THE INFLUENCE OF INJUNCTIVE SOCIAL NORMS ON FOOD WASTE PREVENTION BEHAVIORS: TOWARD A CULTURALLY-BASED SOCIAL NORMATIVE APPROACH

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ABSTRACT

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Injunctive norms refer to what most people think to be appropriate or inappropriate behaviors (what is socially approved or disapproved). The current study examined the mechanisms underlying the influence of injunctive norms in a cross-cultural context. Specifically, how perceived injunctive norms (PIN) influenced the behavioral intentions of preventing food waste among participants from the U.S. and China, and how cultural tightness-looseness (CTL) influenced individuals' susceptibility to normative impact. A 5 (injunctive norms: control without message vs. control with message only vs. weak disapproval vs. strong disapproval vs. strong disapproval with social sanctions) × 2 (country: U.S. vs. mainland China) between-subject experiment was conducted among two nationally representative samples, with a total of 1049 participants from both countries. The results showed that injunctive normative message inductions had mediated effects on behavioral intentions to prevent food waste. High-context/low-context (HC/LC) cultural tendency moderated the relationship between norm message types and PIN, such that explicit messaging on social sanctions increased perceived salience of injunctive norms only among those with a lower-context tendency. A moderation effect of CTL on the PIN-behavioral intentions relationship was found in the Chinese sample, such that individuals who perceived their culture as tighter were more susceptible to the injunctive normative influence.

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INTRODUCTION

> Culture hides more than it reveals, and strangely enough what it hides, it hides most effectively from its own participants. (Hall, 1959, p.39)

The study of social norms has garnered popularity from a variety of perspectives in the field of communication sciences and social psychology in recent years (Chung & Rimal, 2016; Manning, 2009; Mollen, Rimal, & Lapinski, 2010). This area of scholarship has focused on normative influence on human behaviors or behavioral intentions, with a wide variation in the strength of social norms documented in the literature (Yanovitzky & Rimal, 2006).

The interplay between culture and normative influence remains underappreciated due to a dearth of cross-cultural studies in norm-based scholarship (e.g., Cialdini, Wosinska, Barrett, Butner, & Gornik-Durose, 1999; Mollen et al., 2010). Existing evidence suggests culture-based differences in the influence of social norms on behaviors or behavioral intentions due to a different level of susceptibility to normative communication messages (Fischer et al., 2009; Godin et al., 1996; Lapinski, Rimal, DeVries, & Lee, 2007; Lee & Green, 1991; Liu & Lapinski, 2017; Park & Levine, 1999). Injunctive norms, which refer to the perceived level of social approval/disapproval towards a certain behavior have been shown as effective not only in inhibiting certain undesirable behaviors (e.g., cutting into a line), but also providing support and rewards to facilitate desirable actions (e.g., pro-environmental behaviors) (Cialdini, 2003; Coleman, 1988). However, despite some evidence from studies conducted in the U.S. that injunctive norms influence behaviors or behavioral intentions, little attention has been paid to the role of injunctive social norms in a cross-cultural context. Given the large variance around the globe in adhering to the social expectations and punishing norm violators (Gelfand et al., 2011), investigating these culturally-based differences systematically has theoretical and empirical

implications to further our understanding of the nature of normative influence cross-culturally and to enhance our ability in designing effective and culturally appropriate communication messages.

As such, the current study was designed to consider the ways in which differences in cultural tightness-looseness (CTL) play a role in the influence of injunctive norms on actions. Focusing on the issue of food waste prevention in nationally representative samples from China and the United States, it examined the function of explicit messaging about social sanctions in normative messages on subsequent perceptions of injunctive norms (PIN), how PIN influence behavioral intentions to prevent food waste, and how CTL has an impact on susceptibility to normative influence. In addition, signing up for a 7-day no food waste challenge was used as a behavioral measure in this study. Methodologically, an online experiment embedded with injunctive norm message inductions was adopted to test the hypotheses and answer the research questions.

In the following sections, the relevant literature on injunctive norms is reviewed and the mechanisms of normative influence on behaviors are explained; then, the issue of food waste is addressed; next, the relationship between CTL and susceptibility to social injunctive norms is explicated in detail; then, the research design of the experiment and the results generated are presented; and finally, implications for practice and directions for future research are discussed.

CHAPTER 1: LITERATURE REVIEW

Social Norms

Social norms are unwritten codes of conduct, referred to "rules and standards that are understood by member of a group, and that guide or constrain social behavior without the force of law" (Cialdini & Trost, 1998, p. 152). Norms are dynamic, contextually dependent, and socially negotiated and shaped (Rimal & Lapinski, 2015). Normative information indicating what is done and what is approved is exchanged and understood among group members through social interactions, making norms a communication phenomenon (Kincaid, 2004; Rimal & Lapinski, 2015; Shaffer, 1983).

Norms exist at both collective (i.e., prevailing codes of conduct existing at the level of the group, community, or culture) and individual levels (i.e., people's understanding and interpretation of the normative information; perceived norms; Lapinski & Rimal, 2005). It is crucial to distinguish these two norms to fully understand the mechanisms of normative influence and the role of communication in this process. Collective norms are developed and crystalized through dynamic group interactions in which diverse individual responses converge to a collectively agreed pattern (Bettenhausen & Murnighan, 1985), whereas perceived norms are formed based on individuals' interpretation of normative information.

Three primary sources of information from which perceived norms are constructed (i.e., how people form normative perceptions toward a specific social phenomenon) have been identified (Miller & Prentice, 1996), including (1) observable behaviors, (2) direct and indirect communication, and (3) knowledge of the self. The first source provides individuals with the most abundant information to make dispositional inferences about others. People tend to attribute observed behaviors to an actor's dispositions and traits without sufficient consideration to the

situational constraints (Miller & Prentice, 1996). The second source of information functions through communicating either directly (i.e., in the actual words and deeds) or indirectly (i.e., implications of the words and deeds). Communicative activities play a critical role in propagating information about norms. The final source is the knowledge about oneself (i.e., one's own preferences and attitudes). When one believes that most others think and behave in the same manner as him/herself, the false-consensus effect (i.e., an egocentric bias in consensus estimates) occurs (Ross, Greene, & House, 1977).

Given the unwritten and often unspoken nature of collective norms (Cruz, Henningsen, & Williams, 2000), they may be discrepant from perceived norms. Studies show the persistent inconsistency between these two norms, such as the phenomenon of pluralistic ignorance (O'Gorman, 1988), and inaccurate perceptions of norms related to drinking behaviors among college students, which contribute significantly to excessive drinking behaviors (Borsari & Carey, 2003). Even though the two constructs as related, collective and perceived norms are conceptualized and thus measured differently, and it would be misleading to either measure collective norms based on aggregated data of perceived norms at the individual level or assess perceived norms from measures taken at the collective level (Lapinski & Rimal, 2005). Perceived norms are the focus of the current study.

Conceptualizing Injunctive Norms

Communication has been shown as a powerful method to influence normative perceptions about both the prevalence of a behavior (i.e., descriptive norms; what is commonly done by most members of a society) and what most people think to be appropriate or inappropriate behaviors (i.e., injunctive norms; what is socially approved or disapproved) (Borsari & Carey, 2003; Cialdini, 2003, 2007; Cialdini, Reno, & Kallgren, 1990; Park & Smith,

2007; Rimal & Real, 2005; Rivis & Sheeran, 2003). The focus theory of normative conduct (Cialdini, 2012; Cialdini et al., 1990) proposes that injunctive and descriptive norms engage different psychological response tendencies when made salient selectively. Descriptive norms motivate behaviors via serving as a decision-making heuristic through providing information about what is normal and what most people do (Cialdini et al., 1990), whereas injunctive norms motivate behaviors because of anticipated social sanctions for non-compliance with the norm. As a primary focus of the current research, only the mechanisms underlying the influence of injunctive norms will be discussed.

Stemming from Cialdini and colleagues' (Cialdini et al., 1990) original work, injunctive norms have been conceptualized as "rules or beliefs as to what constitutes morally approved and disapproved conduct," specifying what "ought to be done" (p. 1015). Injunctive norms address the motivation of gaining social approval to build and maintain stable social relations (Cialdini & Trost, 1998). Instead of providing information concerning behavioral prevalence, injunctive norms indicate what ought to be done via social evaluation of appropriateness (i.e., what is the right thing to do). By specifying what is appropriate and accepted, injunctive norms provide information concerning the standards and rules of a group.

Injunctive norms are accompanied by social sanctions, which function as a major part of the mechanism of social control (Tittle, 1980). Social sanction refers to "any means by which conformity to socially approved standards is enforced" (Scott & Marshall, 2009, "Sanction," para. 1). It can be either positive (rewards to conformity) or negative (punishments for deviance) (Scott & Marshall, 2009). Individuals are driven to enact a certain behavior by the potential social rewards or punishments associated with the deviant action. Sanctions can arise from either formal or informal controls.

Formal sanctions are in response to violations of laws, rules or other types of formal agreements. Frequently observed types include legal restraints, which impose tangible costs of money or time on violators including fines, incarceration, and economic boycotts (Noussair & Tucker, 2005). Informal sanctions are social sanctions associated with norm violations, referring to penalties that do not impose tangible costs on the violator, though his or her utility may be decreased. Potential types of sanctions are endless, such as social disapproval, ostracism, ridicule, shame, sarcasm, criticism, gossip, peer pressure, or public embarrassment of the violator (Blau, 1964; Noussair & Tucker, 2005). As a focus of the current study, only informal sanctions will be discussed. Unless specified, the term social sanctions will solely refer to informal sanctions. The underlying mechanism of injunctive normative influence is through the threat or promise of punishments (i.e., social sanctions) for deviant behaviors. Literature (Blau, 1964; Hollinger & Clark, 1982; Homans, 1974; Noussair & Tucker, 2005) shows the power of informal sanctions in deterring behaviors that are viewed as antisocial and enforcing social norms, even when a formal sanction is in effect.

For example, Tittle (1980) conducted a survey study with samples aged 15 and over from three states, including New Jersey, Iowa and Oregon in 1972. A large number of people (n = 1993) differing in demographics and social characteristics were included by area probability techniques, to ensure that such a sample did not systematically exclude those who might be more or less deterred by sanction fear. The object was to examine how sanction fears predict deviant inclinations. Data were collected concerning individual perceptions of the probability of being caught and punished for a variety of deviant acts and then to relate those perceptions to individual self-reports of deviant conduct and inclinations. The results showed that informal sanctions to be far more important than formal ones in deterring deviance. For example, the

perceived severity of a jail sentence was found as the least effective among all types of sanctions, including five interpersonal sanctions (e.g., interpersonal respect loss, interpersonal severity, etc.), four informal sanctions on the level of the community (e.g., community respect loss, community severity etc.) and five legal sanctions (e.g., arrest probability, jail probability etc.) according to his study. Tittle's study also demonstrated that sanction fear is a significant independent predictor of estimates of future deviance.

Noticeably, in many cases, sanctions are conveyed implicitly with the assumption that the perception of others' disapproval of their behaviors will lead to a realization as well as a subsequent fear towards the potential social punishments on the deviant action. A number of studies testing the effects of perceived norms (e.g., Borsari & Carey, 2003; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007) operationalize injunctive norms as one's perception of others' judgment about their behaviors, in which only the perceptions of approval/disapproval were measured, rather than the fear towards potential sanctions for deviance from the norm. In other experimental studies testing the effects of normative messages (e.g., Cialdini, 2003; Liu & Lapinski, 2017; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), injunctive norms were operationalized as the approval/disapproval information in the normative message without including language regarding potential social sanctions.

