**Introduction**

Masses of people today are living lifestyles abundant in consumption (Matsuyama, 2002; Trentmann, 2004; US Census Bureau, 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). Lifestyles are patterns of behavioral choices that are shaped by human psychological tendencies (Dean et al., 1995). Thus, a psychological approach could provide key insights into how current consumption practices can be changed. The purpose of the current project is to investigate how psychological interventions can be used to reduce people’s consumption.

People engage in many consumer activities on a daily basis, like heating and cooling their homes, driving in personal cars, and purchasing food and clothing (among other behaviors), that generate, and provide demand for the generation of, massive amounts of greenhouse gas (GHG) emissions (Hertwich & Peters, 2009; 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 human safety and sustainability (IPCC, 2014). Widespread reductions in people’s high-consumption lifestyles is considered vital to mitigating the ongoing climate change crisis (Creutzig et al., 2018; Druckman & Jackson, 2010; Dubois et al., 2019; Girod, van Vuuren, & Hertwich, 2014; IPCC, 2014, 2018, 2022).

The IPCC (2021) set an international goal of limiting the rise in global temperatures to only 1.5°C, where each additional 0.5°C increase above this limit is associated with increasingly severe environmental consequences. Limiting warming to 1.5°C requires that the world reaches zero human emissions of GHGs by 2050. There are two main climate-change mitigation approaches that can be used to reach this goal: supply- and demand-sided strategies. Demand-sided strategies involve finding ways to reduce demand for products and services that generate GHG emissions. Supply-sided strategies involve decarbonizing corporations’ supply chains (i.e., altering manufacturing processes to produce goods and services in ways that do not emit GHGs) and scaling technological innovations like carbon capture, which removes GHGs from the atmosphere, and renewable energy sources, which provide energy without producing GHGs (IPCC, 2018).

Supply-sided solutions may be appealing to most because they do not require widespread changes to people’s lifestyles. However, it is highly unlikely that they will be able, on their own, to prevent alarming levels of warming from occurring. For instance, there is no certainty that carbon capture technologies will be able to scale quickly enough to remove the amounts of GHGs that are necessary to reduce GHG emissions to zero in the next 30 years. 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 will be able 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, rather than the responsibility being on individuals collectively to reduce GHG emissions through lifestyle changes, that corporations are the ones who are responsible for producing GHGs, and have profited immensely from current emissions practices, and thus should also be in charge of reducing emissions. This would mean relying on companies to invest resources, very quickly, into decarbonizing their supply chains. However, our high-consumption lifestyles make corporations’ current infrastructures very profitable (US Census Bureau, 2022), and companies have shown less motivation to make sustainability changes to their infrastructures when there was no financial benefit to doing so (O’Rourke, 2014). That being so, current consumption practices likely create little incentive for corporations to make costly investments in restructuring their manufacturing processes, much less at the scale and speed that is necessary to reach net-zero emissions in the next 27 years.

This means that demand-sided strategies are a necessary part of the climate solution, and psychological research can play a key role in finding ways to make them most effective. The main strategy that will be investigated in this paper is how psychological interventions can best be used to reduce the amount of consumption that people engage in. The field of social psychology already has an established history of developing interventions aimed at encouraging people to adopt more environmentally-responsible 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).

Norm interventions work by altering people’s perception of the norms that are endorsed by the people around them. Norms have been defined in social psychology as the behavioral rules understood by members of a group that guide or constrain group members’ behaviors (Cialdini & Trost, 1998). The sociologist Bicchieri expands on this definition slightly by adding that these behavioral rules are upheld by people’s expectations that the rules are endorsed by other members of their group (Bicchieri, 2006). Norm interventions are low-cost, easy to implement to a wide audience, and have been found to have consistent, positive effects on encouraging .

