0.42, 3.78]	0.71	0.42	0.674
SE	-1SD Egoistic	Descriptive vs Control	1.45	[0.38, 5.60]	1.00	0.54	0.586
		Convention vs Control	0.77	[0.22, 2.66]	0.49	-0.41	0.682
		Social vs Control	0.69	[0.19, 2.49]	0.45	-0.57	0.569
		Moral vs Control	1.09	[0.30, 3.98]	0.72	0.13	0.897
	+1SD Egoistic	Descriptive vs Control	1.89	[0.46, 7.67]	1.35	0.89	0.374
		Convention vs Control	1.86	[0.48, 7.20]	1.29	0.90	0.367
		Social vs Control	2.61	[0.70, 9.71]	1.75	1.44	0.151
		Moral vs Control	2.34	[0.60, 9.18]	1.63	1.22	0.221

Note. PE = pro-environmental, SE = self-enhancing

Hedonic values. In the overall model, hedonic values did not significantly predict consumer behaviors, $F(1, 345328.62) = 0.02$, $p = .893$. There was no significant difference in the odds of choosing the pro-environmental consumer behavior option between people high and low on hedonic values, $OR = 1.01$, $z = 0.07$, $p = .948$, 95%CI[0.70, 1.47].

Consistent with the consumer intentions analysis, there was no significant two-way interaction between hedonic values and framing condition, $F(2, 10144.25) = 0.32$, $p = .729$, or three-way interaction between hedonic values, framing condition, and norm condition, $F(8, 24721.97) = 0.76$, $p = .635$. Simple effects analyses were performed to examine the nature of these interaction effects further. EMPs for these contrasts are shown in Table 5.48 and are also visually depicted in Figure 5.24.

Table 5.48

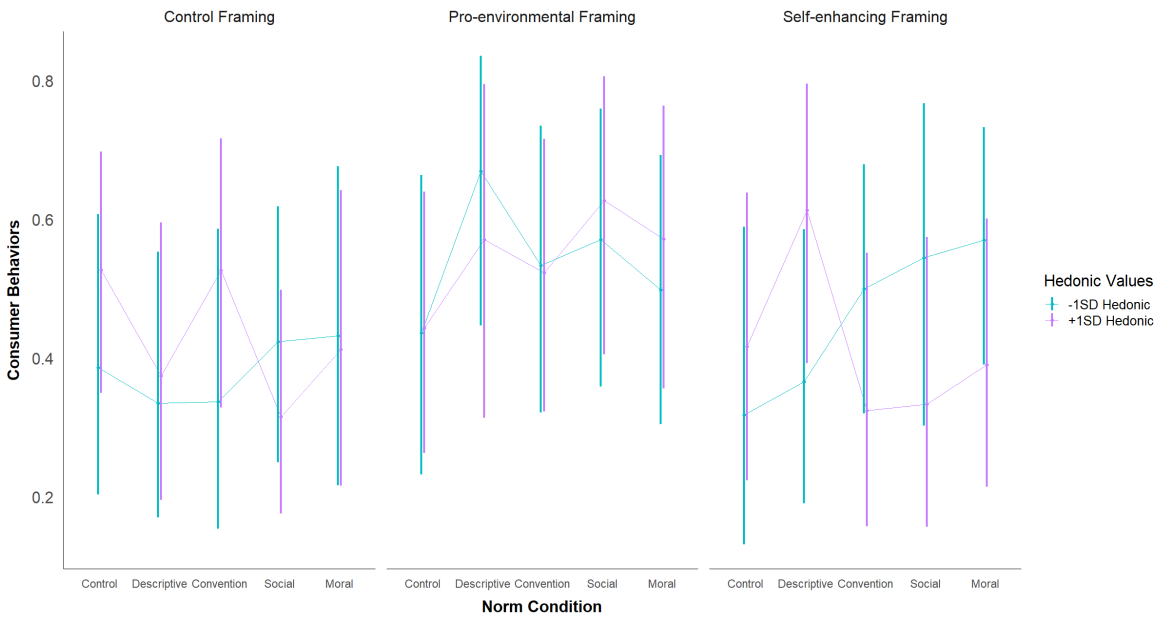
EMPs for Consumer Behaviors at Low and High Hedonic Values across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	0.39 (0.11)	0.53 (0.09)	0.44 (0.12)	0.44 (0.10)	0.32 (0.12)	0.42 (0.11)	0.38 (0.07)	0.46 (0.06)
Descriptive Norm	0.33 (0.10)	0.37 (0.11)	0.67 (0.10)	0.57 (0.13)	0.37 (0.11)	0.61 (0.11)	0.46 (0.07)	0.52 (0.07)
Convention	0.34 (0.12)	0.53 (0.10)	0.53 (0.11)	0.52 (0.11)	0.50 (0.10)	0.32 (0.11)	0.45 (0.07)	0.46 (0.06)
Social Norm	0.42 (0.10)	0.32 (0.08)	0.57 (0.11)	0.63 (0.11)	0.54 (0.13)	0.33 (0.11)	0.51 (0.07)	0.42 (0.06)
Moral Norm	0.43 (0.13)	0.41 (0.12)	0.50 (0.10)	0.57 (0.11)	0.57 (0.09)	0.39 (0.10)	0.50 (0.06)	0.46 (0.06)
Per Framing Condition	0.38 (0.05)	0.43 (0.05)	0.54 (0.05)	0.55 (0.05)	0.46 (0.05)	0.41 (0.05)		

Note. This table reports EMPs for consumer behaviors (0 = new clothing, 1 = secondhand clothing) at low (-1SD) hedonic values and high (+1SD) hedonic values across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.24

Visualization of EMPs for Consumer Behaviors at Low and High Hedonic Values



As shown in Table 5.49 and Figure 5.25, there was no significant difference in the odds of people choosing the pro-environmental consumer behavior option between people low and high on hedonic values across all framing conditions.