Given that the effectiveness of social sanctions in deterring deviant behaviors is well documented in the body of literature (Blau, 1964; Hollinger & Clark, 1982; Homans, 1974; Noussair & Tucker, 2005; Tittle, 1980), it is reasonable to assume that an injunctive norm message explicitly stating the potential sanctions on nonconformity will lead to more behavioral compliance with message recommendations compared to injunctive normative messages merely reflecting social approval/disapproval information. As such, one goal of the current research is

testing the ability to manipulate injunctive social norms in an experimental setting and including a check on the effectiveness of the manipulations. The next section will explain specifically the effects of injunctive social norms on behaviors and behavioral intent.

Injunctive Norms and Behaviors

It is a ubiquitous phenomenon in human societies that individuals have various social relationships with others who are generally aware of their actions. To avoid potential punishment and enhance one's reputation, individuals fulfill obligations through ways such as following injunctive norms. Despite the projected long-term reputational and relational benefits, the pursuit of immediate self-interests triggered by momentary impulses can make it difficult to behave as one recognizes that he/she *ought to* (Jacobson, Mortensen, Jacobson, & Cialdini, 2015). This form of constant conflict between interpersonal and intrapersonal goals has been termed as "implicit bargain of social life" by Baumeister, DeWall, Ciarocco and Twenge (2005, p. 590).

However, situations that require each individual to contribute to a collectively beneficial activity or else individual behaviors will not lead to any benefits, such as environmental conservation, may enhance the salience of an injunctive norm (e.g., the increased sense of interdependence with others and the magnitude of potential social sanctions that may lead to a long-term negative consequence), which will, in turn, help to resolve this implicit bargain by restraining people by suppressing their immediate intrapersonal impulses and encouraging actions associated with long-term group and individual benefits, such as protecting the environment. As Coleman (1988) pointed out, a prescriptive norm within a group that is "reinforced by social support, status, honor, and other rewards" should discourage the pursuit of self-interest and strengthen the ideas of acting in the interest of the collective (p. 104). In some cases, norms are internalized (i.e., personal beliefs or values), but in others, norms are "largely

supported through external rewards for selfless actions and disapproval for selfish actions" (p. 105). Consequently, injunctive norms should play a critical role in solving problems existing in collectives, such as the environmental conservation issues focused in this study.

Empirical studies have found that injunctive norms can influence behaviors or behavioral intentions directly, as well as moderate the influence of descriptive norms on behaviors such as recycling (Ewing, 2001), reducing public littering (Cialdini et al., 1990), energy conservation (Schultz et al., 2007), food waste reduction (Liu & Lapinski, 2017), and water conservation (Goldstein, Griskevicius, & Cialdini, 2007; Lapinski et al., 2007). Indeed, there is evidence supporting the causal claim that injunctive norm messages exert independent direct influence on behaviors. For example, in a 5-week field experiment conducted in the Arizona's Petrified Forest National Park (Cialdini et al., 2006), visitors were exposed to messages against the theft of petrified wood, which conveyed information either about descriptive norms (the prevalence of other's theft behaviors) or injunctive norms (the other's disapproval of the theft behavior). Results indicated that recipients of the high-level descriptive normative information were most likely to increase theft behaviors, whereas the strong disapproval information (i.e., injunctive norm) was most likely to suppress this action.

In another study, Schultz et al. (2007) manipulated injunctive norms about household energy conservation by drawing smiley (or sad) faces on door hangers distributed to the 290 households in San Marcos, California, indicating information that if the household consumed less (smiley face) or more (sad face) energy that the average households in that neighborhood. The data were consistent with the prediction that people would behave in accordance with the injunctive norms highlighted in the experiment. Despite the merits of these studies, due to the nature of field experiments, no manipulation checks on the perceived norms as a function of the

normative treatments were performed to ensure that the underlying normative mechanisms functioned as expected. Hence, alternative explanations for behavioral changes exist for this causal path.

Other cross-sectional studies have demonstrated the relationship between existing perceived injunctive norms and behavioral outcomes (e.g., Bobek, Roberts, & Sweeney, 2007; Larimer & Neighbors, 2003; Lewis, Lee, Patrick, & Fossos, 2007; Neighbors et al., 2007; Park & Smith, 2007). For example, a survey conducted among the non-faculty staff members at a Southern university who were the primary shoppers in their households (Minton & Rose, 1997) measured their perceived injunctive norms toward environmental friendly consumer behaviors among their friends, neighbors, coworkers and family members (e.g., using biodegradable garbage bags, buying products made from and/or packaged in recycled materials and returning bottles and cans). The results showed a significant main effect of perceived injunctive norms on the behaviors and behavioral intentions among those shoppers.

A number of studies described above focused on health and environmental issues. Food waste prevention is an issue with environmental implications in which social norms should be important in influencing actions. Individuals take action for which they see both direct economic and health benefits and, more importantly, environmental benefits accruing at the level of collective or society. In the case of food waste prevention, the collective action nature of the problem will enhance the salience of injunctive norms, as the issue cannot be resolved without everyone's efforts in reducing their own food waste, no matter how small the amount is. The next section will focus on the issue of food waste as a context for the present study.

The Issue of Food Waste

The current study aims to examine injunctive social norm influence on behavioral intentions and behaviors concerning the issue of food waste. One unique attribute of environmental behaviors like food waste that is different from many health-related behaviors is the collective-level outcomes resulting from the enacted behaviors (Lapinski, et al., 2007). The benefit of many people engaging in individual actions will be shared by the entire population at the societal level rather than at the individual level. For example, to achieve the collective goal of improving air quality, many people need to contribute to reducing air pollution through taking actions such as using public transportation as much as possible to reduce exhaust emission from individual vehicles. Relative to immediate and clearly observable individual benefits, the impact of the collective-level outcomes is distant in time and space, and are relatively vague and uncertain (Vlek & Keren, 1992). The issue of food waste is one in which there is the necessity for collective action because any single person's action will not substantially reduce the problem. For the focal behavior in this study, initiating the program to reduce food waste requires everyone's effort to cumulate individual actions and transform them into a societal movement that fundamentally changes our consumption of natural resources. It is possible that social norms exert a greater influence on behaviors that benefit the collective relative to the individual all other things being equal (Lapinski et al., 2007).

Food waste prevention has been chosen for the focal topic of the current study because it is a significant global environmental health problem [United Nations Environment Programme (UNEP) Annual Report, 2013]. According to the report (UNEP, 2013), although many people still suffer from hunger, there is enough food produced to feed the world. Unfortunately, every year, one third of all the food produced gets lost or wasted, totaling 1.3 billion tons. Across

industrialized countries, retailers and consumers discard around 300 million tons of edible food each year, which is more than the total net food production of Sub-Saharan Africa, and could feed the estimated 900 million hungry people in the world. In the United States, 31% (133 billion pounds) of the 430 billion pounds of the available food supply at the retail and consumer levels in 2010 went uneaten, and consumer-level losses 21 percent (90 billion pounds) of the available food supply. The estimated total value of food loss at the retail and consumer levels reached $161.6 billion in 2010. (Buzby, Wells, & Hyman, 2014). In China, this issue is by no means smaller in scale compared to the U.S. or to other regions in the world (Liu, 2014). An estimated of 50 tons of grain is wasted every year at the consumer stage (Zheng, 2011), the majority of which is lost in mid- to high-end restaurants and public service canteens (together about 90%). In addition, food waste is also a serious environmental issue in essence. A huge amount of water and energy is wasted in producing, processing, distributing, filling landfills and so on. What is worse, food waste is the 3rd largest contributor to greenhouse gases (GHGs) to our climate (UNEP, 2013), which threatens the future of human beings and the planet.

Due to the seriousness of this problem across the whole world, especially in the two countries of interest in the current study, as well as its essence as an environmental issue that requires collective actions, the target behaviors of preventing food waste is appropriate for a study involving samples from two cultures.

Normative Influence and Cultural Tightness and Looseness

Although the existence and enforcement of social norms is believed to be universal, there is a wide variety in the strength of social norms across cultural groups. Sensitivity to perceived norms differs across cultural contexts and evidence shows culturally-based differences in the

relationship between perceived norms and behaviors (Bresnahan et al., 2007; Fischer et al., 2009; Lee & Green, 1991; Liu & Lapinski, 2017; Park & Levine, 1999).

One specific construct associated with the adherence to social norms and the punishment of norm violators is cultural tightness and looseness (CTL; Gelfand et al., 2011; Gelfand, Nishii, & Raver, 2006). In the 1960s, this construct was initially suggested from multiple disciplines, including anthropology (Pelto, 1968), sociology (Boldt, 1978a, 1978b), and psychology (Berry, 1966, 1967), tapping into variance in norms, values and behaviors. Since then, it was further developed theoretically and the measurement has been validated within the U.S., as well as in more than 30 countries worldwide (Gelfand et al., 2011, 2006; Harrington & Gelfand, 2014; Uz, 2015).

The key components of CTL are the strength of social norms (i.e., how clear and how pervasive norms are within societies) and the strength of sanctioning (i.e., how much tolerance there is for deviance from norms within societies). The literature on CTL indicates that cultural groups that have had high degrees of territorial threats necessitating national defense, low natural resources (e.g., food supply), and high degrees of natural disasters (e.g., floods, cyclones, and droughts) such as China, evolve to be tight, i.e., have strong norms and less tolerance for deviant behavior, to coordinate their social action. On the other hand, cultural groups that generally have low threat in history such as the United States evolve to be loose, i.e., have weaker norms and higher tolerance for deviant behavior (Gelfand et al., 2011; Harrington & Gelfand, 2014; Roos, Gelfand, Nau, & Lun, 2015).

CTL contrasts cultures that have strong norms and little tolerance for deviance with those that have weak norms and high tolerance for deviance. Individuals in a tight society experience a much greater degree of normative restrictiveness across societal institutions as compared to

individuals in a loose society due to the reason that a tight society is a social world where they feel a heightened scrutiny of their actions, and expect that violations of norms will be met with stronger punishments as compared to individuals in a loose society.

Rooted in the traditional individualism-collectivism literature (Triandis, 1989; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988), CTL examines cultural differences in external constraints, with a focus on the strength of external norms and sanctioning. A previous study conducted by the authors (Liu & Lapinski, 2017) examined individualistic vs. group/collectivistic orientation as an explanation for the cultural differences in normative influence. The results showed that group orientations interacted with both descriptive and injunctive norms to influence individuals' behavioral intentions. The current study focuses on the influence of injunctive norms specifically. With cross-cultural literature evolving to overcome the limitations of the traditional value approach, CTL is deemed as another potential cultural mechanism for different normative influence.

As a construct that has received scholarly interest for development and validation in a recent decade, there are limited numbers of empirical studies testing the effects of CTL in the body of literature, and the majority of them have been conducted within the organizational or managerial context (Aktas, Gelfand, & Hanges, 2016; Chua, Roth, & Lemoine, 2015; Li, Fock, & Mattila, 2012; Ozeren, Ozmen, & Appolloni, 2013). For example, Chua et al. (2015) used data from a global online creative crowdsourcing platform, and found that individuals from tight cultures are less likely than their counterparts from loose cultures to engage in and succeed at foreign creative works relative to local creative tasks. In addition, tight cultures were less receptive toward foreign creative ideas.

