

THE MEDIATING EFFECT OF EMOTIONS ON THE COMPARISON BETWEEN  
DESCRIPTIVE NORM INFORMATION AND BEHAVIORS: THE CASE OF RECYCLING

By

Hye Seung Koh

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## **ABSTRACT**

### **THE MEDIATING EFFECT OF EMOTIONS ON THE COMPARISON BETWEEN DESCRIPTIVE NORM INFORMATION AND BEHAVIORS: THE CASE OF RECYCLING**

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Based on the focus theory of normative conduct, discrete emotion approaches and the heuristic-systematic model, this study examined the effects of descriptive norms message and prior recycling behavior on affective responses, cognitive responses, attitudes, and intentions toward recycling. It was predicted that the effect of descriptive norm messages on young people's feelings of satisfaction and guilt, number and valence of thoughts, attitudes, and behavioral intentions toward recycling would be moderated by prior recycling behavior. It was also predicted that the descriptive norm message – attitude/intention relationship is mediated by emotional responses which result from a discrepancy between prior recycling activity and the descriptive norm message. In the main experiment, one hundred-eighty-eight college students were exposed to either a high prevalence or a low prevalence message. Prior recycling behavior, aroused emotions, message processing, attitude, and intention to recycling were measured to see if any differences existed as a function of the individual's prior recycling behavior and descriptive norm message exposure. Overall, results indicated that prior recycling moderated only the relationship between descriptive norms messages and intention to recycling. Descriptive norms message was a significant predictor of feelings of satisfaction while prior recycling behavior was a significant predictor of feelings of guilt. There was no significant difference in the number of thoughts across experimental condition. There was a significant difference between recyclers in the high prevalence condition and those in the low prevalence condition in

valence of thoughts such that recyclers in the high prevalence condition had greater number of positive thoughts while recyclers in the low prevalence condition had fewer number of positive thoughts.

Key-word: descriptive norm messages, prior behavior, emotion, cognitive processing, intention to recycling.

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## INTRODUCTION

Socially desirable behaviors are those behaviors that the majority of people in society think are the right things to do for the collective, although an individual might not directly benefit from performing them (Cialdini, Kallgren, & Reno, 1991; Kallgren, Reno, & Cialdini, 2000). Recycling is a socially desirable behavior since most people acknowledge the necessity of recycling although it is personally costly (Smith, Haugtvedt, & Petty, 1994). Some people still do not recycle despite growing public concern about recycling and the recognition of the importance of recycling (Harrison Poll, 2007). Efforts have been made to improve recycling rates using social norms campaigns, however, some of them have cautioned that informing non-recyclers of the prevalence of recycling or the descriptive norm, may lead to arousal of negative emotions such as guilt (Dannenbergh, Hausman, Lawrence, & Powell, 2012).

Studies have shown that pro-social behaviors including recycling can be predicted by the perception of social prevalence or approval of the desirable behavior (Cialdini, 2003; Kaiser & Shimoda, 1999). Such perceived public support is essential to social movements (Stern, Dietz, Abel, & Kalof, 1999). Many studies have examined the cognitive mechanisms of how perceived normative information influences attitudes, intention, and behavior (Jacobson, Mortensen, & Cialdini, 2011; Rimal, 2008). However, there is little literature exploring the role of emotions in the persuasive power of normative information. This study attempts to fill this gap by exploring the emotions that emerge as a result of the discrepancy between one's previous behavior and the prevalence of a behavior described in norms messages; it also looks at the effects of emotion-eliciting normative messages on attitudes and behaviors.

Focus theory of normative conduct (FTNC) (Cialdini et al., 1991; Cialdini, Reno, & Kallgren, 1990) provides a theoretical framework to examine the effects of perceived social



norms to improve recycling among young people. According to the theory, when social norms are salient, individuals behave based on their observation of what the majority does. This is because the popularity of a particular behavior is an indicator of an effective or helpful behavior in a given context (Cialdini, 2011; Goldstein & Cialdini, 2011).

Based on focus theory and the research on the role of discrete emotions in persuasion, this study predicts the effects of descriptive normative information on young people's attitudes and behavioral intentions toward recycling. It is also predicted that the normative information – attitude/intention relationship is mediated by emotional responses (satisfaction or guilt) which result from a discrepancy between prior recycling activity and normative information. Thus, this study attempts to explore the underlying cognitive and affective mechanisms of how normative information influences people's behaviors through arousing emotions. This paper begins with a review of relevant literature and then hypotheses and research questions are proposed. To test the hypotheses and to answer the research questions, the method for an experiment is detailed. Next, in the results section, preliminary data analyses are described and the findings from the experiment are addressed. Finally, the implications of the results are discussed along with the limitations of the study and suggestions for future research.

## **LITERATURE REVIEW**

### **The Focus Theory of Normative Conduct (FTNC)**

Social science researchers have discussed the role of social norms in influencing behavior and put effort into refining the definition of norms (Pepitone, 1976; Schaffer, 1983). Cialdini and Trost (1998) define norms as standards which describe and guide behavior. Rimal and Real (2003) conceptualize norms as the codes of conduct corresponding to one's group, which are communicated through social interaction. Social norms can be defined as social standards which inform and guide behavior via social interaction (Rimal & Real, 2003). These behavioral standards are understood, created, and maintained through people's cognitive and affective processing of nonverbal and verbal messages through observation or communication.

According to focus theory of normative conduct (FTNC), social norms can be categorized into two distinct types, descriptive and injunctive norms, both of which influence behaviors (Cialdini et al., 1991; Cialdini et al., 1990; Kallgren et al., 2000). Descriptive norms refer to what is commonly done in a society while injunctive norms refer to that which is commonly approved and disapproved. A primary difference between descriptive norms and injunctive norms is social sanctions; descriptive norms do not entail social sanctions for non-compliance with the norm (Cialdini et al., 1990). That is to say, descriptive norms motivate individuals to behave by informing them of what is likely to be an effective or helpful behavior in the society while injunctive norms motivate via real or anticipated social punishment. Cialdini (2011) argued that the components of descriptive norms and injunctive norms in a message should work in different ways because of the distinct motivational mechanism of each norm.

Descriptive norms are related to intrapersonal goals (e.g., making accurate/efficient decisions) which can be achieved by applying the heuristic rule 'most others do it so I will too',

through observing others' behaviors (Cialdini & Trost, 1998). On the other hand, injunctive norms are more closely associated with interpersonal goals (e.g., gaining/maintaining social approval) which demands an understanding of the culture's moral rules, that is, what others tend to approve or disapprove (Goldstein & Cialdini, 2011). For example, Goldstein, Cialdini, and Griskevicius's study (2008, Experiment 1) showed that using normative influence (i.e., informing targets about what the majority has been doing to protect the environment), it was more effective to persuade people to reuse a hotel towel compared to just providing arguments for the importance of environmental protection in a standard message. Specifically, the results indicated that 44% of people who received the message including descriptive normative information reused the hotel towel while 35% of people who received the standard message without descriptive normative information reused it. This shows that it is persuasive to inform people that the majority is following a particular desirable behavior. Also, a study conducted by Cialdini et al., (1990) indicated that participants littered in an already littered environment (i.e., showing the prevalence of littering) rather than in a clean environment since the descriptive norms regarding pro-littering was more prominent than the anti-littering one. From these results it can be inferred that people are more likely to perform a certain behavior when they perceive the behavior as socially prevalent regardless of whether the behavior is socially desirable or not.

In addition to the importance of distinguishing between the two different types of social norms, FTNC addresses the issue of the salience of normative effects; explaining why normative influence occurs. When descriptive norms or injunctive norms are salient, normative influence is more likely to occur and people will engage in norms-congruent behavior (Cialdini, 2011; Cialdini et al., 1991; Goldstein & Cialdini, 2011). Salient norms are those which are focal to people. Enhancing salience occurs through highlighting or making people focused on the norms

and can occur when an individual views a message including normative information or where an individual has distinctive dispositional factors activating a particular norm (Goldstein & Cialdini, 2011; Jacobson et al., 2011; Kallgren et al., 2000). According to FTNC, salient norms can activate behavior, whereas non-salient or less salient norms cannot. People should be more likely to perform norm-congruent behaviors when the norm within a message is prominently emphasized (Cialdini & Goldstein, 2004).

Several previous studies support the FTNC effects for descriptive norms. For example, Cialdini et al., (1990) manipulated descriptive norms and salience to determine their effects on littering. Specifically, these researchers manipulated the descriptive norms into either a dirty environment (i.e., indicating the high prevalence of littering) or a clean environment (i.e., indicating the low prevalence of littering). Normative salience was manipulated as high or low by including a confederate. In the high-norm salience condition, the confederate dropped garbage into either a dirty or clean environment while in the low salience condition, (s)he just walked by a garbage can in either a dirty or clean environment without littering. The results showed that participants in the littered environment with high-norms salience were most likely to litter than others following the salient high descriptive norms. On the other hand, participants who were in the clean environment with high-norms salience condition littered the least because it was salient to them that littering was as an unpopular behavior. That is to say, the stark contrast between the clean environment and the confederate's behavior (littering), led to norms-salience effects. These findings could be interpreted as indicating that people tended to perform certain behaviors when they were exposed to descriptive normative information showing that a particular behavior was socially prevalent (Goldstein et al., 2008) because it enhances the salience of norms. Importantly,

a number of studies have been designed to understand the motivators of recycling; several of which address the role of social norms in this process.

### **Previous Literature: Persuading People to Recycle**

There have been a number of studies designed to improve recycling rates, some of which have addressed the role of social norms in recycling. For example, Park, Levine, and Sharkey (1998) applied theory of reasoned action (TRA; Fishbein & Ajzen, 1975) and self-construal to predict one's motivation toward recycling. The two predictors of intention toward recycling, attitude and subjective norms, had a significant effect on behavioral intention toward recycling. However, independent self-construal and interdependent self-construal had no direct effect on behavioral intention toward recycling. Theory of planned behavior (TPB; Ajzen, 1991) has also been used to predict paper recycling in an inter-cultural context: Thailand and the U.S. (Chaisamrej & Zimmerman, 2007). In their study, personal values, altruism and cultural value (self-construal) were added to three major components of TPB, attitude, subjective norms, and perceive behavioral control (PBC). They found that subjective norms and PBC were the predictors of one's intention to engage in paper recycling for the two different cultures depending on the level of altruism. For both countries, participants who had high levels of altruism were more likely to intend to recycle than those who had low levels of altruism. Furthermore, one's altruistic value predicted attitude and PBC toward recycling. On the other hand, the attitude component had an effect on only the U.S. participants' intention toward paper recycling.

Although previous findings have demonstrated the effectiveness of the TRA and TPB concepts, including subjective norms, to predict behavioral intention, many studies indicate the need to improve the predictive power of these theories by including factors such as affective

states (i.e., anticipated regret) and moral norms (Conner & Armitage, 1998; Parker, Manstead, & Stradling, 1995; Ravis, Sheeran, & Armitage, 2009), descriptive norms and group identification (Norman, Clark, & Walker, 2005), and personal- and societal-levels of social norms (Park & Smith, 2007). Some of this research (Norman et al., 2005; Parker et al., 1995; Ravis et al., 2009) indicates that the inclusion of additional normative (i.e., moral norm and descriptive norms) and affective (i.e., anticipated regret) components in the TPB substantially improved prediction of behavioral intentions.

In addition to normative influence, previous literature also has explored various ways to persuade people to actively engage in recycling by varying the nature of the messages used to influence people. For example, recent research by Kronrod, Grinstein, and Wathieu (2012) compared the relative persuasive effects between assertive message appeals and suggestive message appeals. Previous studies indicated assertive requests would violate one's drive for freedom (Dillard & Shen, 2005; Dillard, Steven, James, & Terry, 1997). Consequently, Kronrod et al., (2012) predicted assertive appeals would be less effective in persuading people to engage in pro-social behavior. However, they found that the effect of assertive appeals depended on one's level of perceived importance of the issue of recycling. In other words, the assertive appeal was effective among people with higher levels of perceived importance of recycling while the suggestive phrasing had persuasive power for people who attributed lower levels of importance to the behavior. Although this study did not measure participants' affective responses to different message appeals, it might be reasonable to assume that if people strongly believe that recycling is the right thing to do, they might rarely perceive the violation of their freedom when they are exposed to the assertive appeal message because the assertive phrasing corresponds with their beliefs.

Loroz (2007) also examined the interaction between message frames (positive vs. negative) and reference points (self vs. self-other) on attitudes and intentions toward prosocial behaviors including recycling and prevention of HPV. The results illustrated that participants who received a positively framed message paired with self-other reference point or a negatively framed message paired with self-reference point had more positive attitudes and intentions toward recycling compared to others who received unmatched messages. White, MacDonnell, and Dahl (2011) showed similar message effects between gain/loss-framed messages and one's construal level. Specifically, when the loss-framed message (i.e., one that describes recycling as a way to avoid losing/wasting resources) was matched with concrete construal, and the gain-framed message (i.e., one that describes recycling as a way to save/gain resources) was matched with abstract construal, their persuasive effects were greater than when the messages were unmatched. Further, they explored the role of mediators of 1) processing fluency and 2) increased efficacy in explaining matching effect on intention toward recycling. According to their results, individuals who received matched messages were more likely to process messages easily relative to those who received unmatched messages; this led to enhanced self-efficacy. Consequently, this process generated greater intention to be active recyclers. Findings from these studies (Kronrod et al., 2012; Loroz, 2007; White et al., 2011) provide guidelines for how to create effective persuasive messages to persuade people to recycle considering the influence of individual differences.

There is some research to suggest that beyond the social-psychological drivers of behaviors described above, emotional response to messages may play a role in motivating recycling behaviors. In a study designed to describe young people's recycling behaviors, Dannenberg et al., (2012) conducted in-depth interviews with college students. These interviews

indicated that students recognized the importance of environmental issues and showed intentions to engage in sustainable behaviors including recycling. At the same time, students expressed the lack of time and resources, which resulted from conflicting demands. The authors argued that social norms might have little effect on behavioral change because young people already know that recycling is necessary, but they rarely recycled because of the lack of time. They concluded that young people might feel guilty when they are informed that recycling is the norm because of their own inaction. Accordingly, the present study takes into account this possibility by exploring the effect of discrepancy between one's prior recycling activity and the normative information indicating the prevalence of recycling on young people's attitude and intention toward recycling, which is possibly mediated by emotional mechanisms, specifically: satisfaction and guilt.

In the current study, it is expected that the discrepancy between an individual's previous recycling behavior and the prevalence of recycling portrayed in a message would differently influence one's attitude and intention toward recycling through emotional responses. Little is known about the role of emotion generated by appraisal of descriptive normative information in changing people's attitudes and behavioral intentions despite the fact that emotional response to messages is an important motivator of individual behavior (Nabi, 2010). Accordingly, this study attempts to explore the role of emotions as mediators of the discrepancy between one's prior behavior and descriptive normative information, and these effects on attitude and intention. The following section reviews in detail two approaches to studying the effects of emotions on persuasion with a particular focus on two emotions thought to result from social norms messages: guilt and satisfaction.



## Emotions and Social Norms

Emotion, a psychological construct, can be defined as “internal mental states representing evaluative valenced reactions to events, agents, or objects that vary in intensity” (Nabi, 2010, p. 153). Approaches to emotion can be broadly categorized into two perspectives: dimensional and discrete (Bolls, 2010; Lazarus, 1991; Nabi, 2010). Both approaches commonly posit that emotion plays a significant role in persuasion. In the dimensional perspective, emotion emerges from basic motivational processes, either appetitive or aversive motivational subsystems. Through the process, the direction of emotion can range from a pleasant response to an unpleasant response with different levels of arousal (Bolls, 2010). The effect of emotions on attitude, intention and/or behavior change mainly depends on the direction and intensity of the aroused emotion. However, several studies contended that a discrete emotional perspective allows researchers to better understand the persuasion process compared to the dimensional, which is simply based on valence (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Dillard & Nabi, 2006; Dillard & Peck, 2000; 2001; Nabi, 1999; 2002; 2010; O’Keefe, 2002). This is because the discrete emotion perspective specifies differences between different emotions and allows prediction of how people respond to each distinct emotion (Cornner & Armitage, 1998; Griskevicius, Goldstein, Mortensen, Sundie, Cialdini, & Kenrick, 2009; Nabi, 2010).

