Temporal Distance and Descriptive Norms on Environmental Behaviors: A Cross-Cultural Examination of Construal-Level Theory

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Abstract
Rapid urbanization has beset sustainable consumption. Although many countries are increasingly taking pro-environmental stances, most countries continue to have a low recycling rate and a high littering rate. This study examines the effect of temporal distance as a part of Construal-Level Theory and descriptive norms on pro- and contra-environmental behaviors (i.e., recycling and littering) cross-culturally. Participants were recruited from the United States and South Korea, and randomly assigned to one of five versions of the survey. Findings indicated stronger intention to recycle for the distant future (only 3-year) and no significant difference for littering. Americans showed higher likelihood to recycle than Koreans while Koreans showed higher likelihood to litter when temporal distance was disregarded. Situational descriptive norms showed significant differences cross-culturally, but the interaction of culture and time distance was not visible. Theoretical implications for Construal-Level Theory research and practical implications for environmental policymakers in encouraging pro-environmental behaviors are discussed.

Keywords
temporal distance, descriptive norm, recycling, littering, Construal-Level Theory

Introduction
With urbanization and a rapid increase in consumerism, sustainability and waste management have become more important (Varotto & Spagnolli, 2017; Yang et al., 2019) now than ever. Even though increasing the frequency of recycling and reducing the frequency of littering are vital and effective methods to lessen waste and its detrimental effects on the environment, people are not always motivated to do so. It has been suggested that the fact that it takes so much time to see the outcome of their behavior (whether it is positive or negative) is one reason why people choose not to recycle (Schumaker, 2016). As for littering, Wagner (2014) posits that it is related to not only lack of realization of the outcome but also to an individual’s social environment. Given the importance of pro-environmental behaviors in society today, it is important to understand both psychological and social reasonings behind behaviors affecting the environment to prevent detrimental behavior (i.e., littering) and to reinforce beneficial behavior (i.e., recycling).

Construal-Level Theory (CLT; Trope & Liberman, 2010) posits that individuals perceive the outcome of a certain behavior based on the psychological distance between them and the relevant behavior and that this perception can affect their behavioral intentions. As environmental behaviors are affected by the psychological distance, specifically temporal distance (e.g., Brügger et al., 2016; Schill & Shaw, 2016; White et al., 2011; Yu et al., 2017), CLT can provide a useful framework to understand what motivates people.

However, recent literature (Hartley et al., 2018) has demonstrated that psychological distances alone might not be enough to explain contra-environmental behaviors. Hartley and colleagues’ research posits the importance of social norms, which has also been suggested by other scholars, as it points out that norms are strong motivators to choose whether or not

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to litter (e.g., Cialdini et al., 1990; Schultz et al., 2013) and whether or not to recycle (e.g., Thomas & Sharp, 2013; Tucker, 1999). In accordance with this perspective, this study utilizes CLT and examines the role of social norms to underline the mechanisms of pro- and contra-environmental behaviors.

Finally, culture is an important additional factor for understanding the underlying mechanisms for both CLT and social norms. Culture affects both perception of time (e.g., Boroditsky et al., 2011; Hall, 1983; Kim et al., 2018) and the strength of norms (e.g., Iran et al., 2019; Spencer et al., 2015). Koreans, who are from a collectivist culture, have a more concrete perception of the near future than Americans, whose culture is individualistic (Kim et al., 2018). Countries also differ in their norms (Abrams et al., 1998), and even when norms are the same, the strength and effects of these norms vary cross-culturally (e.g., Iran et al., 2019; Spencer et al., 2015). High-context cultures like Korea are more likely to conform to social norms than low-context cultures like America (Kim et al., 1998). Specifically, research focusing on norms regarding pro-environmental behaviors (Culiberg & Elgaaied-Gambier, 2016) have shown the differences in the mediating effects of norms on predicting environmental behaviors. Accordingly, by focusing on America and South Korea, two countries that are similar in their attempts at preventing contra-environmental behaviors but very different in their ratios of pro-environmental behaviors, this study scrutinizes how CLT and social norms work across cultures. By doing so, this research aims to provide valuable insight that may have implications for environmental scholars and educators seeking to generate better prevention for littering. Furthermore, by studying both pro-behavior and contra-behavior in terms of simple daily behaviors, this article seeks to help environmental policymakers direct their policies to alter people’s environmental behaviors.

Literature Review

Construal-Level Theory and Temporal Distance

CLT suggests the relation between the psychological distance and mental construal process (Trope & Liberman, 2010). Trope and Liberman (2010) have described psychological distance in terms of spatial, temporal, social, and hypotheticality. Spatial distance refers to physical proximity, whereas temporal distance refers to being in a near or distant future. On the other hand, social distance is related to the person that the behavior or the object deals with (e.g., whether it is a friend or an unknown person you are helping), and hypotheticality concerns the likelihood of the event. One study looking at all psychological distances together concludes that each psychological distance relates to the construal similarly (Bar-Anan et al., 2006). Therefore, for the sake of parsimoniousness, the current research focuses on only one type of psychological distance, temporal distance, because of its status as the pioneer distance in theory building (see Liberman & Trope, 1998); its frequent usage in environmental literature (e.g., Chang et al., 2015; Milfont & Demarque, 2015); and its relevance to cultural differences (e.g., Lee et al., 2011; Lee & Park, 2012).