Another study (Li et al., 2012) involved 2 experiments with the scenarios of a service failure occurring at a restaurant. The researchers found that the varied level of CTL influenced consumers' perceptions of service recovery efforts, which in turn impacted their postrecovery complaint behaviors. Specifically, overcompensation for service failure reduced postrecovery complaint tendency among consumers with a loose orientation, but not among those with a tight orientation. In addition, while either tangible compensation or an apology reduced the dissatisfaction level from the failure and alleviate compliant intention among consumers with a loose orientation, consumers with a tight orientation seek an apology rather than tangible compensation when a service failure occurred. This suggested that tight consumers expected strict adherence to social norms, in which apologizing would be the only normative form in respond to service failures.

Although the majority of studies of CTL have been conducted in the organizational context, there are good reasons to believe that the mechanisms of the CTL can be applied to other contexts given that social norms exist in all kinds of groups outside of the organizational context, and CTL appears to be a universal value-based dimension. Hence, in the current study, CTL is conceptualized as the basis for the cultural mechanism of different susceptibility to injunctive normative influence.

Hypotheses and Research Questions

Participants' perceptions of the disapproval and potential social sanctions for food waste behavior (i.e., perceived injunctive norms) are expected to be influenced by the messages provided in the experimental context. Findings from large-scale social norm campaigns on the issue of excessive drinking on college campuses have shown that perceptions of social approval/disapproval can be modified through messages, which may exert influence on

behavioral outcomes (Borsari & Carey, 2001, 2003). In addition, studies (e.g., Empelen, Schaalma, Kok, & Jansen, 2001; Ewing, 2001; Larimer & Neighbors, 2003) indicate that injunctive norms emanating from group members influence people's pro-environmental behaviors, even when the imagined others are generalized society members rather than family or friends. That is, expectations concerning other's approval/disapproval of a behavior tend to be very influential.

For example, in a study investigating how perceived injunctive norms influence people's curbside recycling behaviors, Ewing (2001) conducted a door-to-door survey in the city of Montreal and in neighborhoods of three other island municipalities. The results indicated that beliefs about the effects of recycling and perceived expectations of significant others (i.e., perceived injunctive norms; e.g., household members, friends and neighbors) were important factors influencing peoples' decisions to whether or not participate curbside recycling. Another longitudinal study conducted by Smith and McSweeney (2007) found that perceived injunctive norms significantly predicted participants' intention to make charitable donations, which in turn predicted donation behaviors when a subsample was surveyed four weeks later after the initial survey.

These empirical studies indicate the main effects of perceived injunctive norms on behaviors. Based on the evidence, in the present study, when appropriateness information concerning food waste preventing behavior is provided (i.e., the injunctive norms message), it is predicted that individuals will suppress their immediate intra personal impulses (e.g., the easiness of dealing with leftovers, saving time with not making plans for meal preparations, and being lazy with preserving food or keeping a track on the food expiration dates). Instead, the long-term interpersonal goals (i.e., to gain social approval and maintain social relations with the

groups endorsing the norm of being pro-environmental) would lead to enacting the food waste prevention behaviors.

To test the effect of injunctive information, in addition to the control conditions (i.e., no injunctive norm information provided; functioning as a baseline for perceived injunctive norms for food waste prevention) two additional messages were designed to demonstrate a strong or a weak disapproval of food waste behaviors respectively. It is expected that when the messages concerning social disapproval are provided, the perceptions of social disapproval toward the focal behavior will be modified among the participants, and the modified perceptions would have an impact on their behavioral intentions. In a previous study with Chinese and U.S. samples conducted by the authors on the same issue (Liu & Lapinski, 2017), data were shown as consistent with this prediction. With the intent to replicate the results from the previous study, the following hypothesis focusing on the weak and strong disapproval messages is proposed:

H1: Perceived injunctive norms will mediate the effects of injunctive normative messages on behavioral intentions such that relative to those who receive a weak social disapproval message, participants receiving a strong social disapproval message will perceive a stronger disapproval of the food waste behaviors, which will in turn lead to a stronger intention of enacting the waste prevention behavior.

Given that the effectiveness of social sanctions in deterring deviant behaviors has been well documented in the literature (Blau, 1964; Hollinger & Clark, 1982; Homans, 1974; Noussair & Tucker, 2005; Tittle, 1980), it is reasonable to assume that an injunctive norm message explicitly stating the potential social sanctions for nonconformity will lead to more behavioral compliance to the message recommendations compared to an injunctive norms message that merely provides social disapproval information. As a result, subsequent stronger behavioral

intentions of preventing food waste would be expected compared to injunctive norm messages with social sanctions implicitly conveyed.

It is important to acknowledge, however, that when messages indicate social disapproval information, social sanctions may be *implied* (and therefore may be perceived) similar to studies of descriptive norms where the high prevalence of a behavior results in perceptions of social approval (Lapinski et al., 2007). To the author's knowledge, the difference between messages that explicitly describe the potential social sanctions and those that do not has not been tested in the existing literature. Hence, one goal of the current research is trying to test the ability of manipulating different forms of injunctive social norms in an experimental setting and include a check on the effectiveness of the manipulations.

There is also the possibility of a cultural difference in message response as a function of the high vs. low context cultural mechanism. This distinction deals explicitly with the type of messages people in a certain culture prefer to use (Hall, 1976). High Context (HC) communication tends to be "more indirect, ambiguous, and understated than Low Context (LC) communication, which is direct and precise, and expresses feelings and intentions rather openly" (Gudykunst et al., 1996, p.8). HC communication requires more context-related cues, some of which are related to the communication partner (e.g., sex, age, in-group, etc.), leading to more personalized communication. While in LC communication, "most of the information must be in the transmitted message to make up for what is missing in the context" (Hall, 1976, p. 103). LC communication, therefore, tends to increase clarity, directness, explicit messages, and univocal content that do not require interpretation. Even though cultures cannot be categorized as exclusively HC or LC, they locate towards either end of the HC-LC continuum (Hall, 1976). Toward the high end of the continuum are Asian countries like China, Korea, and Japan, and at

the low end of the continuum are North America and Northern Europe (e.g., Germany, Switzerland, and Scandinavian countries) (Hall, 1976; Onkvisit & Shaw, 2004).

Individuals from a HC culture tend to talk around things expecting the interlocutor to understand the cues (Hall, 1976). The speaker provides part of the message and leaves the remaining pieces to be filled by the listener. For example, a colleague says he/she feels sick but could not leave because he/she has to finish the tasks at hand. For a LC individual, this means that the colleague does not feel well but unfortunately, he/she has to finish the work first. On the other hand, HC person may get the signal that the colleague would like him/her to help cover the unfinished work so that he/she can go back home. Expressing this directly might appear demanding, so by talking around what he/she wants, the listener might be able to pick up the cues. Hall (1976) mentioned that in-group members in HC cultures are expected to know what is appropriate to say to a group member. Details are not specified but considered to be known by the other person.

In addition, studies consistently show that Chinese exhibit tendencies that are consistent with Hall's (1976) description of HC cultures, while North Americans exhibit tendencies that are consistent with LC cultures (e.g., Gudykunst & Nishida, 1986; Kim, Pan, & Park, 1998; Korac-Kakabadse, Kouzmin, Korac-Kakabadse, & Savery, 2001). As Hall (1976) stated in his seminal piece on context: “China, the possessor of a great complex culture, is on the high-context end of the scale. One notices this particularly in the written language of China, which is thirty-five hundred years old and has changed very little in the past three thousand years” (p. 91). Based on the existing evidence, the following hypothesis is proposed:

H2: On average, Chinese participants will exhibit stronger tendencies towards high-context communication compared to the U.S. participants.

If the above-mentioned cultural context assumption holds, there is no need to explicitly message the potential sanctions of a deviant behavior among HC members as they have already realized the consequence of such a behavior regardless of explicit messaging, while among LC members, explicit messaging about the social sanctions would enhance the salience of the normative information in their minds, which would in turn increase the normative influence on the behaviors. As such, the following research question is proposed to address this issue.

RQ1: Will HC/LC cultural tendency moderate the relationship between injunctive norm message types and the perceptions of the injunctive norms?

Mu, Kitayama, Han and Gelfand (2015) conducted a lab study with noninvasive electroencephalography (EEG) to examine the neural mechanisms underlying the detection of norm violations cross-culturally among participants from the U.S. and China. In addition to a cultural-general neutral maker of detecting norm violations [i.e., consistent negative deflection of event-related potential around 400 ms (N400)] found over the central and parietal regions among participants from both countries, culture-specific neural substrates (i.e., the magnitude of N400 at the frontal and temporal regions) was found stronger in the violation conditions than in the appropriate condition only among Chinese participants. These results suggested that whereas both Americans and Chinese are equally likely to detect discrepancies between an observed behavior and the behavior normatively expected (as revealed in the centro-parietal regions), only Chinese go beyond the detected norm violation to infer the mental state of the person violating the norms, or even consider different punishment options for the violator. This study provides indirect evidence from a neurobiological perspective to the argument made above that Chinese people automatically associate potential sanctions with the deviant behaviors without explicit

messaging while Americans do not. Given the robust evidence of the effectiveness of social sanctions, the following hypotheses are proposed:

H3: For American participants, the PIN will be stronger for people who receive the strong disapproval message with explicit social sanctions compared to those who receive a strong disapproval-only message.

H4: For American participants, those who receive the strong disapproval message with explicit social sanctions will have stronger behavioral intentions of preventing food waste relative to those who receive strong disapproval only message.

However, as an initial probe of this issue within a cross-cultural context, as well as the potential cultural context mechanism, there is not sufficient evidence in the existing literature to make these predictions on the Chinese sample. Hence, the following research questions are proposed:

RQ2: Among Chinese participants, will there be a difference in their PIN between the strong disapproval only message and the strong disapproval with explicit sanction message?

RQ3: Among Chinese participants, will there be a difference of the impact on behavioral intentions of preventing food waste between the strong disapproval only message and the strong disapproval with explicit sanction message?

Participants from the U.S. and China are the focus of this study due to the distinct CTL which has been indicated in several multinational studies (e.g., Chan et al., 1996; Gelfand et al., 2011; Mu et al., 2015; Uz, 2015). The results consistently show that China embraces a much tighter culture (with a tightness score of 7.9) than the U.S (with a tightness score of 5.1). Thus, to replicate the result from these studies, the following hypothesis will be tested through empirical assessment of the CTL:

H5: On average, participants from China will exhibit greater cultural tightness than the American participants.

Because tight societies impose stronger external constraints and more severe potential sanctions compared to loose societies, the salience of the social injunctive norms is enhanced among its members, who are more likely to engage in the activity of calculating the long- vs. short- term costs and benefits. This will lead to an increased impulse restraint (i.e., tendencies toward self-discipline, deliberation over one's actions, and exerting effortful self-control) to suppress one's immediate intrapersonal goal (Jacobson et al., 2015). Hence, the likelihood of enacting the norm-consistent behavior will be increased. As such, the following hypothesis is proposed:

H6: Cultural tightness will moderate the relationship between perceived injunctive norms and behavioral intentions of preventing food waste, such that the influence of perceived disapproval on food waste behaviors will be greater among participants who perceive their culture as tighter relative to those who perceive their culture as looser.

CHAPTER 2: METHOD

Overview

A 5 (injunctive norms: control without message vs. control with message only vs. weak disapproval vs. strong disapproval vs. strong disapproval with social sanction) × 2 (country: U.S. vs. mainland China) between-subject experiment was conducted to test the hypotheses and answer the research questions. Participants from both mainland China and the U.S. were randomly assigned to one of the five conditions.

