THE EFFECTS OF GAIN- AND LOSS-FRAMED MESSAGES WHEN PAIRED
WITH A SOCIAL-NORM IN ALTRUISTIC SETTINGS ON MOTIVATING ENERGY
CONSCIOUS BEHAVIOR CHANGE

by

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A Dissertation submitted in partial fulfillment of the requirements for the degree of
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DEDICATION

This is dedicated to my husband, Jonathan, my daughter, Lindy Evangeline, my dogs, Willie Nelson and Reba Jean McEntire-Keltner-Stella-Nelson, my cat, Phyllis, and my Dad.

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Kilowatt hour ....kWh
Carbon dioxide..CO_2
Non-governmental organizations.. NGOs
Parts per million...PPM
George Mason University .... GMU

ABSTRACT

THE EFFECTS OF GAIN- AND LOSS-FRAMED MESSAGES WHEN PAIRED WITH A SOCIAL-NORM IN ALTRUISTIC SETTINGS ON MOTIVATING ENERGY CONSCIOUS BEHAVIOR CHANGE

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As a result of slow outcomes from global climate change negotiations, it is increasingly apparent that a multifaceted policy approach to climate change mitigation may be necessary. Encouraging energy efficient behavior at the individual level is one such approach, and would require a public messaging campaign. Two frequently used forms of messages are loss-framed and gain-framed. For example, a gain-framed message related to climate change might feature a thriving polar bear and encourage mitigation action to protect such a majestic creature. However, most climate change appeals use loss-framed messaging, which might include an image of a drowning polar and text shaming readers for their carbon footprint. There has been very little prior work which assesses the effects of message framing in environmental appeals, with most studies focusing on health related communications. This disparity is important since individuals generally do not personalize environmental risks in the same way as health-related risks.

This study tested the effects of message framing when paired with social-norms in 30 residence halls on the George Mason University campus for a six-week period. Social norm appeals remind audiences of the extent to which a behavior is enacted by others they know or admire. Specifically, individual residence halls received one of the following treatment conditions: gain-framed, loss-framed, gain-framed with a positive social-norm or loss-framed with a negative social-norm. Building plug load and electricity use was monitored for change, and pre- and post-test surveys were collected from 175 students to estimate self-reported energy use. While energy use did decrease across many of the halls during the study period, those changes were not significantly associated with any specific treatment condition. One of the targeted behaviors in the messaging campaign, turning the TV off when not in the room, did improve for those students who received a loss-framed message when paired with a negative social-norm. This suggests that the use of a negative social-norm message featuring a descriptive and injunctive norm may be an effective technique to change some energy use behaviors. Interestingly, the use of the positive social-norm was associated with a possible boomerang effect for this same targeted behavior.

CHAPTER ONE: INTRODUCTION

In environmental communication one of the predominant strategies is to use message framing, in which messages can be either loss- or gain-framed. Loss-framed messages are composed in a manner where pursuing a desired behavior results in a worsened outcome (Dillard & Marshall, 2003; Higgins & Lemm, 1995; O'Keefe & Jensen, 2007; Petty & Wagner, 1991; Rothman & Salovey, 1997; Wilson, Purdon, & Wallston, 1988). These appeals are often accompanied with fear, shaming, hierarchical imposition and upsetting imagery in an effort to evoke an unpleasant emotional response. Relating to climate, a loss-framed message would indicate that by not engaging in energy conservation, climate change will be worsened. Upsetting imagery of a drowning polar bear and harsh language indicating personal blame may be used (WWF, 2009). Similarly, a recycling example might indicate that by not recycling, natural resources will be wasted for future generations. The key features of loss-framed messages are condemnation of the target audience and verbal or visual indications of the consequences of continuing to engage in the undesired action.

Gain-framed messaging, or positive messaging, is the equivalent opposite. This means that by engaging in a specific behavior, a desired outcome is achieved. This type of messaging often employs assurance, collective ownership for the problem, a supportive tone and positive imagery. Using the climate change example, a gain-framed

message would indicate that by engaging in energy conservation, climate change will be slowed. This message would have a supportive tone, and would likely contain postive imagery. Similarly with regards to the recycling example, the gain-framed message would indicate that by recycling, natural resources will be conserved for future generations.

In communication literature loss-framed messages, or negative messaging, are frequently used to motivate behavior change (Jensen & O'Keefe, 2007; Maheswaran & Meyers-Levy, 1990). Support for negative messaging is primarily found in health research and communication (Block & Keller, 1995; Maheswaran & Meyers-Levy, 1990; Shiv, Edell & Payne, 1997). These messages have been shown to motivate a desired behavior change over other approaches, especially in instances where the public is fearful of a risk (Witte, Meyer, & Martell, 2001; Moser, 2007). Further, these appeals are most successful when fear is abated by efficacious steps to facilitate change (Maloney, Lapinski, & Witte, 2011; Witte, 2000). However, loss-framed messages may not be as relevant to settings which do not focus on improving personal well-being, such as messages related to climate change. In particular, health related messaging is considered egoistic, or derived from a motivational state with the goal of increasing one's own welfare (Batson & Shaw, 1991). For instance, a person who is frightened by loss-framed messaging related to skin cancer may be persuaded to wear sunscreen. However, many environmental campaigns attempt to invoke an altruistic change in behavior. Altruistic settings are those situations where there is an unselfish motivation for doing a good act, and often this act can come at a personal expense. Related to the natural world, an

example would include making the choice to ride a bicycle to work despite rainy weather. In this example, the bicyclist chose to ride to work to lower her carbon footprint, while accepting the burden of the rain. By contrast, it is unclear whether the efficacy of loss-framed messaging in health communication can be generalized to settings where personal gain is less obvious, such as benefits to the natural environment (Batson & Shaw, 1991).

Related to climate change messaging, because the United States (US) does not have a rigorous climate change policy, non-governmental organizations (NGOs) and local governments are the primary groups that are attempting to modify the public's energy use (WWF, 2009). While local governments tend to focus on energy savings at the household or business level, NGOs often focus more broadly. In developing their climate change communications – for example, NGOs typically provide a series of loss-framed messages, when discussing sea level change, polar bears stranded on ice caps, and people forced off flooding island nations -- in an attempt to change public attitudes and behavior (Moser, 2007). However, the US public has not responded to these messages even though 63% of Americans believe climate change is happening (Leiserowitz, Maibach, Roser-Renou, Feinberg, & Rosenthal, 2015). This situation suggests the possibility that loss-framed communication strategies may be ineffective at communicating climate change risk. Furthermore recent meta-analysis revealed that the potency of loss-framed messaging compared to gain-framed messaging is not as strong as once believed, particularly as it relates to health communications (O'Keefe & Jensen, 2007).

Gain-framed messaging is an alternative communication approach; however, it is seldom used with regards to climate change messaging. This is likely because NGOs believe the supportive nature of these messages is not strong enough to produce energy conscious behavior change. However, gain-framed messaging theory indicates that when the public is largely uninterested or unengaged in a subject, as much of the US population is towards climate change, these messages can help bolster behavior change (Maheswaran & Meyers-Levy, 1990). Furthermore, in situations where there is currently no financial incentive to lower one's carbon footprint, it may also yield effective outcomes (Stern, Black & Elworth, 1983; Stern, Black & Elworth, 1985). Finally, a Canadian laboratory study found that gain-framed messages were superior to loss-framed in increasing positive attitudes towards climate change mitigation, and also increased the perceived severity of climate change impacts (Spence & Pidgeon, 2010).

However, little research compares the efficacy of gain-framed messages to loss-framed messages in the field, especially as these messages relate to climate change communication. Even less is known about the efficacy of pairing a social-norm appeal with gain- and loss-framed messaging. Social-norms messaging uses public behavior as a means to encourage others to embrace similar behaviors (Asts & Dijkster, 2003; Cialdini, Hallgren & Rebo, 1991; Kerr, 1995; Schultz, 2007). An environmentally related example of a social-norm appeal is a statement such as, "75% of the residents in this community recycle." This statistic indicates that the majority of people engage in a desired behavior, and the remaining 25% of non-recyclers should modify their behavior to fit with the majority. Another social-norm example is "most [college] Greek women drink less than

four drinks when they party" (Haines, 1996). This statement is an attempt to combat binge drinking with sorority members, where the common perception among college students is that the majority regularly binge drink.

While social-norms messaging has been effective at encouraging energy conscious behavior when financial incentives exist (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2009), it us unknown whether social-norms are effective in situations without a financial motivation. For many, energy usage does not involve a direct financial accrual (e.g., - those living in residence halls, working in offices, or staying at hotels.) In these settings, energy savings are not returned to the individual. Yet many office workers power down their computers and turn off their lights when leaving, suggesting these individuals are motivated differently. Those who reduce their energy use without a financial incentive are considered to be motivated altruistically. This means that they reduce their energy use without realizing a personal benefit, and in some cases their energy saving may come at a cost. One example might be that of a hotel guest who always turns off her lights when leaving the room, despite the fact that she is uncomfortable returning to a dark room. Another example is a college student that always turns off his computer, even though he will need to wait two minutes for it to boot when he needs it later. In altruistic settings, such as college campuses, it is uncertain whether gain- or loss-framed climate messages, alone or paired with social norms, is effective at encouraging pro-environmental behavior.

This research will address the effects of gain- and loss-framed communication messages related to energy use within collegiate residence halls. Additionally, it

considers the effects of message framing when paired with a social-norm. It further distinguishes itself from previous message framing scholarship because it examines energy use in an altruistic setting rather than egoistic one.

These issues were assessed for 4,092 individuals living in 30 student residence halls at George Mason University, located in Fairfax, VA. By virtue of living in residence halls, students are not responsible for directly paying their utilities. As such, their energy reduction behaviors will be a result of altruistic motivations as defined within this study. The messages were communicated on posters in residence halls on GMU's Fairfax campus during the Spring 2011 semester. The messages encouraged students to reduce their energy consumption by:

1) turning off unused lights, computers, televisions, radios;

2) only doing full loads of laundry; and

3) listening to music rather than using the TV for background noise.

These behaviors were selected after focus group discussions with numerous GMU students regarding students' typical energy consumption, as well as consulting with university Office of Housing (heretofore referenced as Housing) and the Office of Sustainability.

Four treatment groups were utilized, with equal numbers of students being represented across each category. The treatment groups were: 1) gain-framed; 2) loss-framed; 3) gain-framed treatment with a positive social-norm; and 4) loss-framed treatment with a negative social-norm. Weekly electricity usage was monitored at the building level to determine the effectiveness of the messaging.   Gain-framed

messaging was expected to result in greater energy conscious behavior change than loss-framed messaging. Gain-framed messages with a positive social-norm appeal were expected to encourage the greatest desired change in energy use.

CHAPTER TWO: THEORETICAL GROUNDING

Climate Change

In 2013, U.S. emissions equaled 5.3 million metric tons CO_2, which accounts for approximately 29% of the global CO_2 emissions that year (EIA, 2013). Interestingly, in 2009 home heating and cooling accounted for less than half of all household energy use for the first time. This was a result of efficiency improvements in windows and HVAC systems. Simultaneously the number of electronic devices increased resulting in no net energy savings. Specifically, home heating and cooling constituted 58% of household energy consumption in 1993, by 2009 it resulted in only 48% of the energy used. During this same time period, electronic device usage increased from 24% to 35% (EIA, 2013). This finding demonstrates that personal choices at the household level significantly influence total energy consumption.

Reducing emissions at the household level, as well as across all sectors, is critical in slowing climate change. In the event of no change in behavior, global emissions are projected to increase to 16 gigatons of carbon per year by 2060 (Pacala & Socolow, 2004). Emissions might be stabilized at 7 Gt/C/y, or approximately 500 ppm CO_2, if buildings are designed more efficiently and more energy efficient appliances are used (Pacala & Socolow, 2004). Moreover, even with improved building design, a significant portion of energy consumption at the individual level is discretionary (Schipper, 1992).

This phenomenon is demonstrated by the increase in household electronic devices Petty & Wagner, 1991; Dillard & Marshall, 2003; Rothman & Salovey, 1997detailed above. As such, alternatives for energy efficiency improvements should be explored. This research will address how messaging, in the absence of financial incentives, can encourage individuals' energy efficient behaviors.

The issue of whether people are motivated to reduce personal energy consumption solely as a way of saving money is unresolved. When the financial costs of acting in a wasteful manner are not borne by the end user, there can be a temptation to waste electricity. For students living in residence halls and apartment renters who do not directly pay utilities, wasteful energy use patterns may emerge. Similarly, office workers might leave unused lights on or computers running throughout the night. Similarly, hotel guests have electricity costs built into the room rate, which lowers the incentive to conserve energy. These individuals can leave lights, televisions and radios turned on when not in the room. Most people are confronted with daily situations where their energy use does not directly cost them anything. As a result, it remains important to determine what motivates those without a financial incentive to pursue energy conservation.

Altruism Toward the Environment

When financial motivations are removed from the reasons individuals act in a pro-environmental manner, altruism is one motivation. In these cases the public acts in an environmentally friendly manner, even though there may be a tradeoff at the individual level, such as a loss of time in turning on and off lights or rebooting a computer.

However, when looking at message framing and social-norms in a backdrop of altruism, little is known about the direct effects of these variables on one another.

Altruism research has explored the connection between altruism and pro-environment behavior. In these cases, altruistic actions which would typically be from person to person are expanded to include non-human species and the biosphere in general (Stern, et al., 1993; Stern & Dietz, 1994). Often environmentally friendly behavior results in tradeoffs between individual action and the collective benefit (Guagnano, 2001). For example, a person may choose to turn off and unplug their electronics after each use to avoid using unnecessary power. As a result, the individual will sacrifice convenience in order to engage in this ritual each time he uses his computer. However, the personal loss of time, results in lower energy use, lower emissions, and can collectively slow climate change.

Previous research related to altruism and the natural environment often uses the Schwartz (1970) model for eliciting altruistic behavior. Schwartz believed that in order for altruism to occur, there must first be a violation of a personal standard or an "activation of a moral norm" (Schwartz, 1970). This type of norm is of considered a personal norm, where obligations are enforced through an internal sense of duty, personal guilt, or emotions related to failure for not acting (Hetcher, 1999; Vandenbergh, 2005). It differs from the social-norm previously discussed which is driven by an informal obligation enforced through social sanctions or rewards (Vandenbergh, 2005). Next, the person must be aware of an undesired outcome which will result without some type of altruistic intervention. An example of this might be that if an adult sees a lost child, the

adult would realize that the child could be harmed unless returned to his parents. And finally the person must have a willingness to act. Guagnano more succinctly (2001) described this process of norm activation as an *awareness* that something is wrong, a *willingness* to take responsibility for what is wrong, and then taking subsequent *action*.

The Schwartz model has been used successfully to determine the effects altruism has on energy conservation (Stern, Aronson, Darley, Hill, Hirst, Kempton, & Wilbanks, 1986). In situations where low levels of input were required from the public, such as in asking them to set the thermostat back in the winter, norms were activated. The finding indicates that the public was motivated to engage in encouraged behaviors when only modest changes are asked of them. In situations where significantly more effort is required, such as installing more insulation in a home, norms are not activated (Stern, et al, 1983; Stern, et al., 1985).

Altruism toward the natural world is recognized to be a contributing factor in motivating pro-environmental behavior (Schwartz, 1970; Stern, et al, 1983; Stern, et al., 1985; Guagnano, 2001). However, little is known about energy conscious behavior where altruism is the only motivator of behavior change.

Related to messaging, prior scholarship is limited in its examination of how messaging encourages individual altruism. Rather, studies primarily address personality characteristics linked with altruism, such as a strong locus of control, high self-esteem, low need to conform and high moral development (Aronoff & Wilson, 1984; Piliavin et al., 1981; Piliavin & Charng, 1990; Rushton, 1981; Staub, 1978). Other research has explored situational approaches, or the identification of variables associated with

exhibition or inhibition of altruism (Losco, 1986). These studies have found that in urgent situations, personal requests for help and prior wrong doing leads to an increased likelihood of altruistic acts (Kerber, 1984; Shotland & Stebbins, 1983). This study will be among the first that identifies the role of messaging in encouraging altruism as a possible motivation.

Message Framing

Message framing is defined as the use of logically equivalent choice situations used in different ways, which results in a message being either gain- or loss-framed (Wilson, et al., 1988). When describing a message as being gain- or loss-framed, it means that the messages are composed in a manner in which, although worded differently, they convey the equivalent behavioral expectations (Maheswaran & Meyers-Levy, 1990). The use of corresponding opposites is common in communication research, as it allows diametrically opposed testing to occur.

With regards to gain- and loss-framed messaging, the pivot point for this type of messaging has to do with outcomes. Specifically, is the *outcome* from performing a certain behavior desirable or undesirable? (Dillard & Marshall, 2003; Higgins & Lemm, 1995; O'Keefe & Jensen, 2007; Petty & Wagner, 1991; Rothman & Salovey, 1997; Wilson et al., 1988;). With regards to climate change, a positive outcome would be a deceleration in emissions, while a negative outcome would be an acceleration in emissions.