There are two levels of construal: high and low. High-level construals are abstract and decontextualized while low-level ones are concrete and contextualized (Trope & Liberman, 2003). High-level construals are also more related to one’s goal than low-level construals given the ambiguous nature that enables individuals to define and imagine on their own (Liberman & Trope, 1998). According to Trope and Liberman (2010), as the psychological distance grows, more high-level construals are employed. The reason for this is that high-level construals are less likely to change over time compared with low-level construals. As an example, individuals would prefer having food (high-level construal) than having scrambled eggs (low-level construal) due to the uncertainty of doing the activity. The latter would require a specific feature (e.g., egg, fry pan), and if this feature is not available at the moment, the action would be left unfulfilled. On the other hand, high-level construals diversify available features to maximize the satisfaction of the action at that moment. This is consistent with existing research (Eyal et al., 2004, 2009; Liberman & Trope, 1998; Trope & Liberman, 2012).

Previous studies on CLT show mixed results on the effect of time on the behavioral outcome. Choi et al. (2012), for example, posits that blood donation intention is stronger for those who indicate doing the action in 1-year or no-specific time than for those who indicate doing it in 1 week or 3 months. However, Fujita and colleagues (2006) posit that when people expect a gain as a result (e.g., gift certificates), immediate receipt is preferred more than delayed receipt.

Another central issue relating to the effect of temporal distance is the positive-ness and negative-ness of a construal (Trope & Liberman, 2000). As proposed by CLT, positive high-level construal is likely to be preferred in the distant future than the near future while positive low-level construal is preferred in the near future (Liberman & Trope, 1998). On the other hand, negative high-level construal is preferred more in the near future than the distant future (Trope & Liberman, 2000). Recycling can be regarded as time and energy consuming (a negative low-level construal) yet a good social action (a positive high-level construal) while littering is easy and fast (a positive low-level construal) yet a harming action to the nature (a negative high-level construal).

Due to the mixed results of past research and the lack of studies on the effect of temporal construal on environmental behaviors, following research questions relating to recycling and littering are posed:

Research Question 1 (RQ1): Will people indicate stronger intentions to recycle for distant future action?

Research Question 2 (RQ2): Will people indicate stronger intentions to litter for near future action?
**Cultural Comparison of Temporal Distance**

Culture influences the perception of time (Boroditsky et al., 2011; Hall, 1983) and thus is likely to affect the formation of the construal of time and the perception of temporal distance. Hall (1983) separates perception of time through cultures into monochronic and polychronic times. Individualistic cultures are more likely to follow a monochronic time schedule, doing things in order (Ting-Toomey, 1999). Therefore, for individualistic cultures, perception of time would be more straightforward than in collectivist cultures, which are more likely to follow a polychronic time schedule, having more simultaneous arrangements (Ting-Toomey, 1999). Accordingly, Kim and colleagues (2018) illustrate that members of an individualistic culture (i.e., the United States) regard time differently than individuals in a collectivistic culture (i.e., Korea). Koreans have a more concrete perception of the near future than Americans.

Previously, Choi and colleagues (2012) demonstrated no effectiveness of interaction between culture and temporal distance but only an effect of culture on the evaluation of the behavior. Kim and colleagues’ (2018) study supports the lack of effect that the interaction between culture and temporal distance has on behavior. However, when combined with a construal message (high vs. low), culture and temporal distance show significant differences. Specifically, Americans show great differences between distant and proximal temporal distance for high-level construal messages whereas Koreans do not show such strong preference. This means that Americans are more likely to receive high-level construal messages in the distant future more favorably than those in a proximal future whereas Koreans do not differ in this regard.

There are many interventions designed for increasing recycling (i.e., pro-environmental behaviors) and reducing littering (i.e., contra-environmental behaviors) around the world. In the United States, most states enforce fines that are between US$20 and US$1000 (National Conference of State Legislatures, 2014). Fines in Seoul, South Korea, are between 50,000 won (≈US$44) and 1,000,000 won (≈US$885) (Seocho, 2018). Overall, littering fines do not vary drastically between the two countries. Hence, both countries deal with contra-environmental behaviors in a similar manner; however, the difference appears in terms of pro-environmental behaviors. Organisation for Economic Co-operation and Development (OECD, 2017) demonstrates that Korea has a recycling rate of more than 50%, whereas the recycling rate of the United States is between 25.8% and 31.2% (Environmental Protection Agency, 2018). Therefore, by examining Korea and the United States, which are similar in their governmental reinforcement methods to diminish contra-environmental behaviors but different in their overall level of pro-environmental behaviors, this study wishes to re inquire whether there is a cultural distinction regarding the perception of time (Boroditsky et al., 2011; Hall, 1983) or if no such distinction exists (Choi et al., 2012) across pro- and contra-environmental behaviors:

**Research Question 3 (RQ3):** Will culture be a factor affecting the relationship between the perception of time and the intention formation?

**Descriptive Norms**

There are several theories looking at the effect of social norms on behaviors, such as Theory of Reasoned Action (Ajzen & Fishbein, 1980) and Comprehensive Action Determination Model (Klöckner & Blöbaum, 2010). However, Theory of Normative Social Behavior (TNSB; Rimal & Real, 2003) differentiates itself from other theories given its consideration of descriptive norms as a distinct descriptive rather than simply studying social norms in general. According to TNSB, individuals are most likely to behave in a certain way when there is both a high perceived descriptive norm on the behavior and a significant benefit as a result. A descriptive norm describes what is usual, or normal (Cialdini et al., 1990), and what everyone else is doing around a person will affect that person to regard a given situation. There are two types of descriptive norms: perceived descriptive norms and situational descriptive norms. Perceived descriptive norms are the norms that an individual accepts as a result of her or his own perception of what others are doing (Long et al., 2014). A situational norm, on the other hand, is the generally accepted way to act in a specific situation, and a perceived situational norm refers to the perception of the normative behavior in a given situation (Aarts & Dijksterhuis, 2003).