After the consent procedure, participants first completed several pre-experimental measures, followed by a 5-min distractor video to reduce possible carryover effects of these measures (Jacobson et al., 2015). Except for those assigned to the control without message condition, in the subsequent norm manipulations, participants were instructed to read a post on a popular social media website in their country respectively[1].

After message exposure[2], participants' perceived injunctive norms on food waste were measured to check if the message manipulations worked as expected. Then their behavioral intentions and behavior of reducing food waste (i.e., outcome variable measures) were measured. Finally, demographics information was collected.

Participants

In total, 1049 participants were recruited from the United States and mainland China separately (526 Americans and 523 Chinese; See Figure 9 and Figure 11 for the states or provinces where the data were collected). Both the U.S. participants (U.S. citizens living in the U.S.) and Chinese participants (Chinese citizens living in mainland China) were recruited from

[1] A Timing function was employed to track and manage the time a respondent spends on that message to ensure sufficient view time.

[2] For those assigned to the control without message condition, they completed the perceived injunctive norm measures right after the distractor video.

Qualtrics Panels[3]with quotas on sex, age groups (over 18 yes old; see Table 1) and population density (see Figure 10 and Figure 12) derived from the U.S. and Chinese Census data (National Bureau of Statistics of the People's Republic of China, 2010; U.S. Census Bureau, 2010). Participants were compensated with an incentive through Qualtrics for participation. After the completion of the experiment, participants were fully debriefed.

The U.S. sample consisted of slightly more females (51%; Census 2010: 50.8%) than males (48.9%; Census 2010: 49.2%) with one person identified as "gender fluid." The mean age of the sample was 46.41, ranging from 18 to 81, *SD* = 16.63. The vast majority of participants reported being Caucasian (61.6%) with 17.5% being Hispanic or Latino, 13.5% African-American, 5.7% Asian, 1.1% Mixed and 0.6% Native-American. More than half of the participants (66.8%) reported their household income in 2016 as less than $70,000 and the majority (91.7%) spent less than $600 on food per month (see Figure 13 for details). The most common sizes of the households were living alone (23.6%), living with one person (34.6%) or living with two persons (19.2%) (see Figure 15). Regarding the employment status, 39.7% of the participants were working full-time and 19.8% were retired (see Figure 16). Finally, around half of the participants finished high school (21.1%) or took some college credits without receiving a degree (25.7%), and about one thirds of the participants received an advanced degree (Bachelor's or higher; see Figure 17).

[3] Qualtrics, a marketing research firm, recruits participants through social media, web publishers, and global partners to specific surveys or to join custom survey panels from over 100 countries around the world. Data quality is assured by multiple checks throughout the collection process (see Brandon, Long, Loraas, Mueller-Phillips, & Vansant, 2014). A recent meta-analysis (Walter, Seibert, Goering, & O'Boyle, 2016) shows that online panel data (OPD) largely demonstrates similar psychometric properties to conventionally sourced data and OPD correlations generally fall within the credibility intervals of existing meta-analytic results using conventionally sourced data. Hence, with suitable caution, OPD are concluded as appropriate for many research questions in the field of social science research.

On the other hand, the Chinese sample was slightly more female (48.6%; Census 2010: 48.73%) than males (51.2%; Census 2010: 51.27%) with one person identified as "unwilling to report." The mean age is 40.81, ranging from 18 to 85, *SD* = 14.09. The vast majority of participants reported being Han Chinese (汉族) (97.3%) with 0.8% reporting being Hui Chinese (回族), 0.8% Zhuang Chinese (壮族), and 0.8% other ethnic minorities, including Li (黎族), Mongolian (蒙古族), Man (满族), Miao (苗族), and Tujia (土家族)[4]. More than half of the participants (60.8%) reported their household income in 2016 as ranging from 90,000 to 399,999, and more than half of the participants (51.8%) spent 1000-2500 on food per month (see Figure 14 for details). Around half of the participants live in a family of three (47.2%) and the two other most common sizes of the households were a family of four (20.1) or of two (14.3%) (see Figure 15). Regarding the employment status, the majority of the participants were working full-time (76%) and 12.8% were retired (see Figure 16). Finally, more than half of the participants (71.5%) received an advanced degree (Bachelor's or higher; see Figure 17). In summary, as expected, both samples closely mirrored the most recent census data from both countries in terms of age, sex and population density (National Bureau of Statistics of the People's Republic of China, 2010; U.S. Census Bureau, 2010).

Procedures

A computer-based experiment was conducted in the current study, in which data were collected online. U.S. participants completed a questionnaire in English and Chinese participants completed the questionnaire in Mandarin Chinese. As the survey should be equivalent in transferring the meanings of questions and messages, a professional English-Chinese translator

[4] Ethnic minorities in China refer to non-Han Chinese population in the People's Republic of China (PRC). PRC officially recognizes 55 ethnic minority groups within the country in addition to the Han majority.

who is not involved in this research first translated the original English questionnaire into Chinese. Then, the first author of this paper who is native in mandarin Chinese and fluent in English back-translated the questionnaire from Chinese into English (Lapinski, Liu, Kerr, Zhao, & Bum, 2016). Both English and Chinese versions of questionnaires were carefully checked and compared and edited to help maximize conceptual equivalence (Brislin, 1970).

Members of the panel were invited to participate this study by giving a URL and instructed to log into the study from an Internet-connected computer. Upon arriving at the study webpage, participants were instructed to complete informed consent (see Appendix A). After completing the informed consent, those who agreed to proceed were asked to complete a short survey (see Appendix B) to measure their CTL, HC/LC cultural tendency, previous food waste prevention behaviors, and existing attitudes towards food waste prevention. Then they watched a 5-min distractor video on bird migration modeled after Jacobson et al. (2015) to reduce possible carryover effects of these measures. Next, participants were randomly assigned to the control without message condition or one of the four other conditions in which they received the assigned message (see Appendix C). Immediately following message exposure, they were directed to complete another survey including two manipulation check variables (i.e., perceived social disapproval of wasting food and perceived social sanctions of wasting food), two outcome variables (i.e., behavioral intent to reduce food waste in the future and willingness to sign up for a 7-day no food waste challenge activity), two additional variables (i.e., perceived believability and perceived source credibility of the message), and demographics (see Appendix D). Participants were fully debriefed after completing all the experimental procedures. Data were captured automatically as participants completed it.

Message Inductions

Except for the control without message condition, injunctive norm message inductions were presented in the format of a social media post modeled after either a Facebook (for the U.S. participants) or a Sina Microblog *Weibo* (for the Chinese participants) interface with adaptations for the purpose of this study[5] (China Internet Network Information Center, 2017; Statista, 2017). All messages are presented in Appendix C and Appendix E.

Participants in all conditions were informed that this post is written and released by the *Save Food Initiative*, a fictitious international non-governmental organization (NGO) devoted to reducing food waste globally. This study was being conducted in collaboration with Michigan State University (in the U.S.) or Chinese Communication University (in China) with the purpose to help improve the Initiative's social media activities of promoting food waste prevention in the U.S. or China. Then, except for those who were assigned to the no message condition, participants were instructed to read the entire message carefully. The post listed facts about the severe situation of food waste in the U.S. or in China and advocated the importance of not wasting food. Pictures of food waste and children suffering from hunger were shown as well. Across all message conditions, the posts were identical in content, length and the nature of the arguments presented with the exception of the message inductions. The 'thumbs-up' and 'thumbs-down' information and comments from readers, common on social media sites as approval or disapproval information, were designed to function as normative inductions.

Control without message condition. After the cover story, no message was displayed.

[5] To avoid the potential issue of different social media affordances (Halpern & Gibbs, 2013), the names of the website were intentionally removed throughout this study. Instead, the generic term "social media post" was used.

Control with message only condition. Only the post itself, without any feedback information from other readers (i.e., thumbs-up and thumbs-down, and comments) was displayed (see Figure 1 and Figure 2).

Weak disapproval condition. In addition to the post itself, feedback information from other readers was displayed. The post included 103 thumbs-up and 105 thumbs-down. The numbers were chosen based on the analysis of the most popular social media posts from both Facebook in the U.S. and Sina Weibo in China, as well as the data of the social media posts from the world's leading environmental organizations on both platforms, with a balance between the purpose of manipulating injunctive norm messages, as well as achieving experimental realism. Five comments were presented, among which one spoke in a neutral tone (i.e., #3 I didn't know much about the issue of food waste), two expressed approval towards food wasting (i.e., #2, #4 and #5; counterarguments such as these are extreme pictures about food waste, not reflecting the truth; some waste is due to the bad food quality), and only one was the disapproval comment (i.e., #1 wasting food should not be accepted or tolerated) (see Figure 3 and Figure 4).

Strong disapproval condition. Everything was identical as described in the weak disapproval condition, except for that there were 3016 thumb-ups and 105 thumbs-downs. Among the 5 comments, one spoke in a neutral tone (i.e., #3), and the other four expressed disapproval towards food wasting (see Figure 5 and Figure 6).

Strong disapproval with sanction condition. Everything except for the comments was identical as described in the strong disapproval condition. Among the five comments, one still spoke in a neutral tone (i.e., #3), and the rest four not only conveyed the identical disapproval information, but also followed by stating the social sanctions towards wasting food (i.e., ostracism, dislike and shame) (see Figure 7 and Figure 8).

Measurement

The scale items used in this study were adapted from existing literature. Previous research provides evidence for scale reliability and validity for the measures used in this study (Beltramini, 1982; Gelfand et al., 2011; Lapinski et al., 2007; McCroskey & Teven, 1999; Ohashi, 2000; Park & Smith, 2007). Specifically, items have been used and validated in a previous study conducted by the authors with both U.S. and Chinese samples (Liu & Lapinski, 2017). Reliability estimates, zero-order correlations, means, and standard deviations of all measures for each national sample are reported in Table 2 and Table 3. All the items were included in Appendix B and Appendix D.

Independent Measures

Cultural tightness-looseness. Cultural tightness-looseness was measured with a six-item scale developed by Gelfand et al. (2011). The items on this scale assess the clarity and number of social norms, the degree of tolerance for norm violations, and overall compliance with social norms in each nation. Higher scores indicated a tighter culture. Sample items included "There are many social norms that people are supposed to abide by in the U.S./China; "In the U.S./China, if someone acts in an inappropriate way, others will strongly disapprove"; and "People in the U.S./China almost always comply with social norms." Procrustes analyses (Gelfand et al., 2011) demonstrated that the scale had metric equivalence across cultures and people in tight and loose cultures also agree on the levels of tightness–looseness in their respective nations as indicated by other validation methods. Details on the scale can be found in Gelfand et al. (2011). One reverse coded item (i.e., #4 People in the U.S./China have a great deal of freedom in deciding how they want to behave in most situations) was excluded from the analyses in both samples due to its poor correlations with all the other items in this scale.

HC/LC culture. HC/LC culture was measured with a seven-item scale developed by Ohashi (2000) and further used and modified by Bresnahan et al. (2002) and Richardson and Smith (2007), in which HC/LC culture was assessed with a unidimensional bipolar scale instead of a two-dimensional scale. Items were rated on Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a tendency towards the HC culture; Ohashi (2000) provides evidence for scale reliability and validity. Sample items included "Even if not stated exactly, a speaker's intent will rarely be misunderstood." and "People understand many things that are left unsaid."