According to the discrete perspective, emotions can be divided into discrete categories. Each discrete emotion emerges from one’s evaluative appraisal of the relationship between one’s goal and the environment (Nabi, 1999). Each emotion has a distinctive goal and its corresponding action tendency to serve adaptive functions, which can influence attitudes, intention, and/or behavior. The perceived discrepancy between the goal and environment generates negative emotional states while the perception of compatibility of goal-environment

yields positive emotions (Dillard & Nabi, 2006). For example, guilt is aroused when an individual violates a moral or ethical code against oneself or society, and thus another person may be harmed by the individual's action or inaction (Lazarus, 1991). Bierbrauer (1992) contended that people feel guilty when they violate norms; when people feel guilty, they tend to blame themselves through self-reflection. From the evolutionary perspective, this negative affect needs to be alleviated through the corresponding action tendency such as reparation for the harm or seeking punishment (Baumann, Cialdini, & Kendrick, 1981; Dillard & Peck, 2000; Kugler & Jones, 1992; Nabi, 1999; 2010). The feeling of guilt is a form of self-sanction, which motivates appropriate deeds and instills a sense of social responsibility in a constructive way. However, too strong a feeling of guilt may arouse psychological resistance eliciting resentment, annoyance, and irritation, which may lead to a decrease in the effect of persuasive message on attitude or intention (O'Keefe, 2002).

Previous studies indicate that guilt is motivational in that it encourages various pro-social behaviors including helping others (Boster, Mitchell, Lapinski, Cooper, Orrego, & Reinke, 1999; Carlsmith & Gross, 1969), giving donations (Basil, Ridgway, & Basil, 2006; 2008; Hibbert, Smith, Davies, & Ireland, 2007; Massi, 2005), and getting health screening for others (Hullett, 2004). In these studies, one's perception of responsibility elicited feelings of guilt, which, in turn, motivated people to perform an action that increased positive emotion thereby reducing feelings of guilt.

Research has also explored the association between persuasion and positive discrete emotions such as satisfaction, happiness and pride (De Young, 1986; Dillard et al., 1996; Dillard & Peck, 2000; 2001, Lazarus 1991). Theories of positive emotion indicate that positive emotions are attained when one's goal and environment are compatible (Dillard & Nabi, 2006; Dillard &

Peck, 2001; Lazarus, 1991; Nabi, 1999; 2010; Shaver, Schwartz, Kirson, & O'Connor, 1987) and the concept of discrete emotional response has dominated this paradigm. Yet, the identification of discrete positive emotions, like negative emotions, is complex (see Table 1). For example, Shaver et al., (1987) categorized human emotions into six basic categories (i.e., love, joy, anger, sadness, fear, and surprise) and explored hierarchical structures of these basic human emotions. Their analysis indicated that joy was a higher-order concept embracing sub-categories such as pride, or satisfaction. According to their findings, people who succeeded in their tasks and had a sense of achievement felt joy. They were also joyful when they were accepted by the surrounding environment and had a feeling of belonging (Shaver et al., 1987). According to Lazarus (1991), happiness as feeling people have when they make reasonable progress toward their goals and when they expect positive outcomes, which is similar to satisfaction or contentment. Pride was conceptualized as a feeling people have when they enhance their ego-identity (i.e., self- and social- esteem) by taking credit for an achievement for themselves or for someone or groups with whom they identify (Lazarus, 1991). That is to say, the critical others between happiness and pride is whether credit is given to oneself or to others.

Dillard and Peck (2000; 2001) conceptualized happiness and contentment/satisfaction distinctively, and measured the two discrete positive emotions. They defined happiness as a feeling people have when they achieve or make progress toward their goals and as a function of self-rewarding behavior. Contentment or satisfaction was defined as a feeling people have when they are absent from threats and as a function of conserving resources.

Among the discrete positive emotions, De Young (1985-1986; 1986; 1996) found that intrinsic personal satisfaction was the most important motivational emotion for recycling. Recyclers who actively participated in recycling were satisfied with their behaviors and

continued to perform them on their own since they wanted to maintain their positive emotions. According to Oliver (1980), people tend to be satisfied with themselves when they have an initial standard/goal and experience some positive discrepancy from the standard. Along with the role of descriptive normative information as an indicator of an efficient or helpful behavior, it is reasonable to assume that an individual would have his/her own standard in accord with descriptive normative information and experience a discrepancy between his/her prior behavior and the standard. Satisfaction, as a sub-category of happiness/joy, reflects those antecedents and responses (Lazarus 1991; Shaver et al., 1987). Accordingly, because experiencing positive affect is rewarding, when people experience positive affect such as satisfaction, they tend to maintain or elevate their emotional states by performing behaviors that result in positive emotion.

In a study of recycling and emotional appeals, Lord (1994) explored the effect of affective appeals (fear vs. satisfaction) and source types (advertising, publicity, and personal-influence) on motivating people to engage in their community's recycling program. In the study, fear was manipulated by showing risks from the failure to recycle while satisfaction was manipulated by indicating environmental benefits and personal and social satisfaction arising from recycling. Also, each source type was manipulated by presenting the source directly. For example, the advertising type was designed to appear as an ad for a fake company name. The publicity was a type of news article, and the personal type was in the form of a letter. The results showed that the positively framed satisfaction appeal message led to more favorable beliefs and attitudes toward recycling. On the other hand, the negatively framed fear appeal message was more effective to increase recycling behavior.

In their work examining the weak relationship between attitudes and behaviors for pro-social behaviors, Smith et al., (1994) argued for the importance of the consideration of the

affective aspects of such behaviors. In their survey, participants were asked to indicate their feelings, both satisfaction and guilt when they do or do not recycle. The results showed that the affect associated with recycling had greater power to predict one's recycling behavior among people who had weak attitudes toward recycling than among people with strong attitudes. Other research on recycling provides evidence that one's attitude, intention and/or behavior are closely associated with affect. Meneses' (2010) study indicated that one's level of involvement with recycling was more dependent on cognitive factors such as knowledge of recycling and ecological conscience than emotions, while actual recycling behavior was more dependent on emotion rather than cognition since people have directly or indirectly experienced what recycling is and how to recycle (making cognitions less important). The finding implies that if people have knowledge of how to recycle and self-efficacy about recycling behaviors, they may rely on aroused emotion when they decide to recycle. This section has addressed the affective predictors of recycling. Given the persuasive effects of descriptive normative information and emotions discussed above, the current study makes predictions about their effects on attitude and intention toward recycling in the following section.

## **HYPOTHESES AND RESEARCH QUESTIONS**

The literature reviewed above suggests that recycling behaviors might be susceptible to normative influence, but that emotions could be elicited from norms messages. Thøgersen (1996) contended that ecologically-oriented behaviors such as recycling are categorized within the area of morality. Although external incentives such as monetary benefits also have an effect on recycling behavior, people are more likely to regard the conduct of recycling as beliefs about right and wrong rather than comparing costs and benefits (Viscusi, Huber, & Bell, 2011). In this way, recycling is a behavior guided by the norm that recycling is the morally correct behavior (Cialdini et al., 1991; Kallgren et al., 2000). Previous studies examined the effect of moral norms on recycling and found the predictive power of moral norms on intention to recycle (Kaiser, Ranney, Hartig, & Bowler, 1999; Kaiser & Shimoda, 1999). These studies indicate that it may be reasonable to regard recycling as a socially desirable activity. Thus, people are encouraged to participate in recycling, yet not everyone does participate. To promote recycling, it might be not enough to only argue the social desirability of the behavior.

According to FTNC, each type of social norm has a distinctive motivational mechanism; descriptive norms motivate people to follow the normative behavior by showing them the prevalence of the behavior while injunctive norms stimulate people to perform the normative behavior by showing them the approved behavior (Goldstein & Cialdini, 2011). Descriptive normative information indicating what the majority is doing plays the role of a guide for popular and effective behavior. That is to say, descriptive normative information can be a standard or goal when a person makes a decision about what s/he will do later. Given the role of descriptive normative information as a standard, recyclers should experience satisfaction when they are exposed to a descriptive norm message indicating low prevalence of recycling relative to when

they are exposed to the message indicating high prevalence of recycling. That is, when viewing messages about low prevalence, recyclers will think that they have been performing better than other people and are likely to subsequently feel satisfied.

According to Oliver (1993), satisfaction occurs when one's positive expectations are fulfilled or exceeded. Lazarus (1991) also contended that individuals will be satisfied with themselves or their behaviors when they perform well to achieve their goals. That is, satisfaction will be derived from a sense of achievement. It seems reasonable to expect that recyclers who have actively engaged in recycling would be more satisfied with themselves when they are informed that this behavior exceeds the social norm. Thus, recyclers who are exposed to a message indicating low prevalence of recycling would be more satisfied with themselves than recyclers who are exposed to a message indicating high prevalence of recycling.

On the contrary, it is predicted here that people who rarely recycle will experience guilt when they are exposed to a message indicating high prevalence of recycling relative to when they are exposed to a message indicating low prevalence of recycling. This is because the message highlights the fact that they have failed to perform a behavior that the majority is actively performing. Baumeister, Stillwell, and Heatherton (1994) argued that guilt is aroused by the perception that one has performed non-normatively or that one has failed to behave normatively. Considering the nature of recycling behavior in a society, and the causes and processes which result in emotional consequences, the current study predicts:

H1: The effect of descriptive norm messages on satisfaction will be moderated by prior recycling behavior such that recyclers, relative to non-recyclers, will experience the most satisfaction in the low versus high prevalence message condition.

H2: The effect of descriptive norm messages on guilt will be moderated by prior recycling behavior such that non-recyclers, relative to recyclers, will experience the most guilt in the high versus low prevalence message condition.

Research on discrete emotions indicates a number of different potential categories of positive emotion that might be driven by norms messages; additional research is needed to clarify the structures and relationships among discrete positive emotions (Bagozzi, 1991). In order to address this issue, the present study includes measures of multiple discrete positive and negative emotions and explores whether satisfaction is the positive emotion most closely related to recycling among recyclers relative to other positive emotions including happiness and pride. Similarly, it seeks to determine whether guilt is the primary emotion elicited by the high descriptive norms message relative to other negative emotions including fear and anger. To help better understand the characteristics of recycling as well as of the relationships among the discrete positive emotions, this study poses the following research questions:

RQ1: Do recyclers experience greater satisfaction than other positive emotions when they are exposed to a message indicating low prevalence?

RQ2: Do non-recyclers experience greater guilt than other negative or neutral emotions when they are exposed to a message indicating high prevalence?

Conner and Armitage (1998) contend that past behavior (i.e., the consumption of sweet and fried foods, smoking, and exercise) is a powerful predictor of a future behavior. Research has found that prior behavior predicts future behavior, but it remains relatively unclear the process by which one's past behavior impacts one's future behavior. For example, Aarts, Verplanken, and van Knippenberg (1998), in a study of transportation preferences, showed that habitual past behaviors (i.e., frequent performance) were more closely related to simplified



decision making processes rather than rational information processing. This means that people were likely to perform the same behavior they conducted in the past, such as using the same mode of transportation, rather than thinking carefully about new information about it. Past behavior can be an influential source of information in some cases; however, its influence depends on the nature of the behavior (Aarts et al., 1998). Accordingly, in an effort to extend the explanatory power of prior behavior as a source of information, this study examines the extent to which prior behavior plays a role in triggering information processing in response to normative messages about recycling behavior. It is predicted here that when people are exposed to normative messages indicating the prevalence of recycling, they compare their past performance with other people's behaviors.

According to the heuristic-systematic model (HSM) of persuasion, there are two distinct routes of information processing: systematic processing and heuristic processing (Chaiken, 1987; Chaiken, Liberman, & Eagly, 1989; Zuckerman & Chaiken, 1998). HSM posits that two routes of information processing can occur simultaneously with one predominating in some cases. Systematic processing involves careful and effortful consideration of information and results in more thinking about the message; motivation and/or ability drive people to carefully scrutinize the message content. For example, when people perceive a message as relevant or important to them, they are more likely to embark on systematic processing. Subsequently, people who primarily process a message systematically tend to generate more thoughts about issue-relevant arguments than those who heuristically process it because they analyze the given message more carefully. On the other hand, heuristic processing occurs when people depend on simple decision rules without analytical and effortful scrutiny of information.

Dillard and Nabi (2006) contend that emotions can have a direct effect on information processing through their distinct action tendency of each discrete emotion but also that emotions may work with cognitions during the processing. That is, affect may serve as an additional source of information. Previous studies have provided mixed explanations regarding the role of affect in information processing. Some studies have shown that people in a positive mood engage in increased systematic processing in order to maintain the positive mood while other studies have shown that those in a positive mood engage in reduced systematic processing because the cognitive capacity was reduced while activating memories that produce positive feelings (Zuckerman & Chaiken, 1998). Accordingly, Wegener, Petty, and Smith (1995) specified the relationship between positive mood and information processing under certain conditions; people in a positive mood tend to engage in systematic processing when they process uplifting messages but tend to engage in less systematic processing when processing depressing messages. Along with these findings, it is reasonable to predict that recyclers who have actively engaged in recycling will be more likely to engage in systematic processing when they are exposed to a descriptive normative message indicating low prevalence of recycling which arouses higher levels of satisfaction, compared to that indicating high prevalence of recycling which arouses lower levels of satisfaction.

Some research has shown that negative feelings such as fear lead to reduced systematic processing because defensive avoidance resulting from strong negative feelings causes people to feel high levels of stress, and thus discourages them from processing a message carefully (Gleicher & Petty, 1992). On the other hand, other research has argued that negative feelings may increase systematic processing in some cases (Schwarz, 1990; Zuckerman & Chaiken, 1998). For example, people who have negative feelings such as guilt will be motivated to process

a message systematically if they want to be more confident in their judgement or decision because the uncomfortable feelings such as guilt need to be resolved.

In the present study, it is expected that non-recyclers either in the high-prevalence condition or the low-prevalence condition will not experience strong feelings of guilt or fear because the descriptive normative information does not imply sanction or punishment. In regard to this expectation, the greater feeling of guilt people experience, the greater needs to resolve the uncomfortable feelings they will have. Naturally, one's motivation to engage in systematic processing will depend on the extent to which emotions, either satisfaction or guilt, are aroused. It is reasonable to predict that non-recyclers will be more likely to process information systematically when they are exposed to a descriptive normative message indicating the high prevalence of recycling which arouses higher feeling of guilt, compared to that indicating low prevalence of recycling which arouses lower feelings of guilt. With reference to the cognitive mechanisms between normative information and behavior in FTNC, this study predicted that as discrepancy between one's prior recycling behavior and the prevalence of recycling portrayed in a descriptive norm message is greater, one will show greater affective response. Accordingly, both the greater discrepancy and the greater degree of aroused emotions will activate systematic processing. Considering the nature of recycling behavior in a society, and the causes and processes which result emotional consequences, the current study predicts:

The effects of the descriptive norm messages on message-relevant thoughts (both positive and negative) will be moderated by prior recycling behavior such that:

H3a: Recyclers will produce a higher number of total message-relevant thoughts, both positive and negative, in the low versus high prevalence message condition.

H3b: Non-recyclers will produce a higher number of total message-relevant thoughts, both positive and negative, in the high versus low prevalence message condition.

The ways in which the normative messages and prior behavior will be linked with the valence of the thoughts are less clear. Mathur and Chattopadhyay (1991) explored that the effects of television program-induced moods on cognitive processing of embedded advertisements. In their experiment, participants were asked to write down their thoughts about the advertisements after being exposed to either a happy or sad program. Their findings showed a significant positive association between the valence of moods and the valence of thoughts; participants who were exposed to a happy program generated a greater number of positive thoughts about advertisements than did those who are exposed to a sad program. In line with this finding, it may be assumed that recyclers, relative to non-recyclers, will produce a higher number of positive message-relevant thoughts in the low versus high prevalence message condition since they will experience the most positive affect, satisfaction. On the contrary, non-recyclers, relative to recyclers, will produce a higher number of negative message-relevant thoughts in the high versus low prevalence message condition because they will experience the most negative emotion, guilt.