Individuals’ perceptions of descriptive norms about recycling and littering can be understood as the extent to which individuals consider the public to recycle and litter in general (i.e., perceived descriptive norms). Nevertheless, individuals who would generally recycle (or litter) may be compelled to not recycle (or not litter) under certain situations (i.e., situational descriptive norms). Hence, a situational descriptive norm may be more relevant to one’s intentions to recycle and to litter since literature has shown discrepancies relating to the effect of perceived descriptive norms on recycling, littering, and other physical activities. Although some show a positive effect of perceived descriptive norms (e.g., Goldstein et al., 2008; Liao et al., 2016; Reese et al., 2014), others show a null effect (e.g., Bissing-Olson et al., 2016; Long et al., 2014; Smith et al., 2012). Long and colleagues’ (2014) study displays the effect of friends’ behaviors on recycling and littering for an individual, but it fails to do so for perceived norms. This result shows the potential of friends’ behaviors as a situational norm, which was supported by interviewees’ answers in the same study, with many saying their behaviors changed depending on whom they were with because certain friends would call them out on their actions in the moment. These results can be explained in terms of TNSB. For an individual, outcome expectation (in the above situation, relational expectations) can be higher in its influence than general descriptive norms, thus creating a certain situational
descriptive norm that accepts the negative behavior as the normal thing to do.

Furthermore, because people litter less when the environment is cleaner and they litter more when the environment is already littered (Cialdini et al., 1990), this study proposed the following hypothesis suggesting the situational descriptive norms as the missing predictor suggested by Long et al. (2014):

Hypothesis 1 (H1): Individuals’ perception of perceived descriptive norms will not relate to their intentions to recycle (H1a) and intentions to litter (H1b), whereas individuals’ perception of situational descriptive norms will relate to their intentions to recycle (H1c) and intentions to litter (H1d).

The strength and importance of social norms varies across cultures (e.g., Iran et al., 2019; Spencer et al., 2015). Accordingly, Cialdini et al. (1990) suggested that the power of norms over behavior was controlled by norm salience that can be related to culture (Ross, 1973). Abrams and colleagues (1998) demonstrated that different countries show differences in their subjective norms. Buchtel and Norenzayan (2008) added that the differences between East Asian and Western cultures on norm encouragement are visible. These differences may contribute to the varying effects of interaction of norms and countries on the behavior (Abrams et al., 1998). Therefore, in this study, we expect different cultural effects on the relationship between norms perception and behavioral intention. Given the lack of the previous studies on descriptive norms in such context, we further asked the following research question:

Research Question 4 (RQ4): Do Koreans and Americans differ in the relationship between norm perceptions and behavioral intentions (RQ4a)? If yes, will temporal distance affect these relationships between perceived norms and behavioral norms differently in each culture (RQ4b)?

Method
Overview
Participants for this study were recruited from the United States and South Korea. Each participant was randomly selected to answer one of five versions of the survey (no time indication, 1-week, 3-month, 1-year, and 3-year time frames). Participants were also randomly assigned to respond to the measurement items for either recycling or littering. That is, each participant received only one type of environmental behavior (either it is pro- or contra-environmental) and one type of temporal distance. The survey included items measuring behavioral intentions, perceived descriptive norms, situational descriptive norms, and demographic information.

Participants
Recycling Questionnaire. Participants from the United States (n = 305, 37.2% women, age M = 21.93, SD = 3.02) were undergraduates enrolled in a large Midwestern University. The participants consisted of 63.4% Caucasian, 10.2% Asian American, 7.0% African American, 5.1% mixed, 2.8% Hispanic, 2.8% Pacific Islander, and 8.7% others. Korean participants (n = 259, 47.9% women, age M = 23.55, SD = 2.32) were undergraduates enrolled in Inha University Incheon, South Korea. All the Korean participants were from South Korea.

Littering Questionnaire. Participants in the United States (n = 312, 61.5% women, age M = 21.4, SD = 1.81) were undergraduates enrolled in a large Midwestern university. The participants consisted of 72.4% Caucasian, 9.6% African American, 6.4% Asian American, 2.6% Hispanic, 1.9% Pacific Islander, 1.3% mixed, and 5.8% others. Korean participants (n = 266, 42.5% women, age M = 23.32, SD = 2.74) were undergraduates enrolled in Inha University in Incheon, Korea. All the Korean participants were from South Korea.

Procedure
American students participated in the survey voluntarily and received extra credit or monetary compensation ($5 per participant) in exchange of participation in the study. All Korean participants voluntarily participated without any compensation.

The participants completed the questionnaires in their native languages, either English or Korean. As the survey should be equivalent in transferring the meanings of questionnaires, the original English questionnaires were first translated into Korean by a professional English to Korean translator who was not involved in this research (cf., Brislin, 1970). Then, the authors fluent in both English and Korean carefully checked the English and Korean versions. For perceived descriptive norms and situational descriptive norms, American and Korean participants responded measurement items referring to people in America and Korea, respectively.

Measurements
All the measures used a 7-point Likert-type scale (1 = strongly disagree, 7 = strongly agree).

Perceived descriptive norms. Individuals’ perceptions of descriptive norms were measured with four items. The four items for recycling (Cronbach’s α = .91 in the United States and .90 in Korea) were “Many people in the U.S. (Korea) participate in recycling,” “Many U.S. (Korean) citizens are willing to recycle materials,” “Recycling is a common
behavior that people in the U.S. (Korea) engage in,” and “Many U.S. (Korean) citizens participate in recycling.” The four items for littering (Cronbach’s $\alpha = .89$ in the United States and .93 in Korea) were “Many people in the U.S. (Korea) carelessly discard litter,” “Many U.S. (Korean) citizens are willing to litter,” “Littering is a common behavior that people in the U.S. (Korea) engage in,” and “Many U.S. (Korean) citizens throw trash on the street.”