Dependent Measures

Perceived social disapproval. Participants' perceived social disapproval of wasting food was assessed with ten items developed by Park and Smith (2007). Items were rated on Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a perception of a greater perceived social disapproval. The first five items measured the personal-level perceived social disapproval (i.e., individuals' belief regarding disapproval of wasting food by those valued others). Sample items included "I believe most people whose opinion I value would disapprove of my wasting food." and "The majority of people around me would think it's unacceptable if I waste food." The rest of items measured the societal-level perceived social disapproval (i.e., individuals' belief regarding disapproval of wasting food in their society, the U.S. or China in this study). Sample items included "Most people in the United States/China regard food waste behavior as not acceptable." and "Most people in the United States/China disapprove of food wasting behaviors." Park and Smith (2007) pointed out despite the fact that there are actual levels of injunctive norms among a certain group and in their society (i.e.,

collective norms), individuals may vary in their perception of the norms existing at both the personal and the societal level.

Perceived social sanctions. Participants' perceived social sanction of wasting food was assessed with six items developed based on Tittle (1980). Items were rated on Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a perception of a greater social sanction. Sample items included "I think people who are important of me would think less of me if I waste food" and "I am concerned that if I waste food, those who are close to me will judge me negatively."

Behavioral intent to prevent food waste in the future. Participants' post-experiment intent to engage in future food waste prevention activities were measured with 6 items rated on 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree) adapted from Park and Smith (2007). All the items were revised to match with the focal topic, food waste prevention behavior. Higher scores indicated a stronger intention to engage in future food waste prevention activities. Sample items include "I have it in my mind to start meal planning to reduce unnecessary food waste" and "I will take leftovers home when eating out."

Sign up for the challenge activity. All the participants were invited a join a one-week no food waste challenge as an indirect measure of their food waste reduction behavior with a dichotomous option, Yes/No. Those who indicated being willing to join this challenge were directed to a signup website where they can read more details on this challenge activity and sign up for it using their name and e-mail address[6].

[6] To ensure the anonymity of the participants, their sign-up information was recorded separately from the answers on the questionnaire. There is no way to associate their identity with the answers.

Additional Variables

Perceived message believability. To ensure that participants were not suspicious toward the content in the message inductions, perceived believability of the message was assessed using Beltramini's (1982) perceived believability scale. The original scale was composed of ten items using a five-point semantic differential scale response format. The current study used the most relevant 7 items on five-point semantic differential scales. Higher scores indicated greater believability of the message. Sample anchors included “believable/unbelievable”, “credible/not credible”, and “unconvincing/convincing.”

Perceived source credibility. To measure participants’ perceived credibility towards the fictional non-profit organization who posted the message on the social media website, perceived source credibility was assessed with the scales adapted from McCroskey and Teven (1999). The source competence scale consisted of four items, each assessed on a five-point Likert response scale, e.g., “The person who wrote this is very competent when writing about this topic.” The source trustworthy scale consisted of four items, also assessed on five-point Likert response scales, e.g., “The person who wrote this message is honest when writing about this topic.” Higher scores indicated greater perceived credibility towards the source. One reverse coded item (i.e., #8 The person who wrote this is biased when writing about this topic) was excluded from the analysis in both samples due to its poor correlations with all the other items in the same scale.

Attitudes toward food waste prevention. Participants’ existing attitudes toward food waste prevention were measured as a potential covariate (Ajzen, 1991; Madden, Ellen, & Ajzen, 1992) with five items rated on 5-point Likert scales modified based on Lapinski et al. (2007). The items were adjusted to focus on the issue of food waste prevention. Higher scores indicated

a more favorable attitude toward engaging in food waste prevention. Sample items included "I think reducing food waste is a good idea" and "I feel strongly preventing food waste is important."

Previous food waste prevention behaviors. Participants' existing food waste prevention behaviors were measured with six items rated on 5-point Likert scales ranging from always to rarely never, modified based on Lapinski et al. (2007). The purpose of including this measurement was to collect data to establish a baseline of the existing food waste prevention behaviors among the participants, as well as to monitor if the existing behaviors were significantly different among participants across the experimental conditions. Higher scores indicated a higher level of engagement in food waste prevention behaviors. Sample items include "I prepare the right amount of food when cooking meals" and "I only order as much food as I can eat when eating outside."

Demographics. Standard demographic information was collected from the participants at the end of the experiment, including biological sex, age, ethnicity, employment status, household income, average cost on food per month, household size, education level and residence location.

CHAPTER 3: RESULTS

Measurement Invariance

Multi-group confirmatory factor analysis (MGCFA) was conducted for all measures using Mplus (Muthén & Muthén, 2012) to establish unidimensional measurement models prior to computing composite scores and testing hypotheses, and to provide evidence that the observed scale indicators/items under study measured the same theoretical constructs (latent variables or factors) across the two samples.

In cross-national or cross-cultural research, different level of measurement equivalence across samples is critical in evaluating responses regarding latent variables, as measurement invariance is a prerequisite for group comparisons. Without established measurement invariance, analyses of the corresponding measures do not produce meaningful results, and results of differences between groups cannot be unambiguously interpreted (Byrne, 2013; Horn & Mcardle, 1992; Milfont & Fischer, 2015; Myers, Calantone, Page, & Taylor, 2000; Steinmetz, Schmidt, Tina-Booh, Wieczorek, & Schwartz, 2008; Wang & Wang, 2012).

Hence, a series of MGCFAs were conducted following procedures recommended by Byrne (2013). Missing data were handled with listwise deletion. The results are reported in Table 5. Firstly, a baseline model (Model 1) was established to test whether the measurement model fits the empirical data from each national group (see Table 4 for the results of baseline measurement models); no constraints were imposed across the groups for configural invariance (i.e., pattern invariance test). Configural invariance is a necessary condition for testing invariance of measurement parameters in the next steps. Model 2 examined metric invariance by constraining the factor loadings to be equal across the two groups (i.e., weak measurement invariance test). When invariance of factor loading is demonstrated, the underlying latent

variables/factors are measured in the same way in all groups. Model 3 tested scalar invariance through constraining both the factor loadings and indicator/item intercepts to be equal across the two groups (i.e., strong measurement invariance test) (Byrne, 2013; Wang & Wang, 2012). When invariance of both factor loadings and item intercepts holds, the item scores from different groups would have the same measurement metric and the same scalar (i.e., the change in model fit between the configural model and the tested model would not be statistically significant). Thus, it enhances our confidence that mean scores for the underlying factors can be compared across groups.

The results in Table 5 showed that except for the scale of perceived social sanctions, no significant changes occurred to Chi-squares across the three models, indicating a good measurement equivalence across the two national samples. For perceived social sanctions, even though the initial model of full scalar invariance was rejected, partial scalar invariance was achieved by releasing the intercept of one item free. Byrne, Shavelson, & Muthén (1989) argued that full measurement invariance was not always necessary for further invariance tests and substantive analyses. Numerous empirical studies have employed the idea of partial measurement invariance with the acknowledgement of its limitation (Hong, 2015; Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). Hence, the results were deemed acceptable in this case.

Manipulation Checks and Preliminary Analysis

Based on its conceptual definition, perceived injunctive norms (PIN) was measured with three scales, including the personal-level perceived social disapproval (PPSD), the societal-level perceived social disapproval (SPSD) and perceived social sanctions (PSS). After the unidimensionality and measurement invariance of each sub-scale has been established, a second-

order confirmatory factor analysis (CFA) was conducted with Mplus in each national sample to test for the second order unidimensionality of the PIN, with PPSD, SPSD and PSS being treated as the items. The results (see Figure 18 and Figure 19) showed that the data in both samples were consistent with the second order unidimensioanlity with a plausible model fit yielded, U.S. χ^2 (101) = 236.67, $p < .001$; CFI (Comparative Fit Index) = 0.97, TLI (Tucker-Lewis index) = 0.96, RMSEA (Root Mean Square Error of Approximation) = .05, 90% CI [.04, .06], SRMR (Standardized Root Mean Square Residual) = .04; China χ^2 (101) = 216.22, $p < .001$; CFI (Comparative Fit Index) = 0.98, TLI (Tucker-Lewis index) = 0.97, RMSEA (Root Mean Square Error of Approximation) = .05, 90% CI [.04, .06], SRMR (Standardized Root Mean Square Residual) = .04. Hence, PIN was composed by averaging the scores of PPSD, SPSD and PSS.

To test the effectiveness of injunctive norms inductions, Analysis of Variance (ANOVA) was conducted in each national sample separately, in which injunctive norm inductions were the independent group factors and perceived injunctive norms (PIN) was the dependent variable.

The results (see Figure 20) showed that in both samples there was a main effect for the message inductions on PIN, $F_{U.S.}$ (4, 525) = 20.23, $p < .001$, $\eta^2 = .13$; F_{China} (4, 522) = 28.69, $p < .001$, $\eta^2 = .18$. Post-hoc Tukey HSD analysis (see Table 6) showed that in both samples, PIN did not differ across the two control conditions, with or without a message, indicating that the social media post itself did not contribute to a different level of PIN, which is consistent with the research design that normative information was manipulated by the number of thumbs-up and thumbs-down, as well as the content of the comments below the post. On the other hand, both the strong injunctive norm and strong norm with sanction conditions induced significantly more salient PIN towards food waste in both samples compared to the weak injunctive norm and the two control conditions.

In the U.S. sample, the weak injunctive norm condition did not induce a different level of PIN compared with either control condition, whereas in the China sample, the weak injunctive norm condition reduced the salience level of PIN as compared to the two control conditions. Noticeably, Chinese participants perceived a more salient PIN compared to their American counterparts in both control conditions, $t_{no\ msg}(205) = 8.51$, $p < .001$, 95% CI of the difference = [.60, .96], $t_{msg\ only}(209) = 5.43$, $p < .001$, 95% CI of the difference = [.34, .73], indicating that the existing PIN (i.e., baseline PIN) was stronger among the Chinese participants compared to the Americans. Given that in both national samples, the two strong injunctive norm conditions induced a significantly higher level of PIN compared to the baseline PIN, the injunctive norm message manipulations were deemed successful.

In addition, as an initial probe in exploring the role of perceived social sanctions (PSS) as a first-order unidimensionality within PIN, PSS scores were compared among the two strong norm conditions to test the effectiveness of the social sanction message induction. Analysis of Variance (ANOVA) was conducted in each national sample separately, in which the two strong injunctive norm inductions were the independent group factors and PSS was the dependent variable.

The results (see Figure 21) showed that in both samples there was a main effect for the sanction message inductions on PSS, $F_{U.S.}(1, 215) = 12.30$, $p = .001$, $\eta^2 = .05$; $F_{China}(1, 208) = 16.83$, $p < .001$, $\eta^2 = .08$, indicating that participants in the strong norm with sanction condition perceived significantly more potential social sanctions on food waste behaviors compared to those in the strong norm only condition. Hence the sanction message inductions were deemed as successful.

To test the perceived believability of the message inductions, one-sample t-tests and ANOVAs were conducted in each national sample separately, in which injunctive norm induction (except for the no message condition) was included as the independent group factors and perceived message believability as the dependent variable.

In the U.S. sample, the mean believability score was 4.21 with a standard deviation of 0.80, a figure significantly above the midpoint of the five-point response scale, $t(423) = 31.13$, 95% CI of the difference = [1.13, 1.28], indicating that these messages were believable. Differences in believability as a function of experimental inductions were also examined. The results from ANOVA (see Table 7) indicated that the messages were perceived as similarly believable across all experimental conditions, $F(3, 423) = 2.18$, $p = .09$. One sample t-tests showed that the mean believability score in each experimental condition was all significantly higher than the midpoint of the scale, all $p_s < .001$, indicating that these messages were not differentially believable across the conditions.