At least one study, however, would lead to a different hypothesis. Dillard et al. (1996) predicted a positive association between the valence of affective response and the valence of the dominant cognitive response while examining affective responses to HIV/AIDS PSAs. Their findings indicated that there was no statistically significant association between six affective responses (i.e. surprise, puzzlement, happiness, fear, anger and sadness) and the valence of the dominant cognitive response. In reference to the mixed results, this study posed a research question regarding the association between the affective responses and the valence of thoughts about the messages indicating prevalence of recycling.

RQ3: Does the pattern of the valence of thoughts vary by experimental conditions?

Previous studies have found that satisfaction is one of the most critical motivations to encourage recycling (De Young, 1985-1986; 1986; 1996; Lord, 1994; Smith et al., 1994). For example, positively framed messages appealing to satisfaction led to more positive attitudes toward recycling (Lord, 1994). Attitude, for the purpose of this study, is defined as a combination of an individual's evaluations about a given issue, object, person, or behavior including both affective (i.e. evaluations) and cognitive (i.e. beliefs) properties (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986). Affective properties refer to one's feelings toward the behavior (i.e. excited or bored), and cognitive properties refer to traits and characteristics of the behavior (i.e. beneficial/harmful) (Crites, Fabrigar, & Petty, 1994). In this study, affective properties in attitude may be closely associated with one's evaluation of recycling behavior itself, while the emotions (i.e. satisfaction or guilt) which are induced by the discrepancy between one's prior recycling behavior and the prevalence of recycling in a message may be closely related to one's assessment of one's past performance. Based on the findings from previous studies (De Young, 1985-1986; 1986; 1996; Lord, 1994), it seems reasonable to predict that a behavior that brings about positive emotions about oneself such as satisfaction will yield a positive attitude. Furthermore, recyclers who experience satisfaction are likely to continue to recycle because of the need to maintain positive emotions (De Young, 1985-1986; 1986; 1996; Meneses, 2010). Based on these findings, this study predicts:

H4: Recyclers in the low prevalence message condition will have more positive attitude toward recycling than those who in the high prevalence message condition.

H5: Recyclers in the low prevalence message condition will be more likely to intend to recycle than those in the high prevalence message condition.

H6: For recyclers, the effects of descriptive norm messages on behavioral intent will be mediated by satisfaction.

Once guilt generates an unpleasant affective state, people are motivated to engage in recommended or desirable behaviors which produce positive affect in order to alleviate such negative feelings (Baumann et al., 1981). Accordingly, people who have higher levels of feelings of guilt, as a result of perceived discrepancy via self-reflection between one's previous inaction and the high prevalence of the action, will actively attempt to alleviate their strong negative states indicating positive attitudes and strong intentions toward recycling in order to reduce their feelings of guilt. Taking into account aversive aspect of feelings of guilt and an individual's need to alleviate it (Baumann et al., 1981; Nabi, 1999; O'Keefe, 2002), the current study predicts:

H7: Non-recyclers in the high prevalence message condition will have more positive attitude toward recycling than those in the low prevalence message condition.

H8: Non-recyclers in the high prevalence message condition will be more likely to intend to recycle than those in the low prevalence message condition.

H9: For non-recyclers, the effects of descriptive norm messages on behavioral intent will be mediated by guilt.

To sum up, the discrepancy between one's previous recycling activity and the descriptive norm messages will lead to emotional consequences and cognitive appraisal, which, in turn, influence attitude and/or intention toward recycling. Nabi (2010) contended that it is important to research the specific emotional state as well as the onset of emotional experiences since it may improve the predictive power of human's behavioral outcomes. This study attempts to provide an explanation of the effects of normative influence by exploring the emotional

process as a mediator in the relationship between descriptive normative information and young people's attitudes and intentions toward recycling.

## METHOD

### Design Overview

To test the study hypotheses and answer the research questions, this study consisted of a pilot study and a main experiment. The purpose of the pilot study was to check the manipulation of the independent variable (i.e., messages about the prevalence of recycling) as well as the quality of messages (i.e., believability and persuasiveness). In the main experiment, a 2 (prevalence of recycling: High versus Low) x 2 (prior recycling behavior: Recycler versus Non-recycler) pre-post test mixed design was employed. Participants' past recycling behavior was a measured within-subject factor and the prevalence of recycling was manipulated in the messages; emotions, attitudes, and behavioral intent were the measured dependent variables. In the pre-test, all participants were asked to report their participation in environmental activities including prior recycling behavior. After completing these questions, all participants were randomly assigned to watch a video message indicating the prevalence of recycling (i.e., high or low). After watching a video message, they were asked to report their emotional responses, thoughts about recycling, attitudes, and behavioral intentions toward recycling as outcome variables.

### Stimulus Material

This study used a video as the stimuli to persuade participants to recycle (Appendix A). The documentary film, *Making it Work*, was created by students at Michigan State University.<sup>1</sup> The short film has a running time of about 11 minutes and includes interviews with students, faculty, and staff around from MSU. The main story of the film is what people at MSU can recycle and what they think about recycling. For the interest of current study, the video was shortened to a running time of around three minutes to reduce participants' fatigue. The edited video included content about the type of materials students recycle, how they recycle, and why



they do it.<sup>2</sup> The descriptive normative content was added in the first and last scenes of the video to show the prevalence of recycling among MSU students. The messages for the high and low prevalence conditions were exactly the same except the prevalence manipulation. The descriptive normative information (i.e., the prevalence) was manipulated using either a high or low percentage of students who recycle. The high prevalence message stated: *In 2012, 80% of MSU students recycled the paper they used.* The low prevalence message stated: *In 2012, 20% of MSU students recycled the paper they used.*<sup>3</sup>

### **Pilot Study**

The purpose of the pilot study was to test whether the independent variable was manipulated as intended. In this study, for a message containing high descriptive normative information, participants should perceive the message as showing the high prevalence of recycling as well as perceive that recycling is a prevalent behavior among MSU students; for the message containing low descriptive normative information, participants should perceive the message as showing low prevalence of recycling as well as perceive that recycling is a less prevalent behavior among MSU students than those receiving the high prevalence message. A small sample ( $N = 68$ ) was used in the pilot study. Participants were recruited from a participant pool maintained in the Department of Communication at a Midwestern university in the U.S. They were randomly assigned to watch one of two video messages.

After viewing the messages on the website, an online survey was completed by participants to measure the manipulation of the independent variable (all pilot test items were presented in Appendix B). Perceived descriptive normative content in the message was measured with four items with a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Evidence for the reliability and validity of the scale using a 5-point response format was

provided in a previous study (Lapinski, Maloney, Braz, & Shulman, 2013,  $\alpha = .89$ ). The examples included such as: “*The information presented above indicates that most students at MSU engage in recycling the paper they use.*” and “*Clearly, this message shows that not many students at MSU are recycling the paper they use.*” The perceived prevalence of recycling among MSU students was measured with four items with a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) adopted from a study conducted by Lapinski et al., (2013;  $\alpha = .91$ ). The examples included such as: “*Most students at MSU actively recycle the paper they use.*” and “*The majority of the students at MSU actively recycle the paper they use.*”

To determine the possible effects of confounds, the extent to which people perceived the approval of recycling among MSU students and perceived the injunctive normative content in the message were measured. Each measure was adopted from a previous study (Lapinski, Rimal, DeVries, & Lee, 2007,  $\alpha = .80$ ) and consisted of four items with a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The measure for the perceived approval of recycling included examples such as: “*It is clear that many students believe paper recycling is important.*” and “*People at MSU approve of paper recycling.*” The measure for the perceived injunctive normative content in the message included examples such as: “*Based on the video, I feel like students at MSU would think less of me if I didn’t recycle the paper I use.*” and “*This video shows that people around me would respect me more if I recycled paper I use.*”

In addition, the quality of messages (i.e. believability and persuasiveness) was checked. To check the believability of a message, three items with a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) were adapted from Chen’s study (2011,  $\alpha = .72$ ) and one item was created for the current study. For example, the believability measurement included items such as: “*I understand what the video is talking about.*” and “*I think the statistic in the*

*video seems believable.*” The persuasiveness of a message was assessed with three 7-point semantic differential items. Two items were adopted from Dillard and Peck’s study (2000,  $\alpha = .95$ ), which anchored with “*not at all convincing/very convincing*” and “*not at all persuasive/very persuasive*”. Additionally, one item was created for the current study anchored with “*not at all influential/very influential*”.

## **Main Experiment**

**Participants.** Participants for this study were undergraduate college students at a large public university in the Midwest. One hundred eighty eight college students were recruited from a participant pool maintained in the Department of Communication or from courses opened in the College of Arts and Science at the university. They were offered extra course credits for their participation. The age of participants ranged from 18 to 33 years old. The mean age of the participants was 20.90 years ( $SD = 1.86$  years). Most participants were Caucasian (61.7%), but the sample included people who reported as Asian (20.7%), African-American (12.2%), Asian-American (2.1%), Hispanic (1.6%), and Hispanic-American (.5%). Around two percent of the participants reported their race as “other”. The gender split was approximately even (female-54.8%). The sample comprised 43.9% seniors followed by juniors (29.4%), sophomores (17.6%), and freshmen (8%). Two participants (1.1%) did not report their year. Most participants lived off-campus (83.5%), and lived with roommate(s) (85.6%). Eleven participants (5.9%) affiliated to at least one pro-environmental group. Just over half of participants identified themselves as recyclers (58.5%).

**Procedure.** Participants were recruited from a participant pool in the Department of Communication or received an invitation email from their instructor. Once voluntarily choosing to participate in the study, they were provided a consent form (Appendix C). After agreeing to

the terms on the consent form, they were asked to complete an “Environmental Behaviors Scale” adopted from Lapinski et al. (2007). To reduce the possibility of demand characteristics, the scale included not only questions about recycling behavior but also filler questions about other environmentally friendly behaviors. First, participants answered screening questions asking about their use of recycling materials. When participants answered “Yes” to the screening question, they were asked to report how many times they engaged in recycling including paper, glass, metal cans, and plastic at home or while in the class (all pre-test items were presented in Appendix D).

After completing the pre-test, participants were told that each individual would view a video related to environmental behaviors in order to evaluate the quality of the video message. They were then randomly assigned to one of the two experimental conditions: the high or low prevalence message condition. Subsequently, all participants completed measures of main outcome variables, aroused emotions, cognitive processing, attitude, and intention. Additionally, they completed the measures for manipulation check and several demographic items in the post-test (all post-test items were presented in Appendix E). The experiment took approximately 25-30 minutes for participants to complete.

**Measures.** Each measure was checked for inter-item correlations, item contribution to scale reliability, and internal consistency.

### ***Independent Variables***

***Prior Recycling Behavior.*** Two independent scales were employed to measure the prior recycling behavior. First, the extent to which participants engaged in recycling several materials (i.e. paper, plastic, metal can, and glass) during the last 6 months was assessed with 8 items ranging from 1 *Never* to 5 *Always*. The measure included items such as: “*In the last 6 months,*

*how often did you recycle the paper you use at home or in the dorm?* and *“In the last 6 months, how often did you recycle the paper you use while in the class?”* Additionally, participants were asked to identify themselves as recyclers or non-recyclers with a single item.

### ***Dependent Variables***

***Aroused Emotions.*** Participants were asked to answer questions about their feelings of happiness, pride, satisfaction, and guilt for the main outcome variables. Measures of other negative or neutral emotions were also completed.

***Happiness.*** The extent to which participants experienced happiness when watching the video messages was measured with five items which were created for the current study. Five items used a 7-point Likert-type scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). The measure included items such as: *“While watching a video I felt happy”*, *“I felt joyful”*, *“I felt glad”*, *“I felt delighted”*, and *“I felt cheerful.”*

***Pride.*** The extent to which participants felt proud while viewing the message was measured with three items which were created for this study. The items used a 7-point Likert-type scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). The measure included items such as: *“While watching a video I felt proud”*, *“I felt accomplished”*, and *“I felt credited for myself because of my own behavior.”*

***Satisfaction.*** The extent to which participants experienced satisfaction when watching the video was measured with four items. One item was derived from previous literature in which satisfaction was measured with six items (Oliver, 1980,  $\alpha = .82$ ) and three items were created for this study. The items used a 7-point Likert-type scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). The measure included items such as: *“While watching a video I felt satisfied”*, *“I felt good”*, *“I felt pleased”*, and *“I felt contented.”*

**Guilt.** The extent to which participants felt guilty while watching the video was measured with four items modified from Harris's study (2007,  $\alpha = .92$ ). The guilt measure used a 7-point Likert-type items ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The measure included items such as: "While watching a video I felt guilty", "I felt regretful", "I felt bad about myself", and "I felt remorseful."

**Other Negative Emotions.** To check possible influence of other negative or other emotions (neither positive nor negative), a measurement was adopted from previous research (Dillard et al., 1996). The scale consisted of 15 single items to measure 5 negative or neutral emotions anchored by 0 (*None of this feeling*) and 6 (*A great deal of this feeling*). Each emotion comprised of three items: puzzlement (puzzled, confused, and bewildered,  $\alpha = .74$ ), surprise (surprised, astonished, and amazed,  $\alpha = .74$ ), fear (fearful, afraid, and scared,  $\alpha = .94$ ), anger (angry, irritated, and annoyed,  $\alpha = .84$ ), and sadness (sad, dreary, and dismal,  $\alpha = .78$ ).

**Thoughts about the Video Message.** The procedure for capturing and analyzing the number and valence of message-relevant thoughts was adapted from previous studies (Dillard et al., 1996). Participants were asked to write the thoughts they had while watching the video message with a single open-ended question. Participants were allowed two minutes to type these thoughts. Each participant's thoughts were unitized by independent coders based on a single stated idea regardless of grammatical errors. The criteria to unitize the thoughts were derived from Cacioppo and Petty (1981), which included 1) surface feature markers (i.e. periods, commas, and semicolons) and 2) conjunctions – coordinate conjunction (i.e., and, or, but, so), correlative conjunction (i.e., both A and B, not only A (but) also B, B as well as A, either A or B), and subordinate conjunction (i.e., since, because, if, unless, though). The unit of analysis was a single thought unit. For example, a participant who answered like "I feel surprised that we only

have 20% of MSU student to recycle things (1). I would recycle plastic (1), papers (2) and metal (3) in future to make contribution to our environment.” had four thoughts while watching the video. After unitizing the thoughts, two coders counted the total number of thoughts. Then, the unit was coded as being relevant or irrelevant to the content of the video. A message relevant thought was thoughts about the message contents such as one that was related to the content of the message (i.e., “*I realized how much waste I produce every single day*”), or thoughts about emotions experienced (i.e., “*I felt guilty that I do not recycle the paper I use*”). If irrelevant, the unit was not coded. Irrelevant thoughts were those that did not relate to the video in any way (i.e., “*Trying to figure out what the question is asking.*”). Subsequently, the valence of thought units was coded as one of three categories: positive (i.e., “*[I was] Proud to be a part of a university that is making a difference.*”), negative (i.e., “*I was embarrassed at how little I recycle in comparison with the statistics mentioned in the video.*”) or neutral (i.e., “*I had no idea that MSU students were so active in recycling.*”). Overall, the dependent variables assessed here were: number of message-relevant thoughts, types of thoughts (relevant or irrelevant), and the valence of thoughts (positive, negative, or neutral). Thought coding variables and examples can be found in Table 2. Inter-coder reliability was assessed for all steps of the process.

Two trained, independent coders unitized the thoughts for 40 participants (about 20% of the participants) and coded the types of and the valence of thoughts. Guetzkow’s U was calculated to check inter-coder reliability for unitization.<sup>4</sup> Guetzkow’s U was .003,<sup>5</sup> which could be regarded as being reliable since a small figure indicates successful unitization (Guetzkow, 1950). Then, to check inter-coder reliability for the types and valence of thought units, Cohen’s Kappa (Cohen, 1960) was calculated but the values were under .7. To improve the quality of coding process, disagreements in coding were resolved by discussion and the two

coders were re-trained. Guetzknow's U and Cohen's Kappa were calculated for the thoughts from 20 participants. Guetzknow's U was .018.<sup>6</sup> Cohen's Kappa for the types of thoughts was .78 and for the valence of thoughts was .72. Coders then coded the remaining thoughts.