Table 5.49

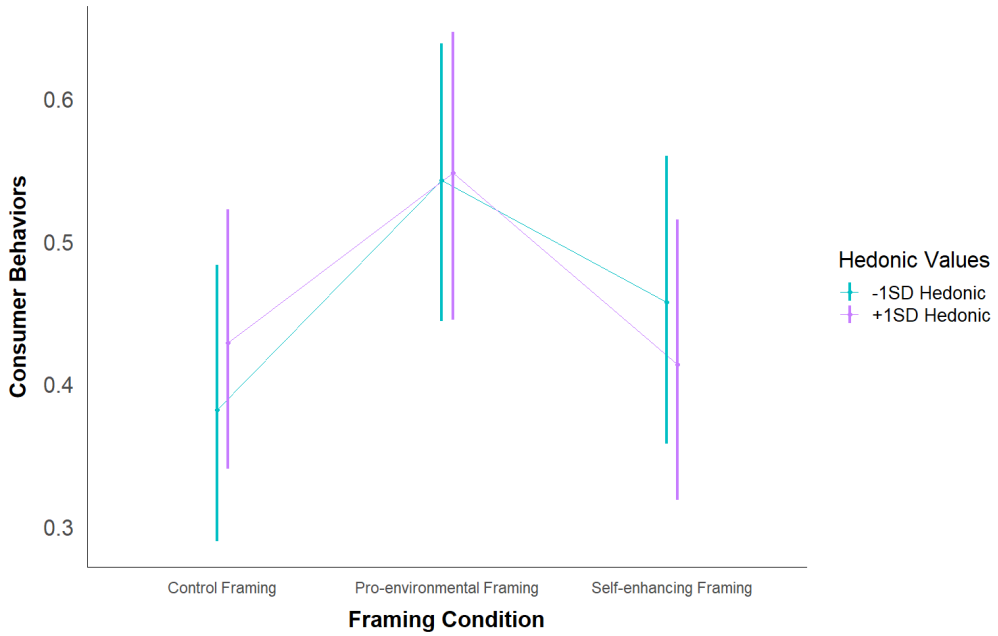
Comparison of Consumer Behaviors Across People Low and High on Hedonic Values Across Framings

Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
C framing: High Hed - Low Hed	1.22	[0.65, 2.26]	0.39	0.62	0.536
PE framing: High Hed - Low Hed	1.02	[0.54, 1.94]	0.34	0.06	0.952
SE framing: High Hed - Low Hed	0.84	[0.43, 1.62]	0.28	-0.53	0.599

Note. C = control, PE = pro-environmental, SE = self-enhancing

Figure 5.25

EMPs for Consumer Behaviors at Low and High Hedonic Values Across Framings



Although the three-way interaction effect was non-significant, the pattern of the effects of each norm-intervention condition appeared to be most similar between people low and high on hedonic values in the pro-environmental framing condition compared to the other two framing conditions (see Table 5.48 and Figure 5.24).

Table 5.50 below displays the results of examining the three-way interaction between hedonic values, framing condition, and norm condition by breaking down the effect of each norm-intervention condition across each framing condition separately for participants low and high on hedonic values. The effects of each norm-intervention condition were non-significant across all framing contexts for both people low and high on hedonic values.

Table 5.50

Effect of Each Norm on Consumer Behaviors at Low and High Hedonic Values Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
Control	-1SD Hedonic	Descriptive vs Control	0.80	[0.22, 2.86]	0.52	-0.34	0.733
		Convention vs Control	0.81	[0.21, 3.16]	0.56	-0.31	0.759
		Social vs Control	1.17	[0.35, 3.85]	0.71	0.26	0.798
		Moral vs Control	1.21	[0.31, 4.66]	0.83	0.28	0.783
	+1SD Hedonic	Descriptive vs Control	0.54	[0.17, 1.72]	0.32	-1.05	0.295
		Convention vs Control	1.00	[0.33, 2.99]	0.56	0.00	0.996
		Social vs Control	0.41	[0.14, 1.19]	0.22	-1.64	0.101
		Moral vs Control	0.63	[0.19, 2.07]	0.38	-0.76	0.446
PE	-1SD Hedonic	Descriptive vs Control	2.62	[0.70, 9.74]	1.76	1.44	0.151
		Convention vs Control	1.48	[0.41, 5.37]	0.97	0.60	0.551
		Social vs Control	1.72	[0.48, 6.15]	1.12	0.83	0.404
		Moral vs Control	1.28	[0.37, 4.42]	0.81	0.40	0.692
	+1SD Hedonic	Descriptive vs Control	1.67	[0.44, 6.29]	1.13	0.76	0.449
		Convention vs Control	1.38	[0.43, 4.36]	0.81	0.54	0.588
		Social vs Control	2.11	[0.63, 7.02]	1.29	1.22	0.223
		Moral vs Control	1.67	[0.51, 5.47]	1.01	0.85	0.393
SE	-1SD Hedonic	Descriptive vs Control	1.24	[0.30, 5.17]	0.90	0.29	0.771
		Convention vs Control	2.14	[0.56, 8.18]	1.46	1.11	0.266
		Social vs Control	2.56	[0.57, 11.59]	1.97	1.22	0.221
		Moral vs Control	2.84	[0.75, 10.81]	1.94	1.53	0.126
	+1SD Hedonic	Descriptive vs Control	2.22	[0.62, 7.95]	1.44	1.23	0.220
		Convention vs Control	0.67	[0.18, 2.49]	0.45	-0.60	0.551
		Social vs Control	0.70	[0.18, 2.68]	0.48	-0.52	0.605
		Moral vs Control	0.90	[0.26, 3.12]	0.57	-0.17	0.867

