**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). Since lifestyles are behavioral patterns, a psychological approach may provide key insights into how these behaviors can be changed. The purpose of the current project is to investigate how psychological interventions can best be used to reduce people’s consumption.

Many of the consumer activities that people engage in on a daily basis, like heating and cooling their homes, driving in personal cars, and purchasing food and clothing, among other consumer goods, generate 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 frequent extreme weather events, and ultimately a planet that is more threatening to human safety and sustainability (IPCC, 2014). Thus, changing people’s high-consumption lifestyles is vital to mitigating climate change (Creutzig et al., 2018; Druckman & Jackson, 2010; Dubois et al., 2019; Girod, van Vuuren, & Hertwich, 2014; IPCC, 2014, 2018, 2022).

This is considered a demand-sided mitigation strategy because it confronts one of the factors driving demand for GHG-intensive products. There are also many supply-sided mitigation strategies, such as renewable energy sources, carbon capture technology and the decarbonization of corporations’ supply chains. However, relying solely on supply-sided solutions has significant weaknesses and will not, on its own, be enough to limit the global rise in temperatures (Hoekstra, 2014; IPCC, 2018).

One reality that may be desirable to consumers is for technological innovations to solve the climate crisis because this approach maintains the consumption status quo. However, technologies like carbon capture have substantial drawbacks as a climate solution. First, there is no certainty that carbon capture technologies, which require energy and resource inputs themselves, will be able to scale quickly and efficiently enough to be able to remove the amounts of GHGs from the atmosphere that are necessary to keep average global temperatures from continuing to rise (IPCC, 2018). Additionally, to meet operation costs, carbon capture companies sell CO2 to oil companies to be used for enhanced oil recovery (EOR), 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 hundreds of gigatonnes of CO2 currently in the atmosphere in addition to being able to offset the increase in emissions resulting 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.”

Additionally, an argument could be made that corporations are responsible for, and have profited from, the production of GHGs and thus are also primarily responsible for reducing these emissions. This approach involves relying on companies to invest resources, very quickly, into decarbonizing their supply chains (i.e., restructuring their manufacturing processes to produce goods and services without emitting GHGs). It is true that decarbonizing systems of production, and the emissions caused by use of products, is an essential part of mitigating the current climate crisis. However, similarly to the development of climate-solving technologies, sustainable innovations in corporations’ supply chains will likely occur too slowly to solve the climate crisis on their own. Corporations have shown a willingness to invest in making sustainability changes to their supply chains when it financially benefitted them to do so, but less so when investing in these changes did not correspond to cost savings (O’Rourke, 2014). Furthermore, as corporations are being called upon to decarbonize their supply chains, our high-consumption lifestyles are making their current infrastructures very profitable (US Census Bureau, 2022). Thus, current consumption practices likely create little incentive for corporations to make costly investments in restructuring their manufacturing processes.

Demand-sided strategies have many advantages, including that they can 1) directly reduce GHG emissions by reducing demand, 2) are oftentimes lower cost and have less uncertainty associated with their efficacy than technological solutions, and 3) enhance the chances of supply-sided solutions being successful (Girod, van Vuuren, & Hertwich, 2014; IPCC, 2014, 2018, 2022; von Stechow et al., 2016). There are increasing recommendations from researchers to investigate demand-sided strategies, including finding ways of reducing the amount of consumption that people engage in (Creutzig et al., 2018; Druckman & Jackson, 2010; Dubois et al., 2019; Girod, van Vuuren, & Hertwich, 2014; Wiedmann, Lenzen, Keyβer, & Steinberger, 2020).

The purpose of the current project is to investigate how psychological interventions can be used to achieve widespread reductions in people’s consumption behaviors. The field of social psychology already has an established history of developing 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).

In social 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 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 of norms slightly. According to Bicchieri, norms are the behavioral rules people perceive as existing in their group regarding which behaviors are appropriate, or inappropriate, to engage in, and, importantly, these rules are upheld by people’s expectations that the rules are endorsed by other members of their group (Bicchieri, 2006). People’s perception of the norms that exist in their group has been empirically found to shape the behaviors that people are willing to engage in. Norm interventions work by altering these perceptions.

**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