**Attitudes.** Participants' attitudes toward recycling were assessed with semantic differential items including both measures of general attitudes and cognitive items (Crites et al., 1994). Five cognitive word pairs were used to assess participants' beliefs about the traits of recycling (i.e. useful/useless, wise/foolish, beneficial/harmful, valuable/worthless, and wholesome/unhealthy). The attitude items which asked participants' general evaluations about recycling constituted four pairs of words (i.e. positive/negative, like/dislike, good/bad, and desirable/undesirable). All items were assessed on 7-point bipolar semantic differential scales ranging from -3 to 3 with negative numbers indicating the negative evaluations and the positive numbers indicating the positive evaluations and 0 indicating a neutral point. Each participant's answer for each attitude scale was summed and then the average was calculated to test hypotheses.

**Behavioral Intent.** Two scales were used to measure behavioral intention to engage in recycling two weeks later. The first measurement consisted of three items adopted from a study conducted by Anderson (2012,  $\alpha = .96$ ). Example items are such as "*In the next two weeks, how likely it is that I will continue/start to sort trash in order to recycle the paper I use*", "*continue/start recycling paper I use*", and "*continue/start to put paper into the corresponding recycle bin.*" Four items in the second measurement were created for the current study. Example items were: "*In the next 2 weeks, I plan to recycle the materials I use*" and "*I will recycle any paper I use over the next 2 weeks.*" The two scales consisted of 7-point Likert-type scale anchored by 1 (*not likely at all*) and 7 (*extremely likely*). To test hypotheses, the second



measurement was employed because all participants answered it while some participants missed the first measurement.

### ***Manipulation Checks***

***Perceived Descriptive Normative Content in the Message.*** The extent to which participants perceived that the messages indicate the high or low prevalence of recycling was assessed on the same scale used in the pilot test (Lapinski et al., 2013,  $\alpha = .89$ ).

***Perceived Prevalence of Recycling among MSU Students.*** The extent to which participants perceived that the recycling is prevalent among MSU students was assessed on the same scale used in the pilot test (Lapinski et al., 2013,  $\alpha = .91$ ).

***Other Message Factors.*** To ensure the possible effect of confounds in the message manipulation and check the quality of message, the perceived injunctive normative content in the message, perceived approval of recycling, and the believability and persuasiveness of the video message were measured with the same scale applied in the pilot test.

### ***Control Variables***

***Issue Involvement.*** Four items were used to measure the extent to which participants regard recycling as an important issue from a previous study (Lapinski et al., 2013;  $\alpha = .72$ ). The original measure was developed and validated by Cho and Boster (2005). The items were measured on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Examples included: “*Recycling is an important issue to me*” and “*I really don’t care about the issue of recycling.*”

***Social Desirability.*** The measurement for social desirability bias in participants’ responses was adapted from a study conducted by Schuessler, Hittle, and Cardascia (1978). The original scale consists of 16 items with a 9-point bipolar rating scale ranging from 1 - low social

desirability, to 5 - neutral social desirability, to 9 - high social desirability (K- R 21  $\alpha = .64$ ). For this study, the scale was adapted to a 6-item scale which used 7-point Likert-type responses ranging from 1 (*strongly disagree*), 7 (*strongly agree*).

***Demographic Information.*** Questions regarding demographic information included age, gender, ethnicity, major, and on vs. off-living situation. Also, the amount of exposure to the video was measured with a single item, “*How much of the video about recycling did you watch?*” with 7-point scale. The response range was from 0 = “*None of the video message*” to 6 = “*All of the video message.*”

## RESULTS

### Pilot study

To determine whether the descriptive normative information was manipulated as intended and check for the possible effects of confounds a pilot study was conducted. After watching the stimulus message, participants ( $N = 68$ ) completed an online questionnaire asking about their perceptions of the video message. Participants rated the video message on several items with 7-point Likert-Type scales – including perceived descriptive normative content of the message ( $\alpha = .89$ ), perceived prevalence of recycling ( $\alpha = .94$ ), perceived injunctive normative contents in the message ( $\alpha = .65$ ), perceived social approval of recycling ( $\alpha = .57$ ), message believability ( $\alpha = .77$ ), and message persuasiveness ( $\alpha = .93$ ).

An independent sample t-test was performed to determine whether participants who watched the video message with high descriptive norm information ( $N = 33$ ) perceived the video message as showing higher prevalence of recycling as well as perceived that recycling is a more prevalent behavior among MSU students than participants watching the video message with low descriptive norm information ( $N = 35$ ). Participants viewing the high descriptive norm message ( $M = 5.02$ ,  $SD = 1.20$ ) perceived the video message as showing higher prevalence of recycling than participants watching the low descriptive norm message ( $M = 3.62$ ,  $SD = 1.06$ ,  $t(68) = 5.11$ ,  $p = .001$ ,  $\eta^2 = .28$ ). Likewise, participants who were in the high descriptive norm condition ( $M = 4.53$ ,  $SD = 1.38$ ) perceived that recycling is a more prevalent behavior among MSU students relative to participants in the low descriptive norm condition ( $M = 3.41$ ,  $SD = 1.15$ ,  $t(68) = 3.66$ ,  $p = .001$ ,  $\eta^2 = .16$ ).

Other differences between the groups were evidenced. Participants viewing the high descriptive norm message ( $M = 4.84$ ,  $SD = 0.93$ ) perceived that the video message content

indicated greater approval of recycling than participants who viewed the low descriptive norm message ( $M = 4.31$ ,  $SD = 0.65$ ,  $t(68) = 2.71$ ,  $p = .009$ ,  $\eta^2 = .10$ ). Participants in the high descriptive norm condition ( $M = 4.93$ ,  $SD = .76$ ) perceived that recycling is a behavior more strongly approved among MSU students than did those in the low descriptive norm condition ( $M = 4.48$ ,  $SD = .73$ ,  $t(68) = 2.49$ ,  $p = .02$ ,  $\eta^2 = .08$ ).

Regarding the quality of the video message, there was no significant difference between the two groups in perceived believability and persuasiveness of the message. Participants who were exposed to the message containing high descriptive norm information did not differ from participants watching the video message containing low descriptive norm information in perceived believability (High  $M = 5.64$ ,  $SD = 0.83$ ; Low  $M = 5.58$ ,  $SD = 0.80$ ,  $t(68) = .33$ ,  $p = .74$ ,  $\eta^2 = .002$ ) or persuasiveness (High  $M = 4.85$ ,  $SD = 1.04$ ; Low  $M = 4.52$ ,  $SD = 1.16$ ,  $t(68) = 1.22$ ,  $p = .23$ ,  $\eta^2 = .021$ ). From the results above, it was reasonable to assume that the manipulation of the current study was successful (Smith, Atkin, Martell, Allen, & Hembroff, 2007). However, the perceived injunctive normative information in the message and perceived social approval of recycling among MSU students were significantly different between two experimental conditions. It is not unusual for descriptive normative information to influence people's perception of injunctive norms (Rimal, 2008). These findings resulted in inclusion of measures of the variable described above in the main experiment.

## **Main Experiment**

**Preliminary Analyses.** Before testing hypotheses and answering the research questions, preliminary analyses were conducted. All data were cleaned. In total, 188 participants completed the survey for this study. One participant reported s/he did not watch the video and her/his data

were removed from additional analyses. The mean exposure of participants was 5.12 ( $SD = 1.32$ ; mid-point of the scale: 3). Thus, 187 participants were used for further analyses. Of 187, one participant did not identify him/herself as either a recycler or a non-recycler. His/her data were automatically excluded in the SPSS when analyses were conducted.

All scaled items were examined for positive contribution of items to scale reliability, item-total correlations, overall scale reliability, and the extent to which the distributions approximated normality. The scale means, standard deviations, and alphas for all scales across conditions were presented in Table 3. This analysis revealed scale alphas were largely within acceptable ranges ( $\alpha > .75$ ) with several exceptions. The involvement ( $\alpha = .64$ ), social desirability ( $\alpha = .64$ ), perceived injunctive normative content in the message ( $\alpha = .71$ ), and perceived approval of recycling ( $\alpha = .64$ ) scales indicated relatively low reliability. To improve the reliability, items that did not contribute to scale reliability were removed from each scale: involvement ( $\alpha = .75$ , removed item 3), social desirability ( $\alpha = .840$  removed item 4, 5, and 6), and perceived approval of recycling ( $\alpha = .75$ , removed items 1 and 4).

To check the stimulus induction, an independent t-test was employed. The results showed that Levene's Test for Equality of Variances was violated so that the corrected values were reported. The descriptive normative information was manipulated as intended; participants in the high prevalence condition ( $N= 98$ ,  $M = 5.38$ ,  $SD = 1.08$ ) perceived that the message content indicated higher prevalence of recycling than those in the low prevalence condition ( $N= 88$ ,  $M = 3.49$ ,  $SD = 1.30$ ,  $t(169.57) = 10.71$ ,  $p = .001$ ,  $\eta^2 = .40$ ). Also, participants in the high prevalence condition ( $N= 99$ ,  $M = 5.31$ ,  $SD = 1.13$ ) perceived that recycling was a more prevalent behavior among MSU students than those in the low prevalence condition ( $N=88$ ,  $M = 3.50$ ,  $SD = 1.60$ ,  $t(154.57) = 8.84$ ,  $p = .001$ ,  $\eta^2 = .34$ ).

Participants in high prevalence condition ( $N = 99$ ,  $M = 4.89$ ,  $SD = 0.88$ ) perceived the video message as showing greater approval of recycling at MSU than those in low prevalence condition ( $N = 88$ ,  $M = 4.25$ ,  $SD = 1.07$ ,  $t(185) = 4.53$ ,  $p = .001$ ,  $\eta^2 = .10$ ). Also, participants exposed to the high descriptive norm information ( $N = 99$ ,  $M = 5.58$ ,  $SD = 1.08$ ) perceived that recycling is a behavior more strongly approved among MSU students than participants exposed to the low descriptive norm information ( $N = 88$ ,  $M = 4.89$ ,  $SD = 1.04$ ,  $t(185) = 4.47$ ,  $p = .001$ ,  $\eta^2 = .10$ ).

Regarding the quality of the video message, there was no significant difference in perceived persuasiveness of the video message between the two groups (High:  $N = 99$ ,  $M = 5.11$ ,  $SD = 1.37$ ; Low:  $N = 88$ ,  $M = 5.05$ ,  $SD = 1.28$ ,  $t(185) = 0.32$ ,  $p = .75$ ,  $\eta^2 = .001$ ). However, there was a significant difference in participants' perceived believability between the high prevalence condition and the low prevalence condition [ $t(185) = -2.20$ ,  $p = .029$ ,  $\eta^2 = .03$ ]. Participants in the low prevalence condition ( $N = 88$ ,  $M = 5.68$ ,  $SD = 1.00$ ) perceived that the message was more believable than those in the high prevalence condition ( $N = 99$ ,  $M = 5.34$ ,  $SD = 1.12$ ). Importantly, the overall mean of perceived persuasiveness was 5.09 ( $SD = 1.33$ ) and the perceived believability was 5.50 ( $SD = 1.08$ ). The mid-point of the scales for the persuasiveness and the believability was four (i.e., like 7-point Likert type scale); one-sample t-tests indicated that the mean of persuasiveness ( $t(186) = 11.21$ ,  $p = .001$ ,  $\eta^2 = .40$ ) and believability ( $t(186) = 19.09$ ,  $p = .001$ ,  $\eta^2 = .66$ ) significantly differed from the mid-point. It was reasonable to assume that the stimulus was of good quality (Smith et al., 2007).

**Main Analyses.** To test the study hypotheses and answer the research questions, hierarchical regression analyses, single sample t-tests, and chi-square tests were employed. Prior to conducting hierarchical regression analyses experimental conditions were dummy-coded, with the high descriptive norm condition being 0 and the low descriptive norm condition coded as 1. The participants' prior recycling behavior was similarly dummy-coded, with a recycler coded as 0 and a non-recycler coded as 1. Other continuous variables, except the dependent variables were mean-centered to avoid potential multicollinearity. For decisions about the inclusion of covariates, correlations between all study-variables were calculated; only potential covariates exhibiting significant correlations with the study dependent variables were included as covariates in the analyses. For a full overview of these results, see Table 4. For each analysis performed, the first block of the regression analyses contained study covariates including demographic variables. The second block of the regression analyses contained the main predictors followed by an interaction term between the main predictors (i.e., experimental condition and prior recycling behavior) in the third block. A simplified summary of each hypothesis and research question and its result were provided in Table 5.

Hypotheses 1 and 2 predicted that the effect of the descriptive normative information on arousal of emotions depended on prior recycling behavior. Specifically, Hypothesis 1 predicted that recyclers would experience the most satisfaction in the low versus high prevalence condition, relative to non-recyclers. Hypothesis 2 predicted that non-recyclers would experience the most guilt in the high versus low prevalence condition.<sup>7</sup>

For the satisfaction dependent variable, a total of 187 participants were included in the analyses. To test Hypothesis 1, two variables which were highly correlated with the dependent variable, involvement and persuasiveness were included as covariates in the analysis. The overall

model was significant  $F(5, 180) = 8.15, p < .001, adjusted R^2 = .162$ . The analysis showed that the descriptive norm information had a significant direct effect on satisfaction, unstandardized  $B = -0.40, t(185) = -2.75, p = .006, sr^2 = .03$  such that participants in the high prevalence condition experienced greater satisfaction than those in the low prevalence condition. However, participants' prior recycling behavior was not a significant predictor of feelings of satisfaction, unstandardized  $B = -0.30, t(185) = -1.91, p = .058, sr^2 = .02$ . Furthermore, there was no significant interaction effect between descriptive normative information and prior recycling behavior on satisfaction, unstandardized  $B = 0.12, t(185) = 0.42, p = .68, sr^2 = .001$ . Thus, it was concluded that the data were not consistent with Hypothesis 1.

For the guilt dependent variable, two variables which were highly correlated with the dependent variable, involvement, and social desirability, were included as covariates in the analysis. The overall model was not significant  $F(5, 180) = 6.34, p < .005, adjusted R^2 = .06$ . The results indicated there was no significant direct effect of the descriptive normative information on feelings of guilt, unstandardized  $B = 0.36, t(181) = 1.83, p = .07, sr^2 = .02$ . However, prior recycling behavior was a significant predictor of guilt (unstandardized  $B = 0.44, t(181) = 2.08, p = .04, sr^2 = .02$ ) such that non-recyclers experienced greater feelings of guilt than recyclers did. Furthermore, there was no significant interaction effect between descriptive normative information and prior recycling behavior on feeling of guilt, unstandardized  $B = -0.27, t(180) = -0.67, p = .51, sr^2 = .002$ . Consequently, it was concluded that the data were not consistent with Hypothesis 2.



Research question 1 and Research question 2 asked whether there were different patterns of positive emotions (RQ1) and negative emotions (RQ2) across different levels of descriptive norm message and prior recycling behavior. Single-sample t-tests were used to answer these questions. RQ1 asked whether recyclers would experience more satisfaction than other positive emotions including happiness and pride when they were exposed to the low descriptive norm message relative to the high descriptive norm message. A total of 109 participants who identified themselves as a recycler were included in the analyses. Among the recyclers, those in the high prevalence condition ( $N = 59$ ) experienced greater positive emotions overall including satisfaction, happiness, and pride than those in low prevalence condition ( $N = 50$ , see Table 6). The mean score of satisfaction in the low prevalence condition ( $M = 4.73$ ,  $SD = 0.98$ ) was used as a test value in a series of single-sample t-tests. Among recyclers in the low prevalence condition, there was no significant differences among the positive emotions [Happiness,  $M = 4.72$ ,  $SD = 1.08$ ,  $t(49) = -0.07$ ,  $p = .95$ ,  $\eta^2 = .001$ ; Pride,  $M = 4.91$ ,  $SD = 1.01$ ,  $t(49) = 1.23$ ,  $p = .22$ ,  $\eta^2 = .03$ ]. That is to say, the recyclers in the low prevalence condition did not experience different amounts of positive emotions nor did those in the high prevalence condition.