Another important messaging consideration is whether or not the *outcome* from the message is *attained* or *avoided* (Rothman & Salovey, 1997). If an outcome is

attained, it is acquired, achieved or made more likely, while an *avoided* outcome is said to be averted, not realized or made less likely. If the outcome is desirable, a person would want to attain it. If the outcome is undesirable, a person would want to avoid it (Dillard & Marshall, 2003; Rothman & Salovey, 1997). Example of attained outcomes would be slowing climate change or increased recycling participation, while examples of an avoided outcome would be worsened climate change or lesser recycling participation.

      Gain-framed messaging and energy conscious behavior. Message framing has been studied extensively in public health communications, primarily as a means of encouraging patients to receive treatment or engage in preventative behaviors. A meta-analytic review of message framing concluded that gain- and loss-framed appeals are similarly effective in encouraging disease detection behaviors, while gain-framed messages encouraged greater disease prevention (O'Keefe & Jensen, 2007; O'Keefe, 2015). One Canadian study found that gain-framed messages were persuasive in increasing hope for climate change mitigation (Spence and Pidgeon, 2010, while another determined that gain-framed messages encouraged high-level thought, and increased recycling intentions as a result (White, MacDonald & Dahl, 2011).

      Gain-framed messaging has been generally found to be effective in persuading behavior change in at least four contexts, including when: 1) there is low interest or involvement with the subject; 2) the prescribed treatment for the issue is considered to be low risk or low effort; 3) anecdotal evidence is used as a motivator of behavior change; and 4) benefits to the public, future generations or the world at large are emphasized.

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These themes will be individually addressed in the following paragraphs, as they relate to the broader messaging scholarship, but also to energy consumption in altruistic settings.

The first manner in which gain-framed messages have been found to be effective in producing a desired change in behavior is when an individual has low interest in a problem or has low issue involvement (Greenwald & Leavitt, 1984; Kardes, 1988; Chaiken, 1980; Petty & Cacioppo, 1986; Maheswaran & Meyers-Levy, 1990). This seminal work by Maheswaran and Meyers-Levy (1990) found that gain-framed messaging was more effective than loss-framed messaging at changing behavior when motivation and interest in the subject were low. This is because for those who are not actively engaged in the subject, it is easier to be engaged in gain-framed, supportive messages. Most Americans have low issue involvement with climate change, suggesting that gain-framed messaging is likely to be more effective at producing an energy conscious behavior change.

Several scholars have examined issue involvement and willingness to accept risk, finding that low risk suggestions are more easily accepted when put in a gain-framed message (Detweiler et al., 1999; Edwards, Elwyn, Covey, Matthews, & Pill, 2001; Hoffner, 2009; Ray & Wilkies, 1970; Rothman et al., 1993). Related to climate change, asking people to turn off their lights is an example of a low risk suggestion as this action does not require a significant amount of effort. Additionally, virtually everyone would understand that turning off their lights saves energy. Drawing on Detweiler et al. (1999), within this setting, gain-framed messages therefore should be used to promote energy conscious behavior change.

The second context in which gain-framed messaging produces desired behavior change is where the suggested steps are considered low risk. Several studies have provided practical examples as to how low risk suggestions within health related messaging improve performance (Detweiler et al., 1999; Edwards, et al., 2009; Hoffner, 2009; Rothman et al., 1993). This scholarship has generally sought to increase preventative health behaviors, such as the application of sunscreen. The wearing of sunscreen would be considered a low risk behavior because it does not require a significant amount of personal effort (Rothman et al., 1993). A follow-up study found that both males and females were responsive to gain-framed messages which encouraged sunscreen use, with 71% of participants either applying or reapplying sunscreen when they had previously had no intention of doing so (Detweiler et al.,1999, Hoffner, 2009). Still others studies have examined the most appropriate message framing to present to consumers in print advertisements for health care products (Chang, 2007). This study concluded that gain-frame messaging was most advantageous in stimulating health product use. These findings suggests that when trying to encourage low risk behaviors, such as turning off electronics or lights, gain-framed messaging would be more persuasive than loss-framed messaging.

The third context in which gain-framed messaging has been found to be effective is one where anecdotal evidence is used in the messaging. Das et al. (2008) found that when trying to increase charitable donations, anecdotal evidence was most effectively used when supported by gain-framed messaging. With regards to climate change, the public most often notes anecdotal weather changes as their reasons why climate change is

occurring (Moser, 2007). However, it should be acknowledged that often the formed mental models are inaccurate, as much of the public finds the subject difficult to understand (Moser, 2007). Nevertheless, the primary way in which the public attempts to grasp the concept is by relating the information back to personal events, such as extreme hot or cold spells (Moser, 2007). As a result of anecdotal evidence being commonly used in association with climate change, gain-framed messaging is an appropriate choice in supporting this type of processing.

A fourth way in which gain-framed messaging has been found to be effective is when the public, future generations or the world at large are considered within the message wording. For instance, one study examined public appeals for recycling participation where an emphasis was placed on the benefits of collective recycling across a community. This study found that including benefits to others in recycling messaging yielded a greater desired behavior change than those which did not address the benefits to others (Das et al., 2008). This campaign is also unique because motivations for increased recycling were altruistic, or did not have self-motivated benefits. When trying to communicate to the public about global phenomenon such as climate change, where impacts are diffuse, gain-framed messaging may be the most effective choice in motivating an energy conscious behavior change. This is particularly important to consider when messaging tries to convey to the public that in order to stop climate change, they will need to act in concert with one another.

Combined, these findings suggest that gain-framed messaging will motivate energy conscious behavior change in an altruistic setting.

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H1a: Gain-framed messaging is likely to motivate energy conscious behavior change in altruistic settings.

Loss-framed messaging and energy conscious behavior. The previous section detailed the scenarios in which gain-framed messaging was found to be effective. Similarly, there are instances when loss-framed messaging can motivate behavioral change. Loss-framed messages can be used as an attitude change agent or to evoke concern under the proper circumstances (Ruiter, et al., 2001). These situations include when: 1) the public is willing to think about and engage in a topic; 2) message efficacy is low; and 3) efficacious instructions are provided to decrease the threat. These situations are discussed below, as they relate to the broader literature, but also to energy consumption in altruistic settings.

Related to the public's willingness to think and engage in a topic, Maheswaran and Meyers-Levy (1990) found that in situations in which the public has a high level of interest in a subject, and is willing to think about the information, loss-framed messages can be a motivator of change. According to these authors, negativity can rally the green base, which is actively engaged in climate change policy already.

Building on this idea, other research has found that loss-framed information is perceived as being more informative, and is translated more clearly into some type of central reference point (Kanouse & Hanson, 1972). This happens as a result of the *negativity bias* (Fiske, 1980), which indicates "that in most situations, loss-framed events are more salient, potent, dominant in combinations, and generally more efficacious than gain-framed events" (Rozin & Royzman, 2001). Due to negativity bias, loss-framed

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information is perceived to be more thorough than gain-framed (Kanouse & Hanson 1972; Lau, 1985; Weinberger et al., 1981). The bias further suggests that loss-framed messages related to energy use will motivate a desired behavior change, and the perceived thoroughness of the messages could help persuade individuals to take altruistic actions. The negativity effect allows for the loss-framed messages related to energy use to be perceived in a salient and informative manner, and thus is more likely to motivate an energy conscious behavior change.

The second circumstance in which loss-framed messaging has been found to be effective in encouraging behavior change occurs when there is doubt regarding the response efficacy of the prescribed treatment (Meyerowitz & Chaiken, 1987). Specifically, can the behavior change suggestion increase the likelihood of an improved outcome (Witte, 2011)? When response efficacy is doubted, loss-framed messaging encourages individuals to engage in "effortful processing" (Block & Keller, 1995). This doubt encourages the individual to think about whether following the recommendation is worth the time or effort (Block & Keller, 1995; Kanouse & Hanson, 1972). In such instances, even if there is uncertainty that a recommendation will lead to the improved outcome (averted climate change), loss-framed messaging can encourage a desired behavior change (turning the lights out) (Block & Keller, 1995). Related to prior literature, women who are given loss-framed brochures on breast self-exams are more likely to do so than those women given gain-framed brochures because the response efficacy of performing breast self-exams is perceived as being fairly low (Maheswaran & Meyers-Levy, 1990). An example might be, "13% of American women will get breast

cancer. Early detection is critical, of which breast self-exam is a key component. Help save yourself from this terrible disease." Similarly, loss-framed brochures have been found to be more effective at persuading women to regularly check their bodies for new mole growth or changes in pre-existing moles (Rothman et al., 1993) since the benefits of doing so are not certain.

The third scenario in which loss-framed messaging is effective is when the message raises an individual's perceived threat level, and then provides specific instructions as to how to decrease that threat. This theory is known as the Extended Parallel Process Model (EPPM), where an individual's response to fear appeals depends on his threat assessment and the perceived efficacy of their actions to reduce that threat (Maloney, Lapinski & Witte, 2011; Witte, 1992; Witte, 2011). According to EPPM, the public also considers the *severity* of the problem, and the *susceptibility*, or the likelihood that the problem will affect them (Witte, 1992). Similarly, individuals also consider the *response efficacy*, or the degree to which they believe the suggested solution will solve the problem (Witte, 1992; Witte, 2011). Additionally, individuals evaluate their own *self efficacy*, or whether or not they believe they can perform the suggested actions. A successful use of EPPM requires that the fear level imposed by the messages is sufficiently high, but not unduly high, so as to motivate an individual to wish to reduce his anxiety. Appeals that induce high levels of fear typically are ineffective because they reduce individuals' beliefs that effective management of a problem is possible. It is also necessary to ensure that the efficacy of the suggestions is high enough that the public believes the suggested behavior response will work (Tanenbaum et al., 2015). Building

upon Witte's model, this suggests that the use of loss-framed messaging, when coupled with efficacious steps suggesting precise behavior changes, should reduce energy consumption.

In sum, these arguments suggest that lost-framed messaging will motivate energy conscious behavior change in an altruistic setting:

H1a: Loss-framed messaging is likely to motivate energy conscious behavior change in altruistic settings.

Social-norms messaging and energy conscious behavior. A third type of messaging, which will be used in conjunction with gain and loss-framed messages, is social-norms. *Social-norms* are averages in public behavior, which can be harnessed to promote further desired behavior (Donaldson et al., 1994, Larimer & Neighbors, 2003; Neighbors et al., 2004; Schultz, 1999). Social-norm messaging seeks to reduce deleterious behaviors by correcting individuals' misperceptions regarding the prevalence of these behaviors (Schultz et al., 2007). Many studies have found that "social norms not only spur but also guide [behavior] in direct and meaningful ways" (Schultz et al., 2007; Aarts & Dijksterhuis, 2003; Cialdini et al., 1991; Darley & Latane, 1970; Goldstein et al, 2006; Kerr, 1995; Terry & Hogg, 2001). Several studies have tested various messaging themes related to environmental issues, and found that using social-norm messaging can lead to pro-environmental outcomes (Schultz et al., 2007; Cialdini et al., 1991; Cialdini, 2003; Goldstein, Cialdini, & Griskevicius, 2008).

Norm-related research finds that individuals formulate their behavior in response to other's patterns (Bearden & Etzel, 1982; Griskevicius et al., 2006; Shapiro & Neuberg,

2000). In other words, people tend to pattern their behavior according to their peers.

Encouraging patterning on majority good behavior in a situation is known as using a

descriptive norm (Goldstein et al., 2008; Cialdini et al., 1991). Goldstein et al. (2008)

found that the use of a descriptive norm in messaging about hotel towel usage allowed for

the greatest reuse of towels. In particular the descriptive norm related to same room

assignment outperformed the descriptive norm messages of citizen identity, gender, and

guest identity. The following text was used to appeal to the guest identity, "JOIN YOUR

FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study

conducted in Fall 2003, 75% of the guests participated in our new resource savings

program by using their towels more than once. You can join your fellow guests in this

program to help save the environment by reusing your towels during your stay." The

message which targeted room assignment was found to be the most persuasive: "JOIN

YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study

conducted in Fall 2003, 75% of the guests who stayed in this room (#xxx) participated in

our new resource savings program by using their towels more than once. You can join

your fellow guests in this program to help save the environment by reusing your towels

during your stay" (Goldstein et al., 2008).

The effect of this study suggests that norms can be used to motivate altruistic

behaviors, as the hotel guests had no financial incentive to reuse towels. Altruistic

behaviors were similarly invoked when normative messages related to recycling

increased the total volume and frequency of recycling within a neighborhood (Schultz,

1999). Others have had similar success in promoting socially desirable behavior changes

through the use of the descriptive norm (Agostinelli et al., 1995; Haines & Spears, 1996; Neighbors et al., 2004).

However, despite the success of some normative campaigns, others have failed to produce a desired change in behavior (Clapp et al., 2003; Granfield, 2005; Peeler, Far, Miller & Brigham, 2000; Werch, Pappas, Carlson, DiClemente, Chally & Sinde, 2000). Some studies have found that as a result of descriptive norms, a boomerang effect occurs in that undesirable behavior actually increases (Perkins, Haines & Rice, 2005; Wechsler, Nelson, Lee, Seibring, Lewis & Keeling, 2003; Werch et al., 2000). This effect occurs because by making people aware of public behavior prevalence (e.g. 75% of your community recycles), awareness that a substantial portion (25%) do not perform social desirable behaviors also increases. Knowledge of those not performing the desired behavior can reduce adherence.

One solution to the boomerang effect is to pair a descriptive norm with an injunctive norm. An injunctive norm refers to "perceptions of what is commonly approved or disapproved within a culture" (Reno et al., 1993; Schultz et al., 2007). In an effort to feel approved of, individuals will attempt to perform socially desirable behaviors, despite the fact that many people do not engage in this action. Cialdini (2003) found that aligning descriptive and injunctive norms related to recycling PSAs allowed for increased intentions to recycle. Related to energy consumption, one study addressed the boomerang effect on household consumption within a California neighborhood. Households received a descriptive norm which compared their energy use to that of the average home within their community. Those messages that also received an injunctive

norm in the form of emoticons (☺ and ☹) signaling whether their energy related behavior was socially desirable, were most likely to decrease their energy use (Schultz, et al., 2007). Although this study directly examined the effects of norms on energy use, it did not address the role of pairing norms with gain- and loss-framed messages. Furthermore, the study was set in an egoistic setting where home owners were financially responsible for energy use.

Descriptive and injunctive social-norms have been found to be effective in producing environmentally friendly behavior. As a result, this research asserts that:

H2a: Gain-framed messaging including a positive social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than gain-framed messaging alone.

H2b: Loss-framed messaging including a negative social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than loss-framed messaging alone.

Gain-framed messaging compared to loss-framed messaging. While gain- and loss-framed messaging, both with and without social-norms, are anticipated to encourage energy conscious behaviors, they are not expected to perform equivalently in altruistic settings. My position is that several of the principles within the Schwartz model (1973) are violated with the use of loss-framed messaging. As such, it is likely that gain-framed messaging will encourage a greater energy conscious behavior change than loss-framed messaging. I draw on the Schwartz model which indicates that altruistic behavior occurs when a moral norm has been activated. Norm activation occurs when an individual

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becomes aware of a problem, and has a willingness to take actions for the benefit of others (1973).

The Schwartz model (1977) follows six principles allowing for norm activation to lead to altruistic behaviors. They include: 1) awareness of the existence of the problem; 2) acceptance of responsibility for that need; 3) perceived efficacy of behaviors to alleviate that need; 4) perceived ability to perform pro-social behaviors; 5) awareness of consequences of inaction; and 6) accepting any personal hardship, and acting anyway for the benefit of others. This model has been used successfully to explore the connection between altruism and the environment, as well as to predict environmentally friendly behaviors (Guagnano, 1995; Hopper & Nielsen, 1991; Van Liere & Dunlap, 1978). For instance, Guagnano (1995) found that an awareness of environmental consequences of actions, and willingness to take responsibility for those actions, allowed for a prediction of willingness to take action to protect the environment.

With regards to climate change messaging, not all of the conditions can be satisfied using loss-framed messaging. By contrast, within gain-framed messaging, each of these components is easily satisfied, allowing for norm activation to occur, leading to altruistic behaviors. This occurs as a result of the supportive, nonjudgmental nature of gain-framed messaging. The public is able to harness a personal sense of right or wrong to motivate norm activation, rather than having it imposed as occurs with loss-framed messaging. As a result of the harsh techniques used in loss-framed messaging, including shaming and using upsetting images, several of Schwartz's principles for norm activation

are violated. I will now detail how the gain-framed messages within this campaign were designed in an effort to satisfy all of the Schwartz's conditions.