In the Chinese sample, the mean believability score was 4.43 with a standard deviation of 0.59, a figure significantly above the midpoint of the five-point response scale, $t(417) = 49.48$, 95% CI of the difference = [1.37, 1.48], indicating that these messages were believable. The results from ANOVA (see Table 7) indicated that the messages were perceived as similarly believable across all experimental conditions $F(3, 417) = 2.09$, $p = .10$. One sample t-tests showed that the mean believability score in each experimental condition was all significantly higher than the midpoint of the scale, all $p_s < .001$, indicating that these messages were not differentially believable across the conditions. Hence, all the message inductions were deemed as equally believable, and there was no need to control for this factor in subsequent analyses.

To test the perceived source credibility of the message inductions, one-sample t-tests and ANOVAs were conducted in each national sample separately, in which injunctive norm induction (except for the no message condition) was included as the independent group factors and perceived source credibility as the dependent variable.

In the U.S. sample, the mean credibility score was 4.19 with a standard deviation of 0.75, a figure significantly above the midpoint of the five-point response scale, $t(423) = 32.59$, 95% CI of the difference = [1.12, 1.26]), indicating that these messages were perceived as credible. Differences in perceived source credibility as a function of experimental inductions were also examined. The results from ANOVA (see Table 8) indicated that the messages were perceived as similarly credible across all experimental conditions, $F(3, 423) = 2.97$, $p = .08$. One sample t-tests showed that the mean credibility score in each experimental condition was all significantly higher than the midpoint of the scale, all $p_s < .001$, indicating that these messages were not differentially credible across the conditions.

In the Chinese sample, the mean credibility score was 4.30 with a standard deviation of 0.54, a figure significantly above the midpoint of the five-point response scale, $t(417) = 49.17$, 95% CI of the difference = [1.37, 1.48], indicating that these messages were perceived as credible. The results from ANOVA (see Table 8) indicated that the messages were perceived as similarly credible across all experimental conditions $F(3, 417) = 2.26$, $p = .08$. One sample t-tests showed that the mean credibility score in each experimental condition was all significantly higher than the midpoint of the scale, all $p_s < .001$, indicating that these messages were not differentially credible across the conditions. Hence, all the message inductions were deemed as equally credible, and there was no need to control for this factor in subsequent analyses.

Finally, the other two additional measures, existing food waste prevention attitudes and behaviors were examined across the four groups in both nations, as well as examined between the two national samples to see if there were existing significant differences in attitudes and behaviors before exposure to the messages. ANOVAs were conducted in each national sample separately, in which injunctive norm inductions were included as the independent group factors and existing attitudes and behaviors as the dependent variables. Results (see Figure 22) showed that in both national samples, there were no differences in existing attitudes and behaviors across the five conditions. In the U.S. sample, $F_{beh}(4, 525) = 0.90$, $p = .47$; $F_{att}(4, 525) = 0.74$, $p = .57$, and in the China sample, $F_{beh}(4, 522) = 0.30$, $p = .88$; $F_{att}(4, 525) = 0.34$, $p = .85$. In addition, independent samples t-tests were performed with country as the grouping variable and existing attitude and behaviors as the test variables. The results indicated no differences among the two samples in both existing attitudes $t(1047) = 1.60$, $p = .11$ and behaviors $t(1047) = 1.60$, $p = .11$. Hence, there is no need for them to be included as covariates in the subsequent analyses.

Tests of Hypotheses and Research Questions

H1 predicted that perceived injunctive norms (PIN) would mediate the effects of injunctive normative message inductions on behavioral intentions to not waste food in the future. A mediation model with strong and weak social disapproval message inductions as the predictors, PIN as the mediator, and behavioral intentions as the outcome variable was tested with PROCESS Macro (Hayes, 2013) for each national sample respectively. The resulting causal models with path coefficients are illustrated in Figure 23. Parameters are corrected for attenuation due to measurement error.

Results showed that in the U.S. sample, the message induction had a direct effect on the perceived social injunctive norms of wasting food ($\beta = .50$, 95% CI [.39, .60]), which in turn had

a direct effect on behavioral intentions of reducing food waste in the future (β = .27, 95% CI [.14, .39], corrected β′ = .32, 95% CI [.19, .44]). All of the parameters were of sufficient magnitude for them to be indicators of direct effects. In addition, there was a significant indirect effect (i.e., mediated effect) of injunctive message induction on behavioral intentions (β = .14, 95% CI [.06, .25]).

In the Chinese sample, similarly, the message induction had a direct effect on the perceived social injunctive norms of wasting food (β = .64, 95% CI [.55, .71]), which in turn had a direct effect on behavioral intentions of reducing food waste in the future (β = .22, 95% CI [.09, .35], corrected β′ = .24, 95% CI [.11, .36]). All of the parameters were of sufficient magnitude for them to be indicators of direct effects. In addition, there was a significant indirect effect (i.e., mediated effect) of message induction on behavioral intentions (β = .14, 95% CI [.09, .21]). Hence, data from both national samples were consistent with H1.

Additional analyses were performed with the behavioral data of signing up for the one-week no food waste challenge. All participants who indicated the willingness to participate the challenge signed up in the website with their name (or nick name) and e-mail address. In total, 93 (17.7%) Americans signed up for participation while 264 (50.5%) Chinese did. Mediation analysis (i.e., the mediated effects of injunctive normative message inductions on sign-up behavior via PIN) with PROCESS Macro showed that in both national samples, PIN was the only significant predictor of whether a participant was or was not willing to participate the challenge. In the U.S. sample, for every one-unit increase in PIN, a .58 increase in the log-odds of being willing to participate is expected, holding all other independent variables constant. In the China sample, for every one-unit increase in PIN, a .57 increase in the log-odds of being

willing to participate is expected, holding all other independent variables constant. No indirect effect (i.e., mediated effect) of message induction on sign-up behavior via PIN was found.

H2 predicted that Chinese participants would exhibit stronger tendencies towards high context communication compared to the U.S. participants. To test this hypothesis, an independent-samples t-test was conducted with comparing the means of HC/LC scale between Chinese and American samples. The results showed that Chinese (M = 3.73, SD = 0.50) exhibited a significantly stronger tendency towards HC compared to the American participants (M = 3.29, SD = 0.82), $t(1047) = 10.64$, $p < .001$, $r = .31$. Hence, the data were consistent with the prediction made in H2.

RQ1 asked if HC/LC cultural tendency moderated the relationship between injunctive norm message types and perceived injunctive norms. To answer this research question, a moderation model was tested with PROCESS Macro (Hayes, 2013), with the two strong injunctive norm message inductions as the independent variable (the strong injunctive norm condition was coded as "0" and the norm with sanction condition was coded as "1"), HC/LC cultural tendency as the moderator and PIN as the dependent variable, using the whole dataset. The results showed that the overall model including all the predictors was significant, $F(3, 424) = 35.14$, $p < .001$, adjusted $R^2 = .20$. Both HC/LC ($\beta = .38$, $t = 9.53$, $p < .001$) and injunctive norm treatments ($\beta = .20$, $t = 3.51$, $p < .001$) yielded a significant main effect on PIN. The predicted interaction effect between HC/LC and injunctive norm treatment on PIN was also significant ($B = -.21$, $t = -2.66$, $p < .01$) (see Figure 24 for the plot of the interaction).

For the significant interaction, simple slope analysis was conducted and statistical significance of unstandardized simple slopes was assessed, following the procedure advanced by Aiken and West (1991). Table 9 shows the simple slopes of predictor treatment on criterion

variable PIN at two points of the moderator HC/LC (i.e., one standard deviation above or below the mean). For individuals with a low context tendency, the simple slope was positive and significant, but as the tendency becomes high context, the simple slope became not significant. That is to say, adding a sanction message (i.e., changing the value of the independent variable from 0 to 1) will induce more PIN among those with a low-context tendency but not change the PIN among those with a high-context tendency. Hence, it showed that HC/LC cultural tendency moderated the relationship between injunctive norm messages and the PIN.

H3 predicted that American participants who received the strong disapproval message with social sanctions will perceive a more salient injunctive norm compared to those who received the strong disapproval only message. The dataset was split first so that the analysis was only conducted only with American participants. A one-way ANOVA was performed with the two injunctive norm message inductions as the fixed factor and PIN as the dependent variable. The results showed that there was a main effect for the injunctive norm message induction on PIN, $F(1, 215) = 10.02$, $p = .002$, $\eta^2 = .04$, such that the U.S. participants in the strong social disapproval with sanctions condition ($M = 4.06$, $SD = 0.63$) perceived a more salient injunctive norm of not wasting food compared to those in the strong injunctive norm condition ($M = 3.77$, $SD = 0.73$). Date were consistent with H3.

H4 predicted that American participants who received the strong disapproval message with social sanctions will have stronger behavioral intentions of preventing food waste compared to those who received the strong disapproval only message. The dataset was split first so that the analysis was only conducted among American participants. A one-way ANOVA was performed with the two injunctive norm message inductions as the fixed factor and behavioral intentions as the dependent variable. The results showed that there was a main effect for the injunctive norm

message induction on behavioral intentions, F (1, 215) = 136.17, $p < .000$, $\eta^2 = .39$, such that the U.S. participants in the strong social disapproval with sanctions condition (M = 4.69, SD = 0.28) expressed a stronger intention to prevent food waste in the future compared to those in the strong injunctive norm condition (M = 4.05, SD = 0.51). The data were consistent with H4.

RQ2 and RQ3 asked if there was a difference in Chinese participants' perceived injunctive norms (PIN) and behavioral intentions of preventing food waste between the strong disapproval only message and the strong disapproval with explicit sanction message. To answer these two research questions, the dataset was split first so that the analysis was only conducted among Chinese participants. Two one-way ANOVAs were performed with the two strong injunctive norm message inductions as the fixed factor, and PIN (RQ1) or behavioral intentions (RQ2) as the dependent variable. Results showed no significant differences in either PIN, F (1, 208) = 1.15, p = .28, or behavioral intentions F (1, 208) = 0.32, p = .57 among Chinese participants across the two strong injunctive norm conditions.

H5 predicted that on average, the culture in China would be tighter than that in the U.S. To test this hypothesis, an independent-samples t-test was conducted with comparing the means of CTL scale between Chinese and American samples. The results showed that Chinese (M = 3.95, SD = 0.65) perceived a tighter culture in their society compared to the American participants (M = 3.15, SD = 0.80), t(1047) = 17.74, $p < .001$, r = .48. Hence, the data were consistent with the prediction made in H5.

H6 predicted an interaction between PIN and CTL on behavioral intentions toward preventing food waste. To test this hypothesis, a hierarchical regression analysis was conducted for each national sample respectively. Behavioral intention was treated as the outcome variable in each regression model, mean-centered CTL and PIN were entered in block 1, and the

standardized interaction term between CTL and PIN was entered in block 2. The results were presented in Table 10.

The results showed that the overall model including all the first- and second-order effect predictors was significant, $F(3, 525) = 66.64$, $p < .001$, adjusted $R^2 = .27$ for the U.S. sample, and $F(3, 522) = 74.91$, $p < .001$, adjusted $R^2 = .30$ for the China sample. When PIN and CTL were entered to the first block of the regression analysis, only PIN exhibited a statistically significant main effect on behavioral intentions of preventing food waste (US: $\beta = .53$, $t = 13.51$, $p < .001$; China: $\beta = .55$, $t = 13.78$, $p < .001$). CTL was not associated with behavioral intentions of preventing food waste in both national samples. In the Chinese sample, the predicted interaction effect between PIN and CTL on behavioral intentions was significant ($B = .27$, $t = 4.13$, $p < .001$) (see Figure 25 for the plot of the interaction between PIN and CTL on behavioral intentions). No significant interaction between PIN and CTL was found in the U.S. sample.