RQ2 asked whether non-recyclers would experience more guilt than other negative or neutral emotions including puzzlement, surprise, fear, anger, and sadness when they were exposed to the high descriptive norm message relative to the low descriptive norm message. A total of 77 participants who identified themselves as non-recyclers were included in the analyses. Non-recyclers in the low prevalence condition ( $N = 40$ ) experienced greater feeling of guilt, puzzlement, fear, and sadness than those in high prevalence condition ( $N = 37$ ; see Table 7). On the other hand, non-recyclers in high prevalence condition experienced greater feelings of surprise and anger than those in low prevalence condition. None of the negative or neutral

emotions was significantly different between the high prevalence condition and the low prevalence condition. Then, the mean score of guilt in the high prevalence condition ( $M = 3.5$ ,  $SD = 1.41$ ) was used as a test value in the one-sample t-tests. Among non-recyclers in the high prevalence condition, there were significant differences such that non-recyclers in the high prevalence condition experienced more guilt than puzzlement ( $M = 1.88$ ,  $SD = 1.28$ ,  $t(39) = -8.00$ ,  $p = .001$ ,  $\eta^2 = .62$ ), fear ( $M = 1.93$ ,  $SD = 1.39$ ,  $t(39) = -7.18$ ,  $p = .001$ ,  $\eta^2 = .57$ ), anger ( $M = 2.06$ ,  $SD = 1.19$ ,  $t(39) = -7.67$ ,  $p = .001$ ,  $\eta^2 = .60$ ), and sadness ( $M = 1.83$ ,  $SD = 1.22$ ,  $t(39) = -8.69$ ,  $p = .001$ ,  $\eta^2 = .66$ ). However, there was no significant difference between guilt and surprise ( $M = 3.53$ ,  $SD = 1.72$ ,  $t(39) = 0.12$ ,  $p = .90$ ,  $\eta^2 = .001$ ). Thus, the non-recyclers in the high prevalence condition experienced more guilt and surprise than other emotions.

Hypotheses 3a and 3b predicted that the effect of descriptive norm information on the number of total message-relevant thoughts would depend on prior recycling behavior. Hypothesis 3a predicted that recyclers in the low prevalence condition would have greater number of message-relevant thoughts than those in high prevalence condition while Hypothesis 3b predicted that non-recyclers in the high prevalence condition would have greater number of message-relevant thoughts than those in the low prevalence condition. To test these hypotheses, participants' answers for the thought listing question were coded by two independent coders.

Of all 187 participants, 3 participants did not answer the thought listing question. Thus, the total number of participants was 184 for testing these hypotheses. The total number of thought units was 682. The average number of thought units per each participant was 3.71 ( $SD = 2.42$ ). The total number of message-relevant thoughts was 641 (94%). Specifically, 454 units (70.8%) were coded as thoughts about the message content and 187 units (29.2%) were coded as

thoughts about emotions experienced. Forty one thought units (6%) were irrelevant or incomplete and thus excluded from further analyses.

A hierarchical regression analysis was conducted to test whether there was difference in the number of message-relevant thoughts across different experimental conditions. In the regression model, the number of message-relevant thought units per each participant was regressed onto descriptive normative information and prior recycling behavior in the first block and then the interaction term in the second block. The overall model was not significant,  $F(3, 173) = 0.48, p = .69, \text{adjusted } R^2 = -.01$ . The results indicated that no significant main effects (descriptive normative information, unstandardized  $B = -0.29, t(174) = -0.85, p = .40, sr^2 = .004$ ; prior recycling behavior, unstandardized  $B = -0.03, t(174) = -0.10, p = .93, sr^2 = .0001$ ) on the number of message relevant thoughts. The interaction effect on the number of message-relevant thoughts was also not significant, unstandardized  $B = -0.59, t(173) = -0.86, p = .39, sr^2 = .004$ .

Research question 3 asked whether the patterns of the valence of message-relevant thoughts (positive, negative or neutral) varied by experimental conditions. To answer the research question, four categories were created and a chi-square test of independence was conducted: 1 - recyclers in the high prevalence condition, 2 - recyclers in the low prevalence condition, 3 - non-recyclers in the high prevalence condition, and 4 - non-recyclers in the low prevalence condition. A chi-square analysis showed a significant association between the experimental conditions and the valence of thought units,  $\chi^2(6, N=637) = 21.97, p = .001, \alpha = .05, \text{Cramer's } V = .13$  (see Table 8). The results indicated that there was a significant difference in the positive message-relevant thoughts across different experimental conditions such as recyclers in the high prevalence condition had a significantly greater number of positive

thoughts than those in the other conditions (standardized residual = 2.3). Similarly, recyclers in the low prevalence condition had a significantly fewer number of positive thoughts than people in the other conditions (standardized residual = -2.7, see Figure 1).

Hypotheses 4 and 7 dealt with the relationship between descriptive norm information and attitudes toward recycling based on prior recycling behavior. Hypothesis 4 predicted that recyclers in the low prevalence condition would have more positive attitudes toward recycling than those in high prevalence condition while Hypothesis 7 predicted that non-recyclers in the high prevalence condition would have more positive attitudes toward recycling than those in low prevalence condition. To test these hypotheses, a hierarchical regression analysis was conducted after the two scales for attitude were summed and the mean was calculated. In the regression model, attitude toward recycling was regressed onto five covariates, namely, believability, persuasiveness, involvement, social desirability, and perceived approval, in the first block and then the descriptive normative information and prior recycling behavior in the second block, and the interaction term in the third block.

The overall model was significant,  $F(8, 177) = 3.08, p = .003, adjusted R^2 = .08$ .

However, the results indicated that no significant main effects or interaction effects on attitudes toward recycling (see Table 9). Thus, it was concluded that the data were not consistent with hypotheses 4 and 7. However, it is worth mentioning that the overall mean of participants' attitudes toward recycling was 6.25 ( $SD = 1.19$ ) on a 7-point scale. There appears to be a ceiling effect for attitude; participants had positive attitudes toward recycling across all experimental conditions (see Table 10).

Hypotheses 5 and 8 predicted that the relationship between descriptive norm information and behavioral intent to recycle would depend on prior recycling behavior. Hypothesis 5

predicted that recyclers in the low prevalence condition would have greater intention toward recycling than those in the high prevalence condition whereas Hypothesis 8 predicted that non-recyclers in the high prevalence condition would have greater intention toward recycling than those in the low prevalence condition. Of the two intention scales included in the questionnaire, the second intention scale was used for the analysis because all participants completed it ( $N = 187$ ) compared to the first intention scale ( $N = 176$ ). Hierarchical regression analysis was conducted to test these hypotheses. In the regression model, intention to recycle was regressed onto five covariates, believability, persuasiveness, involvement, social desirability, and perceived approval, in the first block, and then the descriptive normative information and prior recycling behavior in the second block followed by the interaction term in the third block. The overall model was significant,  $F(8, 177) = 22.32, p < .001, adjusted R^2 = .48$  (see Table 11).

The results indicated that involvement, social desirability, and persuasiveness were significant predictors in the first block. There was no significant direct effect of descriptive norm message on intention toward recycling. Prior recycling behavior was a significant predictor for intention toward recycling such that recyclers were more likely to intend to recycle in the future than non-recyclers, unstandardized  $B = -0.67, t(178) = -3.96, p = .001, sr^2 = .05$ . Furthermore, there was a significant interaction effect between descriptive normative information and prior recycling behavior on intention toward recycling, unstandardized  $B = -0.68, t(178) = -2.12, p = .035, sr^2 = .01$ . Recyclers were more likely to intend to recycle in the low prevalence condition ( $M = 6.10, SD = 0.98$ ) than in the high prevalence condition ( $M = 5.92, SD = 1.27$ ) while non-recyclers were more likely to intend to recycle in the high prevalence condition ( $M = 4.98, SD =$

1.63) than in the low prevalence condition ( $M = 4.57$ ,  $SD = 1.56$ ). Thus, it was concluded that the data were consistent with the hypotheses 5 and 8 (see Figure 2).

To test the mediated model predicted in Hypotheses 6 and 9, steps for testing mediation outlined in Baron and Kenny (1986) were followed. This consists of four conditions necessary to establish mediation; the first of these steps is to establish an association between the causal variable and the mediator variable (Kenny, 2013). Because the data were not consistent with the predicted interaction between normative message and prior recycling behavior on either guilt or satisfaction, the other steps were not necessary and it was determined that the data were not consistent with the predicted mediated model.

## **DISCUSSION**

Previous literature has focused on examining the effect of social norms messages on the cognitive mechanism of normative influence. The aim of this study was to fill the gap in the literature by exploring the affective mechanisms; particularly the role of emotions in the relationship between descriptive norm information, prior recycling behavior, and attitude/intention toward recycling. The study tested a number of predictions and research questions about these relationships. Although the data were not consistent with many of the study predictions, the data were consistent with the predicted interaction effect of descriptive norm message and prior recycling behavior on intention to recycle. Along with this finding, there are several interesting findings in this study.

First, the descriptive norm messages designed to manipulate prevalence perceptions as either high or low prevalence were successful. Participants in both the pilot study and the main experiment perceived the high descriptive norm message content as showing high prevalence of recycling and the low descriptive norm message content as indicating low prevalence of recycling at MSU. In terms of influencing normative perceptions, participants exposed to the high descriptive norm message perceived that recycling was more prevalent behavior among MSU students than those exposed to the low descriptive norm message. Although there were differences in believability, perceived injunctive norm content in the messages, perceived social approval of recycling among MSU students between the experimental conditions, it is not unusual for descriptive norm information to influence people's perceptions of injunctive norms (Rimal, 2008). Given these data, it is reasonable to conclude that the stimulus messages were of good quality.

In the main experiment, this study examined whether recyclers and non-recyclers experienced different affective responses when they were exposed to different levels of descriptive norm messages. Specifically, Hypotheses 1 and 2 predicted that recyclers would experience the greatest satisfaction in the low prevalence condition relative to the high prevalence condition whereas non-recyclers would experience the greatest guilt in the high prevalence condition relative to the low prevalence condition. The data were inconsistent with this prediction. There was no interaction effect for descriptive norm information and prior recycling behavior on satisfaction or guilt. This indicates prior recycling behavior does not moderate the relationship between descriptive norms and emotion in the current research. Contrary to the prediction, descriptive normative information was a significant predictor of feeling of satisfaction such that participants in the high prevalence condition experienced greater satisfaction than those in the low prevalence condition. Prior recycling behavior was a significant predictor of feelings of guilt such that non-recyclers experienced greater feelings of guilt than recyclers.

According to previous literature on discrete emotions, satisfaction or happiness can be aroused by experiencing enjoyable situations or events such as observing a desirable phenomenon regardless of their contribution to it (Ekman & Cordaro, 2011) while guilt or pride can be regarded as self-conscious emotions which require one to hold responsibility for or take credit for the situation (Baumeister et al., 1994; Sauter, 2010; Weiner, 1985). In order to better understand these findings, post hoc analyses were conducted to examine the effects of the independent variables on the other emotions. In the post-hoc tests, similar directions were detected in terms of the effect of the descriptive norm messages on happiness and the effect of prior recycling behavior on pride. Like satisfaction, the results indicated that the prevalence of



recycling in the descriptive norm messages was a significant predictor of feelings of happiness such that participants in the high prevalence condition experienced greater happiness than those in the low prevalence condition. Like guilt, pride was predicted only by prior recycling behavior such that recyclers experienced greater pride than non-recyclers.

These findings may be explained by different referent points of the emotions; that is, the messages may cause people to reflect on their own or others behaviors. For example, the people presented in the descriptive norm message or the descriptive norm message itself may be the referent point of the feelings of satisfaction and happiness whereas oneself like one's prior performance may be the referent point of the feelings of guilt and pride. It will be meaningful to examine the referent point of each discrete emotion in the future research to help researchers better understand the mechanism of discrete emotions.

In order to untangle the effects of messages on different emotions, research questions 1 and 2 asked whether recyclers experienced greater satisfaction than either happiness or pride in the low prevalence condition while non-recyclers experienced greater feelings of guilt than other negative or neutral emotions such as puzzlement, surprise, fear, anger, and sadness in the high prevalence condition. Regarding research question 1, recyclers in the low and high prevalence conditions experienced similar amounts of the three positive emotions. Recyclers also indicated greater positive emotions in the high prevalence condition relative to the low prevalence condition. These findings, along with the findings for Hypothesis 1, call into question whether satisfaction and happiness are distinct from each other in the current study. In this study, many of the positive emotions were highly correlated each other ranging from  $r = .66$  (happiness and pride), to  $r = .69$  (happiness and satisfaction), to  $r = .74$  (satisfaction and pride). However, there

was a significant difference between experimental conditions only in recyclers' satisfaction but not happiness or pride, indicating different antecedent conditions for different positive emotions.

Some previous research has conceptualized happiness and satisfaction in the same category (Ekman & Cordaro, 2011; Lazarus, 1991) while other research has conceptualized them differently (Dillard & Peck, 2000; 2001; Oliver, 1980). Sauter (2010) argued that pride is a self-conscious emotion and is distinct from basic emotions like happiness. Previous literature has argued that future studies should clarify the structures and associations among discrete positive emotions (Bagozzi, 1991; Lazarus, 1991), but the results of the current study cannot provide solid evidence regarding how these emotions should be categorized. Future research may examine whether these emotions are distinct by considering other moderators such as group identity in the relationship between descriptive norms and emotions. For example, Rimal (2008) found that descriptive norms have a stronger effect on college students' intentions to drink as the extent which their group identification (i.e., aspiration and similarity) increased. It is possible that recyclers in the high prevalence condition might find greater similarity while watching the message and thus experience greater satisfaction than those in the low prevalence condition.

For research question 2, non-recyclers experienced significantly greater guilt than other negative emotions in both the high and low prevalence conditions. That is, across message conditions, the non-recyclers experienced guilt; indicating that even low prevalence messages may motivate behavioral comparison. Previous literature pointed out that people feel guilty when they violate norms (Baumeister et al., 1994). This study provides evidence for this. When non-recyclers were exposed to a descriptive norm message, they may become conscious of their violation of the norms both in the high and low prevalence condition because they already know the importance of recycling.

This study also explored whether prior recycling behavior moderated the relationship between the descriptive norm messages and information processing. Hypothesis 3a predicted that recyclers in the low prevalence condition would have greater number of message-relevant thoughts than those in high prevalence condition whereas hypothesis 3b predicted that non-recyclers in the high prevalence condition would have greater number of message-relevant thoughts than those in the low prevalence condition. The data were not consistent with this prediction. Neither the prevalence of recycling nor prior recycling behavior was a significant predictor of the number of message-relevant thoughts. It was found that participants perceived injunctive norm content in the message as well as the social approval of recycling among MSU students in the manipulation check and it may be the case that social approval of recycling predicts the number of thoughts. In the thought listing, participants expressed statements like, *“I thought that it was surprising that so many students recycle and that I should be better about it”*, *“Like I should start recycling more often”*, and *“I felt hopeful for the future, happy, good. I felt like I should recycle more.”* Jacobson et al. (2011) indicated that participants needed more cognitive effort to process injunctive normative information than descriptive normative information in their experiment. Future research can examine whether descriptive and injunctive norm messages are processed in different ways by comparing the number of thoughts from one who receives a descriptive norm message with the number of thoughts from one who receives an injunctive norm message.

Research question 3 explored the patterns of valence of message-relevant thoughts across experimental conditions. The results showed that there were different patterns of valence across experimental conditions. Specifically, recyclers had more positive message-relevant thoughts in the high prevalence condition than other conditions and had fewer positive message-

relevant thoughts in the low prevalence condition. This is consistent with other research on emotional response to messages. Mathur and Chattopadhyay (1991) found a positive relationship between mood and the number of thoughts such as that participants exposed to a happy program generated a greater number of positive thoughts about advertisements than did those who were exposed to a sad program. In the current study, there was a significant difference in recyclers' satisfaction between the high and low prevalence condition among all emotion measures. It may be the case that satisfaction facilitates message processing as an additional source of information in a positive direction.

Next, this study sought to examine whether the effect of descriptive norm messages on attitudes toward recycling depended on prior recycling behavior. Hypothesis 4 predicted that recyclers in the low prevalence condition would have greater positive attitudes toward recycling than those in the high prevalence condition whereas hypothesis 7 predicted that non-recyclers in the high prevalence condition would have greater positive attitudes toward recycling than those in the low prevalence condition. The data were not consistent with this prediction. Participants, regardless of the different levels of descriptive norm messages and prior performance, had positive attitudes toward recycling. That is, across conditions, participants had very positive attitudes toward recycling.