**Situational descriptive norms and behavioral intentions.** Participants read the following brief vignette:

Imagine that on a hot summer day reaching 100 °F degrees, you have a job interview at a downtown building. You have arrived at the entrance of the building and want to get rid of the bottle of water you just finished. You are in a hurry and do not want to be late, but there is no trash can nearby. Instead, you see a small pile of trash (e.g., crushed cans, bottles, papers, etc) at the corner of the building, which is very close to where you are now. You also see a recycling bin quite far (about 150 feet or 0.03 mile) away from your destination.

To increase vividness of the vignette, we placed below the vignette a drawing developed with MS office tool which depicted a pile of trash and the building. After reading the vignette, participants indicated their behavioral intentions as well as situational descriptive norms.

The measurement items for situational descriptive norms were designed to account for the possibility that individuals’ perception of descriptive norms in general could be different from their descriptive norms specific to the situation (i.e., perceptions of what many others would do in the described situation). The four items for recycling (Cronbach’s $\alpha = .88$ in the United States and .95 in Korea) were “When facing the above situation, many people in the U.S. (Korea) throw away the bottle in the recycling bin,” “When facing the above situation, many U.S. (Korean) citizens are willing to put the bottle into the recycling bin,” “Placing the bottle in the recycling bin in the above situation is a common behavior that people in the U.S. (Korea) engage in,” and “When facing the above situation, many U.S. (Korean) citizens dispose the bottle in the recycling bin.” The four items for littering (Cronbach’s $\alpha = .92$ in the United States and .92 in Korea) were “When facing the above situation, many people in the U.S. (Korea) throw away the bottle in the small pile of trash,” “When facing the above situation, many U.S. (Korean) citizens are willing to put the bottle on the small trash pile,” “Placing the bottle on the small pile of trash in the above situation is a common behavior that people in the U.S. (Korea) engage in,” and “When facing the above situation, many U.S. (Korean) citizens dispose the bottle in the small pile of trash.”

To examine the effect of temporal distance on behavioral intentions, each behavioral intention item was accompanied with one of four time-points or the control option (no time indication/1 week/3 months/1 year/3 years). The designation of four time-points was partly based on the common way to set temporal distance in previous CLT studies and some comments of participants who participated in the pretest to ensure the appropriateness of the temporal distance. Although the standards for creating intervals of temporal distance were not mentioned in previous CLT studies, the temporal distance interval was set to observe the relative salience of high- or low-level construals for distant or near-future judgments of activities. For example, Liberman et al. (2002) used “within a week” versus “a year later” and Liberman and Trope (1998) used “tomorrow” versus “sometime next year” to activate a low-level and a high-level construal. In addition, this study used the item with no time indication to observe how much the intention toward the behavior in the future is different from the current intention. It is expected that the four time-points would activate abstract or concrete aspects for each behavior.

Participants were instructed to “Imagine yourself about 1 week (3 months, 1 year, 3 years or no time indication) from now in the above situation” and asked to respond to four items for measuring the intention to recycle (Cronbach’s $\alpha = .93$ in the United States and .93 in Korea): “I intend to throw away the bottle in the recycling bin before the interview,” “I will try to use the recycling bin to discard the bottle before the interview,” “Before having the interview, I plan to get rid of the bottle in the recycling bin,” and “I have it in my mind to discard the bottle in the recycling bin instead of the small trash pile before the interview.” The four items for measuring intention to litter (Cronbach’s $\alpha = .94$ in the United States and .96 in Korea) were “I will try to discard the bottle in the small trash pile before the interview,” “I intend to throw away the bottle in the small pile of trash before the interview,” “Before having the interview, I plan to get rid of the bottle in the small pile of trash,” and “I have it in my mind to discard the bottle in the small trash pile instead of the recycling bin before the interview.”

**Results**

**Preliminary Analyses**

For recycling, a $t$-test showed that Americans ($M = 4.60, SD = 1.08$) and Koreans ($M = 4.74, SD = 0.88$) differed in perceived descriptive norms, $t (564) = 1.70, p < .01$, Cohen’s $d = .14$. A $t$-test showed that Americans ($M = 3.56, SD = 1.12$) perceived stronger situational descriptive norms about recycling than did Koreans ($M = 2.89, SD = 1.04$), $t (564) = -7.28, p < .001$, Cohen’s $d = .62$. For littering, a $t$-test showed that Americans ($M = 5.30, SD = 1.02$) perceived stronger descriptive norms than did Koreans ($M = 4.27, SD = 1.20$), $t (578) = -11.16, p < .001$, Cohen’s $d = .92$. A $t$-test showed that Americans ($M = 5.24, SD = 1.01$) perceived stronger situational descriptive norms about littering than did Koreans ($M = 4.79, SD = 1.11$), $t (578) = -5.17, p < .001$, Cohen’s $d = .42$. 
and culture was not significant, \( p < .05 \), \( \eta^2 = .01 \). RQ1 asked whether people indicated stronger intentions to recycle for distant future action. As shown in Table 1, individuals indicated stronger intention to recycle in 3 years (\( M = 4.73 \)) than in 1 week, 3 months, and 1 year. Culture had a significant main effect on intention to recycle, \( F(1, 556) = 135.64, p < .001, \eta^2 = .19 \). Americans (\( M = 5.05, SD = 1.46 \)) had stronger intention to recycle than did Koreans (\( M = 3.63, SD = 1.41 \)). The interaction between temporal distance and culture was not significant, \( F(4, 556) = 0.22, p = .93, \eta^2 = .00 \).

Littering. A 5 \( \times \) 2 between-subject ANOVA did not show a significant main effect for temporal distance, \( F(4, 570) = 0.95, p = .43, \eta^2 = .01 \). RQ2 asked whether people indicated stronger intentions to litter. Culture had a significant main effect on intention to litter, \( F(1, 570) = 119.27, p < .001, \eta^2 = .17 \). Koreans (\( M = 4.40, SD = 1.60 \)) had stronger intention to litter than did Americans (\( M = 2.86, SD = 1.63 \)). The interaction between temporal distance and culture was not significant, \( F(4, 570) = 0.71, p = .59, \eta^2 = .00 \).