The first condition of the Schwartz model which is difficult to satisfy with loss-framed messaging is awareness of the existence of need. For climate change, this means that people are aware that climate change exists and is a threat that should be stopped. Although upsetting images and messages associated with loss-framed messaging can accurately portray the severity of the situation, the public often perceives the situation differently. In student-led interviews on the GMU campus, it was mentioned that strong imagery or wordage regarding climate change made the problem seem exaggerated, agenda bound or even a hoax. Issues which are deemed meritless as a result of associated messaging do not build Schwartz's existence of need. Gain-framed messaging, however, is less likely to produce this effect. The supportive, and more neutral nature of gain-framed messaging, allows for the public to assess the situation on merit.

A second condition within loss-framed messaging which is difficult to satisfy is Schwartz's acceptance of responsibility. Acceptance of responsibility indicates that a person understands how personal behaviors contribute to a situation. For climate change, this indicates that a person is aware of the effects of not acting to slow the problem. Loss-framed messaging uses tactics such as shaming or hierarchical imposition forcing individuals to acknowledging their role in issues such as climate change. For example, a message that has these characteristics would say, "Climate change is happening, and it is your fault. Act now to fix your energy wasting ways." This technique has been effective at modifying behavior for those who have high issue involvement (Maheswaren & Levy,

1979). However, for the majority of individuals who have low concern about climate change, the reaction to loss-framed messaging tactics may be different. When imploring uninterested people to act in a manner contrary to their best interests (at least in the short-term), these individuals may develop defense mechanisms to loss-framed messaging tactics. These defense mechanisms include denial, avoidance and reactance (Witte et al., 2001; Witte, 2011). For example, a person may become a climate change denier as a result of loss-framed messaging.

Another condition of loss-framed messaging which is difficult to satisfy within the Schwartz model is that of focusing on meeting another's needs rather than one's own. In this step, individuals make a personal sacrifice, such as time or comfort, for the benefit of others which results in an altruistic behavior. This might include choosing to ride a bike in lieu of driving a car, which would be slower and allow for less vanity for many. It is unlikely that a person who is troubled by shaming or hierarchical imposition associated with loss-framed messaging will make a personal sacrifice for the benefit of others. Rather, these individuals would be more likely to not change their behaviors. Furthermore, Das et al. (2008) found that when the benefits of a recycling campaign included those to the community at large, gain-framed messaging was more persuasive than loss-framed messaging. Because gain-framed messaging does not use forceful techniques to promote desired behavior changes on the public, it remains likely that these appeals would prove more persuasive than would loss-framed messages.

Because of loss-framed messaging's failure to meet Schwartz's three conditions that encourage altruistic behavior, it is unlikely that loss-framed messaging will promote energy saving behavior. Therefore,

H3: Gain-framed message are likely to motivate greater energy conscious behavior change compared to loss-framed messages in altruistic settings.

Gain-framed messaging compared to loss-framed messaging with a social-norm. Finally, this research will assess the effectiveness of gain- and loss-framed messaging when paired with a social-norm appeal. My position is that gain-framed messages that include a positive social-norm will produce a greater change in energy conscious behavior than a loss-framed message that includes a negative social-norm. This viewpoint, like that supporting H4, is grounded in the idea that Schwartz's (1977) six conditions of altruistic behavior are less likely to be satisfied using loss-framed messaging. Loss-framed messages that include a negative social-norm result in the same deficits as those found with loss-framing alone. Simultaneously, gain-framed messaging including a positive social-norm will continue to meet the requirements established within the Schwartz model. This suggests gain-framed messages including a social-norm are likely to produce a desired behavior change.

However, it is my belief that in altruistic settings, gain-framed messages that include a social norm are also likely to elicit greater energy conscious behavior than gain-framed messages alone. This position draws on evidence from several studies which have found that compared to general messages related to the environment, social-norms have been the most potent change agent. Goldstein et al. (2008) found that the use of a norm

was the most persuasive in encouraging towel reuse at a hotel, compared to other messages related to environmental conservation. Similarly, a study related to household energy use determined that norm invocation was the only type of message which produced a desired change in energy use. Messages related to a variety of environmental benefits, including climate change, yielded no difference from the control (Schultz et al., 2007).

H4: In an altruistic setting, gain-framed messages that include a positive social-norm are more likely to motivate greater energy conscious behavior than loss-framed messages that include a negative social-norm.

CHAPTER THREE: METHODS

In the fall of 2011, this study attempted to reduce energy use on residence halls on the George Mason University campus. For the purpose of this study, energy use indicates the electricity associated with plug load (e.g. – TV, computer, hair dryers, washing machines, refrigerators) and lighting (room and common space lighting) used within GMU residence halls. HVAC and water heating are separately metered. This distinction is important as it allows for personal energy use behaviors to emerge in the data. Half of the energy used in college residence hall rooms is a result of lifestyle choices, and the remainder is due to building characteristics and equipment (Schipper, 1999). In considering how universities might reduce their energy consumption within residence halls, many are focusing on lifestyle choices, because modifying building characteristics and equipment involve either fixed costs or expensive retrofits. For instance, Oberlin College in Ohio conducts an annual two week energy reduction competition which targets student energy use in the residence halls. In 2005 alone, students saved 68,500 kWh of energy, $5,120 in electricity costs and reduced carbon dioxide production by 148,000 lbs (Oberlin College, 2007). Prior research has indicated that energy reductions related to student consumption are possible on college campuses (Oberlin College, 2009; Ohio University, 2009; Schipper, 1977); however, it has yet to be determined what type

of messaging motivates behavior change in students. This research explored whether message framing paired with social-norms results in energy savings in residence halls.

For each messaging category, two similar flyers were developed for posting as signage within the residence halls. Each sign remained in place for a period of six weeks. The messaging types received similar distribution and placement throughout residence halls, being posted approximately every 30 feet when walking through all building hallways. Messages were printed in poster and horizontal legal sized paper form and hung throughout the corridors, while the lobby of each building received a poster sized version of the message. Care was taken to create similarly treatment groups; building size, demographics of residents, building age and whether the hall featured a Living and Learning Community were all considered. These issues will be discussed in greater depth later in the methods section.

For the purposes of this research, the experimental setting is defined as being altruistic, because students do not directly pay for their electrical consumption. To assess the effects of message framing and social-norm appeals on energy reduction, flyers with each of these messages types were displayed in residence halls on GMU's campus. This setting is similar to other altruistic environments such as within office settings, where individuals have no means of monitoring their energy consumption (by using a meter for instance) and do not pay for their electricity use.[1]

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[1] Hotel guests and students within residence halls are indirectly responsible for electric use. Energy consumption is included with rent, which is a fixed cost. As result of fixed rates, there are fewer incentives to conserve energy, as a decrease in energy use will not lower rents.

In order to assess my research hypotheses, I examined student energy use by way of weekly energy use summaries provided by the Housing at the residence hall level. Additionally, a pre-survey and a post-survey were administered to students living within residence halls to determine if students' attitudes were affected by the messaging or if their attitudes changed towards climate change or energy use. Having residence hall level energy readings, as well as self-reported data, allowed for the analysis to be viewed through two lenses: at the residence hall level and also at the individual level.

Sample

Established in 1972, George Mason University (GMU) enrolls more than 33,700 students across its three campuses. In 2011 it housed 4,779 of these students in 39 residence halls on the Fairfax campus (GMU Housing, 2011), which are clustered across five community areas. About 62% of the university's residence halls are designated for freshmen and sophomores, whereas the balance is allocated for upperclassmen (see Table 1).

Table 1

Number of Buildings per Grade Level of Students

Year of students	Number of residence halls
Freshmen	13
Freshmen and sophomores	7
Sophomores	5
Upperclassmen	14

Residence halls range in size from the upper-class student apartments, which house only 55 students per building, to Liberty Square, which houses 500 upper-class students.

Students have the ability to select their residence hall, and if students are interested in living in a particular Living and Learn Community (LLC), such as ones which promote Sustainability or Health Living, they can do so. LLC programs are sponsored by Housing, as an attempt to group students with similar lifestyles and interests.

The GMU campus offers three types of residence halls: 1) traditional, 2) suite and 3) apartment. Each type of housing varies based on sleeping arrangements, and kitchen and bath availability.

Table 2 provides the sample size of students participating in each of the treatment conditions.

Table 2

Sample for Treatment Groups and Survey Responses

	Total students per treatment	Residence halls per treatment	Pre- and post-survey
Gain-framed	1016	6	36
Gain + norm	990	5	34
Loss-framed	1038	5	37
Loss + norm	1048	5	21
Excluded surveys	908	7	13
Total	4779	30	175
Usable	3871	21	162

We see that each treatment condition involved five to six residence halls which housed approximately 1,000 students. A total of 21 residence halls and 3,871 students received a messaging treatment. I collected 748 pre-survey responses, with 175 reciprocating post-treatments surveys. After excluding some surveys for being incomplete or because the participant resided in an uninvolved residence hall, there were 162 usable pre- and post-treatment surveys.

Dependent Variables

Because this research utilizes two lenses through which change was measured there are several dependent variables. I will first discuss the dorm level dependent variable, and later those related to self-reported data.

The dependent variable at the dorm level is energy use per residence hall. Residence halls are mostly individually metered allowing for changes in energy use to be attributed to messaging. In several instances, two buildings were metered on the same energy reading. In those circumstances, both buildings were assigned to the same treatment condition. Energy use was measured by Housing on a weekly basis. The energy reading predominantly consisted of light use and plug load. Building heating and cooling is metered separately. Because energy use was examined throughout the semester, changes in energy consumption behavior could be attributed to each message type.

The other dependent variables in this study relate to the change in self-reported behavior for suggested behavior changes. In an effort to determine which student energy consumption behaviors needed modification, in the first week of May 2009 I interviewed 10 GMU undergraduates living in residence halls. Flyers were posted in residence halls

asking for students to participate in interviews related to their energy use. Interested

students emailed me to establish interview times. Participants were paid $15 for their

time. By paying the students, I increased the chances that their motivations to participate

in the interviews were a result of their desire to make money rather than because of their

strong interest in climate change. Ten students (six females and four males) were

interviewed for a period of approximately 45 minutes each. Students were asked

numerous questions about their energy use patterns within their dorm rooms, including

questions about energy saving behaviors that they could reasonably perform with no

financial cost and little effort. They also were asked about their beliefs and understanding

of climate change. Student responses were recorded and aggregated. They were then

reviewed by GMU's Sustainability Coordinator for face validity. Three salient energy

consumption behaviors emerged as part of this process: 1) turning off computers, TVs

and lights when leaving the room; 2) listening to music instead of the TV for

"background noise;" and 3) doing laundry only when there is a full load. Change in

frequency with which students engaged in these behaviors provide the individual level

dependent variables.

Independent Variables

  **Gain-framed message, loss-framed message, gain-framed message that
includes social-norm, loss-framed message that includes social-norm.** This research

examined four independent variables: gain-framed messages, loss-framed messages,

gain-framed messages that include social norms, and loss-framed messages that include

social norms. Each messaging type was conveyed through signage around the residence

halls selected to receive the treatment. The following sections describe the theoretical

grounding of each message and how they were constructed. First gain- and loss-framed

messages will be considered together, and then social-norms will be examined as they are

a separate message feature predicted to affect energy use.

The gain-framed messages were created following Detweiler et al.'s (1999)

recommendation of incorporating actionable steps in order to avoid an undesirable

outcome. Specifically, the residence hall messages indicate that by turning off unused

light and electronics, the undesirable outcome of climate change can be avoided. These

messages were coupled with visually pleasing images. Similarly, the general tone of the

messages is supportive and inclusionary. To invoke a sense of unity in the face of a

problem, the message incorporate terms such as "everyone," "students" and "we." The

loss-framed messages also follow Detweiler et al.'s (1999) recommendation of

incorporating actions that should be ignored to avoid an undesirable outcome. These

residence hall messages suggest that by not turning off unused electronics, climate

change will worsen.

Within message framing, certain elements can be used to manipulate the framing

effect, creating a spectrum along which message framing resides. These elements

include: *identity, power relations, consequences* and *image.* Table 3 provides an

overview as to how each consideration is manipulated based on message type.

Table 3

Considerations Within Message Design

Considerations within message design	Gain-framed	Loss-framed
Identity	Collaborative Involvement	Perpetrator
Power relation	Relative Equals	Hierarchy
Consequence	Positive results of avoided climate change	Negative results of continued climate change
Image	Thriving	Failing

The first element used in creating message framing within this research design is *identity*, which is defined as how the message sender and receiver relate to the message. In this study, identity refers to who is to blame for climate change. A second consideration within message framing is that of *power relations* between the message sender and receiver. Senders and receivers can be cast as relative equals or in a superior-subordinate relationship. The third element used to create a message framing effect is that of *consequence,* where the impacts of action or inaction on climate change are revealed. Finally the use of *imagery* within messaging can be manipulated to create a framing effect. The role as to how these elements instantiate each of the message framing types will now be detailed using the actual messages developed for this campaign.

For gain-framed messaging, each of the elements is used in a positive manner to provoke a desired behavior change. Provided in Figures 1 and 2 are the two positive messages created for this study. Though images shown are in black and white, students received color messages:

Figure 1. Gain-framed message 1.

Figure 2. Gain-framed message 2

In the first gain-framed message, the message sender attempts to show what the *benefits are of avoided* climate change. In this case the benefits are protecting "majestic species" such as the elephant and calf portrayed in the *imagery*. The image depicts a *thriving* environment, in which the natural world is safe from the threats of climate change. The *identity* to the message receiver is that of *collaborative involvement* in the causing of climate change, meaning that nearly everyone contributes to climate change. This is expressed through the phrasing "acting together" and "we." Similarly the notion of being a *relative equal* to the message sender is imparted by these inclusive terms.

The phrasing "Climate change threatens many of the planet's most majestic species" attempts to stimulate *awareness of the consequences* and *of the existence of need*, an important state emphasized in altruism motivational theory (Schwartz, 1977). The next phrases "by acting together to reduce our energy," and then including the notion that it can be stopped with collective action are used to create a feeling of togetherness and group cohesion. Gain-framed messages should emphasize the benefits to the public, future generations or the world at large (Loroz, 2007). As a result, a sense of unity was created in these messages by using the terms "we," "everyone" and "together." Likewise similar thought was put into the next lines which indicated that these were steps students should take together to lower their carbon footprints. Furthermore, messaging which appeals to the greater collective also helps to meet Schwartz's condition of motivation toward altruism by *accepting personal hardship, and acting anyway for the benefit of others*. By placing a heavy emphasis on group action, it helps to point to the many other people who are involved with and affected by climate change.

The energy-saving behaviors promoted by the flyers were selected in part because of what students and the GMU Sustainability Coordinator indicated were problem behaviors, but they were also selected because they are easy behaviors to perform. As such, students should have an *acceptance of responsibility* for the requested behavior change. The behavioral suggestions were not seen as difficult or complex. Either students leave on their electronics and lights when not in use, or they do not (Schwartz, 1977). Students should readily be able to accept responsibility for that action. Similarly students should be able to easily understand how these energy saving suggestions would result in using less energy. Thus the *perceived efficacy of behaviors* and the *perceived ability to perform those behaviors* are likely to be achieved by selecting easily attainable suggestions for students (Schwartz, 1977).

Messaging elements can also be manipulated to create a loss-framed message. The following two loss-framed messages, Figures 3 and 4, were constructed using these elements to create a loss valanced message. A description as to how the elements instantiate the message framing will be provided.

Figure 3. Loss-framed message 1.

Figure 4. Loss-framed message 2.

The first loss-framed message attempts to convey that a failure to act on *climate change will result in harm* to the natural world, including the "one million species" which are threatened with extinction. Harm to the natural world is further depicted in the *imagery*, in which a lone elephant is walking through a barren land in a dust storm. This image symbolizes a planet in failure. The *identity* of the message receiver is that of a *perpetrator*, where the message receiver is personally responsible for climate change and its negative outcomes. This condemnation is seen in the accusation that the message receiver wastes energy. Using the word "you" (as in "your actions cause climate change") indicates to the receiver their direct responsibility for causing climate change. Furthermore, shame and guilt are built into the message design in an attempt to increase the level of condemnation toward the message receiver. There is also a notion of *hierarchy*, where the message receiver is told that "It is time to do your part."

The use of social norms can also be manipulated to create a message framing effect. This section describes the gain and loss-framed social-norms messaging related to climate change. These messages would be added to the bottom of the gain or loss-framed message. This allows for some halls to receive both a framing and a social-norms treatment (see Table 2). Provided below are the two social-norms messages (Figures 5 and 6).

Nice work, Tidewater! Compared to other halls on campus, you saved 6,000 kWh of energy last month! Keep up the good work.
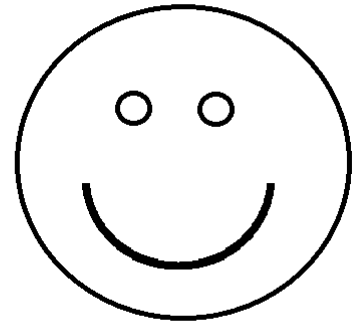
Figure 5. Positive social-norms message developed for GMU residence halls.