Note. PE = pro-environmental, SE = self-enhancing

In-group identification effects.

In the overall model, in-group identification did not significantly predict consumer behaviors, $F(1, 8926.29) = 0.01$, $p = .938$. There was no significant difference in the odds of choosing the pro-environmental consumer behavior option between people high and low on in-group identification, $OR = 1.02$, $z = 0.14$, $p = .888$, 95%CI[0.76, 1.36].

Unlike what was predicted by hypothesis 6, there was no significant two-way interaction between in-group identification and norm condition, $F(4, 9488.21) = 0.24$, $p = .916$. Simple effects analyses were performed to examine the nature of this interaction effect further. The EMPs for each norm condition are visualized in Figure 5.26 below.

As shown in Table 5.51 and Figure 5.26, the effects of each norm-intervention condition were similar for people low and high on in-group identification across all of the norm-intervention conditions.

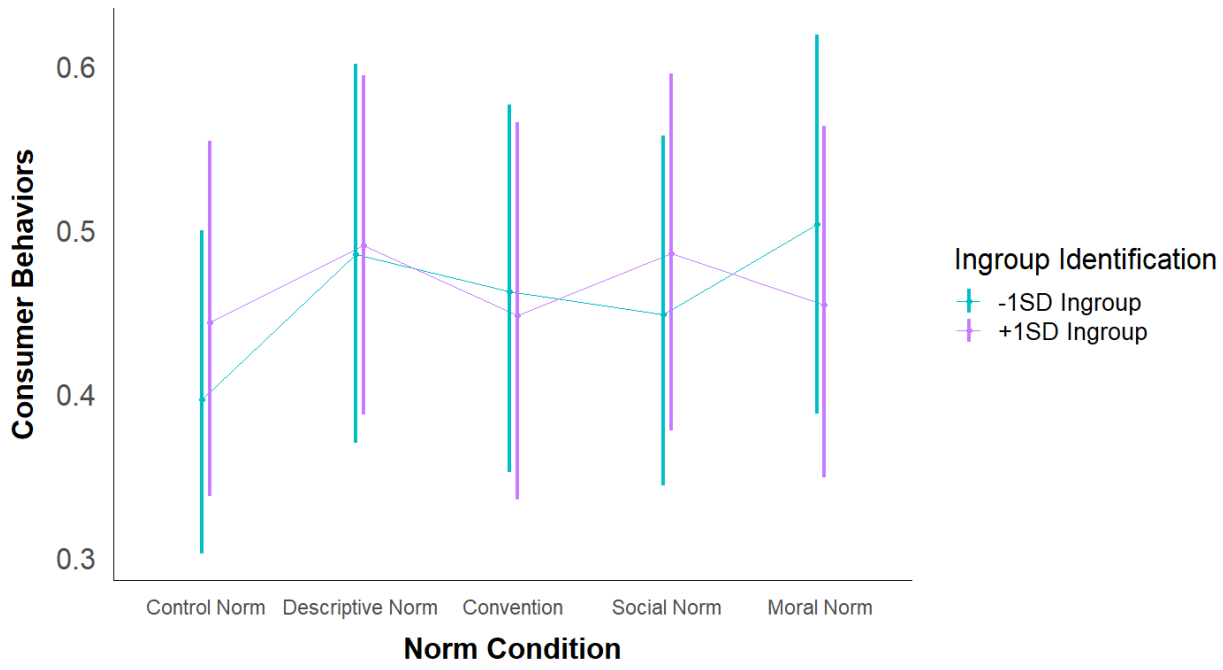
Table 5.51

Effect of Each Norm Intervention Condition at Low and High In-group Identification

Level of In-group Identification	Contrast	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*p*
-1SD In-group Identification	Descriptive vs Control	1.43	[0.76, 2.68]	0.46	1.12	0.262
	Convention vs Control	1.31	[0.71, 2.43]	0.41	0.85	0.393
	Social vs Control	1.24	[0.68, 2.25]	0.38	0.70	0.486
	Moral vs Control	1.54	[0.83, 2.88]	0.49	1.36	0.173
+1SD In-group Identification	Descriptive vs Control	1.21	[0.66, 2.22]	0.37	0.61	0.544
	Convention vs Control	1.02	[0.54, 1.93]	0.33	0.05	0.959
	Social vs Control	1.19	[0.63, 2.21]	0.38	0.53	0.593
	Moral vs Control	1.04	[0.56, 1.95]	0.33	0.14	0.893

Figure 5.26

Visualization of EMPs at Low and High In-group Identification Across Norms



Exploratory analyses.