RQ3 asked whether culture is a factor to affect the relationship between the perception of time and intention formation and the results showed that culture is not a factor.

### Hypothesis 1 and Research Question 4

Correlation analyses were used to examine H1 and RQ4. Table 2 shows correlations between perceived descriptive norms and behavioral intentions and correlations between situational descriptive norms and behavioral intentions for each temporal distance for recycling and littering. Across each time frame and in each culture, perceived descriptive norms about recycling and littering were not significantly related to intentions to recycle and litter. The only exception was that, when both the United States and Korean data were combined for no time indication condition, perceived descriptive norms were significantly and negatively related to intentions to litter, \( r(120) = -.27, p < .001 \). This result supports H1a stating that perceived descriptive norms will not relate to intentions to recycle, and it partially supports H1b stating that perceived descriptive norms will not relate to intentions to litter, only when temporal distances were considered. However, the research fails to support to find the same nonsignificant relationship when there was either no time indicated, or no temporal differences specifically studied.

The correlations between situational descriptive norms and behavioral intentions, however, show some cultural differences. Overall across each time frame, situational descriptive norms were significantly related to behavioral intentions to recycle and to litter among Koreans. This result supports H1c and H1d for Koreans, meaning that individuals’ perception of situational descriptive norms related to their intentions to recycle and litter with no regard to temporal distances. On the other hand, some of the correlations between situational descriptive norms and behavioral intentions were not significant among Americans. These results partially supported H1c and H1d for Americans, meaning that American
Table 2. Correlations.

| Norms                  | Temporal distance | 1 week | 3 months | 1 year | 3 year | No time indication | Total |
|------------------------|-------------------|--------|----------|--------|--------|-------------------|-------|
| **Recycling**          |                   |        |          |        |        |                   |       |
| Perceived descriptive norm | United States    | −.14   | .22      | .18    | .24    | −.06              | .08   |
|                        | (n = 62)          | (n = 62) | (n = 63) | (n = 47) | (n = 71) | (n = 305)         |       |
|                        | Korea             | −.08   | .03      | .04    | .47    | .06               | .07   |
|                        | (n = 57)          | (n = 56) | (n = 52) | (n = 38) | (n = 56) | (n = 259)         |       |
|                        | Total             | −.10   | .10      | .09    | .20    | −.08              | .04   |
|                        | (n = 119)         | (n = 118) | (n = 115) | (n = 85) | (n = 127) | (n = 564)         |       |
| Situational descriptive norm | United States   | .23    | .31*     | .12    | .29*   | .27*              | .23** |
|                        | (n = 62)          | (n = 62) | (n = 63) | (n = 47) | (n = 71) | (n = 305)         |       |
|                        | Korea             | .49*** | .33*     | .54*** | .39*   | .43*              | .46** |
|                        | (n = 57)          | (n = 56) | (n = 52) | (n = 38) | (n = 56) | (n = 259)         |       |
|                        | Total             | .39**  | .44**    | .42**  | .30**  | .44**             | .41** |
|                        | (n = 119)         | (n = 118) | (n = 115) | (n = 85) | (n = 127) | (n = 564)         |       |
| **Littering**          |                   |        |          |        |        |                   |       |
| Perceived descriptive norm | United States    | .02    | .03      | .10    | .14    | −.14              | .02   |
|                        | (n = 66)          | (n = 63) | (n = 79) | (n = 38) | (n = 66) | (n = 312)         |       |
|                        | Korea             | .17    | .20      | −.04   | .22    | −.11              | .09   |
|                        | (n = 58)          | (n = 54) | (n = 55) | (n = 43) | (n = 56) | (n = 266)         |       |
|                        | Total             | −.13   | −.12     | −.15   | .04    | −.27***           | −.14**|
|                        | (n = 124)         | (n = 117) | (n = 134) | (n = 81) | (n = 122) | (n = 578)         |       |
| Situational descriptive norm | United States   | .30*   | .22      | .35**  | .28    | .02               | .23** |
|                        | (n = 66)          | (n = 63) | (n = 79) | (n = 38) | (n = 66) | (n = 312)         |       |
|                        | Korea             | .39**  | .58**    | .41**  | .48**  | .42**             | .43** |
|                        | (n = 58)          | (n = 54) | (n = 55) | (n = 43) | (n = 56) | (n = 266)         |       |
|                        | Total             | .16    | .17      | .31*** | .30**  | .13               | .20** |
|                        | (n = 124)         | (n = 117) | (n = 134) | (n = 81) | (n = 122) | (n = 578)         |       |

*p < .05. **p < .01.

people’s perception of situational descriptive norms only related to their intentions to recycle and to litter depending on temporal distances.

Overall when the data from two cultures combined into a total sample, situational descriptive norms were significantly and positively related to the behavioral intention to recycle across each temporal distance, further supporting H1c. Nonetheless, for the littering, the total sample showed a significant and positive correlation with only 1- and 3-year temporal distances, along with a total temporal distance which is the created by combining the all five temporal distance categories into a single item. It again only partially supported H1d.

RQ4a inquired whether people from different cultures, specifically Americans and Koreans in this study, differ in the relationship between norm perceptions and behavioral intentions. Also, RQ4b asked if the temporal distance could affect these correlations. The question has been answered in two ways. First, the study looked at the relationship between perceived descriptive norms and behavioral intention to recycle and litter across different temporal distances for each country. Then, the research focus shifted toward the relationship between situational descriptive norms and behavioral intentions to litter and/or to recycle across different temporal distances for each country.