Bad job, Tidewater. Compared to other halls on campus, you used 6,000 kWh more energy last month. It's time to stop wasting energy.
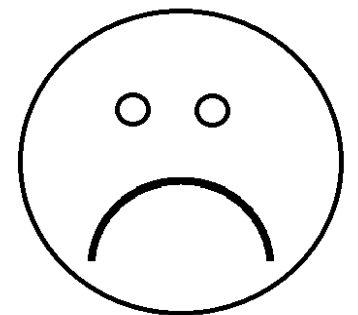
Figure 6. Negative social-norms message developed for GMU residence halls.

These messages harness the descriptive norm, where they state how much more or less energy is used by a hall compared to other halls. It also uses the injunctive norm in the emoticons which signal whether the energy use within the hall was socially desirable. Pairing the injunctive norm with the descriptive norm has been associated with a reduction in the boomerang effect in previous research (Cialdini, 2003; Schultz, et al., 2007). A boomerang effect occurs when undesirable behavior increases as a result of the

descriptive norm (Perkins et al., 2005; Wechsler, et al., 2003; Werch et al., 2000). This effect can transpire because while by making people aware of public behavior prevalence (e.g. 75% of your community recycles), awareness that a substantial portion (25%) do not perform social desirable behaviors also increases.

Experimental Design

This study utilized a quasi-experimental design, since randomization was not possible. Rather, individuals were grouped according to predisposed characteristics, such as their housing situation (Rossi et al., 2004). The experiment included four treatment groups. Some residence halls received a gain- or loss-framed messaging treatment only, while others residence halls received the messaging treatment plus a social-norms treatment. Table 4 depicts the research framework.

Table 4

Messaging Schema

Messaging type		
Framing only	Gain	Loss
Framing + social-norm	Gain + Norm	Loss + Norm

The residence halls were carefully assigned to the five messaging categories in an attempt to ensure that each comparison group had a balanced composition. The following issues were considered when assigning residence halls to their messaging categories: building age; residents' class year; cost of living for each residence hall, Living and

Learning Communities, and residents' gender. Each of these variables are addressed individually below.

Due to GMU's recent and rapid growth, residence halls can be loosely classified as being either old or new. There are 29 older residence halls which were constructed prior to 2000, and eight new residence halls. Newer residence halls, which are generally more costly buildings in which to live, were distributed as evenly as possible across the treatments groups.

Another consideration is the class year of the students residing on-campus. Freshmen constitute 48% of the students living within residence halls and sophomores represent 26% of residents. Juniors and seniors represent a smaller proportion at 17% and 15%, respectively. Table 5 provides residence hall enrollment by year:

Table 5

Class Year Demographics of Students Living in Residence Halls

Class year of students	Number of students living in residence halls by year	Percentage
First time freshmen	1,875	37%
Other freshmen	440	9%
Sophomore	1,258	25%
Junior	799	16%
Senior	553	11%
Other senior	107	2%

Note. Source: Davis – GMU Housing, Interview.

Similar numbers of students from each of the above categories were placed into each of the messaging treatment types.

After accounting for building age, residents' class year, and cost of living for each residence hall, the buildings were assigned to four message categories, as described in Table 6.

Table 6

Residence Halls' Treatment Conditions

Treatment	Building	Year	Type	Age	LLC	Cost	Number of students
Gain-frame	Roosevelt	Freshmen	Traditional	Old	No	Low	100
	Jackson	Freshmen	Traditional	Old	No	Low	100
	Harrison	Freshmen	Traditional	Old	No	Low	100
	Franklin	Freshmen	Traditional	Old	No	Low	100
	Blue Ridge	Sophomore	Suite	New	No	Medium	258
	Adams	Freshmen	Traditional	Old	No	Low	100
	Sandridge	Sophomore	Suite	New	No	Medium	258
							1,016
Gain + norm	Potomac Heights	Upperclassmen	Apartment	New	No	High	500
	Truman	Freshmen	Traditional	Old	No	Low	100
	Kennedy	Freshmen	Traditional	Old	No	Low	100
	Dickenson	Freshmen	Traditional	Old	No	Low	90
	Eastern Shore	Mixed	Suite	New	Yes	Medium	200
							990
Loss-framed	Northern Neck	Sophomore	Suite	New	No	Medium	258
	Lincoln	Freshmen	Traditional	Old	No	Low	100
	Dominion	Upperclassmen	Suite	Old	No	Medium	250
	Amherst	Freshmen	Traditional	Old	No	Low	90
	Essex	Freshmen	Traditional	Old	No	Low	90
							788
Loss + norm	Liberty Square	Upperclassmen	Apartment	New	No	High	500
	Tidewater	Sophomore	Suite	New	No	Medium	258
	Jefferson	Freshmen	Traditional	Old	No	Low	100
	Monroe	Freshmen	Traditional	Old	No	Low	100
	Grayson	Freshmen	Traditional	Old	No	Low	90
							1,048

Threats to Validity

Within any experiment, there is always a concern about threats to validity. An internal threat to validity "refers specifically to whether an experimental treatment/condition makes a difference or not, and whether there is sufficient evidence to

support the claim" (Cook & Campbell, 1979). An external threat to validity "refers to the generalizability of the treatment/condition outcomes" (Cook & Campbell, 1979).

Within this research, there are several threats to consider, including cross contamination of message. Related to cross contamination, there is a possibility that students who are exposed to one message type in their residence hall may see differing types of messages in other residence halls. If so, associating one distinct treatment with a behavioral change is less possible. To address this problem, during the Spring 2009 focus group interviews, students were asked whether they entered or spent a significant amount of time in residence halls other than their own. All stated they rarely went into other residence halls, in part because residence halls require key card or escorted access. Furthermore, focus group students indicated that if they did go to a residence hall other than their own, they were unlikely to observe messaging, because they were interested in visiting and talking with their friend, not in learning about activities within the residence hall. Another reason why cross contamination is less likely to be a concern is because the cumulative effect of a message is more likely to influence energy conscious behavior than a single exposure (Hether et al., 2008). As such, even if some students are exposed to a message outside their treatment group, the effects would not be significant.

Still another concern related to interval threats to validity is the possibility of selection bias. While great care was used to assign the various residence halls into their treatment condition, the students were not randomly assigned into the housing conditions. Rather students generally self-select into their residence hall. As a result changes in the

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dependent variable of energy use over time could be a manifestation of the students'

lifestyle choices rather than because of the messaging campaign.

Analytic Method – Repeated Measure ANOVA

To evaluate each of my hypotheses, I utilized repeated measure ANOVAs. In its

most basic form, an ANOVA is a procedure which attempts to isolate the sources of

variability in a set of measurements. From a research perspective, the goal is for the

variability to be a result of the independent variables (Girden, 1992). For this study,

ideally the variability would occur as a result of the messaging treatments.

This approach was used for several reasons. First, the research design is such that

the independent variable is categorical (messaging treatments), while the dependent

variable is numeric (energy use at the dorm level or Likert scale self-reported behavior).

Further, the study compares two or more paired samples with multiple treatment

conditions where the numeric data is in a normal distribution (Kermer, 2015). All are

conditions which are best suited to using a repeated measure ANOVA. Finally, this

method is best when looking for change in groups over a period of time, which occurs in

this study, as the change in energy use is examined over a six week period starting in

early October and ending the week before Thanksgiving (Fields, 2012).

Advantages of repeated measure ANOVAs include that the sample size can be

relatively small which is important for this study as the total number of residence halls is

low. Further it is not necessary to have a control group, as change is measured over time,

which further allows for an increased sample size. A second advantage is that it is not

necessary to have equivalent pre-treatment measures. This is also important for this

research, as there is inherent variation between residence halls and their energy use because of building size and the residents' energy choices (Girden, 1992).

Resident Survey

Students living in the residence halls were given two surveys. The first survey was conducted in early October 2011, prior to putting the messages in the residence halls. The second survey was administered in late November 2011, prior to the semester's end. The surveys achieved several objectives. First, they help to add a human dimension to the research, and determine the *perceived* attitude and behavioral changes in students as a result of the messaging. In the absence of a change in energy use, the surveys allow for assessment of other dependent and independent variables.

The pre-treatment survey has four sections of questions, those relating to: 1) perceived personal energy use, 2) understanding and beliefs towards climate change, 3) altruism, and 4) personal demographics. When examining perceived student energy use, the pre-treatment survey determines the presence of the following energy-use behaviors specifically mentioned within the messaging campaign: 1) Turning off computers, TVs and lights when leaving the room; 2) listening to music instead of the TV for "background noise;" and 3) doing laundry only when there is a full load. The goal is to determine the proportion of students engaging in these energy consuming behaviors. The post-treatment survey has three objectives: 1) to repeat pre-treatment survey questions to determine if a change occurred in perceived behavior change or attitudes towards climate change; 2) determine if students saw and believe they were affected by the messages; and 3) allow for personal demographics to be ascribed to perceived behavior change or

attitudes towards climate change. By repeating the questions from the pre-treatment survey, the post-treatment survey assessed whether the students perceive they performed the suggested energy conscious behaviors described in the various messages. Similarly, the repeat of the survey questions allowed for demographics to be tied to perceived changes in attitude and behavior.

The pre-treatment survey was administered to students in dining halls across campus. This allowed for the targeting of on-campus only students. Furthermore, by administering surveys in-person in dining halls, students with the highest issue involvement are less likely to dominate the responses. The post-treatment survey was administered via SurveyMonkey, and all students who provided a valid email address received the post-treatment survey. Upon conclusion of the study period, 748 pre-treatment surveys were collected, while 175 post-treatment surveys were returned electronically. The useable sample was 162 surveys after eliminating surveys for failure to answer enough questions or for students residing in uninvolved residences.

CHAPTER FOUR: RESULTS

This study examined data through two lenses: at the dorm level and at the individual level. In the dorm level analysis, the dependent variable is change in energy use across an entire building. It is an aggregate measure of all student energy use within a particular hall and for those receiving a particular treatment condition. Energy use measurements were provided weekly, and generally consisted of plug load and lighting choices by students. For this analysis, only building characteristics, such as number of occupants, can be a control variable.

The other lens through which this analysis will be viewed is at the individual level. Related to this research, these data include the responses to the pre- and post-treatment survey in which students self-report their energy use. For these data, individual characteristics such as race can serve as a control. The dorm level analysis will first be reviewed.

Dorm Level Analysis – Energy Use Trends

Before testing for statistical significance in changes in energy use as it relates to the residence halls, we will visually review changes in energy use curves across the Fall 2011 semester.

Figure 7 shows energy use by all involved residence halls throughout the fall semester. As is a standard practice in longitudinal studies, the dependent variable was

averaged to represent different time points. The first four full weeks of the semester were averaged to create the variable PreStudy kWh per dorm which represents the pre-campaign timeframe. The average of the next four weeks created EarlyStudy kWh per dorm. This time span represents the earlier part of the messaging campaign when only message framing was utilized. The following three weeks which were averaged to create LateStudy kWh per dorm represents the later part of the campaign. This also corresponds with the point in time in which the social-norm campaign was implemented into the residence halls receiving that treatment. Finally, the three weeks which occurred after the conclusion of the messaging treatment were averaged to create PostStudy kWh per dorm. Thanksgiving break falls during this PostStudy time period.
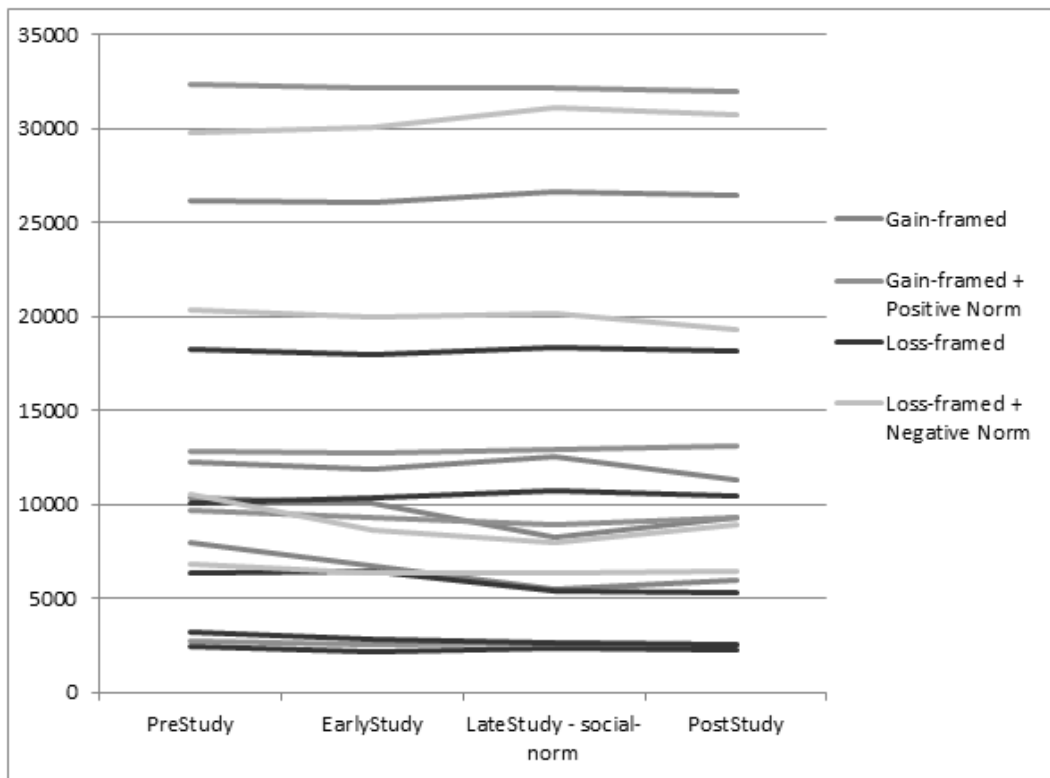
Figure 7. Energy used by residence halls by treatment condition.

The figure reveals several interesting points. First, the graph demonstrates that the total kilowatt hours used per week varies significantly by dorm size. The smaller buildings use approximately 4500 kWh per week, while larger buildings use over 30,000 kWh per week. As a result of this, dorm size was controlled for in all statistical analysis. Secondly, this figure demonstrates that the smaller and larger building were relatively stable in their energy use during the time of the study regardless of their treatment group, whereas the mid-sized residence halls showed more movement in total weekly energy use. Finally, the most active times of energy fluctuation corresponds with the time in which the messaging campaign was in place in the residence halls.

Figure 8 depicts those residence halls where energy use fluctuated by more than 10% during the semester, and thus represents those halls with the greatest energy delta. The only exception is one gain-framed with a norm residence hall curve that was added as a representative of that treatment condition. None of the buildings in this treatment condition change by more than 10%. Ratios were created to show a change in energy use over time. This was accomplished by dividing each averaged weeks' energy by the pre-treatment weeks' average energy. This approach is useful as it equalizes the effects which are a result of dorm size.
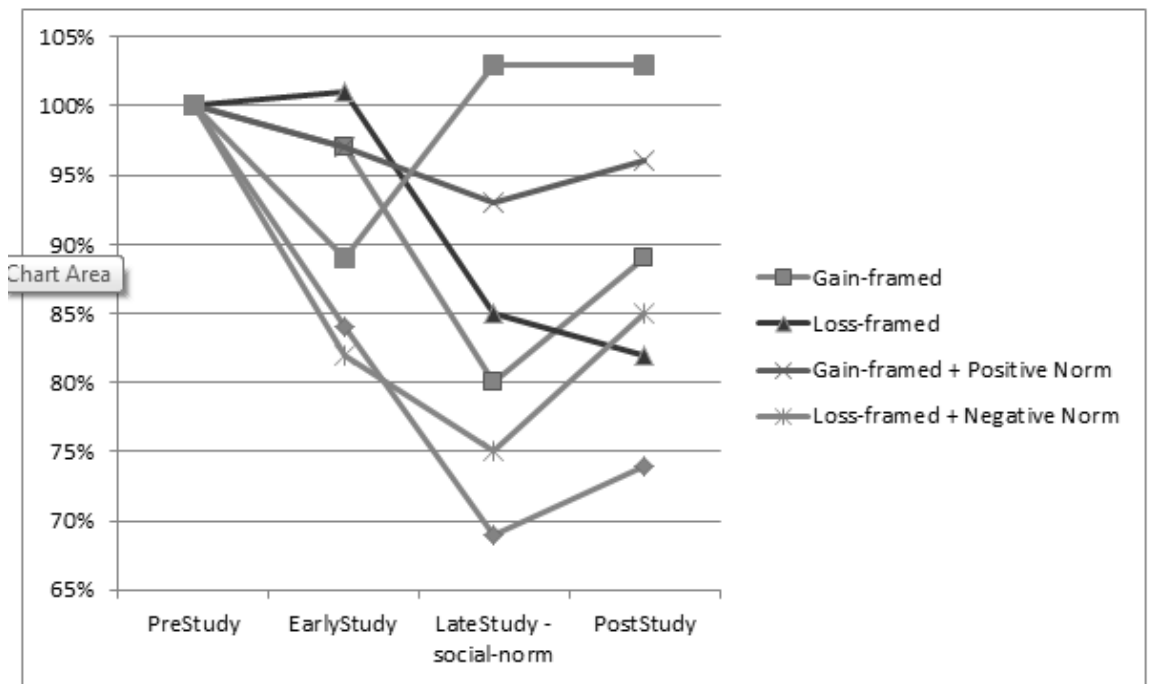
Figure 8. Energy use ratios for residence halls.