Similarly to the exploratory analyses conducted using consumer intentions as the outcome variable, given the exploratory nature of the last two research questions and the number of multiple comparisons involved, Sidak-adjusted *p*-values and 95%CIs were calculated for these simple effects analyses. To examine the first exploratory research question, I investigated the three-way interaction effect between in-group identification, framing, and norm condition. The three-way interaction between in-group identification, framing condition, and norm condition was non-significant in the overall model, $F(8, 830.24) = 0.42$, $p = .909$. To understand the nature of this interaction, the EMPs at low and high in-group identification across each norm and framing condition were examined. These EMPs are shown in Table 5.52 and Figure 5.27.

Table 5.52

EMPs for Consumer Behaviors at Low and High In-group Identification across Framings and Norms

	Framing Condition							
	Control		Pro-environmental		Self-enhancing		Per Norm Condition	
Norm Condition	Low	High	Low	High	Low	High	Low	High
Control	0.39 (0.08)	0.52 (0.09)	0.46 (0.09)	0.42 (0.10)	0.34 (0.09)	0.39 (0.09)	0.40 (0.05)	0.44 (0.06)
Descriptive Norm	0.32 (0.10)	0.39 (0.09)	0.62 (0.10)	0.62 (0.10)	0.52 (0.09)	0.46 (0.08)	0.48 (0.06)	0.49 (0.05)
Convention	0.52 (0.10)	0.34 (0.09)	0.50 (0.09)	0.56 (0.09)	0.37 (0.10)	0.45 (0.11)	0.46 (0.06)	0.45 (0.06)
Social Norm	0.37 (0.07)	0.36 (0.08)	0.55 (0.10)	0.64 (0.09)	0.42 (0.11)	0.45 (0.10)	0.45 (0.06)	0.49 (0.06)
Moral Norm	0.45 (0.11)	0.39 (0.09)	0.52 (0.10)	0.55 (0.10)	0.54 (0.10)	0.42 (0.10)	0.50 (0.06)	0.45 (0.06)
Per Framing Condition	0.41 (0.04)	0.40 (0.04)	0.53 (0.04)	0.56 (0.04)	0.44 (0.04)	0.43 (0.04)		

Note. This table reports EMPs for consumer behaviors (0 = new clothing, 1 = secondhand clothing) at low (-1SD) in-group identification and high (+1SD) in-group identification across framing and norm conditions. Standard errors are reported in parentheses.

Figure 5.27

Visualization of EMPs at Low and High In-group Identification

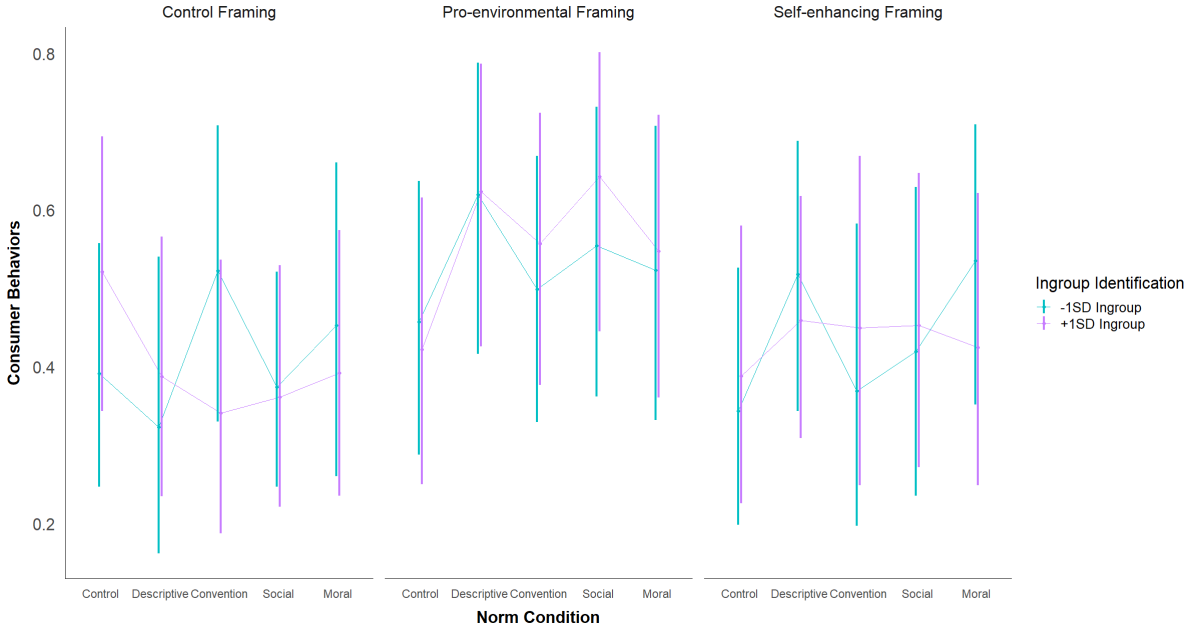


Table 5.53 examines the effect of each norm-intervention condition across each framing condition separately for participants low and high on in-group identification. The nature of this two-way interaction effect in the control framing and self-enhancing framing conditions was very similar to what was observed in the consumer intentions analysis.