Temporal distance affected the sizes of the correlations between intention and perceived descriptive norms in each culture. To explicate, Fisher’s r to z comparisons showed that, for recycling among Americans, the correlation for 1 week, r(60) = −.14, differed from the correlation for 3 months, r(60) = .22, z = −1.98, p = .05 (two-tailed), and 3 years, r(45) = .24, z = 1.94, p = .05 (two-tailed). Among Koreans, the correlation for 3 years, r(36) = .47, differed from each correlation for 1 week, r(55) = −.08, z = −2.72, p < .05; 3 months, r(54) = .03, z = 2.20, p < .05; 1 year, r(50) = .04, z = −2.12, p < .05 (two-tailed); and no time condition, r(54) = .06, z = 2.07, p < .05 (two-tailed). Perceived descriptive norms showed no significant differences in their correlations between each temporal distance for either the United States or Korea on the behavioral intention to litter.

Second, the same correlations were tested for situational descriptive norms. Temporal distance affected the size of the correlation between intention to litter and situational descriptive norms of littering among Americans. There was a significant difference in correlations between 1-year, r(78) = .35, and no time indication, r(64) = .02, conditions for Americans, z = 2.03, p < .05 (two-tailed) whereas for Koreans, there were no significant differences.

The only two significantly different correlations between intentions to litter and situational descriptive norms for
littering for each time frame were found when Koreans were compared with Americans for the 3-month condition, (Koreans \( r(52) = .58 \) and Americans \( r(61) = .22 \), \( z = -2.30, p < .05 \) (two-sided), and in the no-time indication condition, Koreans \( r(54) = .42 \) and Americans \( r(64) = .02 \), \( z = -2.29, p < .05 \) (two-sided).

In sum, when collapsed across all the time frames (i.e., without considering the temporal distance), situational norms were more strongly related to behavioral intentions among Koreans than among Americans. That is, for the overall intention to recycle (i.e., intentions averaged across the temporal distance), Koreans, \( r(257) = .46, p < .001 \), and Americans, \( r(305) = .23, p < .001 \), differed significantly in the correlations between situational descriptive norms and intention, \( z = -3.10, p < .01 \) (two-tailed). For the overall intention to litter (i.e., intentions averaged across the temporal distance), Koreans, \( r(265) = .43, p < .001 \), and Americans, \( r(311) = .23, p < .001 \), differed significantly in the correlations between situational descriptive norms and intention, \( z = -2.70, p < .01 \) (two-tailed).

**Discussion**

In this article, using CLT as a framework inquires how temporal distance to a behavior affects individuals’ intentions to perform pro- and contra-environmental behaviors cross-culturally. The findings showed that individuals’ intentions to recycle or litter do not necessarily vary across different time frames, despite previous studies suggesting there would be a significant difference (Liberman & Trope, 1998; Sagristano et al., 2002). Except for the 3-year time frame, which partly supports existing literature by generating stronger intentions to recycle than all the other time frames, intentions to recycle and intentions to litter did not vary much across the 1-week, 3-month, 1-year, 3-year, and no time indication frames. This result was similar to that of Eyal and colleagues’ (2009) study, which also demonstrates the lack of effect of time perception on behavioral intentions.

In terms of cultural differences, the temporal distance did not influence Koreans and Americans differently for either pro- or contra-environmental behaviors. Although it is interesting to observe insignificant results, given that previous literature has suggested the possible effect of culture on the perception of time (e.g., Arman & Adair, 2012), these results are similar to Chio et al. (2012), finding no differences between cultures on the effect of construal of time on intention formation. Although Korea is mostly accepted as a collectivist culture and America is known as an individualistic culture, cultural dimensions of individuals would provide more precise results, as America is more internally culturally diverse (Chen, 2016; Park & Levine, 1999; Pouders et al., 2015). Rather than focus on cultural differences as a whole, future studies should consider focusing on individual preferences for independence versus interdependence. By doing so, researchers might be able to answer why though the perception of time is different (e.g., Arman & Adair, 2012) but the effect of the different perceptions is not.

In addition, in this article, the relation between descriptive norms and cross-cultural pro- and contra-environmental behavioral intention has been studied. Despite not testing TNSB directly, this research has benefited from its inclusion of moderations on the effects of descriptive norms. This research has looked at the situational descriptive norms along with perceived descriptive norms to see if the effect of descriptive norms is stronger in a certain type of situation. Given the importance of outcome expectations, group identity, and injunctive norms in the relationship between descriptive norms and behavioral intention (Rimal, 2008), we expected situational descriptive norms to provide certain momentary injunctive norms and outcome expectations. Supporting our hypothesis partly, perceived descriptive norm is not related to recycling and littering intentions, whereas situational descriptive norm is related to behavioral intentions of recycling and littering. This result supports Cialdini et al. (1990) as they posit a significant relation between littering and situational norms. These results illustrate that a sustainable lifestyle is best promoted by the usage of situational descriptive norms.

When Koreans and Americans were compared, the perception of situational descriptive norms was more strongly related to Koreans’ intentions to recycle than to that of Americans. This result supports and adds to previous literature. A study conducted in the United Kingdom, another country with individualistic culture, has shown no significant effect of norms on environmental behaviors (Whitmarsh & O’Neill, 2010), whereas a study conducted in China, which is a collectivist country, has actually shown predictive power of norms on pro-environmental intentions (Zhang et al., 2015). The results of this article suggest that environmental educators in Korea should focus on situational descriptive norms while encouraging individuals to recycle and not to litter, whereas American educators might need additional methods to reinforce pro-environmental behaviors.