This graph depicts several interesting points. First, one of the halls which received gain-framed messaging decreased its energy use by over 30% by the LateStudy period, or the final three weeks of the messaging campaign. Four residence halls saw energy reductions greater than 15% of their PreStudy measurement. Interestingly, only two residence halls saw substantial increases in their energy use, but only after an initial dip in energy use.

These visual findings demonstrate there was a change in energy use within certain residence halls over the course of the semester. The following section provides the analysis which will demonstrate whether these changes in energy use may have occurred as result of the messaging treatments.

Dorm-level analysis – Repeated measures ANOVA. This study utilizes a 4(time) x 2 (message framing) x 2 (social-norm) repeated measure ANOVA. One of the benefits of this type of ANOVA as it relates to this study is that one analysis is able to answer all of the hypotheses with one test. As such the following repeated measure ANOVA will test the following hypotheses:

H1a: Gain-framed messaging is likely to motivate energy conscious behavior change in altruistic settings over time.

H1b: Loss-framed messaging is likely to motivate energy conscious behavior change in altruistic settings over time.

H2a: Gain-framed messaging including a positive social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than gain-framed messaging alone.

H2b: Loss-framed messaging including a negative social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than loss-framed messaging alone.

H3: Gain-framed messages are likely to motivate greater energy conscious behavior change compared to loss-framed messages in altruistic settings.

H4: In an altruistic setting, such as a college campus, gain-framed messages that include a positive social-norm are likely to motivate greater energy conscious behavior change compared to loss-framed messages that include a social-norm.

The statistical significance of each result will be addressed following the analysis. The dependent variables are in change in kWh over four different time periods. The independent variables are the treatment conditions of: gain-framed messaging, loss-framed messaging, gain-framed messaging with a positive social-norm, and loss-framed messaging with a negative social-norm.

Table 7 shows which dependent variables were included within the model, and at what level of time each represents. Cronbach's alpha, or a measure of internal consistency, suggests that averaging the time periods was acceptable, and that the data could be grouped. This analysis also utilizes the averaged time periods described above which include: PreStudy, EarlyStudy, LateStudy and PostStudy.

Table 7

Within-Subjects Factors

Time	Dependent variable
1	PreStudy kWh per dorm
2	EarlyStudy kWh per dorm
3	LateStudy kWh per dorm
4	PostStudy kWh per dorm

Table 8 provides the independent variables which were examined in this study. The treatment conditions consist of: gain-framed messaging, loss-framed messaging, gain-framed messaging paired with a positive social-norm, and a loss-framed message paired with a negative social-norm. The use of the social norm was implemented three weeks into the study, and is marked by the LateStudy time frame.

Table 8

Between-Subjects Factors

Treatment condition		Value label	N
Message framing treatment	.00	loss frame treatment	10
	1.00	gain frame treatment	11
Social-norm treatment	.00	framing treatment only	11
	1.00	receives norm treatment	10

Table 9 provides the mean and standard deviation for each of the treatment conditions. It demonstrates that there is a separate mean for each of the treatment conditions at each of the averaged time periods within the study. All treatment conditions contained five residence halls except for the gain-framed messaging treatment which

consisted of six buildings. Standard deviation does vary across treatment condition, which is likely a result of some buildings having more residents than others.

Table 9

Descriptive Statistics

			Mean	Std. Deviation	*N*
PreStudy kWh per dorm	Loss frame treatment	Framing treatment only	8072.950	6430.959	5
		Receives norm treatment	15644.850	9382.604	5
		Total	11858.900	8569.300	10
	Gain frame treatment	Framing treatment only	11554.750	7985.784	6
		Receives norm treatment	13461.000	11212.990	5
		Total	12421.227	9119.751	11
	Total	Framing treatment only	9972.114	7192.741	11
		Receives norm treatment	14552.925	9814.845	10
		Total	12153.452	8643.642	21
EarlyStudy kWh per dorm	Loss frame treatment	Framing treatment only	7961.650	6497.111	5
		Receives norm treatment	14729.750	10070.870	5
		Total	11345.700	8749.967	10
	Gain frame treatment	Framing treatment only	11128.958	8144.309	6
		Receives norm treatment	13230.600	11222.294	5
		Total	12084.250	9205.729	11
	Total	Framing treatment only	9689.273	7265.385	11
		Receives norm treatment	13980.175	10083.363	10
		Total	11732.560	8773.167	21
LateStudy kWh per dorm	Loss frame treatment	Framing treatment only	7892.000	6756.9691	5
		Receives norm treatment	14712.933	10709.477	5
		Total	11302.467	9175.516	10

			Mean	Std. Deviation	N
PostStudy kWh per dorm	Gain frame treatment	Framing treatment only	10533.944	8641.446	6
		Receives norm treatment	13136.400	11265.275	5
		Total	11716.879	9484.0385	11
	Total	Framing treatment only	9333.061	7583.109	11
		Receives norm treatment	13924.667	10395.570	10
		Total	11519.540	9105.164	21
	Loss frame treatment	Framing treatment only	7749.133	6704.488	5
		Receives norm treatment	14896.933	10163.711	5
		Total	11323.033	8948.820	10
	Gain frame treatment	Framing treatment only	10678.722	8386.949	6
		Receives norm treatment	13268.600	11137.477	5
		Total	11855.939	9306.832	11
	Total	Framing treatment only	9347.091	7449.241	11
		Receives norm treatment	14082.767	10088.532	10
		Total	11602.175	8911.765	21

A repeated measures analysis of variance, shown in the following table, revealed that for a test of within-subjects contrasts there is a significant main effect for time where $F(1, 16) = 18.435 \; p < .001$. This means that ignoring all other variables, there is a difference in energy use in residence halls between the pre-study, early study, late study and post-study time periods. A significant interaction also exists between time and the number of students in each residence hall where $F(1, 16) = 7.926 \; p < .012$ (see Table 10).

Table 10

Test of Within-Subjects Contrasts

Source		Type III sum of squares	df	Mean square	F	Sig.
Time	Linear	5351262.555	1	5351262.555	18.435	.001
Time * total students per dorm	Linear	2300719.682	1	2300719.682	7.926	.012
Time * message framing treatment	Linear	10622.628	1	10622.628	.037	.851
Time * social-norm treatment	Linear	18496.217	1	18496.217	.064	.804
Time * message framing treatment * social-norm treatment	Linear	585195.377	1	585195.377	2.016	.175
Error (time)	Linear	4644434.837	16	290277.177		

In testing **H1a** and **H1b** which states that gain- and loss-framed messages, respectively, are likely to individually motivate energy conscious behavior change in altruistic settings, we can see that $F(1, 16) = .037$ $p < .851$. This indicates that there is not a statistically significant relationship between those groups which received a message-framing treatment and the change in energy use over time. This suggests that while the energy use ratios depicted in the previous section yielded a decrease in energy use, particularly for those buildings receiving gain-framed messaging, changes in energy use within those halls cannot be associated with the messaging treatment. Further, despite the statistically significant change in energy use over time, that change is not a result of message framing treatment. As a result, this research fails to reject the null hypotheses for **H1a** and **H1b**.

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The next coupled hypotheses, **H2a** and **H2b**, indicate that gain-framed messaging including a positive social-norm, and loss framed messaging including a negative social-norm are more likely to motivate energy conscious behavior change in an altruistic setting than message framing alone. For this test, we see that $F(1, 16) = 2.106$ $p < .175$, which again is not statistically significant. As a result, this research fails to reject the null hypotheses for **H2a** and **H2b**.

The third hypothesis, **H3** states that gain-framed messaging is likely to motivate greater energy conscious behavior change compared to loss-framed messages in altruistic settings. **H3** is evidenced by the 2-way (three variable) interaction between time and message framing where $F(1, 16) = .037$ $p < .851$, and is not statistically significant. As such it is not necessary to compare the means to determine the comparative advantage. Consequently, this research fails to reject the null hypotheses for **H3**.

The final hypothesis, **H4**, states that in an altruistic setting, gain-framed messages which include a positive social-norm are likely to motivate greater energy conscious behavior change compared to loss-framed messages that include a social-norm. This test is evidenced by a 3-way (three variable) interaction between time, message framing, and the presence of a social-norm. Again, we see that $F(1, 16) = 2.106$ $p < .175$, which is not statistically significant. As such a comparison of means to determine the comparative advantage is unnecessary. As a result, this research fails to reject the null hypotheses for **H4**.

Individual-Level Analysis

      This study also examines behavior change over time on the individual level. Specifically, the pre- and post-treatment survey asked five questions relating to particular energy use behaviors, such as leaving TV on when not in the room. A 2(time) x 2(message framing) x 2(social-norm) x 3(altruism) repeated measure ANOVA was utilized to address whether self-reported behavior changed during the study timeframe. The dependent variables are self-reported patterns in energy use. The independent variables related to treatment condition are: gain-framed messaging, loss-framed messaging, gain-framed messaging with a positive social-norm, and loss-framed messaging with a negative social-norm. There is also an altruism variable (altruism for people) which reflects an individual's post-survey score for their altruism towards others. Students were grouped into high, medium and low altruism in an effort to resolve the apparent self-reporting bias in which student's favorably indicated high levels of altruism.

      A total of 175 students participated in both the pre- and post-surveys; however the usable sample is 162. Some participants were dropped because of failing to complete their survey or because their residence hall was predetermined as needing to be excluded from the study because of building characteristics (Table 11).

Table 11

Participants by Treatment Condition

Participants by treatment condition	Frequency	Percentage
Unassigned residence hall	34	19.4
Gain framed with a norm	24	13.7
Gain framed	36	20.6
Loss framed with a norm	37	21.1
Loss framed	31	17.7
People from uninvolved dorms	13	7.4
Total	175	100

Table 12 demonstrates the percentage of students involved in the pre- and post-treatment survey by class. This sampling is representative of the ratio of students per class who resided in the residence halls at this time.

Table 12

Participants by Class Year

Class	Frequency	Percentage
Freshmen	83	51.2
Sophomore	31	19.1
Junior	30	18.5
Senior	18	11.1
Total	162	100.0

Leaving TV on when not in the room

This analysis looks at the change in self-reported behavior as it relates to the survey question which states "I leave my TV on when not in the room" where 1 represents strongly agreeing and 7 represent strongly disagreeing. Change in TV use over

time constitutes the dependent variables (pre TV on and post TV on). The independent

variables are message-framing, the presence of a social-norm, and an altruism construct

(Table 13).

Table 13

Within-Subjects Factors for TV

Time	Dependent variable
1	Pre TV on
2	Post TV on

Table 14 depicts the independent variables in this analysis, which are: message-

framing, the presence of a social-norm, and an altruism construct. The "altruism for

people" variable reflects an individual's post-survey score for their altruism towards

others. Students were grouped into high, medium and low altruism in an effort to resolve

the apparent self-reporting bias in which student's favorably indicated high levels of

altruism.

Table 14

Between-Subjects Factors for TV

		Value Label	N
Altruism for people	1	Low Altruism	64
	2	Medium Altruism	18
	3	High Altruism	14
Message framing treatment	0	Loss frame treatment	37
	1	Gain frame treatment	49
Social-norm treatment	0	Framing treatment only	38

Table 15

Test of Within-Subjects Contrast for TV

Source	Time	Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Linear	4.431	1	4.431	7.975	0.006
Time * Altruism for people	Linear	6.606	2	3.303	5.946	0.004
Time * message framing treatment	Linear	0.005	1	0.005	0.009	0.924
Time * social-norm treatment	Linear	3.399	1	3.399	6.119	0.016
Time * Altruism for people * message framing treatment	Linear	0.567	2	0.283	0.51	0.603
Time * Altruism for people * social-norm treatment	Linear	4.013	2	2.006	3.611	0.032
Time * message framing treatment * social-norm treatment	Linear	3.681	1	3.681	6.625	0.012
Time * Altruism for people * message framing treatment * social-norm treatment	Linear	1.721	1	1.721	3.099	0.083
Error (time)	Linear	40.556	73	0.556		

The analysis reveals that there is a statistically significant main effect in leaving the TV on when not in the room where $F(1, 73) = 7.975$ $p < .006$ (Table 15). This indicates that when ignoring all other variables, students self-reported a change in their behavior related to TV use when not in the room. Similarly there is a statistically significant interaction between time and altruism levels where $F(2, 73) = 5.946$ $p < .004$. There is also a significant interaction between time and the presence of a social-norm where $F(1, 73) = 6.119$ $p < .016$. Additionally, there is a significant interaction between

time, altruism towards others, and the presence of a social-norm treatment where $F(2, 73) = 3.611 \, p < .032$. The interaction between message framing and the presence of a social-norm is statistically significant where $F(1, 73) = 6.625 \, p < .012$. Finally, the change in leaving the TV on over time, when paired with altruism, message framing and a social-norm is statistically significant (.10) when $F(1, 73) = 3.099 \, p < .083$.

In testing **H1a** and **H1b** which suggests that gain-framed messaging and loss-framed messaging are likely to individually motivate energy conscious behavior change in altruistic settings, we can see that $F(1, 73) = .009 \, p < 0.924$. This indicates that there is not a statistically significant relationship between those groups which received a message-framing treatment and the change in self-reported TV behavior over time. As a result, this research fails to reject the null hypotheses for **H1a** and **H1b**. Further, as a result of the lack of significance in this relationship, we fail to reject **H3** which states that gain-framed messages are likely to motivate greater energy conscious behavior change compared to loss-framed messages in altruistic settings.

The next coupled hypotheses, **H2a** and **H2b**, indicate that messaging including positive and negative social-norms, respectively, are more likely to motivate energy conscious behavior change in an altruistic setting than message framing alone. For this test, we see that $F(1, 16) = 3.618 \, p < . 0.012$, which is statistically significant. To evaluate this relationship more fully we must look at Table 16 which describes the relationship between leaving the TV on when not in the room, message framing, and the presence or absence of a social-norm.

Table 16

Comparative Advantage of Social-Norms

Message framing	Social-norm	Time	Mean	Std. error	95% Confidence interval	
					Lower bound	Upper bound
Loss-framed treatment	Framing treatment only	1	5.033	0.311	4.413	5.653
		2	6.056	0.373	5.313	6.798
	Receives norm treatment	1	6.141	0.281	5.58	6.702
		2	6.641	0.337	5.97	7.312
Gain-framed treatment	Framing treatment only	1	6.219	0.305	5.611	6.827
		2	6.969	0.365	6.241	7.697
	Receives norm treatment	1	6.719	0.291	6.138	7.299
		2	6.548	0.349	5.853	7.244

For those students who received loss-framed messaging only, the mean increased by a full point from 5.033 to 6.056, signifying that fewer students left their TVs on when not in the room. Similarly, when looking at the effects of gain-framed messaging, the framing treatment means increased by 0.7 points, suggesting again that more students turned their TV off by the time of the post-treatment survey. However, the interaction between time and message framing was not statistically significant in the test of within-subjects contrasts (Table 15), making this relationship less meaningful.

When looking at the means for those students who received loss-framed messaging when paired with a social-norm, we see an increase by 0.5 points, signifying that this messaging strategy did instantiate change in the intended direction. Unexpectedly, those students who received gain-framed messaging when paired with a social-norm show an increase in leaving the TV on when not in the room. This is

evidenced by the 0.2 decrease in pre- and post-treatment responses. However, the relatively small numeric change may also indicate the positive social-norm campaign was not effective rather than that it led to increased deleterious behavior. In sum, fewer students self-reported leaving the TV on when not in the room when they received the negative social-norm treatment, while those who received the positive social-norm may engage more often in this unwanted behavior. Figure 9 helps to explain these relationships.
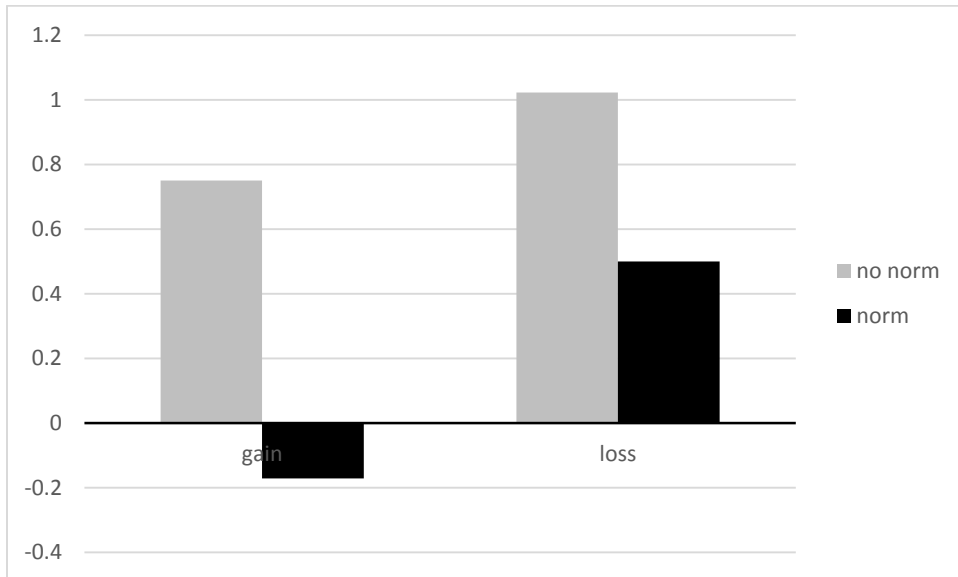
Figure 9. Influence and directionality of message framing and social-norms treatment.