In the control framing condition, the most notable difference between participants low and high on in-group identification was in the effect of the convention condition. For people low on in-group identification, the convention non-significantly improved the odds of choosing the pro-environmental consumer behavior related to the control norm condition, $OR = 1.70$, $p_{Sidak} = .954$, while it non-significantly decreased odds for people high on in-group identification, $OR = 0.47$, $p_{Sidak} = .796$.

In the pro-environmental framing condition, for people low on in-group identification, the odds of choosing the pro-environmental consumer behavior option were highest in the descriptive norm condition relative to the control norm condition, though the difference was not significant, $OR = 1.93$, $p_{Sidak} = .889$. For people high on in-group identification, the odds of choosing the pro-environmental consumer behavior option were highest in the social norm condition relative to the control norm condition, though the difference was not significant, $OR = 2.46$, $p_{Sidak} = .629$.

In the self-enhancing framing condition, for people low on in-group identification, the odds of choosing the pro-environmental consumer behavior option were non-significantly higher in the descriptive norm, $OR = 2.05$, $p_{Sidak} = .786$, and moral norm conditions, $OR = 2.20$, $p_{Sidak} = .717$, relative to the control norm condition. For people high on in-group identification, there was a slight improvement in the odds of choosing the pro-environmental consumer behavior option in all of the norm-intervention conditions relative to the control norm condition, with odds ratios ranging from 1.16 to 1.34, but all effects were non-significant, p_{Sidak}s > .999.

Table 5.53

Effect of Each Norm at Low and High In-group Identification Across Framings

Framing Condition	Level of Values	Contrast of Norm Conditions	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*Sidak-adjusted p*
Control	-1SD In-group	Descriptive vs Control	0.74	[0.16, 3.51]	0.42	-0.52	0.999
		Convention vs Control	1.70	[0.40, 7.25]	0.90	1.00	0.954
		Social vs Control	0.93	[0.26, 3.28]	0.43	-0.16	1.000
		Moral vs Control	1.29	[0.28, 5.90]	0.72	0.45	1.000
	+1SD In-group	Descriptive vs Control	0.58	[0.14, 2.43]	0.31	-1.03	0.943
		Convention vs Control	0.47	[0.10, 2.16]	0.26	-1.34	0.796
		Social vs Control	0.52	[0.13, 2.10]	0.27	-1.28	0.833
		Moral vs Control	0.59	[0.14, 2.47]	0.31	-1.00	0.953
PE	-1SD In-group	Descriptive vs Control	1.93	[0.42, 8.91]	1.08	1.17	0.889
		Convention vs Control	1.18	[0.29, 4.86]	0.61	0.32	1.000
		Social vs Control	1.48	[0.33, 6.55]	0.81	0.71	0.994
		Moral vs Control	1.30	[0.29, 5.84]	0.72	0.48	1.000
	+1SD In-group	Descriptive vs Control	2.26	[0.48, 10.76]	1.29	1.43	0.736
		Convention vs Control	1.72	[0.39, 7.65]	0.94	0.99	0.954
		Social vs Control	2.46	[0.52, 11.74]	1.41	1.57	0.629
		Moral vs Control	1.65	[0.36, 7.54]	0.92	0.90	0.974
SE	-1SD In-group	Descriptive vs Control	2.05	[0.48, 8.71]	1.09	1.36	0.786
		Convention vs Control	1.12	[0.23, 5.54]	0.66	0.19	1.000
		Social vs Control	1.38	[0.29, 6.67]	0.80	0.56	0.999
		Moral vs Control	2.20	[0.50, 9.61]	1.19	1.45	0.717
	+1SD In-group	Descriptive vs Control	1.34	[0.33, 5.40]	0.68	0.57	0.999
		Convention vs Control	1.29	[0.25, 6.70]	0.78	0.42	1.000
		Social vs Control	1.31	[0.28, 6.15]	0.74	0.47	1.000
		Moral vs Control	1.16	[0.25, 5.44]	0.66	0.27	1.000

Note. PE = pro-environmental framing, SE = self-enhancing framing, Sidak-adjusted *p*-values and 95%CIs reported

For the second exploratory research question, each combination of pro-environmental and self-enhancing framing with each of the norm-intervention conditions was compared to the control framing/control norm condition. The EMPs for each condition were given earlier in the chapter in Table 5.36 and shown in Figure 5.17.

Unlike what was observed in the analysis of consumer intentions, the combination of framing and norm-intervention conditions that produced the highest odds of choosing the pro-environmental consumer behavior option compared to the control framing/control norm condition were the pro-environmental framing/descriptive norm condition, *OR* = 1.96, p_{Sidak} = .659, and the pro-environmental framing/social norm condition, *OR* = 1.79, p_{Sidak} = .771, though neither comparison was significant (see Table 5.54). Similarly to the analysis predicting consumer intentions, the self-enhancing framing/control norm condition produced the lowest odds of the pro-environmental consumer behavior option being chosen, though the difference between this condition and the control framing/control norm condition was not significant, *OR* = 0.69, p_{Sidak} = .983.