For the significant interaction found in the Chinese sample, simple regression analysis was conducted and statistical significance of unstandardized simple slopes was assessed, following the procedure advanced by Aiken and West (1991). Table 11 shows the simple slopes of predictor PIN on criterion variable behavioral intentions at two points of the moderator CTL (i.e., one standard deviation above or below the mean). For individuals who perceived their culture as tighter, the simple slope was positive and significant. As the perceived culture becomes looser, the simple slope was relatively smaller but still significant. That is to say, among those who perceive their culture as tighter, PIN will lead to greater behavioral intentions of preventing food waste.

In addition, the Johnson-Neyman technique was employed following the approach described by Pedhazur (1997) to determine the region of significance for the adjusted effect of

PIN on behavioral intentions as a function of CTL (see Figure 25). Despite the broad usefulness of the "pick-a-point" simple slope approach as described above (Rogosa, 1980), it has the limitations such as the values of the moderator to be tested are selected arbitrarily and being unable to test the significant conditional effects of the moderator if it is outsides the range of observed sample data, which results in a limited understanding toward the true effects of a continuous moderator (Preacher, Curran, & Bauer, 2006). On the contrary, the Johnson-Neyman technique provides information about over what range of the moderator the effect of the predictor is significantly positive, nonsignificant, or significantly negative, which allows researcher to plot the confidence bands for the conditional effect instead of just focusing on several arbitrarily chosen values. The results showed that the upper bound of significance region[7] is -1.9395 with no lower bound of the region shown, meaning that the conditional effect of PIN on behavioral intentions is significant outside of this region (i.e., when the value of CTL is above -1.9395). When the value of CTL is greater than -1.9395, PIN will exert a positive significant effect on behavioral intentions, otherwise, CTL will not significantly affect the strength of PIN on behavioral intentions. This finding provides us with a more accurate understanding toward the important role of CTL compared to the simple-slope method and also shows that the data were consistent with the hypothesis made in H6.

[7] Significance region refers to the relation between X (i.e., PIN) and Y (i.e., behavioral intentions) as a function of the moderator (i.e., CTL). This region defines the specific values of CTL at which the regression of behavioral intentions on PIN moves from non-significance to significance. There are lower and upper bounds to the region. Normally, the regression of Y on the focal predictor X is significant at values of the moderator that are less than the lower bound and greater than the upper bound, and the regression is non-significant at values of the moderator falling within the region (Preacher, Curran, & Bauer, 2006).

CHAPTER 4: DISCUSSION

As an effort to expand our understanding of the underlying cultural mechanisms of normative social influence, the current study experimentally manipulated the salience of the injunctive norms using persuasive messages in a cross-cultural context, tested within nationally representative samples from China and the U.S.

The first part of this study aimed to replicate the mediation model shown in a prior study conducted by the authors (Liu & Lapinski, 2017), as well as documented in several previous studies (e.g., Lapinski, Maloney, Braz, & Shulman, 2013; Lapinski et al., 2007; Mabry & Mackert, 2014). The results successfully replicated the previous finding that perceived social approval/disapproval of a behavior can be readily modified, and the modified perceptions mediated the effects of injunctive normative messages on behavioral intentions to enact the focal behavior. In addition, this study expanded the scope of the research design in Liu and Lapinski (2017) by adding two control conditions and one strong norm with sanction condition, with a focus on the effects of injunctive norms. Because the message induction was in the form of a social media post, the results indicate that contextual information embedded in new media platforms (e.g., number of “thumbs-up” or “thumbs-down” and the comments posted) may serve as normative cues to viewers. As pointed out by Spartz, Su, Griffin, Brossard, and Dunwoody (2017), compared to traditional media which provide normative information through a relatively explicit and straightforward method, social media sites with user-generated content such as Facebook, Twitter and Youtube provide normative information through a variety of forms. Users can infer others’ opinions about an issue through numerous cues including comments, blog discussions, emoticons, and the number of thumbs-ups (Thelwall, 2007), which can in turn influence individual’s perception of reality (Lee, 2012).

The second important contribution of this research was to refine the conceptualization and operationalization of PIN. Perceived injunctive norms have been conceptualized as a combination of what people believed the important others think they should do and the possibility of social sanctions from not fulfilling these expectations (Cialdini et al., 1990). As such, messages about injunctive norms can either contain explicit (Tittle, 1980) or implicit (Liu & Lapinski, 2017) information on social sanctions. In this case, we intended to understand the role of explicit social sanction messages, which remained unclear in the existing literature.

The results from this study showed a significant difference in PIN and the subsequent behavioral intentions across the strong injunctive norm and strong injunctive norm with sanction conditions only within the U.S. sample. This finding suggests that implicit social sanctions may not be always inferred by the audience. People with cultural tendency toward high vs. low context communication perceive the salience of the injunctive norms differently, which can, in-turn, weaken the effects of injunctive norm messages without explicit social sanctions. By definition, people with a high-context communication tendency are likely to read the message beyond the words, and the implicit sanction information can be inferred. Hence, it would be redundant and even culturally inappropriate to add social sanction information explicitly in the normative message. This finding offers valuable insights in how to increase the effectiveness of injunctive norm messages in persuading the target audience when they are from different cultural backgrounds, as well as provides important implications for cross-cultural communication activities and strategies.

Finally, to examine the cultural mechanism of injunctive normative influence, CTL was included as a potential moderator on the PIN-behavioral intentions relationship. As a construct initiated in the 1960s, CTL was not further developed until the recent decade. Findings from this

study extended the former work of CTL, which was conducted mainly within the organizational or managerial contexts. Results indicated a significant interaction between CTL and PIN on behavioral intentions within the Chinese sample. As predicted, the PIN-behavioral intention was stronger among those who perceive their societal/national culture as tighter compared to those who perceived their societal/national culture as looser. In addition, it showed that except for the interaction effect, CTL did not have a main effect on behavioral intentions in either national sample. Consistent with previous research on CTL (e.g., Gelfand et al., 2011; Harrington & Gelfand, 2014), it was found that Chinese participants perceived their culture as significantly tighter relative to the sample from the U.S. These findings together provided empirical evidence that CTL can facilitate the effect of PIN on individuals' behavioral intentions of enacting a focal behavior, which also emphasized the importance of a society's cultural norms and cultural climate in promoting pro-social behaviors. An appreciation of cultural factors such as CTL and HC/LC tendency is of great value in designing social norm based communication messages.

The findings from this study, aligned with previous research results, provide several implications for theory advancement and practical utility for injunctive norms-based intervention programs and campaign design within a cross-cultural context. Previous research testing theories of social norms has often been conducted in North America (e.g., Goldstein et al., 2007; Park & Smith, 2007; Schultz et al., 2007) or European countries (Harland, Staats, & Wilke, 1999; Heinrichs et al., 2006). Even though several studies (e.g., Lapinski, et al., 2007, 2015) have investigated the cultural mechanism in normative influence, neither of them had samples from different national cultures. By extending the scope of a prior study (Liu & Lapinski, 2017), this research included an experimental design combined with nationally representative samples from

two countries with an attempt to contribute to our understanding of the ways in which norms function and can help to move theories forward in this realm.

The study context also holds important practical implications. With millions of people across the world struggling with food insecurity, and millions of tons of eatable food being thrown in the garbage at the same time, food waste is increasingly being viewed as a serious environmental and economic issue. The results from this study show a promising communication solution in persuading people to reduce their food waste, in order to solve the problem from its root. Besides, with an increased popularity of social media, the results indicate the possibility and effectiveness of using social media as a channel to deliver normative messages against wasting food. Finally, as a problem that exists globally, it is important to understand how to design culturally appropriate messages to persuade audience with different cultural traditions and values to stop wasting food, and the results from this study provide important implications in this regard.

Despite the merits of the current study, it is not without limitations. One of them is the focal topic in this study, food waste prevention. Given the serious issue of global food shortage, wasting food has been considered as socially unaccepted worldwide. As shown in the results of existing attitudes towards food waste, there was a very clear pattern of favorable attitudes towards reducing food waste, which may contribute to a stronger PIN and the subsequent behavioral intentions of saving food compared to using another controversial topic. Future research with a different focal topic is needed. In addition, there are limitations of employing the single shot message experimental design. One potential issue is a limited ability to detect the long-term effect of the persuasive messages given the focal topic is reducing food waste, which

requires individuals' persistence across a long period of time. Longitudinal research designs in testing the long-term effects of normative messages are an important area of future research.

CHAPTER 5: CONCLUSION

The current study examined the cultural mechanisms underlying the influence of injunctive norms with samples from the U.S. and China respectively. Specifically, it explored how perceived injunctive norms would influence the behavioral intentions of preventing food waste among participants from the two countries, and how cultural tightness-looseness could influence their susceptibility to normative impact. The results showed that injunctive normative message inductions have mediated effects on behavioral intentions to prevent food waste. HC/LC cultural tendency moderated the relationship between norm message types and PIN, such that explicit messaging on social sanctions would increase perceived salience of injunctive norms only among those with a lower-context communication tendency, such as the American participants in this study. Chinese participants perceived the same level of injunctive norms across the two strong injunctive norm conditions. A different topic that involves less established social norms could be employed to replicate the results from the current study. Finally, a moderation effect of CTL on the PIN-behavioral intentions relationship was found in the Chinese sample, such that individuals who perceive their culture as tighter would be more susceptible to the injunctive normative influence. The implications from these findings can be of great value to the future norm-based interventions or campaigns in which cultural factors, such as CTL and HC/LC tendency of the target audience, should be taken into consideration. Otherwise, there is a possibility that a successful social norm campaign implemented in one culture could turn out to be a complete failure in another context with another group if the researchers or campaign designers neglect the relevant cultural factors described in this study

APPENDICES

APPENDIX A

Research Participant Information and Consent Form

You are being asked to participate in a research project. Researchers are required to provide a consent form to tell you about the study, to let you know that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Social Norms and Behaviors
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1. PURPOSE OF RESEARCH:

You are being asked to participate in a research study of people's food waste reduction behavioral patterns. From this study, the researchers hope to learn how various situations influence your behavioral intention. Your participation in this study will take about 20 to 30 minutes. You must be 18 years old or older to participate in this study.

2. WHAT YOU WILL DO:

You will be given survey questions to answer. You will be asked to indicate the extent to which you agree or disagree with each of the questions.

3. POTENTIAL BENEFITS:

While this study is not expected to yield any immediate direct to the individual participants, the knowledge generated from this project will add to the body of Communication research findings and is hoped to increase the understanding of communication processes in general.

4. POTENTIAL RISKS:

There are no foreseeable risks associated with participation in this study.

5. PRIVACY AND CONFIDENTIALITY:

The data for this project will be kept confidential and the data we collect will not be associated with your name in any way. Any information that could potentially identify you will be removed from the survey, and any information published will refer to only aggregated information or be presented in a way that preserves your anonymity. Your individual privacy will be maintained in all published and written data resulting from the study. Information about you will be kept confidential to the maximum extent allowable. Data will be stored on a password-protected computer, or in a locked file cabinet,

under control of the study researchers. This information will be kept for at least three years.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW

Participation in this research project is completely voluntary. You have the right to withdraw your consent or stop participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to refuse to answer particular questions. You will be told of any significant findings that develop during the course of the study that may influence your willingness to continue to participate in the research.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY:

You will receive monetary compensation from participating this study.