In this figure we see first that gain-framed messages with a positive social-norm resulted in either worsened outcomes or no change in behavior. Exposure to this set of messages was associated with greater likelihood of students reporting they left their TVs on. We also see that the use of the negative norm changes TV use behavior in the

intended direction. These findings suggest that for this behavior, using a negative social-norm instantiates the greatest change in students turning the TV off when not in the room.

As a result, this research rejects the null hypothesis for **H2b** which states that loss-framed messaging including a negative social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than loss-framed messaging alone. This study fails to reject the null hypothesis for **H2a**, which states that gain-framed messaging including a positive social-norm is more likely to motivate energy conscious behavior change in an altruistic setting than gain-framed messaging.

Finally, we again use Table 16 to evaluate **H4** which states that in an altruistic setting, gain-framed messages that include a positive social-norm are likely to motivate greater energy conscious behavior change compared to loss-framed messages that include a social-norm. Again, this research fails to reject the null hypothesis as gain-framed treatment receiving a positive social-norm leads to worsened behavior, while loss-framed messages paired with a negative social-norm lead to improved outcomes. Comparatively across all messaging schemes tested in this study, those who were exposed to the negative social-norm treatment were most likely to report turning the TV off when not in the room.

Leaving TV on for background noise.

This analysis looks at the change in self-reported behavior as it relates to the survey question which states "I leave my TV on for background noise" where 1 represents strongly agreeing and 7 represent strongly disagreeing. Change in TV use over time constitutes the dependent variables (pre-background noise and post-background

noise). The independent variables are message-framing, the presence of a social-norm, and the altruism construct (Tables 17-19).

Table 17

Within-Subjects Factors for Background Noise

Time	Dependent variable
1	Pre-background noise
2	Post-background noise

Table 18

Between-Subjects Factors for Background Noise

		Value label	N
Altruism for people	1	Low Altruism	64
	2	Medium Altruism	18
	3	High Altruism	14
Message framing treatment	0	Loss frame treatment	37
	1	Gain frame treatment	49
Social-norm treatment	0	Framing treatment only	38
	1	Receives norm treatment	48

Table 19

Tests of Within-Subjects Contrasts for Background Noise

Source	time	Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Linear	2.333	1	2.333	1.246	.268
Time * altruism for people	Linear	5.579	2	2.789	1.490	.232
Time * message framing treatment	Linear	.403	1	.403	.215	.644
Time * social-norm treatment	Linear	.887	1	.887	.474	.493
Time * altruism for people * message framing treatment	Linear	1.962	2	.981	.524	.594
Time * altruism for people * social-norm treatment	Linear	2.895	2	1.448	.773	.465
Time * message framing treatment * social-norm treatment	Linear	.168	1	.168	.090	.765
Time * altruism for people * message framing treatment * social-norm treatment	Linear	.008	1	.008	.004	.947
Error (time)	Linear	140.380	75	1.872		

In this analysis, none of the relationships are significant. This includes any change over time in self-reporting behavior related to leaving the TV on for background noise. In addition, neither treatment condition was statistically significant. As such, we fail to reject **H1a**, **H1b**, **H2a**, **H2b**, **H3** and **H4**.

Leaving electronics on when not in the room

This survey question states "I leave radio/stereo/MP3 player on when not in room" with 1 equaling strongly agree and 7 equaling strongly disagree. Change in electronics use over time constitutes the dependent variables (pre-electronics on and post-electronics on). The independent variables are message-framing, the presence of a social-norm, and the altruism construct (Tables 20-22).

Table 20

Within-Subject Factors for Electronics On

Time	Dependent variable
1	Pre-electronics on
2	Post-electronics on

Table 21

Between-Subjects Factors for Electronics On

		Value label	N
Altruism for people	1	Low Altruism	64
	2	Medium Altruism	18
	3	High Altruism	14
Message framing treatment	0	Loss frame treatment	37
	1	Gain frame treatment	49
Social-norm treatment	0	Framing treatment only	38
	1	Receives norm treatment	48

Table 22

Test of Within-Subjects Contrasts for Electronics On

Source	time	Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Linear	3.599	1	3.599	3.506	.066
Time * class	Linear	.293	1	.293	.285	.595
Time * race	Linear	.932	1	.932	.908	.344
Time * place	Linear	1.470	1	1.470	1.432	.236
Time * mother_edu	Linear	.741	1	.741	.722	.398
Time * father_edu	Linear	5.760	1	5.760	5.612	.021
Time * Altruism_ post_self_3g	Linear	1.298	2	.649	.632	.535
Time * message framing treatment	Linear	.187	1	.187	.182	.671
Time * social-norm treatment	Linear	1.644	1	1.644	1.602	.210
Time * altruism for people * message framing treatment	Linear	1.545	2	.772	.752	.475
Time * altruism for people * social-norm treatment	Linear	2.405	2	1.203	1.172	.316
Time * message framing treatment * social-norm treatment	Linear	.441	1	.441	.430	.514
Time * altruism for people * message framing treatment * social-norm treatment	Linear	.026	1	.026	.026	.873
Error (time)	Linear	68.772	67	1.026		

The analysis reveals that there is a statistically significant main effect in self-reported behavior of turning unused electronics off when not in the room where $F(1, 67)$ = 3.506 $p < .066$ at the 0.10 level. A review of the data plots for this behavior reveals that more students report turning off unused electronics when leaving the room. This change

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does not correspond with either treatment condition. As such we fail to reject **H1a**, **H1b**, **H2a**, **H2b**, **H3** and **H4**.

Leaving lights on when not in the room.

This survey question states "I leave my lights on when not in room" with 1 equaling strongly agree and 7 equaling strongly disagree. Light related behavior use over time constitutes the dependent variables (pre-lights on and post-lights on). The independent variables are message-framing, the presence of a social-norm, and the altruism construct (Tables 23-25).

Table 23

Within-Subject Factors for Lights On

Time	Dependent variable
1	Pre-lights on
2	Post-lights on

Table 24

Between-Subjects Factors for Lights On

		Value label	N
Altruism for people	1	Low Altruism	64
	2	Medium Altruism	18
	3	High Altruism	14
Message framing treatment	0	Loss frame treatment	37
	1	Gain frame treatment	49
Social-norm treatment	0	Framing treatment only	38
	1	Receives norm treatment	48

Table 25

Tests of Within-Subjects Contrasts for Lights On

Source	Time	Type III sum of squares	df	Mean Square	F	Sig.
Time	Linear	1.511	1	1.511	0.779	0.381
Time * class	Linear	5.041	1	5.041	2.598	0.112
Time * race	Linear	5.854	1	5.854	3.017	0.087
Time * place	Linear	0.013	1	0.013	0.007	0.936
Time * mother_edu	Linear	2.78	1	2.78	1.433	0.235
Time * father_edu	Linear	0.211	1	0.211	0.109	0.742
Time * altruism for people	Linear	2.088	2	1.044	0.538	0.586
Time * message framing treatment	Linear	3.076	1	3.076	1.586	0.212
Time * social-norm treatment	Linear	4.471	1	4.471	2.304	0.134
Time * altruism for people * message framing treatment	Linear	5.994	2	2.997	1.545	0.221
Time * altruism for people * social-norm treatment	Linear	3.026	2	1.513	0.78	0.463
Time * message framing treatment * social-norm treatment	Linear	0.674	1	0.674	0.347	0.558
Time * altruism for people * message framing treatment * social-norm treatment	Linear	5.321	1	5.321	2.742	0.102
Error(time)	Linear	131.927	68	1.94		

The analysis reveals that there is a statistically significant relationship (at the .10 level) between time and race where $F(1, 68)$ 3.017 $p < 0.087$, as well as between time, altruism towards others, message framing and the social-norm treatment where $F(1, 68)$ 5.321 $p < 0.102$. However, because the change in light behavior was not statistically significant with the main effect of time, these relationships are less meaningful. As such we fail to reject **H1a**, **H1b**, **H2a**, **H2b**, **H3** and **H4**.

Do only full loads of laundry. This analysis looks at the change in self-reported behavior as it relates to the survey question which states "I do only full loads of laundry" where 1 represents strongly disagreeing and 7 represent strongly agreeing. Change in laundry patterns over time constitutes the dependent variables (pre-full laundry and post-full laundry). The independent variables are message-framing, the presence of a social-norm, and the altruism construct (Tables 26-28).

Table 26

Within-Subjects Factors for Laundry

Time	Dependent variable
1	Pre-full laundry
2	Post-full laundry

Table 27

Between-Subjects Factors for Laundry

		Value label	N
Altruism for people	1	Low Altruism	64
	2	Medium Altruism	18
	3	High Altruism	14
Message framing treatment	0	Loss frame treatment	37
	1	Gain frame treatment	49
Social-norm treatment	0	Framing treatment only	38
	1	Receives norm treatment	48

Table 28

Tests of Within-Subjects Contrasts for Laundry

Source	Time	Type III sum of squares	df	Mean square	F	Sig.
Time	Linear	.144	1	.144	.080	.779
Time * class	Linear	2.642	1	2.642	1.465	.230
Time * race	Linear	1.833	1	1.833	1.016	.317
Time * place	Linear	1.591	1	1.591	.882	.351
Time * mother_edu	Linear	1.093	1	1.093	.606	.439
Time * father_edu	Linear	.196	1	.196	.109	.743
Time * altruism_ post_self_3g	Linear	.187	2	.094	.052	.949
Time * message framing treatment	Linear	.039	1	.039	.022	.883
Time * social-norm treatment	Linear	.757	1	.757	.420	.519
Time * altruism for people * message framing treatment	Linear	1.437	2	.719	.398	.673
Time * altruism for people * social-norm treatment	Linear	5.173	2	2.587	1.434	.245
Time * message framing treatment * social-norm treatment	Linear	.001	1	.001	.001	.979
Time * altruism for people * message framing treatment * social-norm treatment	Linear	.754	1	.754	.418	.520
Error (time)	Linear	122.637	68	1.803		

In this analysis, none of the relationships are significant. This includes any change in the main effect of time as it relates to self-reported laundry patterns. Further, neither treatment condition was statistically significant. As such we fail to reject **H1a**, **H1b**, **H2a**, **H2b**, **H3** and **H4**.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

This study attempted to discover the effect of message framing in motivating altruistic behavior changes. It also sought to examine the effect of message framing when combined with social-norms. The findings of this study indicated that there was not a statistically significant change in energy use across any of the four treatment conditions. As such this study is unable to assert whether a particular message treatment condition was associated with changing behavior because there was not a statistically significant change in energy use when examined at the dorm level. Interestingly, one of the individual behavior change suggestions, turning the TV off when not in the room, was statistically significant when looking at pre- and post-treatment self-reported information. This chapter will first address the findings which occurred at the dorm level analysis, and then will discuss messaging treatment at the individual level. Additionally, I will explore how the study's limitations likely resulted in lack of effect. Finally, I will theoretically speculate as to why this campaign did not instantiate greater behavior change.

The Effects of Gain-Framed Messages in Altruistic Settings

The lack of behavior change as a result of gain-framed messages was unexpected based on prior literature. Gain-framed messaging has been found to instantiate behavior change in several circumstances. These situations are when: 1) the public has low issue involvement; 2) treatment is low risk or low effort; and 3) anecdotal evidence is used as a

motivator of behavior change. Each theme as it relates to this campaign will be explored individually below.

Prior seminal scholarship revealed that in selected circumstances gain-framed messaging produced a larger desired effect that loss-framed messaging. This includes when individuals have low interest in a problem or have low issue involvement (Chaiken, 1980; Greenwald & Leavitt, 1984; Kardes, 1988; Maheswaran & Meyers-Levy, 1990; Petty & Cacioppo, 1986; Spence and Pidgeon, 2010). The lack of change in energy use is inconsistent with this literature, though it is important to note that most prior message framing research was tested in health related communications, such as encouraging breast self-exam. The differences in efficacy of messages which are egoistic, or are for personal benefit, rather than altruistic messages which are for the benefit of others, may have limited the success of the campaign. Gain-framed messages in altruistic settings simply may not be an effective treatment.

Prior scholarship also suggested that gain-framed messaging produces desired behavior change in contexts where the suggested behavior changes are considered low risk, such as in encouraging sunscreen application (Chang, 2007; Detweiler et al., 1999; Edwards et al., 2001; Hoffner, 2009; Rothman et al., 1993). As such it was thought that the gain-framed messages used in this campaign which only suggested low risk behavior changes, such as turning lights off, would be associated with energy-saving behavior. The lack of statistical significance in changing behavior was contrary to these results. Again, however, this research was conducted in an egoistic setting, as these studies related to

personal care, so the perceived efficacy of the recommended action in having an impact on climate change may be different than those which related to altruistic settings.

The third context in which gain-framed messaging has been previously found to be effective is one where anecdotal evidence is used in the messaging. Das et al. (2008) found that when trying to increase charitable donations, anecdotal evidence was most effectively used when supported by gain-framed messaging. With regards to climate change, the public most often notes anecdotal weather changes as their reasons why climate change is occurring (Moser, 2007). Again, the lack of an association between gain-framed messaging and energy-saving behavior is surprising, particularly as it relates to the Das et al. (2008) finding, because charitable donations are a form of altruistic behavior. This suggests that perhaps the gain-framed messaging treatment alone was not strong enough to instantiate the desired behavior change, and it was not the altruistic nature of the campaign which resulted in a lack of change in behavior.

The Effects of Loss-framed Messages on Decreasing Energy Consumption in Altruistic Settings

Previous literature reveals that loss-message framing has the greatest efficacy when 1) the public is willing to think and engage about a topic; 2) there is doubt regarding the efficacy of the prescribed treatment; and 3) efficacious instructions are provided to decrease the threat. Each of these circumstances, as they related to the campaign outcomes will be addressed below.

Maheswaran and Meyers-Levy (1990) found that in situations in which the public has a high level of interest in a subject, and is willing to think about the information, loss-

framed messages can be a motivator of change. Related to climate change, most Americans have low issue involvement, with only 25% of Americans worrying "a great deal" about climate change in 2011 (Gallup, 2015). As such, the lack of effect as it relates to loss-framed messaging is inconsistent with prior literature.

The second circumstance in which loss-framed messaging has been found to be effective in encouraging behavior change occurs when there is doubt regarding the response efficacy of the prescribed treatment (Meyerowitz & Chaiken, 1987). Specifically, can the behavior change suggestion increase the likelihood of an improved outcome (Witte, 2011)? When response efficacy is doubted, loss-framed messaging encourages individuals to engage in "effortful processing" (Block & Keller, 1995). This doubt encourages the individual to think about whether following the recommendation is worth the time or effort (Block & Keller, 1995; Kanouse & Hanson, 1972). In such instances, even if there is uncertainty that a recommendation will lead to the improved outcome (averted climate change), loss-framed messaging can encourage a desired behavior change (turning the lights out) (Block & Keller, 1995). The behavior change suggestions in this campaign all have low response efficacy to reduce climate change. The campaign asked students to: turn off unused lights and electronics, listen to music instead of the TV for background noise, and do only full loads of laundry. While these behaviors performed by a larger population would reduce carbon emissions, alone they cannot stop climate change. The loss-framed messages created for this campaign should have encouraged students to engage in effortful processing, and therefore instantiate a behavior change.

The final circumstance in prior literature where negative messaging can instantiate change is when the message raises an individual's perceived threat level, and then provides specific instructions as to how to decrease that threat. This theory is known as the Extended Parallel Process Model (EPPM) (Maloney, et al., 2011; Witte, 1992; Witte, 2011). A successful use of EPPM requires that the fear level imposed by the messages is sufficiently high so as to motivate an individual to wish to reduce their anxiety. It is also necessary to ensure that the efficacy of the suggestions is high enough that the public believes the suggested behavior response will work. The messages used within residence halls built upon Witte's model, following her specific steps as to how to create a powerful messaging campaign. Despite this, there was no association between messages that followed her model and energy-conscious behavior. However, several studies found that treatments where threat is followed by efficacy interventions often fail to reach significance, suggesting that many interventions fail despite following the EPPM guidelines (Floyd, Prentice-Dunn, Rogers, 2000; Maloney et al., 2011; Roskos, Ewoldson, Yu, & Rhodes, 2004; Witte & Allen, 2000).