Table 5.54

Comparison of Consumer Behaviors in Each Framing/Norm Condition Compared to the Control Framing/Control Norm Condition

Contrast with the Control Framing/Control Norm Condition	*Odds Ratio*	*95%CI Odds Ratio*	*SE*	*z*	*Sidak-adjusted p*
PE + Control Norm	0.94	[0.33, 2.65]	0.35	-0.17	1.000
PE + Descriptive Norm	1.96	[0.62, 6.20]	0.81	1.64	.659
PE + Convention	1.34	[0.49, 3.66]	0.48	0.81	.996
PE + Social Norm	1.79	[0.60, 5.33]	0.70	1.49	.771
PE + Moral Norm	1.38	[0.49, 3.86]	0.51	0.86	.993
SE + Control Norm	0.69	[0.23, 2.03]	0.27	-0.96	.983
SE + Descriptive Norm	1.14	[0.42, 3.13]	0.41	0.37	1.000
SE + Convention	0.83	[0.28, 2.42]	0.32	-0.50	1.000
SE + Social Norm	0.92	[0.32, 2.71]	0.35	-0.21	1.000
SE + Moral Norm	1.10	[0.38, 3.17]	0.42	0.25	1.000

Note. PE = pro-environmental framing, SE = self-enhancing framing, Sidak-adjusted *p*-values and 95%CIs reported

Chapter 6: Study 2 Discussion

To test hypothesis 1, the effect of framing condition on pro-environmental consumer intentions and behaviors was examined. Overall, the results did not support hypothesis 1. In both the analysis of consumer intentions and consumer behaviors, pro-environmental consumer intentions were actually highest in the pro-environmental framing condition compared to the other two framing conditions. This difference was significant in the consumer behaviors model and non-significant in the consumer intentions model. In both models, pro-environmental consumer intentions and behaviors were only slightly higher in the self-enhancing framing compared to the control framing condition, and the difference between the two was non-significant.

To test hypothesis 2, the effect of norm condition on pro-environmental consumer intentions and behaviors was examined. For consumer intentions, the results generally did not support hypothesis 2. Pro-environmental consumer intentions were only higher in the convention condition compared to the control norm condition, but the difference was non-significant, and they were non-significantly lower in the descriptive norm, social norm, and moral norm conditions. For consumer behaviors, the direction of the results was consistent with what was predicted by hypothesis 2. For pro-environmental consumer behaviors, the probability of choosing the pro-environmental consumer behavior option was higher in every norm-intervention condition compared to the control norm condition, but the differences between each were non-significant.

To test hypothesis 3, the two-way interaction between framing and norm condition was examined. In the analysis of consumer intentions, the overall framing by norm interaction effect was non-significant. However, further analyses revealed that the pattern of the estimated marginal means appeared to be consistent with what was predicted by hypothesis 3. In the pro-environmental framing and control framing conditions, exposure to each norm-intervention condition generally non-significantly worsened, or had no effect on, people's pro-environmental consumer intentions relative to these condition's respective control norm conditions. In the self-

enhancing framing condition, however, pro-environmental consumer intentions were non-significantly higher in the descriptive norm, convention, and moral norm conditions relative to the self-enhancing framing's control norm condition.

Although this pattern of effects appeared to be consistent with hypothesis 3, additional analyses revealed that the control norm condition that was paired with the self-enhancing framing condition had a lower marginal mean than the estimated marginal means for the control norm conditions paired with the other two framing conditions. This difference between control norm conditions was significant when comparing the self-enhancing framing and pro-environmental framing conditions. Thus, although pro-environmental consumer intentions were higher in every norm-intervention condition relative to the control norm condition within the self-enhancing framing condition, they only rose to approximately match the estimated marginal means for the norm-intervention conditions within the other two framing conditions.

In the analysis of consumer behaviors, although the effects of each norm-intervention condition were non-significant within each framing condition, the size of the effects were largest when the norms were preceded by the pro-environmental framing, rather than the self-enhancing framing, condition. This is inconsistent with hypothesis 3 which anticipated that the effects of each norm-intervention condition would be stronger when preceded by the self-enhancing framing compared to the pro-environmental framing.

To test hypothesis 4, the two-way interaction effects between each of the values (biospheric, altruistic, egoistic, and hedonic) and framing condition were examined. The only values scale with findings that partially supported hypothesis 4 were biospheric values. In the analysis of consumer intentions, people high on biospheric values scored significantly higher on pro-environmental consumer intentions compared to people low on biospheric values in every framing condition. Although this did not support hypothesis 4, the size of this difference was largest in the pro-environmental framing condition and smallest in the self-enhancing framing condition, which was

consistent with the direction of the effect that was predicted. This same pattern was also found in the analysis of consumer behaviors, where additionally, the difference between people high and low on biospheric values was also non-significant in the self-enhancing framing condition.

The findings for the two-way interactions between the other three values (altruistic, egoistic, and hedonic) and framing condition were not consistent with hypothesis 4. For altruistic, egoistic, and hedonic values, there was generally a greater difference in pro-environmental consumer intentions and behaviors between people high and low on each value in the self-enhancing framing condition compared to in the pro-environmental framing condition.

To test hypothesis 5, the three-way interaction effects between each of the values (biospheric, altruistic, egoistic, and hedonic), framing condition, and norm condition were examined. In both the analyses of consumer intentions and consumer behaviors, these three-way interaction effects were non-significant in the overall model, and examinations of the patterns of estimated marginal means did not support the prediction made by hypothesis 5.