Although this study opens up a new research area under CLT, it still holds limitations. First of all, unlike making an observation, this study has asked participants to read a vignette and to self-report their thoughts. Reading about a situation may create ambiguity and, therefore, may yield different effects than actually participating in a situation. To diminish these differences and to increase vividness, we provided a visual of the situation; however, people might still act differently when facing the situation in real life. Also, this study has only focused on temporal distance. Investigating the effects of different psychological distances on these behavioral intentions would better enrich CLT. Nonetheless, research shows that different psychological distances are related to each other (Trope & Liberman, 2010). Then, since recycling is socially desirable, and littering is socially undesirable, choosing one of these two behaviors may affect the...
self-reported answers, as participants may feel like they should answer in a socially acceptable way.

Another limitation pertains to common method bias (Podsakoff et al., 2003). Especially in the case of perceived descriptive norms and situational descriptive norms, it is possible that the similar patterns of findings for both norm types may have resulted from the fact that only self-reporting was used for measuring both. It would be interesting to see if behavioral measures or manipulations of situational descriptive norms will produce results that are similar or different from the current findings.

Finally, the current research has not completely tested TNSB. Researchers may further our results by testing TNSB model with CLT to have a more concrete explanation of some of the insignificant results of this article. Furthermore, given that group consciousness is an important factor influencing behavioral intention (Yu et al., 2017) and descriptive norms when operationalized in a relational context to increase pro-environmental behaviors (de Leeuw et al., 2015), future studies should add relational distance while creating an environment for situational descriptive norms (i.e., littered place by participant’s friends or by unknown people). This will provide a more in-depth explanation of environmental behaviors along with efficient ways to reinforce a sustainable lifestyle.

Conclusion

This study extends the existing literature on CLT and descriptive norms, as well as environmental behaviors. To the best knowledge of the writers, this study stands as the sole empirical research on the collective effect of CLT and descriptive norms on pro-environmental behaviors cross-culturally and cross-valence. As collective research, the current result adds to existing studies related to pro-environmental behaviors and help encourage individuals to conserve the natural resource, which in turn would contribute to sustainability in the long-term. Finally, this research encourages policymakers in both countries to utilize situational descriptive norms while creating preventive messages, as they were significant for both pro-behavior and contra-behavior.

Author note

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References

Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, situational norm, and social behavior. Journal of Personality and Social Psychology, 84(1), 18–28.
Abrams, D., Ando, K., & Hinkle, S. (1998). Psychological attachment to the group: Cross-cultural differences in organizational identification and subjective norms as predictors of workers’ turnover intentions. Personality and Social Psychology Bulletin, 24(10), 1027–1039.
Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Prentice Hall.
Arman, G., & Adair, C. K. (2012). Cross-cultural differences in perception of time: Implications for multinational teams. European Journal of Work and Organizational Psychology, 1(5), 657–680.
Bar-Anan, Y., Liberman, N., & Trope, Y. (2006). The association between psychological distance and construal level: Evidence from an implicit association test. Journal of Experimental Psychology: General, 135(4), 609–622. https://doi.org/10.1037/0096-3445.135.4.609
Bissing-Olson, M. J., Fielding, K. S., & Iyer, A. (2016). Experiences of pride, not guilt, predict pro-environmental behavior when pro-environmental descriptive norms are more positive. Journal of Environmental Psychology, 45, 145–153.
Boroditsky, L., Fuhrman, O., & McCormick, K. (2011). Do English and Mandarin speakers think about time differently? Cognition, 118(1), 123–129.
Brislin, R. W. (1970). Back-translation for cross-cultural research. Journal of Cross-Cultural Psychology, 1(3), 185–216.
Brügger, A., Morton, T. A., & Dessai, S. (2016). “Proximising” climate change reconsidered: A construal level theory perspective. Journal of Environmental Psychology, 46, 125–142.
Buchtel, E. E., & Norenzayan, A. (2008). Which should you use, intuition or logic? Cultural differences in injunctive norms about reasoning. Asian Journal of Social Psychology, 11(4), 264–273.
Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. International Journal of Advertising, 34(1), 158–176.
Chen, M. Y. (2016). Consumer response to health product communication: The role of perceived product efficacy. Journal of Business Research, 69(9), 3251–3260.
Choi, S. Y., Park, H. S., & Oh, J. Y. (2012). Temporal distance and blood donation intention. Journal of Health Psychology, 17(4), 590–599.
Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. Journal of Personality and Social Psychology, 58(6), 1015–1026.
Culiberg, B., & Elgaaied-Gambier, L. (2016). Going green to fit in—Understanding the impact of social norms on pro-environmental behaviour, a cross-cultural approach. International Journal of Consumer Studies, 40(2), 179–185.
de Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. Journal of Environmental Psychology, 42, 128–138.

Environmental Protection Agency. (2018). Advancing sustainable materials management: 2015 fact sheet assessing trends in material generation, recycling, composting, combustion with energy recovery and landfilling in the United States. https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management

Eyal, T., Liberman, N., Trope, Y., & Walther, E. (2004). The pros and cons of temporally near and distant action. Journal of Personality and Social Psychology, 86(6), 781–795.

Eyal, T., Sagristano, M. D., Trope, Y., Liberman, N., & Chaiken, S. (2009). When values matter: Expressing values in behavioral intentions for the near vs. distant future. Journal of Experimental Social Psychology, 45(1), 35–45.

Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. Journal of Personality and Social Psychology, 90(3), 351–367.

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. Journal of Consumer Research, 35, 472–482.

Hall, E. T. (1983). The dance of life: The other dimension of time. Anchor Press.

Hartley, B. L., Pahl, S., Veiga, J., Vlachogianni, T., Vasconcelos, L., Hall, E. T. (1983). The dance of life: The other dimension of time. Journal of Personality and Social Psychology, 86(6), 781–795.

Hartley, B. L., Pahl, S., Veiga, J., Vlachogianni, T., Vasconcelos, L., Hall, E. T. (1983). The dance of life: The other dimension of time. Journal of Personality and Social Psychology, 86(6), 781–795.