The Effects of Social-Norms on Decreasing Energy Consumption in Altruistic Settings

Similar to the lack of statistical significance which occurred when evaluating message-framing treatments only, the social-norms campaign also did not have an effect in decreasing energy use within GMU residence halls. This was a somewhat surprising finding as the use of social-norms has been studied broadly related to environmental topics, and some research was even located in altruistic settings. Prior literature tested

various messaging themes related to environmental issues, and found that using social-norm messaging can lead to pro-environmental outcomes (Cialdini et al., 1991; Cialdini, 2003; Goldstein et al., 2008; Schultz et al., 2007). Further, two other studies also found positive behavioral effects in altruistic settings promoting recycling (Schultz, 1999) and reuse of towels in hotels (Goldstein et al., 2008).

The lack of statistical effect of social-norms on energy use in the residence halls may have occurred for several reasons. The first is that the social-norms messaging campaign was only in place for three weeks. This may not have been a long enough time to truly influence student energy use. A review of prior social-norm literature revealed that study periods existed for at least 50-80 days if not longer (Goldstein et al., 2008). Additionally, the norm was generally presented at the individual or household level. For instance, hotel guests were told that 75% of guests who previously stayed in their specific room instantiated an increased towel reuse by 49% (Goldstein et al., 2008). In this case the norm comparison was distinctively attributable, whereas for my study the target audience was all students within a residence hall. The effect may have been lost as it targeted up to 500 students at once for the larger buildings, rather than on the individual level. Simply put, without the norm being distinctively attributable to oneself or at household level, its effect may be less persuasive. Further research assessing the size of the targeted norm group is needed to better understand the lack of success in decreasing energy use in those residence halls which received a social-norm treatment.

Finally, when this study was originally designed one variation involved utilizing resident assistants (RAs) to add a layer of enforcement into the campaign. Specifically,

students would receive energy use report cards on a random basis. Those receiving a

positive social-norm would be thanked for their good energy use behaviors. It might say,

"NICE JOB! Thank you for doing your part to save energy and slow climate change! You

did the right thing by taking the following steps: Turning off all lights and electronics,

Listening to music instead of the TV, and only doing full loads of laundry." Those

students receiving a negative social-norm treatment would receive a report card saying,

"STOP!! You've been caught wasting energy! It is time to take responsibility for the

devastating acts of climate change and do your part. Please take the following steps: Turn

off all lights and electronics, Listen to music instead of the TV, and only do full loads of

laundry." Utilizing this approach was not possible because of limitations placed on the

research by the university, but it would be fascinating to learn the effects of enforcement

when paired with a social-norm.

The Effects of Messaging on Pre- and Post-Treatment Survey Responses

While none of the treatment conditions proved to be statistically significant when

analyzed at the dorm level, this study did find statistically significant changes in some

self-reported behavior. The intervention in this study asked students to: turn off their

computer, lights and all unused electronics when leaving the room; listen to music instead

of the TV for background noise; and do only full loads of laundry. There was a

statistically significant effect on turning the TV off when not in the room. This section

will first address the successful intervention, and then explore those behaviors which

remain unchanged.

When analyzing self-reported data related to turning the TV off when not in the room, this study found that the use of the negative social-norm encouraged this energy saving practice. Further this study found that while the negative social-norm provides the correct direction and effect, the positive social-norm messages were associated with negligibly different outcomes or possibly a boomerang effect. This result supports the hypothesis which asserts that messages invoking social-norms would be more likely to encourage behavior in altruistic settings than message framing alone. However, the finding is contrary to the assertion which stated that a positive social-norm would outperform a negative social-norm. Additional research should be conducted on this finding to determine in which areas message framing when paired with a social-norm are most effective in modifying behavior. This is particularly important because while the negative norm treatment influenced turning the TV off when not in the room, the other behavioral interventions were not statistically significant. Those will now be discussed.

This study also asked students to turn off unused electronics, turn of lights when leaving the room, and do only full loads of laundry. None of these interventions produced a statistically significant change in self-reported behavior when tied to messaging treatment. The lack of change in these behaviors will be theoretically explored later, but first I will discuss how the study's limitations likely resulted in a limited change in behavior.

Study Limitations

The study faced several limitations which may explain why a greater change in behavior was not seen. The first issue is that asking individuals to modify their behavior

often fails. In communication scholarship, there is a hierarchy related to encouraging change. In order of least difficult to most difficult to modify, the hierarchy is: awareness, attitudes and then behavior. My campaign simply may not have been strong enough to yield a greater change in energy use and behavior.

A second limitation relates to the sample size. Though the total number of students who received the messaging treatments was high (4,092), the total number of involved residence halls (30) was low. Likewise, I only had 162 pre- and post-treatment matched surveys. The sample sizes for the dorm level and the individual level were robust enough for a large effect to be detected according to Cohen (1992) using 80% power at a 0.05 level of statistical significance. Unfortunately, the sample size barely misses the threshold for medium effects, and small effects would be completely obscured. This means that it is possible that my campaign influenced energy use, however because the small size was small, only the largest changes were revealed.

The final limitation relates to confines imposed on the research design as a result of university oversight. My campaign was only six weeks in duration. Most messaging campaigns which attempt to influence behavior are in place for months. If my messages were in place for a longer time, it is possible that they may have instantiated a greater change in energy use. Further, I was limited as to where messages could be placed (primarily common areas). Many of my behavior change suggestions encouraged students to change in-room behavior, but messages were not allowed to be placed in residents' personal space. It is likely that the campaign would have been more successful without the limitations discussed in this section. There are also several reasons which I

speculate that the messaging did not instantiate greater change. I will discuss those in the next section.

Theoretical Explanations as to Why the Messaging Campaign Did Not Instantiate Energy Use Change

Motivating the public to act on climate change comes with many stumbling blocks. One of the largest is the notion that most Americans do not presently feel harmed by the phenomenon. According to Slovic (2000) in order for individuals to act on an issue, they must feel at risk. The time lag which occurs with climate change does little to bolster the notion of being presently at risk. As a result, asking Americans to take steps to slow climate change requires a sacrifice in the present, for the benefit in the future (Weber, 2006). The sacrifice comes in many forms, such as the loss of time which results from waiting for a computer to turn off or on, the hesitation which occurs when CFL light bulbs are first flipped on or feeling a little bit uncomfortable in the summer because a person chooses to forgo the use of air conditioning.

The sacrifices are thought of in concrete terms, they are "choice alternatives in the present" (Weber, 2006). The benefits of acting against climate change are less understood because of the temporal distance, but include a generally healthier environment. However, because of the lag between action and results, and the abstract nature of the benefit, these benefits occur at a high discount rate (Weber, 2006). The lack of change in energy use as tied to any treatment condition may be a result of students believing the effects of climate change were too distant to act on given the sacrifices which they would need to make presently.

Another problem with asking individuals to make a sacrifice for the future is the use of *present-bias preference*. This implies that a person would rather pursue immediate gratification over future gratification. Steel and Konig (2006) theorized that people care far more for today than they do for benefits to occur at a later time. A classic example would be that a person would more likely enjoy an ice cream cone now, rather than chose not to have the treat, but be able to enjoy the long-term benefits of a successful diet (O'Donoghue & Rabin, 2001). A related issue is the notion of *time inconsistency*, which indicates that people prefer well-being at an earlier date over a later date, and the phenomenon increases with strength the closer the date becomes. The present-bias may affect all climate change communications, as only 65% of Americans believe climate change will happen in their lifetime, and of that only 35% believe it will pose a serious threat to their way of life (Gallup, 2014). This campaign may not have been able to overcome the present-bias preference. One possible change for future research would be to determine if messages which were more local in their design could correct this issue. An example might be, "Each summer in Fairfax, 20 days exceed heat index guidelines for playing outdoor athletics. Do your part as a student athlete to protect your opportunities to enjoy outdoor workouts. Prevent heat-trapping gasses from getting into the atmosphere by: Turn off lights, computers, and TVs when not in use." It is also interesting to note that by designing messages with a local theme, the motivation for behavior change would likely be egoistic.

There is also research which indicates that, particularly in the United States, there is low understanding of climate change, and as a result people fail to act in relation to the

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severity of the threat (Stern & Weber, 2011). Climate change is difficult to communicate for many reasons, including: its uncertain future impacts, lack of current personal impacts (Hansen, Sato, Glascoe, & Ruedy, 1998; Keller, Siegrist, & Gutscher, 2006), and complicated climate change science (Weber, 2011). Difficulties in understanding climate change have been documented; for example, many Americans confuse the hole in the ozone layer with climate change (Moser, 2008). This campaign, like many others, did not explain why limiting electricity use would decrease the rate of climate change. It did not help participants understand why there is a link between use of energy and increases in the amount of heat-trapping carbon dioxide released in the atmosphere. Fischhoff (2007) is in favor of "nonpersuasive communication" as it relates to climate change communication in an effort to deepen understanding of the causes of climate change. Specifically he suggests that messaging should not be disguised as an effort to engage support for public policy or behavior change. The messaging in this campaign was by its very nature intended to be persuasive, thus violating Fischhoff's suggestion.

One theoretical explanation as to why some self-reported behavior changed and others did not might be found in the social-science literature related to embedded behaviors. "Embeddedness" refers to the extent to which some behaviors are superficial, or not highly embedded, and others are deeply embedded into daily patterns and routines (Booth-Burtterfield, 2003). In the public health arena, a behavior which is not especially embedded might be the taking of an over-the- counter pain reliever. Most people only take these medications occasionally, and are not particularly brand loyal, allowing for individuals to easily transition away from using a certain product (Moon & Biliter, 2000).

For instance many people would not find it difficult to switch from aspirin to a non-aspirin product. The classic highly embedded behavior is smoking. Smoking is a highly ritualized behavior which involves psychological, biological and external environmental rewards which make this behavior occur throughout the smoker's day, and make quitting smoking difficult.

In examining the suggested behavior changes for this study, each of the encouraged behaviors is relatively easy. Turning a computer or light on or off typically involves just the flip of a switch. According to Booth-Butterfield (2003) in general, the simpler the behavior, the easier it is to modify. This suggests that asking students to turn off lights and electronics should have resulted in behavior change. However, there are other important factors in examining embeddedness, such as those which are internal to a person's psychological makeup. With this component, attitudes and personality traits, such as self-esteem, anxiety and conscientiousness are considered. When looking at the suggestion of turning off unused light, some students leave lights on as a result of being scared of the dark. Turning off lights would require these students to overcome a level of anxiety. Approximately 40% of adults are scared when walking around their homes with the lights off (Stylist, 2015). This phenomenon was also mentioned by one student in the focus groups. There may also be a psychological component to always having a computer on, particularly in this social networking savvy era. Asking students to allow for the minute or two lag in turning on a computer could be cumbersome for those who require the reward of immediate access. The inconvenience of needing to wait for the computer to boot was mentioned during focus groups.

Of the targeted behaviors for this campaign, leaving a TV on when not in the room is likely the least embedded, and thus may have been the easiest for a student to correct as it is not tied to rewards. For instance, a student may wish to turn lights off when leaving the room, but that desire may be overcome by a slight fear of the dark. Turning the TV off when leaving the room is associated with few rewards. Future research should explore the role of social-norms in encouraging energy saving behaviors.

Though this campaign faced several shortcomings, there are also recommendations which can be provided to other residential campuses of higher education. Those will now be reviewed in the next section.

Policy Recommendation for Residential Campuses

It possible to influence student energy use. This campaign did see a statistically significant decrease in energy use over the semester. Though it could not be assigned to a particular treatment condition, it does suggest students can change their energy usage behavior. Additionally, we know that 50% of the energy used within a residence hall is a result of personal energy choices, while the other 50% emerges from building characteristics (Schipper, 1999). This further suggests there are opportunities to change student behavior.

I would recommend the use of the use of a negative social-norm to encourage energy saving behaviors from student populations. Specifically, a negative norm which indicates a behavioral deficit compared to peers seems to instantiate change in the intended direction. My campaign asked students to: turn off all unused electronics and lights, listen to music instead of TV for background noise and do only full loads of

laundry. However, there are many energy saving possibilities depending on the student

population and building characteristics. For instance, many newer residence halls allow

for students to control their own thermostat, allowing for many messaging possibilities.

This includes communicating to students about appropriate ambient air temperature.

Additionally, asking students to dress seasonably appropriate, and defining what this

might look like based on the season, could be useful in encouraging energy conservation.

Related to this, I would also suggest attempting to use precise message placement when

possible. For instance, social-norms messaging related to ambient air temperature should

ideally be placed near the thermostat.

I also recommend that the negative social-norm be as precise as possible to their

intended audience. For instance, my research suggests the possibility that social-norms

lose their power when the targeted group is too large. In order of most likely to be

effective, to least likely, I suggest tailoring social-norms to the following: individual,

room, corridor, floor, and residence hall. For instance, there are many pro-environmental

possibilities beyond just energy use which might allow for a more precise use of social-

norms. This might include encouraging recycling where Housekeeping ranked corridors

in terms of volume of recyclables received each week. Housekeeping could also be asked

to visually inspect garbage to determine which corridors placed the most recyclable

material in the wrong stream. There are some very interesting negative social-norm

campaign possibilities which could relate to this. An example might include taking a

picture of all the recyclable materials which were disposed of as garbage over a week,

and using a negative social-norm paired with the picture to encourage future recycling.

This also provides an element of present enforcement which is more likely to encourage behavior change (Weber, 2006).

Another recommendation when asking students to change their behavior is to seek patterns which are least embedded or associated with rewards. For instance, students who received the negative norm treatment turned their TV off more often when not in the room. This behavior change may manifest because there is not a strong reward associated with leaving the TV on. Alternatively, if a campaign seeks to change an embedded behavior, such as that related to leaving lights on when not in the room, providing students with tools to correctly manage the problem might be a solution. For instance, if nightlights were placed in all student rooms at the start of the semester, there is a possibility that many kilowatt hours of energy could be avoided.

My final recommendation for residential campuses is to encourage student research which promotes pro-environmental behaviors. Students have many innovative ideas and a fundamental understanding of the population. Removing barriers to entry to allow strong research projects to take place on campus is critical. Further guidance for such projects is provided below.

Knowledge for Future Student Practitioners

In addition to the contributions made to message framing and social-norms scholarship, this research also offers practical knowledge related to conducting energy saving research on a campus. Deciding to conduct a pro-environmental messaging campaign on a collegiate campus, though ripe with possibilities and rewards, can also be

daunting. I would advise future practitioners to engage the necessary university officials early and be flexible with their research design in order to meet university requirements.

The first critical step in a pro-environmental campaign at a university is to engage the Office of Sustainability (or a similar office at your institution). They are key stakeholders and should be engaged throughout your process. This office can provide abundant knowledge of university environmental policies as well as ideas of current students behaviors which you might like to influence. Use their knowledge to strengthen your work. They will also have an understanding of likely barriers which you may face as you move forward with your research design. This office is likely to be your biggest ally, so having their full support of your research will be critical in moving it forward.

After you achieve support from the Office of Sustainability, but while your research design is still flexible, I would next suggest contacting Housing or Residential Living. It is likely that they will have limitations related to the type of messaging which is allowable within residence halls. This may include: the type, frequency, duration, placement and size of messages allowed within residence halls. It is important to have a sense of these constraints early so that you can design your messaging campaign accordingly. Also determine at this point from whom you will require permission for your campaign, as these are your primary stakeholders. This likely consists of many parties, including: the Office of Sustainability, Housing, Residential Living, University Life, and the Institutional or Human Subjects Review Board. I would suggest meeting with each of stakeholders to determine their requirements and limitations. It would be advisable to discern ways in which your campaign can benefit these offices. What new

information might your experiment provide to each of the primary stakeholders which would benefit them? For instance, my campaign provided Housing with information related to which messaging types are most likely to encourage energy conservation in their students, and thus provided Housing with savings potential.

Once you have an understanding of the limitations which you may face from the various stakeholders, it is time to design your messaging campaign. After your dissertation or project advisory committee approves, receive permission from each of the primary stakeholders. This may be a slow process; you should prepare to receive various permissions one semester and implement the campaign the next semester. Related to this, also determine if there are possibilities of doing in-room signage at the start of the Fall semester, since this might not be available at a later point. Receiving the necessary permissions may be difficult, even when working within the confines of the above stakeholders. Remember, your research is important, too. If necessary, have your faculty advisors and the Office of Sustainability ask for a meeting with high ranking university officials so that they may determine if your work merits approval.

After your research design has been approved, be sure to meet with secondary stakeholders, including those at lower stations, as different knowledge bases will emerge. For instance, I was told by an official from Housing that I could receive weekly electricity meter reports for each residence hall. When I spoke with the gentleman who would later provide the reports, he revealed that some halls share the same meter. This was critical information for my research design. Likewise, a Housing official approved my messaging and message placement. What they did not disclose, but I later learned via

a student employee, was that all messaging needs to have an official stamp of approval on it, and that generally all messaging is hung by resident assistants. Messaging not placed by RAs would be likely to be removed as it is viewed as solicitation.