To test hypothesis 6, the two-way interaction between in-group identification and norm-intervention condition was examined. Unlike what was predicted by hypothesis 6, the results found that the pattern of the effects of each norm-intervention condition on people's pro-environmental consumer intentions and behaviors were very similar across people both high and low on in-group identification.

The first exploratory research question was whether there would be a three-way interaction effect between in-group identification, framing condition, and norm-intervention condition. The results indicated that, across both the analyses of consumer intentions and consumer behaviors, the effects of each norm-intervention condition were similar on both people high and low on in-group identification, particularly in the pro-environmental framing condition. Only a couple of differences stood out. In the control framing condition, the convention condition tended to be more effective on people low, compared to high, on in-group identification, though its effect was non-significant for

both. In the self-enhancing condition, the moral norm condition also tended to be more effective on people low, compared to high, on in-group identification, though its effect was, again, non-significant.

The second exploratory research question was which combination of framing and norm-intervention condition would produce the strongest improvements in pro-environmental consumer intentions and behaviors relative to the control framing/control norm condition. In the analysis of consumer intentions, the conditions with the highest average pro-environmental consumer intentions were the combination of the pro-environmental framing and convention condition, and the combination of the pro-environmental framing and control norm condition, though neither was significantly different from the control framing/control norm condition. In the analysis of consumer behaviors, the conditions with the highest odds of people choosing the pro-environmental consumer behavior option were the combination of the pro-environmental framing and descriptive norm condition, and the combination of the pro-environmental framing and social norm condition, though neither was significantly different from the control framing/control norm condition.

Chapter 7: General Discussion

Purpose of the Current Project

The purpose of the current project was to contribute to research on how to develop effective climate-change mitigation strategies. In the social psychology literature, a technique that has been commonly used to encourage people to adopt more pro-environmental behaviors is the norm intervention. However, currently used norm-intervention methods have been found to produce inconsistent effects and small effect sizes (Farrow et al., 2017; Poškus, 2016). In this project, I proposed three methodological changes and tested how effective they were at improving people's pro-environmental consumer intentions and behaviors. These methodological changes included 1) broadening the range of types of norm-intervention conditions, 2) including both a pro-environmental and a self-enhancing framing, and 3) communicating how pre-existing motivations to engage in environmentally harmful behaviors can be achieved by adopting a new pro-environmental behavior.

The inclusion of both a framing and a norm-intervention manipulation allowed for the investigation of interaction effects between the two, which have not been previously investigated. Additionally, values have been found to consistently predict pro-environmental outcomes (Ghazali et al., 2019; Hansla et al., 2008; Liobikiene & Juknys, 2016; Nordlund & Garvill, 2002; Nordlund & Garvill, 2003; Poortinga et al., 2004) and have moderated the effects of other types of environmental interventions (Bolderdijk et al., 2013). Yet, they are not typically investigated as potential moderators in norm-intervention studies. The question of how to develop climate-mitigation strategies that are effective on people with differing values is an open, difficult question to answer (Steg, 2023). Thus, it is important to in studies developing climate-mitigation tools to examine how the effectiveness of the intervention strategy varies depending on people's values.

I also examined whether in-group identification moderated the effects of the norm-intervention condition in the current study. Especially for a public behavior like whether one buys

and wears new or secondhand clothing, one might expect to see how central and similar one feels to one's peer group to affect how persuaded someone is by norms regarding other group members' clothing purchase behaviors.

Key Findings

The first key finding in this study was that, overall, the norm-intervention conditions did not appear to persuade people to change their pro-environmental consumer intentions and behaviors by much. This study set out to make methodological improvements that could ameliorate the inconsistency in norm interventions' effects and strengthen the size of the effects that they produce. I found that, despite the implementation of these methodological changes, this study adds to those which have found that norm interventions do not always produce significant changes in people's pro-environmental consumer intentions and behaviors (Bohner & Schlüter, 2014; Reese et al., 2014; Schultz et al., 2008; Smith et al., 2012; Terrier & Marfaing, 2015; Yeomans & Herberich, 2014). Additionally, with between 222 and 231 participants in each of the norm-intervention conditions, this study had a very good chance of finding a significant effect of norm condition if one existed (see Chapter 3 for a discussion of this study's power). Overall, it appears that, for encouraging people to reduce their clothing consumption, norm interventions are ineffective. Despite their strengths, they appear to not be effective as a climate mitigation strategy aimed at reducing people's levels of consumption.

One reason why norm interventions may not be effective at increasing people's willingness to reduce their clothing consumption could be that it is difficult to persuade people to believe novel norms regarding the clothing-buying and wearing habits of the people around them. This is because the clothing that people buy and wear is a public type of environmental behavior. People may have access to too much information that could counter researchers' attempts to manipulate perceived norms around this practice. For instance, in response to an open-ended question at the end of this study's survey, nineteen participants expressed skepticism about the veracity of the information

regarding other UO students' opinions about purchasing new clothing items. Several participants described experiences they have had that counter the idea that UO students are concerned with buying secondhand clothing and/or are concerned enough to prefer that others also buy secondhand clothing, such as the fact that they see other students wearing brand new clothing. If the public nature of an environmental behavior makes norm interventions an ineffective intervention approach, then a challenge for future research will be in discerning what types of interventions can be used to effectively reduce people's engagement in environmentally harmful behaviors that are more public in nature.