Finally, this study explored whether the effect of descriptive norm information on intention to recycle depended on prior recycling behavior. Hypothesis 5 predicted that recyclers in the low prevalence condition would be more likely to intend to recycle than those in the high prevalence condition whereas Hypothesis 8 predicted that non-recyclers in the high prevalence condition would be more likely to intend to recycle than those in the low prevalence condition. The data were consistent with these predictions. Recyclers were more likely to intend to recycle

in the low prevalence condition than in the high prevalence condition whereas non-recyclers were more likely to intend to recycle in the high prevalence condition than in the low prevalence condition.

Although the data were in line with the predictions, it is unclear why recyclers tended to intend to recycle more in the low prevalence condition than in the high prevalence condition because they experienced greater satisfaction in the high prevalence condition. In addition, there was no significant difference in non-recyclers' guilt between the two experimental conditions. One possible explanation is that prior behavior drives outcome expectations; a moderator of the descriptive norm-behavior relationship identified in earlier research (Rimal, 2008). Additional research might examine this issue in more depth. In the following section, theoretical implications of the current findings are discussed.

## **THEORETICAL IMPLICATIONS**

The current findings have implications for extending the explanatory power of prior behavior. Previous research suggested that past behavior was a powerful predictor of a future behavior (Conner & Armitage, 1998), however, that its influence would depend on the nature of the behavior (Aarts et al., 1998). In the current study, prior recycling behavior was a significant predictor of future recycling behavior; that is, recyclers were more likely to intend to recycle than non-recyclers. Prior recycling behavior also predicted feelings of guilt such that non-recyclers experienced greater feelings of guilt than recyclers.

Furthermore, the current findings have important implications for theories of social norms to explain behaviors. By exploring the affective mechanism of social norms, the current study extends the previous literature that mainly focused on explaining the cognitive mechanism of social norms. In the current study, descriptive norms messages predicted feelings of satisfaction such that participants in the high prevalence condition experienced greater satisfaction than those in the low prevalence condition. This finding may be related to the distinct level of descriptive norms.

Park and Smith (2007) examined the effects of five distinctive norms on the intention to enroll on a state organ-donor registry and the intention to talk about organ donation with family members based on TPB and SNA (Social Norm Approach). In their study, they separated the levels of perceived social norms into either a personal- or a societal-level. Regarding the personal-level of social norms, the degrees of popularity and approval of a behavior among an individual's important people would be a determinant of the behavior while in the societal-level, the degrees of popularity and approval of a behavior in an individual's society would be a critical referent point. They found that personal level-descriptive norms were a major predictor of intent

to register in a state organ-donor program while subjective norms were a critical predictor of intent to discuss about organ donation with family. These findings imply the close connection between each norm and each distinctive behavior.

When a person individually performs a behavior alone, such as signing an organ-donor registry, personal level-descriptive/injunctive norms may have greater power in predicting future behavior than other norms. On the other hand, when a person performs a behavior that involves a social aspect, such as talking with family about organ donation, subjective norms or societal level-descriptive/injunctive norms may be more critical determinant of future behavior. In the current study, participants may regard recycling behavior as a social behavior so that they simple thought about what other people did in the descriptive norms message but did not think about themselves. That is, it is the effect of societal level-descriptive norms on feelings of satisfaction that participants in the high prevalence condition experienced greater satisfaction than those in the low prevalence condition. In the following section, several limitations of this study and some additional suggestions for future research are discussed.

## **LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH**

First, this study only considered attitude and intention toward recycling as dependent variables without addressing actual recycling behavior. This study could be extended to assess the influence of descriptive normative information on the actual recycling behavior. Recycling is a behavior for which attitudes are overwhelmingly positive, yet many people do not actually do it. Furthermore, recycling involves in several materials, not only paper, but also metal cans, plastic, glass, electronics, etc. The current experiment only focuses on paper recycling as an outcome variable. Future research could deal with other recyclable materials.

Another limitation is related to the use of a convenience sample. Although the target population of this study is young people, using an undergraduate sample in one university in the Midwest may weaken the generalizability of the current findings to other populations such as young people at other universities. The findings may not be generalized to other groups of people including older adults and less educated young people. Also, there was a difference in believability between high prevalence condition and low prevalence condition when checking the quality of descriptive norm messages. This was measured so it could be controlled as a covariate when it was associated with the dependent variables, so may be only a minimal concern. An additional limitation is that this study used an on-line survey design. Because of this, participants could fast forward through the video if they wanted. However, judging by participants' answers to the exposure item, most participants did watch the videos.

Lastly, this study only considered the persuasive effect of descriptive norm information on attitude and intention toward recycling. In the manipulation check, not only descriptive normative content/perceived prevalence of recycling but also injunctive normative content/perceived approval of recycling were significantly different between the high and low



prevalence conditions. This was an unintended effect, and therefore a limitation of this study; to deal with this issue, perceived approval of recycling was included as a covariate in the analyses when appropriate. Future research should also assess the independent effect of injunctive norm information on emotions and subsequent intentions to recycle. This is particularly important because the theoretical framework of this study, FTNC, posits that descriptive and injunctive social norms affect behavior in distinct ways (Cialdini et al., 1990). It may be more desirable to examine the impact of both descriptive norms and injunctive norms than considering only one of them.

Although participants showed relatively strong intention to recycle, the study finding that the interaction effect of the descriptive norm information and prior recycling behavior on intention to recycle could be interpreted as a case of the destructive power of descriptive norms. A previous study found that descriptive norm information could decrease desirable behaviors among people who have already engaged in the desirable behaviors. For example, a field study conducted by Schultz, Nolan, Cialdini, Goldstein, and Griskevicius (2007) showed that the descriptive normative information actually led to increased energy consumption among the households consuming less energy relative to the neighborhood average. Their findings also illustrated the effect of injunctive norms on reducing the negative influence of descriptive norms. Again, combining both descriptive and injunctive norms in a message could be explored in the future research to determine whether injunctive norms messages can temper the effects of descriptive norms messages. Cialdini (2003) also contended if two norms in a message are consistent with each other rather than in opposition to each other, it may have constructive implications for pro-social behaviors like recycling.

Despite the several limitations of the current study, the research has a key strength in that it attempted to fill a gap in the literature by exploring the roles of discrete emotions in the relationship between descriptive norms and attitude/intention. As Nabi (2010) argued, understanding the antecedents and states of discrete emotions will allow researcher to better predict and explain human behaviors. In addition to the directions for future research described above, future research should continue to explore the mediating effects of emotions on the relationship between social norms and attitude, intention, and behavior.

## FOOTNOTES

<sup>1</sup>. The original film was created by David Cooper, Carol Baldwin, and Andy Childers. It was the third prize winning video of the 2009 AHECTA Student Production Awards; our gratitude to the creators for allowing us to use the film for this study. Thanks to Bob Albers in the Department of Telecommunication, Information Studies, and Media for his help identifying the creators.

<sup>2</sup>. The original film is not publically available. The contents in the edited video are not the same with those in the publically available video.

<sup>3</sup>. The current study focused on paper recycling because it has been established for a long time in MSU.

<sup>4</sup>. Guetzkow's U

$$= \frac{\text{the number of units from coder1} - \text{the number of units from coder 2}}{\text{the number of units from coder 1} + \text{the number of units from coder 2}}$$

<sup>5</sup>. Guetzkow's U =  $\frac{139-132}{139+132}$

<sup>6</sup>. Guetzkow's U =  $\frac{57-55}{57+55}$

<sup>7</sup>. For better understanding of the effect of descriptive norm messages and prior behavior on the emotional responses, hierarchical regression analyses were conducted with happiness and pride as outcome variables.

In the regression model, feeling of happiness was regressed onto four covariates, believability, persuasiveness, involvement, and perceived approval, in the first block and then the descriptive norm condition and prior recycling behavior in the second block. The interaction

term was added in the third block. The overall model was significant  $F(7, 178) = 10.07, p < .001$ ,  $adjusted R^2 = .26$ . The results were similar to those of the satisfaction as a dependent variable.

The descriptive norm information had a significant direct effect on happiness, unstandardized  $B = -0.37, t(179) = -2.35, p = .02, sr^2 = .02$  such that participants in the high prevalence condition experienced greater happiness than those in the low prevalence condition. However, the prior recycling behavior was not a significant predictor of the feeling of happiness, unstandardized  $B = -0.08, t(179) = -0.55, p = .58, sr^2 = .001$ . Furthermore, there was no significant interaction effect between the descriptive norm messages and prior recycling behavior on happiness, unstandardized  $B = -0.06, t(178) = -0.19, p = .85, sr^2 = .0001$ .

In addition, ratings of pride was regressed onto two covariates, persuasiveness and involvement, in the first block and then the descriptive normative information and prior recycling behavior in the second block followed by the interaction term in the third block. The overall model was significant  $F(5, 179) = 10.81, p < .001, adjusted R^2 = .21$ . Descriptive norm information was not a significant predictor of feeling of pride, unstandardized  $B = -0.24, t(179) = -1.52, p = .13, sr^2 = .01$ . However, participants' prior recycling behavior had a direct effect on feeling of pride, unstandardized  $B = -0.67, t(179) = -4.05, p = .001, sr^2 = .07$  such that recyclers experienced greater feeling of pride than non-recyclers. There was no significant interaction between the descriptive norm messages and prior recycling behavior on pride, unstandardized  $B = -0.06, t(178) = -0.19, p = .85, sr^2 = .0001$ .

## **APPENDICIES**

## **Appendix A: Tables and Figures**

Table 1. *Conceptual frameworks of discrete positive emotions*

	Happiness	Pride	Satisfaction/Contentment
Lazarus (1991)	A feeling people have when making reasonable progress toward their goals and when they expect positive outcomes	A feeling people have when they enhance their ego-identity (i.e. self- and social- esteem) by taking credit for an achievement for themselves or for someone or groups with who they identify	A feeling same with happiness
Ekman & Cordaro (2011)	Feelings people have when something is enjoyable	A feeling people have when they faced with or challenged difficulties, or achieved goals	
Dillard & Peck (2000; 2001)	A feeling people have when they achieve or make a progress toward their goals and as a function of self-rewarding		A feeling people have when they are absent from threats and as a function of conserving resources
Weiner (1985)		A feeling people have when they can attribute a positive outcome to themselves	
Oliver (1980)			A feeling people experience when they have an initial standard/goal and experience some positive discrepancy from the standard

Table 2. Coding variables, definitions and sample messages from the participants' answers

Coding variable		Definition	Sample messages
Message- Relevant Thoughts	Types	Thoughts about the message content Thoughts that were related to the content of the message or that referenced any features of the message such as credibility and message quality	<i>"I realized how much waste I produce every single day."</i> or <i>"I feel like this percentage is not accurate."</i>
		Thoughts about emotions experienced Thoughts that referenced any emotional responses regarding the message content	<i>"I felt guilty that I do not recycle the paper I use."</i>
	Valence	Positive Thoughts that expressed positive emotions including happiness, satisfaction, pride, and joy	<i>"[I was] Proud to be a part of a university that is making a difference."</i>
		Negative Thoughts that expressed negative emotions including guilt, anger, fear, etc.	<i>"I was embarrassed at how little I recycle in comparison with the statistics mentioned in the video."</i>
		Neutral Thoughts that were neither positive or negative	<i>"I had no idea that MSU students were so active in recycling."</i>



Table 3. *Number of items retained, means, standard deviations, and alphas for all scales across conditions*

Scale	No. of Items	Mean	SD	A
Happiness	5	4.76	5.71	.97
Pride	3	4.69	3.53	.86
Satisfaction	4	4.78	4.30	.94
Guilt	4	3.26	5.56	.95
Attitude 1	5	6.24	6.47	.94
Attitude 2	4	6.26	5.24	.96
Intention 1	3	5.44	4.29	.92
Intention 2	4	5.51	5.90	.97
Involvement	4	4.78	4.01	.64
Improved Involvement (removed item3)	3	4.98	3.35	.75
Social Desirability	6	4.89	4.98	.64
Improved Social Desirability (removed item 4,5,6)	3	5.53	2.76	.84
Believability	4	5.48	4.31	.87
Persuasiveness	3	5.09	3.97	.93
Descriptive Normative Content	4	4.48	6.11	.87
Perceived Prevalence	4	4.47	6.55	.97
Injunctive Normative Content	4	4.59	4.10	.71
Perceived Approval	4	4.68	3.70	.64
Improved Perceived Approval (removed item 1,4)	2	5	2.23	.75

Table 3. (cont'd)

Scale	No. of Items	Mean	SD	A
Puzzlement	3	1.98	1.24	.93
Surprise	3	3.27	3.53	.84
Fear	3	2.08	4.30	.97
Anger	3	2.14	5.56	.94
Sadness	3	1.88	6.47	.94

Table 4. Correlation among variables

	Satisfaction	Happiness	Pride	Guilt	Attitude	Intention	Involvement	Social Desirability
Happiness	.694**							
Pride	.741**	.659**						
Guilt	-.405**	-.295**	-.451**					
Attitude	.081	.107	.086	-.156*				
Intention	.111	.211**	.240**	.027	.318**			
Involvement	.267**	.358**	.343**	-.172*	.268**	.609**		
Social Desirability	.126	.139	.124	-.167*	.192**	.378**	.303**	
Believability	.148*	.323**	.164*	-.113	.236**	.387**	.414**	.308**
Persuasiveness	.307**	.423**	.282**	-.069	.201**	.391**	.359**	.212**
Social Approval	.210**	.313**	.164*	-.143	.236**	.193**	.221**	.339**
Puzzlement	-.192**	-.213**	-.112	.236**	-.079	-.018	-.027	-.090
Surprise	.005	.081	.012	.121	.114	.106	.182*	.130
Fear	-.216**	-.088	-.121	.310**	.019	-.005	.083	-.089

\*  $p < .05$ , \*\*  $p < .01$ ,  $\alpha < .05$  (2-tailed).

Table 4. (cont'd)

	Satisfaction	Happiness	Pride	Guilt	Attitude	Intention	Involvement	Social Desirability
Anger	-.276**	-.338**	-.163*	.245**	-.037	.039	-.027	.034
Sadness	-.292**	-.231**	-.173*	.349**	-.024	.053	-.024	-.061
Experimental Condition	-.194**	-.177*	-.098	.138	-.041	-.022	.057	-.047
Prior Recycling	-.239**	-.177*	-.377**	.204**	-.146*	-.408**	-.314**	-.107

\*  $p < .05$ , \*\*  $p < .01$ ,  $\alpha < .05$  (2-tailed).

Table 4. (cont'd)

	Believability	Persuasiveness	Social Approval	Puzzlement	Surprise	Fear	Anger	Sadness	Experimental Condition
Persuasiveness	.489**								
Social Approval	.250**	.314**							
Puzzlement	-.185*	-.034	-.119						
Surprise	-.018	.197**	.138	.466**					
Fear	-.054	.026	-.106	.655**	.542**				
Anger	-.199**	-.081	-.253**	.646**	.414**	.683**			
Sadness	-.150*	.053	-.192**	.670**	.456**	.810**	.793**		
Experimental Condition	.160*	-.023	-.312**	.079	-.108	.155*	.122	.150*	
Prior Recycling	-.138	-.198**	-.085	.017	.039	.008	-.070	-.008	.022

\*  $p < .05$ , \*\*  $p < .01$ ,  $\alpha < .05$  (2-tailed).