In conclusion, conducting an actual action research experiment on campus can be a complicated and slow process. In order to increase the likelihood of your research being approved, engage key stakeholders early and be flexible with your research design. Also, be sure to engage secondary stakeholders, as they are likely to hold key knowledge which will help ensure the success of your campaign.

Future Research

There are several avenues for future research. The first is to determine which energy saving behaviors are most likely to change in the intended direction as a result of the use of social-norms. My research relied on self-reported data for the targeted behaviors which I attempted to change, but further research examining actual behavior is necessary to deepen the understanding of this topic.

My research also revealed that there was a possibility of a boomerang effect associated with the use of the positive social-norm when asking students to turn their TV off when not in the room despite the use of an injunctive norm (the smiley and frowny emoticon). Knowing that the injunctive norm has prevented the boomerang effect in previous studies (Cialdini, 2003; Schultz et al., 2007), future research should seek to determine under what conditions the boomerang effect is most likely to manifest.

I also speculated that the degree of embeddedness might influence whether certain energy use behaviors are likely to change. Quantitatively evaluating the change in

behavior over time in response to various energy saving suggestions, which contain high, medium and low levels of embeddedness, would be interesting. Ranking energy saving behaviors in terms of embeddedness would be beneficial from a practical standpoint. Those behaviors which are least embedded would be most likely to change, and thus would be the best targets for future messaging appeals.

Additionally I theorized that the effectiveness of my research may have been limited by the size of the group to which my social-norm was communicated (all students living within a residence hall). Asking up to 500 individuals living in a residence hall to follow the same social-norm may not be effective, particularly when many norms are prescribed at the individual or household level. There is little research which explores the relationship between targeted norm group and efficacy. It would be interesting to determine if there is a size threshold for norm efficacy, and if the size of the intended norm group is too large, is there a loss in efficacy?

Finally, additional research should address whether the use of a social-norm in situations which are defined as altruistic actually leads to altruistic behavior change. It is possible that the use of a social-norm to instantiate change actually results in egoistic action. For instance, if a person reduces their energy use to avoid embarrassment from peers, this would suggest the possibility that the behavior change was egoistic in nature. Additional research should address the possibility that the use of social-norms can change all altruistic situations into egoistic ones. Further, does the use of a social-norm help to resolve many Tragedy of the Commons scenarios, as it removes the need for altruistically motivated behavior change?

Conclusion

As a result of slow outcomes from global climate change negotiations, it is increasingly apparent that a multifaceted policy approach to climate change mitigation may be necessary. Encouraging energy efficient behavior at the individual level is one such approach, and would require a public messaging campaign. Most climate change appeals use loss-framed messaging (WWF, 2009); however, few prior studies explored effects of message framing outside of health related communications. This disparity is important since individuals generally do not personalize environmental risks in the same way as they do health-related risks. While in practice loss-framed messaging is more widely used, prior to this study there was little understanding of whether it is more efficacious than gain-framed messaging at influencing individuals' environmental behaviors. This study addressed the effects of message framing when paired with a social-norm of which there is a relative dearth of literature. It further distinguishes itself from previous message framing scholarship because it examines energy use in an altruistic setting rather than egoistic one. Knowledge of these issues will be critical as policy makers attempt to influence individual's energy consumption to address global climate change.

This study aimed to contribute to communication literature in five ways as it evaluated the effects of gain- and loss-framed messaging in altruistic settings on motivating an energy conscious behavior change. It also sought to find the comparative advantage of these message framing treatments, particularly when paired with a social-norm treatment. Though energy use did decrease during the time in which the campaign

was instituted on the GMU campus, those changes cannot be prescribed to the treatment conditions. As such, this research was unable to statistically demonstrate that its messaging campaigns affected energy use in residence halls.

Interestingly, when examining self-reported pre- and post-treatment behaviors, this study was able to determine that one behavior was influenced by messaging treatments in a statistically significant manner. Specifically, we learned that those students who received loss-framed messaging when paired with a negative social-norm were more likely to turn the TV off when not in the room than were students who did not receive such messages. That is, students who were exposed to flyers noting that other students turn off their TVs when the TV is not in use were more apt to report that they enacted this energy-saving behavior. Conversely those students who received a positive social-norm were actually more likely to engage in this behavior. Though prior social-norms scholarship looked at the impacts of different messaging typologies (Goldstein et al., 2008), this study is the first to unpack the effects of message framing on social-norms. It offers the contribution that the use of a negative social-norm message may change behavior in the intended direction, while a positive social-norm may unintentionally lead to worsened behavior. Future research should examine in greater detail whether the effects of social-norms treatments can be applied to other household level energy saving behaviors.

APPENDIX A. RECRUITMENT E-MAILS

Recruitment Email Post-Treatment

Dear Students,

In October you took a survey in the dining hall which asked you questions about your attitudes towards climate change, as well as inquired about your personal energy use patterns. In that survey you indicated that I could contact you later in the semester to take a follow-up survey

As a reminder, I am a GMU PhD student. This survey is necessary for completion of my degree requirements. Please help another GMU student!

Follow the provided link to take a follow-up survey:
(survey monkey link to be provided)

Thank you,

Susan Keltner

Recruitment Email Post-Treatment

Dear Students,

I emailed you earlier this semester regarding a study looking at your personal energy use patterns and attitudes towards climate change. I am hoping you will take a brief follow-up survey to help complete my degree requirements.

Please help another GMU student!

Thank you,

Susan Keltner

APPENDIX B. SURVEY

GMU Pre-Treatment Survey

The following section asks questions related to your energy use patterns. When answering the following questions, please refer to *your energy use and opinions only*. While you may have a roommate who affects your living situation, do the best you can to answer the following questions based on *your* habits. Please answer the question with regards to what occurs in a typical week.

Please provide your GMU email address. By providing your email address, you are indicating that I may contact you via email in late November for a similar, follow-up survey. _____

1) Within a typical week, when your computer is not in use, what mode was it typically in?
   a) On
   b) On with a screen saver
   c) Sleep
   d) Shut down
   e) Don't own a computer

2) Within a typical week, how **frequently** do you engage in the following behaviors:

	Strongly Agree			Neutral			Strongly Disagree
a) I leave my TV on when not in the room	1	2	3	4	5	6	7
b) I have the TV on for "background noise"	1	2	3	4	5	6	7
c) I leave radio/stereo/MP3 player on when not in room	1	2	3	4	5	6	7
d) I leave lights on when not in my room	1	2	3	4	5	6	7
e) I do laundry when the loads aren't full	1	2	3	4	5	6	7

3) Considering the previous question, how **long** in a typical day do you engage in the following behaviors?
   a) Leave your TV on when you when not in your room   Hours/Min _____   N/A
   b) Have the TV on for "background noise"   Hours/Min _____   N/A
   c) Leave on radio/MP3 player when not in room   Hours/Min _____   N/A
   d) Leave lights on when you are not in your room   Hours/Min _____   N/A

4) Within a typical week, how many **loads** of laundry do you do?   1   2   3   4   5   6   7+   N/A
5) Within a typical week, how many **days** do you do laundry?   1   2   3   4   5   6   7   N/A

6) To what extent do you agree with the following statements about your energy use:

	Strongly Agree			Neutral			Strongly Disagree
f) It is my responsibility to the environment to reduce my energy use	1	2	3	4	5	6	7
g) I do my part to reduce my energy use	1	2	3	4	5	6	7
h) I don't see how my energy use has an impact on the planet	1	2	3	4	5	6	7
i) I want to limit my energy use, but I don't know what to do	1	2	3	4	5	6	7
j) I want to limit my energy use, but I forget until afterward	1	2	3	4	5	6	7
k) I want to limit my energy use, but it would limit my lifestyle	1	2	3	4	5	6	7
l) I don't know how much energy I actually use	1	2	3	4	5	6	7

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7) To what extent do you agree with the following statements about your values towards the environment:

		Strongly Agree		Neutral		Strongly Disagree		
a)	I was raised to conserve energy	1 2	3	4	5	6	7	Don't know
b)	I was raised to care for the environment	1 2	3	4	5	6	7	Don't know
c)	My parents care for the environment	1 2	3	4	5	6	7	Don't know
d)	My boyfriend/girlfriend cares for the environment	1 2	3	4	5	6	7	Don't know N/A
e)	My friends care for the environment	1 2	3	4	5	6	7	Don't know
f)	My actions make a difference in helping the planet	1 2	3	4	5	6	7	

Climate Change Questions – This section asks questions related to your opinion on climate change/global warming. Please answer as truthfully as possible.

8) How familiar are you with the concept of climate change/global warming?
   a) I have never heard of it **(Skip to Question 15 after selecting this answer)**
   b) I have heard of it, but don't know anything about it
   c) I know a little bit about it
   d) I know a fair amount about it
   e) I know a lot about climate change

9) To what extent do you believe that following terms relate to climate change:

		Strongly Agree		Neutral		Strongly Disagree		
a)	Carbon footprint	1 2	3	4	5	6	7	Don't know
b)	Greenhouse gas emission	1 2	3	4	5	6	7	Don't know
c)	Carbon sequestration	1 2	3	4	5	6	7	Don't know
d)	The hole in the ozone layer	1 2	3	4	5	6	7	Don't know
e)	Sea level rise	1 2	3	4	5	6	7	Don't know
f)	Plate tectonics	1 2	3	4	5	6	7	Don't know
g)	Solid Waste Disposal	1 2	3	4	5	6	7	Don't know
h)	Vehicle miles driven	1 2	3	4	5	6	7	Don't know
i)	Kyoto Protocol	1 2	3	4	5	6	7	Don't know
j)	Organic Food	1 2	3	4	5	6	7	Don't know
k)	Noise Pollution	1 2	3	4	5	6	7	Don't know
l)	Coal fired power plants	1 2	3	4	5	6	7	Don't know

10) What do you believe causes climate change?
   a) Climate change does not exist
   b) I'm not sure what causes climate change
   c) Climate change is a natural phenomenon
   d) Climate change is caused by human actions, such as using energy consumption

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11) To what extent do you agree with the following statements about climate change/global warming:

	Strongly Agree			Neutral			Strongly Disagree
a) I worry about climate change	1	2	3	4	5	6	7
b) I feel personally threatened	1	2	3	4	5	6	7
c) I worry about other species being harmed	1	2	3	4	5	6	7
d) I worry about people in developing countries being harmed	1	2	3	4	5	6	7
e) Individual actions make a difference in slowing climate change	1	2	3	4	5	6	7
f) Group actions make a difference in slowing climate change	1	2	3	4	5	6	7

12) To what extent do you agree with the following statements about your actions:

	Strongly Agree			Neutral			Strongly Disagree
a) I take personal actions to slow climate change	1	2	3	4	5	6	7
b) I take personal action to lower my energy use	1	2	3	4	5	6	7
c) I take personal action to protect the environment	1	2	3	4	5	6	7
d) I lower my energy use because I am thrifty	1	2	3	4	5	6	7

13) Within a typical week, which of the following actions did you perform? Circle all that apply.
   a) Recycle
   b) Turning off all unused electronics
   c) Turning off unused lights
   d) Dressing seasonally appropriate (layering/removing clothing)
   e) Eating a vegetarian diet
   f) Purchasing less/consume less
   g) Using CFL (spiral) light bulbs
   h) Unplugging unused electronics which operate on standby power
   i) Do only full loads of laundry

This section asks questions related to your level of trust in various entities.

14) To what extent do you agree with the following statements about trusting climate change communications:

	Strongly Agree			Neutral			Strongly Disagree
a) I am a generally trusting person	1	2	3	4	5	6	7
b) I trust the national government	1	2	3	4	5	6	7
c) I trust the local government	1	2	3	4	5	6	7
d) I trust the private sector	1	2	3	4	5	6	7
e) I trust the TV media	1	2	3	4	5	6	7
f) I trust the radio media	1	2	3	4	5	6	7
g) I trust the newspaper media	1	2	3	4	5	6	7
h) I trust the magazine media	1	2	3	4	5	6	7
i) I trust non-profit organizations	1	2	3	4	5	6	7
j) I trust environmental groups	1	2	3	4	5	6	7

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15) Please circle all that apply. I have close family who work for:
   a) The government
   b) The media
   c) Non-profits
   d) Environmental groups
   e) Private sector

Altruism Questions- This section asks questions related to altruism, or the idea of acting in a manner which benefit others, when you do not have a direct benefit. This includes benefits for other species and future generations.

16) To what extent do you agree with the following statements about your values:

	Strongly Agree			Neutral			Strongly Disagree
a) I am easily upset by seeing others suffering	1	2	3	4	5	6	7
b) I am easily upset by seeing other species suffering	1	2	3	4	5	6	7
c) Images of others suffering upset me	1	2	3	4	5	6	7
d) Images of other species suffering upset me	1	2	3	4	5	6	7
e) I have a high amount of empathy for other people	1	2	3	4	5	6	7
f) I have a high amount of empathy for other species	1	2	3	4	5	6	7

17) To what extent do you agree with the following statements about your reactions:

	Strongly Agree			Neutral			Strongly Disagree
a) I am easily upset by scolding	1	2	3	4	5	6	7
b) I am easily shamed for bad behavior	1	2	3	4	5	6	7
c) I am easily embarrassed	1	2	3	4	5	6	7
d) I consider myself to be thrifty	1	2	3	4	5	6	7
e) I like to voice my opinions	1	2	3	4	5	6	7

To what extent do you agree with these statements related to your energy use, even though the **financial benefits of a lower energy bill do not personally accrue to you?**

	Strongly Agree			Neutral			Strongly Disagree
a) I don't reduce my energy use (**Skip to Question 19 after selecting this answer**)							
b) I take steps to reduce my energy use in my dorm room	1	2	3	4	5	6	7
c) I take steps to reduce my energy use when in others homes	1	2	3	4	5	6	7
d) I take steps to reduce my energy use at work	1	2	3	4	5	6	7

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18) To what extent do you agree that you are motivated to reduce your energy use for the benefit of anyone/anything besides yourself?

	Strongly Agree			Neutral			Strongly Disagree
a) Future generations	1	2	3	4	5	6	7
b) Other species	1	2	3	4	5	6	7
c) Benefits to the natural world	1	2	3	4	5	6	7
d) Plants	1	2	3	4	5	6	7
e) People in other developed countries	1	2	3	4	5	6	7
f) People in under developed countries	1	2	3	4	5	6	7

19) There are situations where you might help others, but not receive a personal benefit such as continued friendship or a paycheck. Please answer the following questions with regards to those times where you are helping others without a personal benefit.

	Strongly Agree			Neutral			Strongly Disagree
a) I never help others (**Skip to Question 21 after selecting this answer**)							
b) I am always aware of how my actions influence others	1	2	3	4	5	6	7
c) I easily accept responsibility for others in need	1	2	3	4	5	6	7
d) I believe I am able to help others	1	2	3	4	5	6	7
e) I feel empowered to help others in need	1	2	3	4	5	6	7
f) I am aware that if I don't help others they may suffer	1	2	3	4	5	6	7
g) I help others even if it comes at a person cost to me, such as time or effort	1	2	3	4	5	6	7

20) There are situations where you might help other species without a personal benefit, such as using less energy believing that it might help to protect polar bears. Please answer the following questions with regards to those times when you are helping other **species** without a personal benefit.

	Strongly Agree			Neutral			Strongly Disagree
a) I never help other species (**Skip to Question 22 after selecting this answer**)							
b) I am always aware of how my actions influence other species	1	2	3	4	5	6	7
c) I easily accept responsibility for other species in need	1	2	3	4	5	6	7
d) I believe I am able to help other species	1	2	3	4	5	6	7
e) I feel empowered to help other species in need	1	2	3	4	5	6	7
f) I am aware that if I don't help other species they may suffer	1	2	3	4	5	6	7
g) I help other species even if it comes at a person cost to me, such as time or effort	1	2	3	4	5	6	7

Demographics Questions – This section asks basic background information about yourself.

21) In which residence hall do you live? _____

22) What style of room do you have?   Suite   Apartment   Standard

23) What are last three digits of your G-number? _____ ex) G00412**345**

24) What year were you born? _____

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25) What class year are you?   Freshman   Sophomore   Junior   Senior   Graduate

26) What is your major?   _____

27) What is your ethnicity?
   American Indian   Asian (4)   Black (2)   Hispanic (3)   White (1)   Other (5)
   Prefer not to say

28) What region of the country are you from?
   a) Northeast
   b) South
   c) Midwest
   d) Southwest
   e) West
   f) International

29) Which best describes the area where you grew up?   Urban (3)   Rural (1)
       Suburban

30) What is the highest level of education for your:

MOTHER   **FATHER**
   a) Did not finish high school   a) Did not finish high school
   b) Graduated from high school   b) Graduated from high school
   c) Some college   c) Some college
   d) 2-year associates degree   d) 2-year associates degree
   e) Graduated from college   e) Graduated from college
   f) Master's degree   f) Master's degree
   g) PhD/MD/JD   g) PhD/MD/JD
   h) N/A   h) N/A

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