The second key finding was that pro-environmental consumer intentions and behaviors were actually the highest when a pro-environmental framing was used compared to when a self-enhancing framing or no framing was used. In the analysis of consumer behaviors, participants shown the pro-environmental framing had significantly higher odds of choosing the pro-environmental consumer behavior option compared to participants shown the control or self-enhancing framing conditions. Thus, the pro-environmental framing that has typically been used in prior research was also the most effective here.

This finding was not anticipated because the pro-environmental framing was expected to have less of a wide appeal than the self-enhancing framing condition. However, there are several reasons why this finding may have occurred. First, as discussed in the descriptive statistics section, this sample of University of Oregon students highly endorsed biospheric values. The pro-environmental framing condition was expected to appeal less to people who weakly endorsed pro-environmental values. Since the sample was made up of a majority of people who view biospheric values as being consistent with their principles, though, it is fitting that the pro-environmental framing appealed to many of them.

Second, the current study's attempt at constructing a framing that would depict the adoption of a pro-environmental behavior as being consistent with participants' self-interest may

not have been effective. For example, a previous study which used a self-enhancing framing to promote energy conservation used the straightforward explanation that saving energy could save the participant money. The current study's approach to constructing the self-enhancing framing condition was to explain how reducing one's consumption of new clothing was consistent with one's social goals because people in the US are increasingly reporting being unimpressed by people who buy new clothing, and rather, view people more positively who refrain from purchasing new clothing items. A limitation of the current study is that I did not empirically examine the degree to which participants saw the behavior being depicted by the self-enhancing framing condition as being consistent with their self-interest. Especially considering that the current sample was University of Oregon undergraduate student, it is possible that being told others' thoughts about buying new clothing could have incited a reactionary effect among people in the current sample who may resent their individual clothing choices being influenced by others' opinions.

The third key finding was that it was actually people's values, a dispositional factor, which had the strongest predictive power compared to the study's attempt to modify people's pro-environmental outcomes by varying the situational context. Overall, biospheric values significantly, positively predicted people's pro-environmental consumer intentions and behaviors, and egoistic values significantly, negatively predicted people's pro-environmental consumer intentions and behaviors. This finding was quite consistent across framing and norm-intervention contexts. There didn't appear to be a combination of framing and norm condition that made the intervention equally persuasive to people both low and high on biospheric values, or low and high on egoistic values.

As discussed above, this lack of a moderating effect of values could also be due to the fact that the self-enhancing framing condition may not have methodologically primed what it was intended to, which was that reducing one's consumption of new clothing was aligned with people's self-interest. In De Dominicis et al. (2017), their self-enhancing framing condition emphasized how

engaging in energy consumption could help people to save money each month. This is clearly an appeal that aligns with most people's self-interested goals. The self-enhancing framing used in the current study attempted to convince people that reducing their new clothing purchases was consistent with social goals of fitting in, impressing others, and maintaining status. Previous research has found that, when people are primed with status concerns, they are more likely to make environmentally friendly decisions that are associated with maintaining good social status (Griskevicius, Tybur, & Van Den Bergh, 2010). However, in addition to people's concern about whether the presented information was true or not, social status concerns regarding clothing behaviors may function differently than other pro-environmental behaviors, particularly in an undergraduate Oregon student population. For instance, being told that other people report feeling unimpressed by seeing other people wear brand-new clothing items may incite a reactionary effect in people who desire to uniquely express themselves through the clothing they wear or who resent their individual clothing choices being influenced by other people's opinions.

Finally, the last key finding was the unexpected lack of an effect of in-group identification on people's pro-environmental consumer intentions and behaviors. Regardless of how much the language in the framing and norm intervention conditions centered around sharing the behaviors of other UO students, the results suggested that how similar or central people felt to the UO student community mattered little for predicting their pro-environmental intentions and behaviors. This is inconsistent with previous research which found that the behavior of reference groups significantly, positively predicted people's own engagement in different pro-environmental behaviors (Welsch & Kühling, 2009). The reference group of other UO students was used in the current study because norms regarding their clothing purchase behaviors could potentially be manipulated without the participants having too much access to accurate information that would challenge this information, as they may have for close others like friends and family members. However, it is certainly possible

that UO students are not the most relevant reference group when it comes to influencing their pro-environmental consumer intentions and behaviors.

Limitations and Future Research

Overall, the pro-environmental framing performed the best at improving people's pro-environmental consumer behaviors. However, there were concerns regarding whether the self-enhancing framing condition in this study successfully primed people with the idea that reducing their clothing consumption was actually consistent with their self-interested goals. Future research should test different self-enhancing framings for how much adopting the pro-environmental behavior being depicted in them is perceived as being consistent with participants' self-interested goals. Then, the effectiveness of these self-enhancing framings compared to the pro-environmental framing, and the two-way interaction between framing and norm-intervention condition, could be re-evaluated.

A second limitation of the current study was that, overall, the sample highly endorsed biospheric and altruistic values. Given this small range in the endorsement of biospheric and altruistic values, it is difficult to infer how the pattern of the effects of the norm and framing conditions would extend to people who do not endorse these values. Future research should examine the effectiveness of climate-mitigation strategies in wider audiences with people who endorse more varied values. It remains an open question of how to devise climate-mitigation strategies that are equally effective on people who are, and are not concerned, with pro-environmental goals.

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