Table 5. *Summary of hypotheses and research questions*

<u>Hypothesis</u>	<u>Result</u>
H1: The effect of descriptive norm messages on satisfaction will be moderated by prior recycling behavior such that recyclers, relative to non-recyclers, will experience the most satisfaction in the low versus high prevalence message condition.	Not consistent with data
H2: The effect of descriptive norm messages on guilt will be moderated by prior recycling behavior such that non-recyclers, relative to recyclers, will experience the most guilt in the high versus low prevalence message condition.	Not consistent with data
RQ1: Do recyclers experience greater satisfaction than other positive emotions when they are exposed to a message indicating low prevalence?	Non-significant difference
RQ2: Do non-recyclers experience greater guilt than other negative or neutral emotions when they are exposed to a message indicating high prevalence?	Experienced greater guilt and surprise than other emotions
H3a: Recyclers will produce a higher number of total message-relevant thoughts, both positive and negative, in the low versus high prevalence message condition.	Not consistent with data
H3b: Non-recyclers will produce a higher number of total message-relevant thoughts, both positive and negative, in the high versus low prevalence message condition.	Not consistent with data
RQ3: Does the pattern of the valence of thoughts vary by experimental conditions?	Non-significant difference
H4: Recyclers in the low prevalence message condition will have more positive attitude toward recycling than those who in the high prevalence message condition.	Not consistent with data

Table 5. (cont'd)

H5: Recyclers in the low prevalence message condition will be more likely to intend to recycle than those in the high prevalence message condition.	Consistent with data
H6: For recyclers, the effects of descriptive norm messages on behavioral intent will be mediated by satisfaction.	Not consistent with data
H7: Non-recyclers in the high prevalence message condition will have more positive attitude toward recycling than those in the low prevalence message condition.	Not consistent with data
H8: Non-recyclers in the high prevalence message condition will be more likely to intend to recycle than those in the low prevalence message condition.	Consistent with data
H9: For non-recyclers, the effects of descriptive norm messages on behavioral intent will be mediated by guilt.	Not consistent with data

Table 6. Mean and standard deviation, *t*-value, sig. and  $\eta^2$  for satisfaction and other positive emotions among recyclers

			Mean	SD	<i>t</i>	Sig.	$\eta^2$
Recyclers ( <i>N</i> = 109)	Satisfaction	High ( <i>N</i> = 59)	5.2	1.09	2.36*	.02	.05
		Low ( <i>N</i> = 50)	4.73 <sub>a</sub>	0.98			
	Happiness	High ( <i>N</i> = 59)	5.13	1.18	1.86	.06	.03
		Low ( <i>N</i> = 50)	4.72 <sub>a</sub>	1.08			
	Pride	High ( <i>N</i> = 59)	5.2	1.05	1.49	.14	.02
		Low ( <i>N</i> = 50)	4.91 <sub>a</sub>	1.01			

*Note.* Independent t-test was conducted with the descriptive norm messages as an independent variable and each discrete positive emotion as dependent variables. \* $p < .05$ .

Means with the same subscript (a) are not significantly different from one another in the low prevalence condition at  $p < .05$ .



Table 7. *Mean, standard deviation, t-value, and sig. for guilt and other negative or neutral emotions among non- recyclers*

			<i>Mean</i>	<i>SD</i>	<i>t</i>	<i>Sig.</i>
Non- recyclers ( <i>N</i> = 77)	Guilt	High (40)	3.5 <sub>a</sub>	1.41	-0.67	.50
		Low (37)	3.71	1.32		
	Puzzlement	High (40)	1.88 <sub>b</sub>	1.28	-0.84	.41
		Low (37)	2.13	1.27		
	Surprise	High (40)	3.53 <sub>a</sub>	1.72	1.21	.23
		Low (37)	3.1	1.41		
	Fear	High (40)	1.93 <sub>b</sub>	1.39	-0.98	.33
		Low (37)	2.26	1.62		
	Anger	High (40)	2.06 <sub>b</sub>	1.19	0.39	.70
		Low (37)	1.95	1.32		
	Sadness	High (40)	1.83 <sub>b</sub>	1.22	-0.28	.78
		Low (37)	1.91	1.49		

*Note.* Means with different subscript (a and b) are significantly different from one another in the high prevalence condition at  $p < .05$ .

Table 8. *The association between the valence of thoughts and experimental conditions*

The Valence of Thoughts	Experimental Condition				$\chi^2$	Cramer's V
	High Prevalence		Low Prevalence			
	Recyclers	Non-Recyclers	Recyclers	Non-Recyclers		
Positive	58 (2.3)*	34 (-0.5)	18 (-2.7)*	29 (0.7)	21.97	.13
Negative	17 (-1.1)	27 (1.8)	17 (-0.1)	11 (-0.6)		
Neutral	121 (-0.9)	108 (-0.5)	120 (1.6)	77 (-0.1)		

*Note.* Adjusted standardized residuals appear in parentheses below group frequencies.

\*  $p = <.05$ .

Table 9. *Regression results for attitude toward recycling*

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>Sr</i>
First Block					
Involvement	0.17	0.09	.16	1.98*	.14
Social Desirability	0.07	0.10	.06	0.74	.05
Believability	0.11	0.10	.10	1.11	.08
Persuasiveness	0.04	0.08	.04	0.49	.03
Perceived approval	0.16	0.08	.15	1.87	.13
$F(5, 180) = 4.83, p = .001, adj R^2 = .094$					
Second Block					
Descriptive normative information	-0.05	0.18	-.02	-0.25	-.02
Prior recycling behavior	-0.15	0.18	-.06	-0.84	-.06
$F_{change}(2, 178) = 0.39, p = .68, R^2_{change} = .004$					
Third Block					
Descriptive normative information x Prior recycling behavior	0.04	0.34	.01	0.11	.01
$F_{change}(1, 177) = 0.01, p = .91, R^2_{change} < .001$					

\*  $p < .05$ ,

*Note.* Descriptive normative information: high prevalence was coded as 0 and low prevalence was coded as 1.

Prior recycling behavior: recyclers were coded as 0 and non-recyclers were coded as 1.

*sr*: semipartial correlation

Table 10. *Mean and standard deviation for attitude toward recycling across different experimental conditions*

		High Prevalence	Low Prevalence	Sum
Recycler	<i>N</i>	59	50	109
	<i>M</i>	6.45	6.33	6.40
	<i>SD</i>	0.95	1.36	1.15
Non-recycler	<i>N</i>	40	37	77
	<i>M</i>	6.07	6.01	6.04
	<i>SD</i>	1.12	1.35	1.23
Sum	<i>N</i>	99	87	186
	<i>M</i>	6.30	6.19	6.25
	<i>SD</i>	1.04	1.36	1.19

Table 11. *Regression results for intention to recycle*

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>Sr</i>
First Block					
Involvement	0.62	0.09	.47	7.32**	.41
Social Desirability	0.32	0.10	.20	3.18*	.18
Believability	0.08	0.09	.06	0.88	.05
Persuasiveness	0.19	0.08	.17	2.48*	.14
Perceived approval	-0.06	0.08	-.05	-0.73	-.04
$F(5, 180) = 28.29, p = .001, adj R^2 = .424$					
Second Block					
Descriptive Normative Information	-0.19	0.17	-.07	-1.11	-.06
Prior Recycling Behavior	-0.67	0.17	-.23	-3.96*	-.21
$F_{change}(2, 178) = 8.63, p = .001, R^2_{change} = .049$					
Third Block					
Descriptive Normative Information X Prior Recycling Behavior	-0.68	0.32	-.18	-2.12**	-.11
$F_{change}(1, 177) = 4.49, p = .035, R^2_{change} = .013^*$					

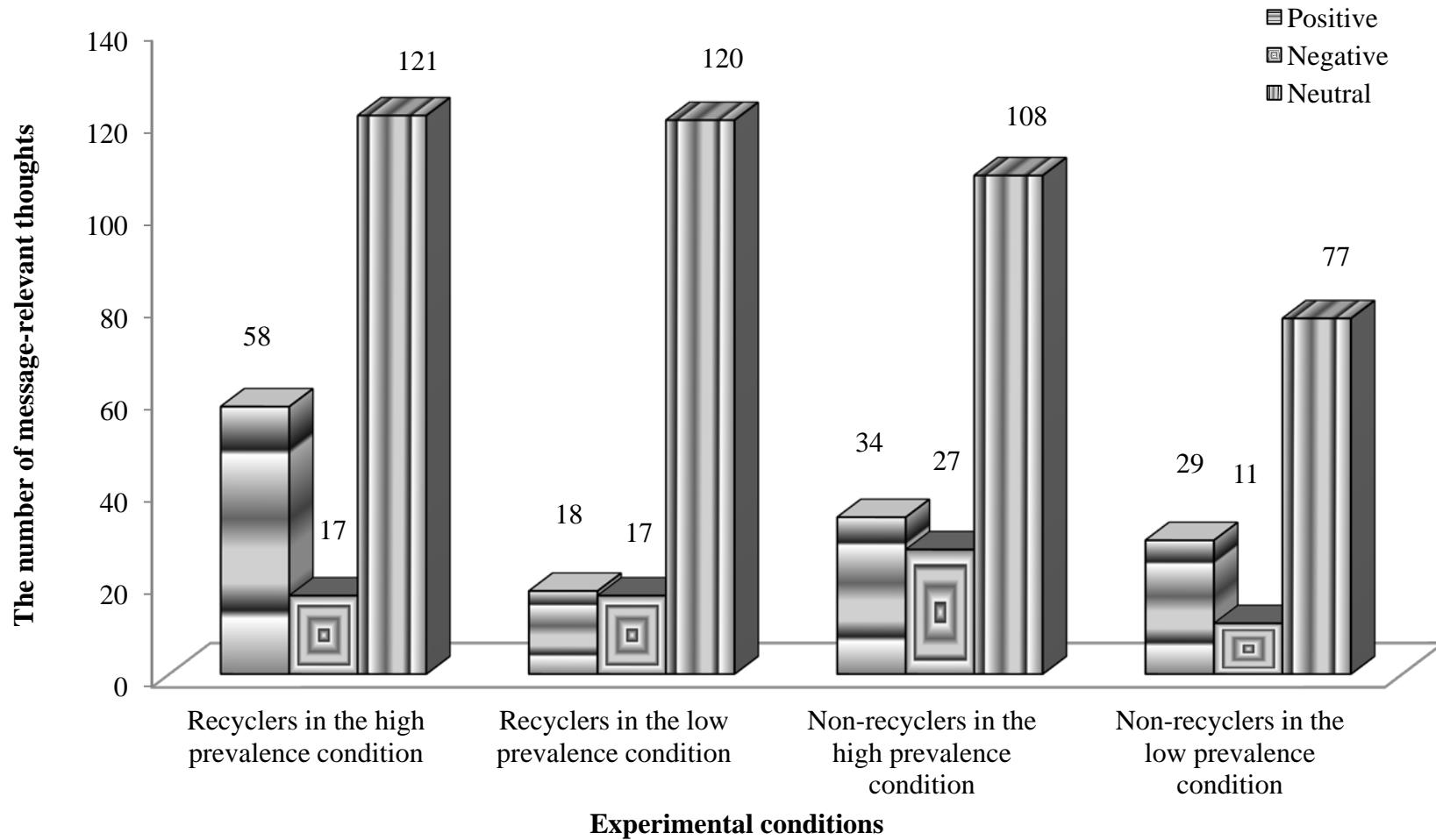
\*  $p < .05$ , \*\*  $p < .001$

*Note.* Descriptive normative information: high prevalence was coded as 0 and low prevalence was coded as 1.

Prior recycling behavior: recyclers were coded as 0 and non-recyclers were coded as 1.

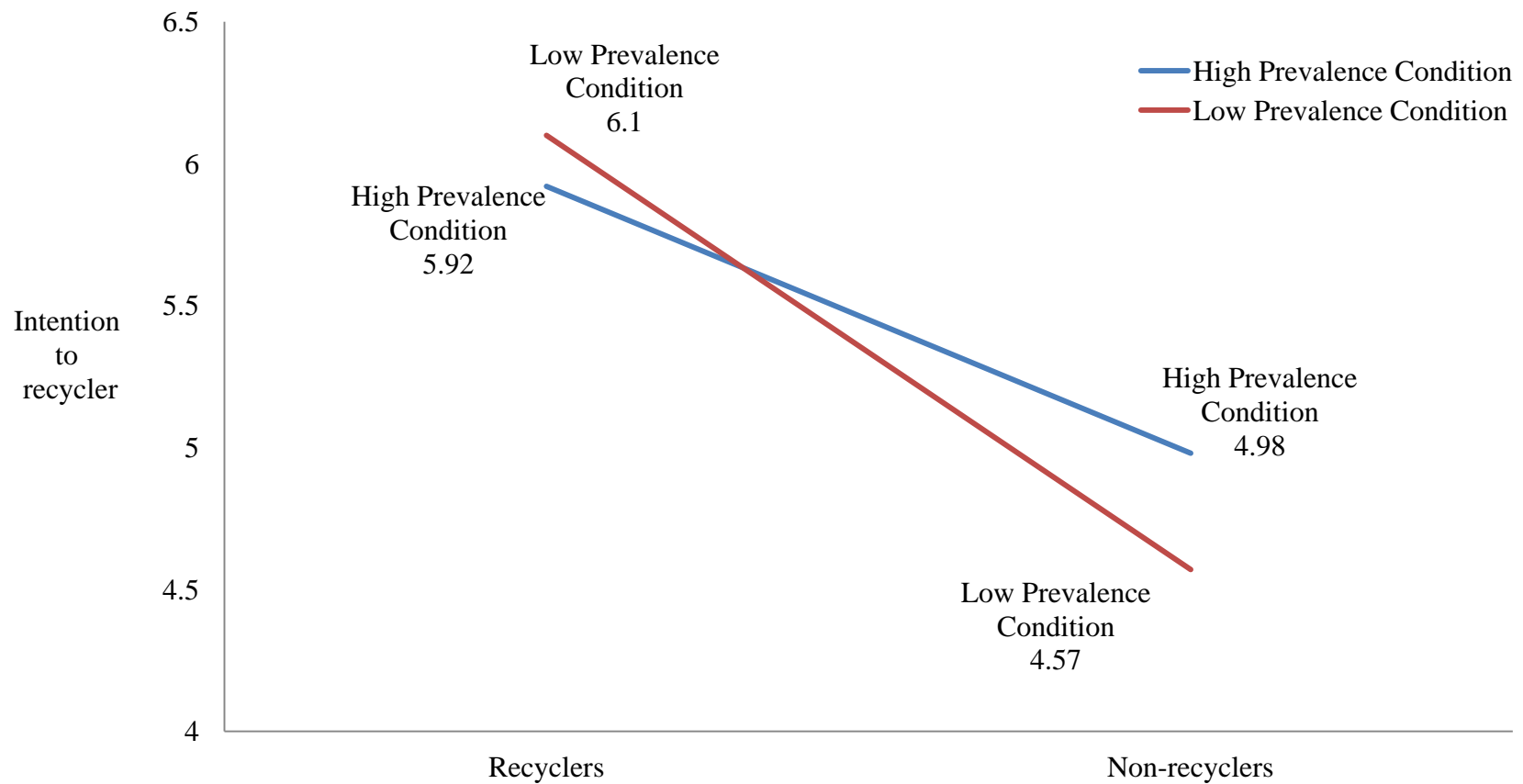
*sr*: semipartial correlation

Figure 1. *The association between the valence of thoughts and the experimental conditions*



*Note.* For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis.

Figure 2. *The effects of the descriptive norm messages on intention to recycle depending on prior recycling behavior.*



*Note.* For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis.

## Appendix B: Stimuli

A video clip indicating other students are actively recycling at MSU will be presented. In the beginning and the end of video clip the descriptive normative information (either high or low) will be shown.

**High prevalence** - <http://www.youtube.com/watch?v=gV6PmhUqK04>

*“In 2012, 80% of MSU students recycled the paper they used.”*

**Low prevalence** - <http://www.youtube.com/watch?v=jG692jN3c70>

*“In 2012, 20% of MSU students recycled the paper they used.”*



## Appendix C: Questionnaire Items for Pilot Study

**Direction:** Please choose the answer that best represents your understanding of what the video message shows.

### Believability

1. I understand what the video is talking about.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. I think the statistics in the video seems believable.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. The statistics in the video seem plausible to me.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. I think the information provided in the video is believable.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### Persuasiveness

#### To me, the message is

1. not at all convincing    1    2    3    4    5    6    7    very convincing

2. not at all persuasive    1    2    3    4    5    6    7    very persuasive

3. not at all influential    1    2    3    4    5    6    7    very influential

**Direction.** Please choose the answer that best represents your understanding of what the video message shows.

**Perceived Descriptive Normative Content in the Message**

1. The information presented above indicates that most students at MSU engage in recycling the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. Clearly, this message shows that not many students at MSU are recycling the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. It is clear that many students have recycled the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. From the information above, it seems that the majority of students at MSU recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

**Perceived Prevalence of Recycling**

1. Most students at MSU actively recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. Most of the students at MSU actively engage in paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. Most of the students at MSU recycle the paper they use as actively as they are supposed to.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. The majority of the students at MSU actively recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Perceived Injunctive Normative Content in the Message**

1. Based on the video, I feel like students at MSU would think less of me if I didn't recycle the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. It is clear from this information that many students believe paper recycling is important.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. The video shows that people at MSU approve of paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. This video shows that people around me would respect me more if I recycled paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Perceived Social Approval of Recycling**

1. I feel like people would think less of me if I didn't recycle the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. It is clear that many students believe paper recycling is important.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. People at MSU approve of paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. I think that people around me would respect me more if I recycled the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

## **Appendix D: Informed Consent Form - “Environmental Behaviors Study”**

Welcome to the “Environmental Behaviors Study” research. We would like to provide you with a consent form to inform you about the research and convey that participation is voluntary. If you have any question while you read this consent form, feel free to ask the researchers.