Lee, S. A., Lee, A. Y., & Kern, M. C. (2011). Viewing time through Klöckner, C. A., & Blöbaum, A. (2010). A comprehensive action perspective theory: Review, research and application (pp. 371–383). Springer.

Lee, S. A., & Park, H. S. (2012). Influence of temporal distance on level of mental construal. Journal of Experimental Social Psychology, 38(6), 523–534.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. Journal of Personality and Social Psychology, 75(1), 5–18.

Long, J., Harré, N., & Atkinson, Q. D. (2014). Understanding change in recycling and littering behavior across a school social network. American Journal of Community Psychology, 53(3–4), 462–474.

Milfont, T. L., & Demarque, C. (2015). Understanding environmental issues with temporal lenses: Issues of temporality and individual differences. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), Time perspective theory: Review, research and application (pp. 371–383). Springer.

National Conference of State Legislatures. (2014, March). States with littering penalties. http://www.ncsl.org/research/environmental-and-natural-resources/states-with-littering-penalties.aspx

Organisation for Economic Co-operation and Development. (2017). OECD environmental performance reviews: Korea 2017.

Park, H. S., & Levine, T. R. (1999). The theory of reasoned action and self-construal: Evidence from three cultures. Communication Monographs, 63, 199–218.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879–903.

Pounders, K. R., Lee, S., & Mackert, M. (2015). Matching temporal frame, self-view, and message frame valence: Improving persuasiveness in health communications. Journal of Advertising, 44(4), 388–402.

Reese, G., Loew, K., & Steffen, G. (2014). A towel less: Social norms enhance pro-environmental behavior in hotels. The Journal of Social Psychology, 154(2), 97–100.

Rimal, R. N. (2008). Modeling the relationship between descriptive norms and behaviors: A test and extension of the theory of normative social behavior (TNSB). Health Communication, 23(2), 103–116.

Rimal, R. N., & Real, K. (2003). Understanding the influence of perceived norms on behaviors. Communication Theory, 13, 184–203.

Ross, H. L. (1973). Perspectives on social order. McGraw-Hill.

Sagristano, M. D., Trope, Y., & Liberman, N. (2002). Time-dependent gambling: Odds now, money later. Journal of Experimental Psychology: General, 131(3), 364–376.

Schill, M., & Shaw, D. (2016). Recycling today, sustainability tomorrow: Effects of psychological distance on behavioural practice. European Management Journal, 34(4), 349–362.

Schultz, P. W., Bator, R. J., Large, L. B., Bruni, C. M., & Tabanico, J. J. (2013). Littering in context: Personal and environmental predictors of littering behavior. Environment and Behavior, 45(1), 35–59.

Schumaker, E. (2016, August). The psychology behind why people don’t recycle. The Huffington Post. https://www.huffpost.com/entry/psychology-of-why-people-dont-recycle_n_57697a7be4b087b70be605b3

Seocho. (2018, March 9). 무단투기 등 과태료 부과기준 [About illegal dumping fines in Seocho]. http://www.seocho.go.kr/site/seocho/04/1040803010500215070706.jsp

Smith, J. R., Louis, W. R., Terry, D. J., Greenaway, K. H., Clarke, M. R., & Cheng, X. (2012). Congruent or conflicted? The impact of
injunctive and descriptive norms on environmental intentions. *Journal of Environmental Psychology*, 32(4), 353–361.

Spencer, J., Lilley, D., & Porter, S. (2015). The opportunities that different cultural contexts create for sustainable design: A laundry care example. *Journal of Cleaner Production*, 107, 279–290.

Thomas, C., & Sharp, V. (2013). Understanding the normalisation of recycling behaviour and its implications for other pro-environmental behaviours: A review of social norms and recycling. *Resources, Conservation & Recycling*, 79, 11–20.

Ting-Toomey, S. (1999). *Communicating across cultures*. The Guilford Press.

Trope, Y., & Liberman, N. (2000). Temporal construal and time-dependent changes in preference. *Journal of Personality and Social Psychology*, 79(6), 876–889.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review*, 110(3), 403–421.

Trope, Y., & Liberman, N. (2010). Construal-Level Theory of psychological distance. *Psychological Review*, 117(2), 440–463.

Trope, Y., & Liberman, N. (2012). Construal level theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *The handbook of theories of social psychology* (pp. 118–155). Sage.

Tucker, P. (1999). Normative influences in household waste recycling. *Journal of Environmental Planning and Management*, 42(1), 63–82.

Varotto, A., & Spagnolli, A. (2017). Psychological strategies to promote household recycling. A systematic review with meta-analysis of validated field interventions. *Journal of Environmental Psychology*, 51, 168–188.

Wagner, V. (2014, August). Littering and following the crowd. *The Atlantic*. https://www.theatlantic.com/health/archive/2014/08/littering-and-following-the-crowd/374913/

White, K., Macdonnell, R., & Dahl, D. W. (2011). It’s the mind-set that matters: The role of Construal Level and message framing in influencing consumer efficacy and conservation behaviors. *Journal of Marketing Research*, 48(3), 472–485.

Whitmarsh, L., & O’Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30(3), 305–314.

Yang, W., Fan, B., & Desouza, K. C. (2019). Spatial-temporal effect of household solid waste on illegal dumping. *Journal of Cleaner Production*, 227, 313–324.

Yu, T. Y., Yu, T. K., & Chao, C. M. (2017). Understanding Taiwanese undergraduate students’ pro-environmental behavioral intention towards green products in the fight against climate change. *Journal of Cleaner Production*, 161, 390–402.

Zhang, D., Huang, G., Yin, X., & Gong, Q. (2015). Residents’ waste separation behaviors at the source: Using SEM with the theory of planned behavior in Guangzhou, China. *International Journal of Environmental Research and Public Health*, 12(8), 9475–9491.