**Introduction**

Masses of people today are living lifestyles abundant in consumption (Matsuyama, 2002; Ritchie, Roser, & Rosado, 2022), and this consumption is driving the planet towards becoming a more inhospitable place to live (Hoekstra & Wiedmann, 2014; IPCC, 2014; Ripple et al., 2019). 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., 2015). 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 consistently called upon the world to develop strategies that can help to mitigate climate change (Ripple et al., 2019). 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 Changing Environmentally-Relevant 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, Schultz, Cialdini, Goldstein, & Griskevicius, 2008; Oceja & Berenguer, 2009; Reese, Loew, & Steffgen, 2014; Reno, Cialdini, & Kallgren, 1993; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 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 are easier to modify than other factors that affect people’s behaviors like their values and beliefs (cite). Norm interventions have also 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 strategy given that climate change has a global audience.

Current norm interventions also have weaknesses. First, their effectiveness appears to be inconsistent across studies. In a review of norm-intervention studies, 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). Second, a meta-analysis found that norm interventions often produce small effect sizes (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 (Hoekstra & Wiedmann, 2014).

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 CO2 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 CO2 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, 2014). After all, corporations encourage overconsumption via marketing, and they are the entities that are producing, and profiting from the production of, GHGs. This supply-sided approach would mean that the world relies 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 (US Census Bureau, 2022). 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. 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 (IPCC, 2018).

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 were more consistently related to pro-environmental outcomes than injunctive norms were.

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. In the next section, I will elaborate further on how the current project is developing novel 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. This is called pro-environmental framing. 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, Abrahamse, & Jones, 2013).

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. Even without the additional pro-environmental language that is sometimes included, it is likely that pro-environmental practices are generally interpreted as behaviors that require some degree of self-sacrifice for the sake of the group or the environment. This is supported by correlational evidence which finds that self-transcendence values, which emphasize transcending concerns for the self in favor of concern for others or for greater principles, consistently, positively predict willingness to engage in pro-environmental behaviors (Ghazali et al., 2019; Hansla et al., 2008; Liobikiene & Juknys, 2016; Nordlund & Garvill, 2002, 2003; Poortinga et al., 2004). On the other hand, self-enhancement values, which indicate one is concerned with achieving self-related goals, tend to negatively predict endorsement of pro-environmental behaviors (Nordlund & Garvill, 2002; Poortinga et al., 2004).

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, such as those who highly endorse self-enhancement values. This is supported by evidence from a study which manipulated whether engaging in energy conservation was preceded by a pro-environmental framing or a self-enhancing framing (De Dominicis, Schultz, & Bonaiuto, 2017). 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 self-enhancing values reported significantly lower intentions to save energy compared to people who scored relatively higher on self-transcendent values. However, when a self-enhancing framing was used, there was no significant difference between the two groups. Individuals who scored relatively higher on self-enhancing values reported similarly high intentions to save energy as individuals who scored relatively higher on self-transcendent values.

This demonstrates that, when adopting a pro-environmental behavior is seen as consistent with one’s self-interest, the behavior can appeal to a wider group of 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, as well as how the effectiveness of this framing is being compared to the effectiveness of a pro-environmental framing.

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 is consistent across the methodologies used in many norm-intervention studies (Allcott, 2009; Bohner & Schlueter, 2014; Carrico & Riemer, 2011; Cialdini et al., 2006; Costa & Kahn, 2013; de Groot et al., 2013; Ferraro, Miranda, & Price, 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 unfriendly habits. For example, two qualitative studies investigated people’s perception of what barriers prevent them from engaging in more environmentally-friendly habits. In studies of recycling and eco-conscious apparel consumption, even among eco-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 *un*friendly 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 used 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, 2007). 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 will first propose distinct definitions for each norm construct that are largely based on the extensive sociological examination performed in Bicchieri (2006).