In the current study, you are being asked to participate in research of Environmental Behaviors. This research study is being conducted by Michigan State University. This research project attempts to evaluate a message regarding environmental behaviors. To be an eligible participant in this study, you must be a MSU student. If you choose to participate in this study, you will view a video message and be asked to complete a questionnaire that assesses the quality of the message and your ideas and attitude toward it.

It will take around 30 minutes or less to complete the questionnaire. If you may feel uncomfortable while answering questions in the current study, do not have to answer any question you do not want to. Participation in this study is voluntary and you may withdraw your consent to participate at any time without penalty. The risks of participating are not greater than those usually met in mundane life. You may not directly benefit from participation in this study, however, you will contribute to the understanding of young people’s behaviors regarding environment issues. You will receive an extra credit for the participation after completing the questionnaire but will not be given money. You may speak with the instructor regarding completing an alternative assignment.

Your privacy will be protected to the maximum extent allowable by law. No personally identifiable information will be reported in any research product. Moreover, only trained research staff will have access to your responses. None of the information that you report will be linked to you individually. Any individually identifying information that is incidentally obtained will be deleted from the research record.

This is a study led by researchers in the Department of Communication at Michigan State University. If you have any question about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact, Maria Lapinski, Associate Professor, 297 Communication Arts & Sciences, 517-355-9569, lapinsk3@msu.edu.

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University’s Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail [irb@msu.edu](mailto:irb@msu.edu) or regular mail at 408 W. Circle Dr. Rm 207 Olds Hall, MSU, East Lansing, MI 48824.

By going forward in the study, you indicate your agreement to participate in this research and have your answers included in the data set.

If you agree please click the button.

## Appendix E: Questionnaire for Main Experiment

### Pre-test

We are interested in learning about how people perceive typical behaviors of MSU students. We are asking you to estimate the percentage of MSU students who engage in certain behaviors as well as how often you engage in these behaviors.

For example, recycling is a behavior including sorting recyclable materials such as used paper, glass, metal cans, plastic, and electronics, and throwing the used materials into each appropriate recycle bin.

It is not a test, so there are no right or wrong answers. Please answer each item as carefully and accurately as you can by moving the bar below.

*For example, if one thought about half the teenagers in the U.S. drink alcohol once each week, one would answer 50% by adjusting the bar below.*

**Instruction.** The following items ask you to estimate the percentage of MSU students who engage in certain behaviors. For each question, your answers can range from 0 (none of MSU students) to 100% (all of MSU students).

1. In the last 6 months, what percentage of students at MSU do you think recycled the paper they used (i.e. office paper, magazine, and newspaper) at home or in the dorm? \_\_\_\_\_
2. In the last 6 months, what percentage of students at MSU do you think recycled the paper they used (i.e. office paper, magazine, and newspaper) while in class? \_\_\_\_\_
3. What percentage of students at MSU do you think smoke at least a pack of cigarettes each week? \_\_\_\_\_
4. What percentage of students at MSU do you think are at risk for eating disorders (anorexia, bulimia, or binge eating)? \_\_\_\_\_
5. In the last 6 months, what percentage of students at MSU do you think recycled the metal cans they used at home or in the dorm? \_\_\_\_\_
6. In the last 6 months, what percentage of students at MSU do you think recycled the metal cans they used while in class? \_\_\_\_\_
7. In the last 6 months, what percentage of students at MSU do you think recycled the plastic they used at home or in the dorm? \_\_\_\_\_
8. In the last 6 months, what percentage of students at MSU do you think recycled the plastic while in class? \_\_\_\_\_

9. In the last 6 months, what percentage of students at MSU do you think recycled the glass they used at home or in the dorm? \_\_\_\_\_
10. In the last 6 months, what percentage of students at MSU do you think recycled the glass they used while in class? \_\_\_\_\_
11. What percentage of students at MSU do you think are at risk for obesity? \_\_\_\_\_
12. What percentage of students at MSU exercises at least 4 times each week? \_\_\_\_\_
13. In the last 6 months, what percentage of students at MSU do you think recycled the electronics (a cell phone or a laptop) they used? \_\_\_\_\_
14. What percentage of students at MSU walks to school or class in order to conserve energy?  
\_\_\_\_\_

**Instruction.** The following items ask you to estimate how often you engage in these behaviors. *For example, if you think that you drink alcohol once each week, you would answer "Always".*

1. In the last 6 months, have you used paper such as office paper, magazine, or newspaper?  
☐☐ 1) Yes                      2) No    ☒ I don't know

If the question 1's answer is 1) Yes following two questions were asked

1-2. In the last 6 months, how often did you recycle the paper you use at home or in the dorm?

- ☐ 1) Never              2) Rarely              3) Sometimes              4) Often              5) Always  
☐

1-3. In the last 6 months, how often did you recycle the paper you use while in class?

- ☐ 1) Never              2) Rarely              3) Sometime              4) Often              5) Always

2. In the last 6 months, have you used plastic (e.g. packaging or containers)?

- ☐ 1) Yes                      2) No    ☒ I don't know

If the question 2's answer is 1) Yes following two questions were asked

2-1. In the last 6 months, how often did you recycle the plastic you use at home or in the dorm?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

2-2. In the last 6 months, how often did you recycle the plastic you use while in class?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

3. In the last 6 months, how often did you exercise 4 times a week?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

4. In the last 6 months, have you used metal cans?

☐ 1) Yes      2) No      ☒ I don't know

If the question 4's answer is 1) Yes following two questions were asked

4-1. In the last 6 months, how often did you recycle the metal cans you use at home or in the dorm?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

4-2. In the last 6 months, how often did you recycle the metal cans you use while in class?

☐ ☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

5. In the last 6 months, have you used glass?

☐ 1) Yes      2) No      ☒ I don't know

If the question 5's answer is 1) Yes following two questions were asked

5-1. In the last 6 months, how often did you recycle the glass you use at home or in the dorm?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

5-2. In the last 6 months, how often did you recycle the glass you use while in class?

☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always

6. In the last 6 months, how often did you walk to school or class in order to conserve energy?

☐☐ 1) Never      2) Rarely      3) Sometimes      4) Often      5) Always



## Appendix F: Questionnaire for Main Experiment

### Post-test

The following questionnaire asks you to evaluate some information about recycling.

Paper recycling is sorting paper which can be recycled and putting the paper into the right corresponding trash bin before disposal. The recyclable paper includes office paper, magazine, and newspaper.

The following items are designed to measure feelings you have while watching the video.

It is not a test, so there are no right or wrong answers. Answer each item as carefully and accurately as you can.

#### **Aroused Emotions**

**Direction:** The following items are designed to measure feelings you have while watching the video. It is not a test, so there are no right or wrong answers. Answer each item as carefully and accurately as you can (1 indicates strongly disagree, and 7 indicates strongly agree).

#### **Happiness**

1. While watching the video, I felt happy.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. While watching the video, I felt joyful.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. While watching the video, I felt glad.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. While watching the video, I felt delighted.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

5. While watching the video, I felt cheerful.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Pride**

1. While watching the video, I felt proud.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. While watching the video, I felt accomplished.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. While watching the video, I felt credited for myself because of my own behavior.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Satisfaction**

1. While watching the video, I felt satisfied.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. While watching the video, I felt good.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. While watching the video, I felt pleased.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. While watching the video, I felt contented

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Guilt**

1. While watching the video, I felt guilty.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. While watching the video, I felt regretful.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. While watching the video, I felt bad about myself.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. While watching the video, I felt remorseful.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Other Emotions**

None of this Feeling(0) \_\_1\_\_:\_\_2\_\_:\_\_3\_\_:\_\_4\_\_:\_\_5\_\_ (6)A Great Deal of this Feeling

#### **While watching the video, I was/felt**

1. Puzzled
2. Confused
3. Bewildered
4. Surprised
5. Astonished
6. Amazed
7. Fearful
8. Afraid
9. Scared
10. Angry
11. Irritated
12. Annoyed
13. Sad
14. Dreary
15. Dismal

### **Thoughts about Paper Recycling**

What kind of thoughts do you have while watching the video message? Please list all of the thoughts you had while watching the video. There is no right or wrong answers.

You will be given 2 minutes to answer it.

## Attitudes

**Direction:** The following statements describe your feelings and thoughts on paper recycling. On the scale below, please choose one answer that best represents your feelings or thoughts about the paper recycling. There is no right or wrong answer. Remember, paper recycling is sorting paper which can be recycled and putting the paper into the right corresponding trash bin before disposal. The recyclable paper includes office paper, magazine and newspaper.

### To me, paper recycling is

- |              |    |    |    |   |   |   |   |            |
|--------------|----|----|----|---|---|---|---|------------|
| 1. Useless   | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Useful     |
| 2. Foolish   | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Wise       |
| 3. Harmful   | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Beneficial |
| 4. Worthless | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Valuable   |
| 5. Unhealthy | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Wholesome  |

### To me, paper recycling is

- |                |    |    |    |   |   |   |   |           |
|----------------|----|----|----|---|---|---|---|-----------|
| 1. Negative    | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Positive  |
| 2. Dislikable  | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Likable   |
| 3. Bad         | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Good      |
| 4. Undesirable | -3 | -2 | -1 | 0 | 1 | 2 | 3 | Desirable |

## Behavioral Intent

**Direction:** For the following items, please indicate your behavior and how much you agree with the behavior described in each of the following statement.

1. Have you recycled paper you use?

☐ 1) Yes                      2) No

If the question 1's answer is 1) Yes, the following question will be presented.

**In the next two weeks, how likely is it that I will...**

1. Continue to sort trash in order to recycle the paper I use.

Not likely at all    1      2      3      4      5      6      7      Very much likely

2. Continue recycling paper I use.

Not likely at all    1      2      3      4      5      6      7      Very much likely

3. Continue to put paper into the corresponding recycle bin.

Not likely at all    1      2      3      4      5      6      7      Very much likely

If the question 1's answer is 2) No, the following question will be presented.

**In the next two weeks, how likely is it that I will...**

4. Start to sort trash in order to recycle the paper I use.

Not likely at all    1      2      3      4      5      6      7      Very much likely

5. Start recycling paper I use.

Not likely at all    1      2      3      4      5      6      7      Very much likely

6. Start to put paper into the corresponding recycle bin.

Not likely at all    1      2      3      4      5      6      7      Very much likely

**Direction:** Please indicate how much you agree with the behavior described in each of the following statement. Your answer can range from not likely at all to very much likely.

1. In the next two weeks, I plan to recycle the paper I use.

Not likely at all    1    2    3    4    5    6    7    Very much likely

2. In the next two weeks, I intend to recycle the paper I use.

Not likely at all    1    2    3    4    5    6    7    Very much likely

3. I will recycle any paper I use over the next two weeks.

Not likely at all    1    2    3    4    5    6    7    Very much likely

4. I plan to engage in paper recycling over the next two weeks.

Not likely at all    1    2    3    4    5    6    7    Very much likely

### **Issue Involvement**

**Direction:** Please indicate your agreement on each of the following statements (1 indicates strongly disagree, and 7 indicates strongly agree).

1. Paper recycling is an important issue to me.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. Paper recycling is an issue I care about.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. To me, paper recycling is a trivial issue. (reverse coded)

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. I really don't care about the issue of paper recycling. (reverse coded)

Strong disagree    1    2    3    4    5    6    7    Strongly agree

## **Social Desirability**

**Direction:** Please indicate your agreement on each of the following items (1 indicates strongly disagree, and 7 indicates strongly agree).

1. I find that I can help others in many ways.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. In spite of many changes, there are still definite rules to live by.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. One can always find friends if he tries.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. It is difficult to think clearly about right and wrong these days.

Strongly disagree    1    2    3    4    5    6    7    Strongly agree

5. Many people are friendly only because they want something from you.

Strongly disagree    1    2    3    4    5    6    7    Strongly agree

6. At times I feel that I am a stranger to myself.

Strongly disagree    1    2    3    4    5    6    7    Strongly agree

## **<The same measures used in pilot study>**

**Direction:** Please choose the answer that best represents your understanding of what the video message shows.

### **Believability**

1. I understand what the video is talking about.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. I think the statistics in the video seems believable.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. The statistics in the video seem plausible to me.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. I think the information provided in the video is believable.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Persuasiveness**

#### **To me, the video message is**

1. not at all convincing    1    2    3    4    5    6    7    very convincing

2. not at all persuasive    1    2    3    4    5    6    7    very persuasive

3. not at all influential    1    2    3    4    5    6    7    very influential

**Direction.** Please choose the answer that best represents your understanding of what the video message shows.

### **Perceived Descriptive Normative Content in the Message**

1. The information presented above indicates that most students at MSU engage in recycling the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. Clearly, this message shows that not many students at MSU are recycling the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. It is clear that many students have recycled the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree



4. From the information above, it seems that the majority of students at MSU recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Perceived Prevalence of Recycling**

1. Most students at MSU actively recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. Most of the students at MSU actively engage in paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. Most of the students at MSU recycle the paper they use as actively as they are supposed to.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. The majority of the students at MSU actively recycle the paper they use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### **Perceived Injunctive Normative Content in the Message**

1. Based on the video, I feel like students at MSU would think less of me if I didn't recycle the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. It is clear from this information that many students believe paper recycling is important.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. The video shows that people at MSU approve of paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. This video shows that people around me would respect me more if I recycled paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### Perceived Social Approval of Recycling

1. I feel like people would think less of me if I didn't recycle the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

2. It is clear that many students believe paper recycling is important.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

3. People at MSU approve of paper recycling.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

4. I think that people around me would respect me more if I recycled the paper I use.

Strong disagree    1    2    3    4    5    6    7    Strongly agree

### Exposure

1. How much of the video about recycling did you watch?

**I watched.....**

None of the video message (0)    \_\_1\_\_:\_\_2\_\_:\_\_3\_\_:\_\_4\_\_:\_\_5\_\_ (6) All of the video message

### Demographic

**Directions:** You are about to answer the last set of questions.    The following questions ask

you to describe YOURSELF. (*Note.* Please choose an answer that best represents you.)

1. I see myself as a....

1) Recycler                      2) Non-recycler                      3) Neither

2. I know where I can recycle the paper I use around my house.

1) Yes                      2) No                      3) No place to recycle

3. I know where I can recycle the paper I use on campus.

☐ 1) Yes                      2) No

4. I know how to recycle the paper I use.

☐ 1) Yes                      2) No

5. Please answer questions below in number. What is your age? For example, if you are 21 years-old, put the number 21 below.

Your age is \_\_\_\_\_ years-old. (e.g. 21)

6. When were you born? For example, if you were born in 1992, put the number 1992 below.

I was born in \_\_\_\_\_ (e.g. 1992)

7. Gender:                      1) Male                      2) Female

8. Your ethnicity is:

- 1) Caucasian
- 2) African American
- 3) Asian
- 4) Asian-American
- 5) Hispanic-American
- 6) Native American
- 7) Hispanic
- 8) Pacific Islander
- 9) Other (\_\_\_\_\_)

9. What are you studying?

My major is \_\_\_\_\_ (e.g. communication, or advertising etc.)

10. What year are you in?

- 1) Freshman    2) Sophomore    3) Junior    4) Senior    5) Other

(\_\_\_\_\_)

11. I live

- 1) on-campus    2) off-campus    3) Other (\_\_\_\_\_)

12. I live

- 1) Alone    2) With roommate(s)    3) With parent(s)    4) Other

(\_\_\_\_\_)

13. Are you affiliated to any pro-environmental group?

- 1)    Yes (Please Specify the name of the group\_\_\_\_\_)  
and how long you have participated in the group \_\_\_\_\_months)

- 2)    No

**Thank you for your participation!    Please click the button to leave your name, PID and email address for credit record.**

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