**Shared Characteristics of Current Norm Interventions**

There are a few shared characteristics across norm-intervention studies. First, norm intervention studies seem to rely mainly on the descriptive-injunctive norm dichotomy. In Cialdini, Reno, & Kallgren (1990), the authors elaborate on how norms that describe behaviors that people perceive as being widely adopted by their group (descriptive norms) can be differentiated from behaviors that people think others believe *ought* to be widely adopted (injunctive norms). These seem to be the two types of norms that are most often manipulated in norm-intervention studies. Of 23 norm interventions included in a review conducted by Farrow et al. (2017), 13 of the studies included a descriptive norm condition, 5 included an injunctive norm condition, and 5 included a condition that combined a descriptive and injunctive norm. Much more rarely, personal norms (commonly defined as the moral standards of behavior that individuals set for themselves) are included as a condition (Niemiec et al., 2020). There was one study in the Farrow et al. (2017) review that included a personal norm condition. This is a significant characteristic to note because more types of norms exist than the two that are most commonly manipulated in norm intervention studies, and different norms have different persuasive appeals. I will elaborate further in this introduction on why we should explore the effectiveness of a broader range of types of norms as norm-intervention appeals and also suggest specific norm conditions for doing so.

A second shared characteristic 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 instance, 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). In a study investigating how to promote energy conservation behaviors, the descriptive norm condition stated, “About 90% of people reported taking steps to conserve in the year prior to this study” (Lapinski et al., 2007).

This characteristic is notable because it means that norm intervention studies commonly frame the adoption of a pro-environmental behavior as a social dilemma pitting one’s short-term self-interests against the long-term interests of the group (Nordlund & Garvill, 2003). That is, messages like these ask people to do something now that may be inconvenient or undesirable for the sake of gaining a planetary environment that sustains life for everyone. Even when pro-environmental language is not overtly used in norm intervention conditions, it is likely that, when presented with an environmentally-friendly behavior with no additional context, people perceive this behavior as being consistent with pro-environmental goals. This possibility is supported by correlational evidence which finds that pro-environmental and self-transcendence values consistently, positively predict willingness to engage in general pro-environmental behaviors (Ghazali et al., 2019; Hansla et al., 2008; Liobikiene & Juknys, 2016; Nordlund & Garvill, 2002, 2003; Poortinga et al., 2004), and self-enhancement values negatively predict endorsement of pro-environmental behaviors (Nordlund & Garvill, 2002; Poortinga et al., 2004). These findings suggest that pro-environmental behaviors have to be intentionally recontextualized to not be interpreted by the audience as being self-sacrificing behaviors in pursuit of pro-environmental goals. In this introduction, I will further discuss how pro-environmental framings could be reducing the effectiveness of norm interventions and suggest an alternative way of framing pro-environmental behaviors to reduce the degree to which adopting them is seen as being in conflict with one’s self-interest.

The third characteristic that is shared among norm intervention studies is that they do not address people’s motivations to engage in their current environmentally *un*friendly behaviors. Rather, studies aimed at promoting energy conservation, or towel reuse, or recycling, among other pro-environmental habits, suggest that people should adopt these behaviors *in spite of* their current motivations to do otherwise. 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. For example, in Lapinski et al. (2007), the authors want to increase people’s intentions to engage in conservation behaviors. In the descriptive norm condition, participants were told that conservation behaviors are much more prevalent among the people around them than the participant thought they were, and that in fact about 90% of people reported taking steps to conserve in the prior year. There is no mention of, or attempt to undermine, the factors associated with people’s desire to *not* conserve water or energy. For example, people may wish to not conserve water because it is easier to let the faucet continue running while brushing one’s teeth. Or people may wish to not conserve energy because they desire to be able to use their electronics as much as they want throughout the day. In the next section of this introduction, I will elaborate on how attempting to specifically undermine the factors motivating people’s environmentally unfriendly behaviors could increase the effectiveness of norm interventions and suggest a way of doing so.

**Suggested Changes for Future Norm Interventions**

* Expanding on types of norms included as intervention conditions
* Testing the self-enhancing framing as an alternative to the pro-environmental framing
* Using the self-enhancing framing to undermine people’s motivation to engage in environmentally unfriendly behaviors