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 conform with (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 mutually expect one another to follow (Bicchieri, 2006). This is different from descriptive norms where expectations about who was expected to conform were unilateral; observers of a descriptive norm expect others to conform, but do not feel that other people have strict expectations for the observer to conform as well. For conventions, expectations of compliance are mutual. Observers expect others to comply, and others also expect the observer to comply, with the behavioral rule. Conventions tend to be rules that help people coordinate their behaviors to achieve a mutual 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 arbitrary 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 repercussions (e.g., praise, improved status). Social norms are similar to the concept of injunctive norms that is used in many other norm-intervention studies, but the definition provided here goes into greater detail than the definition that is typically used for injunctive norms.

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 notmean 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, 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.

**Table 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 | Rules for behaving a certain way that people perceive as being widely followed andbelieve 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) |

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. 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 results are described in greater detail below.

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 effect of framings jointly with a norm intervention has 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 a pro-environmental or a self-enhancing framing is used to contextualize the pro-environmental behavior.

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 (Choudhury, 2014; Gwozdz, Nielsen, & Müller, 2017; Huang et al., 2016; Ivanova et al., 2015; Niinimäki et al., 2020).

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 a replication of the typical pro-environmental framing that has been used 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 methods 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 the self-enhancing framing will have a stronger overall effect on reducing people’s clothing consumption intentions and behaviors 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 each of the norm-intervention conditions will reduce people’s clothing consumption intentions and behaviors compared to the control condition in which participants are not exposed to any normative information. 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, conventions, 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 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.*

The current study is also measuring the extent to which people endorse self-transcendent values. Based on previous findings, it is expected that, when a pro-environmental framing is used, exposure to a norm intervention will be less effective among people who are low (versus high) on self-transcendent 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. I expect a self-enhancing framing, which depicts adopting a pro-environmental behavior as being aligned with self-interested values, to make the norm intervention appealing to both people low and high on self-transcendent values. Thus, the fourth hypothesis is that there will be a three-way interaction between self-transcendent values, framing condition, and norm-intervention condition.

*H4: 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 is used, values will moderate the effect of each norm-intervention condition on people’s clothing consumption intentions and behaviors. However, when a self-enhancing framing is used values will not moderate the effect of each norm-intervention condition on clothing consumption intentions and behaviors.*

As mentioned earlier, the effect of norm interventions may be weaker on people who weakly identify with the group being referenced in the normative message. That is, these people may be less susceptible to group pressures to conform with a new norm. For this reason, I expect an interaction between in-group identification and norm-intervention condition such that the effects of each norm-intervention condition will be stronger on people high, versus low, on in-group identification.

*H5: 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 reductions in people’s clothing consumption intentions and behaviors.

*Exploratory Research Question 2: Which combination of framing condition and norm-intervention condition produces the strongest reductions in people’s clothing consumption intentions and behaviors compared to the control condition?*

**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. 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 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).

***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 below.

**Table 2**

*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. |

**Results**

Prior to analysis of the items in Table 2, 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 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, χ2(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 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 3 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 seem to most aptly capture.

**Table 3**

*Item Loadings from Principal Components Analysis*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Items | PC1  Social Norm (Formal) | PC2  Descriptive Norm / Convention | PC3  Personal Rule | PC4  Social Norm (Informal) | PC5  Moral Norm | PC6  Non-norm / Anti-norm | PC7  Frugality |
| **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.). | **0.851** |  |  |  |  |  |  |
| **dn6:** I got this clothing item for a specific event that I want to make a good impression on others at. | **0.789** |  |  |  |  |  |  |
| **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.). | **0.761** |  |  |  |  |  |  |
| **dn5:** Wearing this clothing item will help me successfully achieve one or more of my goals (i.e., career, academic, financial). | **0.705** |  |  |  |  |  |  |
| **mn4:** I feel a moral obligation to wear clothing similar to the clothing item that I got. | **0.358** |  |  | 0.280 |  |  |  |
| **dn2:** This clothing item, or clothing similar to it, is worn by many of my peers. |  | **0.763** |  |  |  |  |  |
| **dn1:** This clothing item, or clothing similar to it, is in style right now. |  | **0.711** |  |  |  |  |  |
| **conv1:** For a long time, people will wear clothing similar to the style of the clothing item that I got. |  | **0.593** |  |  |  |  |  |
| **conv3:** Other people expect me to wear clothing similar to the clothing item that I got. |  | **0.520** | 0.211 | 0.404 |  |  |  |
| **conv4:** I expect my peers to wear clothing similar to the clothing item that I got. |  | **0.504** |  |  | 0.218 |  |  |
| **an2:** This clothing item, or clothing similar to it, is unusual compared to what other people wear. (***negative***) |  | **-0.390** | 0.266 |  | 0.371 | 0.228 |  |
| **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. |  |  | **0.675** |  |  |  |  |
| **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. |  |  | **0.638** |  |  |  |  |
| **pn3:** This clothing item fits with my personal style. |  | 0.283 | **0.593** |  |  |  |  |
| **pn4:** This clothing item fits with personal guidelines I have for myself about what type of clothes I should wear. |  | 0.243 | **0.570** |  |  | -0.232 |  |
| **an4:** Getting this clothing item, or clothing similar to it, allows me to express my uniqueness. |  |  | **0.523** |  |  | 0.269 |  |
| **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***) |  | 0.321 |  | **-0.613** |  | 0.202 |  |
| **dn4:** There is no strict expectation from my peers for me to wear clothing similar to the clothing item that I got. (***negative***) |  |  | 0.253 | **-0.612** |  |  |  |
| **sn1:** People would judge me if I failed to wear clothing similar to the clothing item that I got. | 0.341 |  |  | **0.492** |  |  |  |
| **mn3:** Failing to wear this clothing item or clothing similar to it would go against my principles. | 0.274 |  |  | **0.440** | 0.223 | 0.244 |  |
| **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. | 0.333 |  |  | **0.429** |  |  |  |
| **mn1:** I think that getting this clothing item or clothing similar to it is good for the economy. |  |  |  | -0.218 | **0.711** |  |  |
| **mn5:** I got this clothing item to support companies with ethical positions that I agree with. |  |  |  |  | **0.628** |  |  |
| **nn4:** I was unexpectedly given this clothing item as a gift. |  |  | -0.308 |  | **0.598** |  |  |
| **nn2:** I got this clothing item on impulse without thinking very much about it. |  |  |  |  |  | **0.784** |  |
| **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. | 0.261 |  |  |  |  | **0.455** | 0.242 |
| **an1:** This clothing item, or clothing similar to it, is an unconventional thing for me to wear. | 0.202 | -0.253 |  |  |  | **0.432** |  |
| **an3:** Wearing this clothing item, or clothing similar to it, rebels against expectations about what is acceptable to wear. | 0.353 | -0.244 |  |  |  | **0.426** |  |
| **nn3:** I got this clothing item purely by accident (for example, being sent the wrong item). | 0.201 |  |  | 0.228 | 0.291 | **0.323** |  |
| **pn5:** I decided that getting this clothing item would be a frugal or cost-effective way of spending my money. |  |  |  |  |  |  | **0.831** |
| **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. |  |  |  |  |  |  | **0.827** |

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 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 coordination (e.g., the general tendency to walk on the right side of the sidewalk). 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 onto two different components.

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, the descriptive norm condition can emphasize a behavior as fitting with current trends, while the convention condition can emphasize a behavior as helping a group of people to coordinate their behaviors with one another.

Another difference between the variables resulting from the PCA and those intended was that a separate frugality component was created that seems to measure another non-normative aspect of acquiring new clothing items. Specifically, this frugality component captures getting a new clothing item because it seems like a cost-effective purchase and perceiving that other people also get new clothing items when they seem like cost-effective purchases. The items assessing personal rules tended to group together as expected. The remaining two non-normative constructs – non-norms and anti-norms – grouped together onto the same component.

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.