8. CONTACT INFORMATION FOR QUESTIONS AND CONCERNS

If you have any 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 research study, you may contact, anonymously if you wish, Michigan State University Human Research Protection Program at 517-355-2180, FAX 517-432-4503, or e-mail irb@msu.edu, or regular mail at: 207 Olds Hall, MSU, East Lansing, MI 48824.

9. DOCUMENTATION OF INFORMED CONSENT.

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

研究参与者知情同意书

我们真诚邀请您参与一项研究课题。本研究现向您提供一份知情同意书向您告知本课题的相关信息、自愿参与原则、参与利弊等信息以确保您在知情的前提下做出是否参与的决定。如有任何疑问敬请询问研究人员。

研究题目社会规范和行为

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9. 知情与同意证明

开始进行调查问卷即表明您已接受并同意参与本次研究课题并同意将您的回答纳入到数据统计中。

APPENDIX B

Pre-Experiment Measurement Scales

Cultural Tightness-Looseness (Gelfand et al., 2011)

文化的松弛-紧绷度

1. There are many social norms that people are supposed to abide by in the U.S.

   在中国有许多大家都应该遵守的约定俗成的社会规范。

2. In the U.S., there are very clear expectations for how people should act in most situations.

   在中国大多数情况下人们对于应该如何行事有着明确的标准。

3. People agree upon what behaviors are appropriate versus inappropriate in most situations in the U.S.

   在中国人们对于大多数情况下什么行为是恰当的什么行为是不恰当的有着一致的想法。

4. People in the U.S. have a great deal of freedom in deciding how they want to behave in most situations. (Reverse coded – excluded from the analysis)

   在大多数情况下 中国人在决定自己想怎么做时有很大的自由空间。

5. In the U.S., if someone acts in an inappropriate way, others will strongly disapprove.

   在中国如果有人行为不当其他人会强烈反对。

6. People in the U.S. almost always comply with social norms.

   中国人通常都会遵守约定俗成的社会规范。

HC/LC Culture (adapted from Ohashi, 2000)

高语境/低语境文化

1. Listeners should be able to understand what a speaker is trying to express, even when the speaker does not say everything they intend to communicate.

   即使是当说话者没有说出他们想要表达的一切内容听众也应该能够理解说话者想要表达的信息。

2. A listener should understand the intent of the speaker from the way the person talks.

   听众应该从其说话的方式去理解说话者的意图。

3. Even if not stated exactly, a speaker's intent will rarely be misunderstood.

即使是没有明确地说明说话者的意图也很少会被人误解。

4. People should be able to understand the meaning of a statement by reading between the lines.

   人们应该能够透过字里行间来了解一段陈述想要表达的真正意思。

5. Intentions not explicitly stated can often be inferred from the context.

   未明确说明的意图通常可以从上下文推断而得知。

6. A speaker can assume that listeners will know what they really mean.

   说话者可以很自然地认为听众能够明白他们真正想要表达的意思。

7. People understand many things that are left unsaid.

   人们能理解许多未被说出口的事情。

Existing Food Waste Prevention Behaviors (developed based on Lapinski et al., 2007)
(Always, Very Often, Sometimes, Rarely, Never)
现有的制止食物浪费的行为 总是/一直 经常有时很少从来没有

1. I prepare the right amount food when cooking meals to avoid unnecessary waste.

   我在做饭的时候会准备适量的食物以此来避免不必要的浪费。

2. I check my food storage to make a shopping list when I need to buy food.

   当需要购买食物的时候我会先检查现有的食物储备情况然后做一个购物清单。

3. I only order as much food as I can eat when eating outside.

   在外面吃饭的时候我能吃多少点多少。

4. I do meal planning to reduce unnecessary food waste.

   我会有计划地准备自己的膳食以此来减少不必要的食物浪费。

5. I take leftovers home when eating out.

   在外面吃饭的时候我会把没吃完的食物打包回家。

6. I take ways to preserve the food for a longer time.

   我会采取各种方法来让食物保存地更久一些从而减少浪费。

Attitudes Towards Food Waste Prevention (developed based on Lapinski et al., 2007)

对制止食物浪费的态度

1. I think reducing food waste is a good idea.

   我认为减少食物浪费是一个好的想法。

2. I feel strongly preventing food waste is important.

   我强烈地感到制止食物浪费非常重要。

3. I believe it is critical to prevent wasting food when there are so many hungry people in the world.

   我相信制止食物浪费是件至关重要的事情因为当今世界上还有很多人正在忍饥挨饿。

4. It is important that we take steps to prevent food waste.

   我们大家采取实际行动来制止食物浪费是非常重要的。

5. I think it is important to not waste food.

   我认为不浪费食物是很重要的。

APPENDIX C

Experiment Scripts and Procedures

实验正文及程序

Hello,
We are social media specialists working for ***Save Food Initiative***, an international non-governmental organization (NGO) devoted to reducing food waste globally. Launched by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), Messe Düsseldorf and interpack (the world's most influential packaging and processing machinery professional exhibition) on January 27, 2011, SAVE FOOD aims to drive innovations, promote interdisciplinary dialogue and spark off debates in order to generate solutions, across the entire value chain "from field to fork," to combat food waste and eradicate hunger.

This study is being conducted in collaboration with Michigan State University (in the U.S.) or Chinese Communication University (in China) with the purpose to help improve the Initiative's social media activities of promoting food waste prevention in the U.S. (or China).

The following picture is a screenshot from one of our recent social media posts. Please read everything carefully in its entirety, as it contains information that we will ask you about in the following sections.

您好
我们是就职于 *Save Food Initiative 节约粮食倡议联盟*的社交媒体专员一个致力于减少全球粮食浪费的国际性非政府组织。创立于 2011 年 1 月 27 日"SAVE FOOD" 是由联合国粮农组织 FAO、联合国环境规划署 UNEP、杜塞尔多夫展览集团、interpack 全球最具影响力的包装和加工机械专业展会联合发起的全球倡议旨在推动创新促进跨学科对话引发讨论从而为 "从田间到餐桌" 的整个价值链建立相应的解决方案从而对抗全球粮食浪费消除饥饿。

本次研究是与美国密西根州立大学合作进行的旨在帮助改进我们倡议联盟在中国社交媒体中推广制止食物浪费的活动。
以下图片是我们最近一则社交媒体发帖的截图。**请您一定仔细阅读以下全部信息**因为其中包含了我们在接下来几个部分要向您提问的内容。

APPENDIX D

Post-Test Measurement Scales

Open-Ended Comment

If you saw this post on the social media website, what comment would you make?

如果在社交媒体网站上看到这篇帖子您会在底下发表什么评论呢

*Perceived Social Disapproval of Food Waste Behaviors (*adapted from Park and Smith, 2007)

1. I believe most people whose opinion I value would disapprove of my wasting food.
   我相信绝大多数那些我珍视他们意见的人都会反对我浪费食物。
2. I feel like most people who are important to me would not endorse my food wasting behavior.
   我觉得绝大对数对我来说重要的人都不会认可我浪费食物的行为。
3. Most people who are important to me would oppose me wasting food.
   绝大对数对我来说重要的人都会反对我浪费食物。
4. The majority of people around me would think it's unacceptable if I waste food.
   如果我浪费食物我身边大部分人都会认为是不能接受的行为。
5. Most People around me would disapprove my food waste behaviors.
   我身边绝大部分人都会反对我浪费食物的行为。
6. Most people in the United States disapprove of food wasting behaviors.
   绝大多数中国人都反对浪费食物的行为。
7. It is clear that many people in the United States believe that wasting food is an inappropriate thing to do.
   很明显许多中国人都相信浪费食物是不恰当的行为。
8. A majority of people in the United States oppose that individuals waste food.

大多数中国人都反对个人浪费食物。

9. I believe a majority of people in the United States do not tolerate food waste behaviors.
   我相信绝大多数中国人都不会容忍浪费食物的行为。
10. Most people in the United States regard food waste behavior as not acceptable.
    大部分中国人都认为浪费食物是不能接受的行为。

Perceived Social Sanctions of Food Waste Behaviors (developed based on Tittle, 1980)

1. I think people who are important of me would think less of me if I waste food.
   如果我浪费食物我觉得那些对我来说重要的人会瞧不起我。
2. I am worried about that people who are important to me may form a negative impression towards me if I waste food.
   我担心如果我浪费食物可能会给那些对我来说重要的人造成负面的印象。
3. I worry that if I waste food, people around me will be disappointed.
   我担心如果我浪费食物身边的人可能会对我很失望。
4. I am concerned that if I waste food, those who are close to me will judge me negatively.
   我担心如果我浪费食物周围亲近的人会对我有负面的评价。
5. I fear to be disliked by those who are important to me if they find I constantly waste food.
   我害怕如果那些对于我来说重要的人发现我经常浪费食物他们会讨厌我。
6. I fear to be rejected and abandoned if my food wasting behaviors were constantly discovered by those around me.
   我害怕如果我浪费食物的行为经常被身边的人发现他们会排斥甚至放弃我。

Behavioral Intent to Prevent Food Waste in the Future (developed based on Lapinski et al., 2007)

1. I intend to prepare the right amount of food when cooking meals to avoid unnecessary waste.
   我打算今后在做饭的时候准备适量的食物以此来避免不必要的浪费。

2. I have it in my mind to start checking my food storage to make a shopping list when I need to buy food.

   我打算今后在需要购买食物的时候我会先检查现有的食物储备情况然后做一个购物清单。

3. I will make sure I only order as much food as I can eat when eating outside.

   我会确保以后在外面吃饭的时候我能吃多少点多少。

4. I have it in my mind to start meal planning to reduce unnecessary food waste.

   我打算开始有计划地准备自己的膳食以此来减少不必要的食物浪费。

5. I will take leftovers home when eating out.

   以后在外面吃饭的时候我会把没吃完的食物打包回家。

6. I mean to take ways to preserve the food for a longer time.

   我打算采取一些方式来让食物保存地更久一些从而减少浪费。

Behavior:

We'd like to invite you to participate a 7-day no food waste challenge – Challenge yourself of not wasting any food in the following 7-days!

我们想邀请你参与一项 7 日杜绝食物浪费的挑战活动-挑战自己在之后的 7 天内不浪费任何食物

SIMPLE THINGS YOU NEED TO DO

您需要做的非常简单

- Try the best to reduce your food waste for the next 7 days

-尽量减少未来 7 天的食物浪费

- Keep a food waste diary to record how much food that you throw away for the next 7 days.

-用日记的形式记录下您在未来 7 天内扔掉的食物

This challenge is to help you to capture a snapshot of food waste patterns over a week. You will be amazed to find out how easy it is to save food in your daily life!

这个挑战旨在帮助您截取一张一周内食物浪费模式的“快照”。你会惊奇地发现在日常生活中节约粮食其实可以如此地容易

Remember, save food = save money = save our planet
请记住节约粮食 = 节省开支 = 拯救我们的地球

YOU CAN DO IT!
你能行

- Yes, I'd like to sign up for this 7 Day No Waste Challenge to help save food, save money and save our planet! -> Direct to the signup webpage https://raindissertation.wixsite.com/food-waste-challenge
- 好的我想要参与这次 7 日无食物浪费挑战来帮助节约粮食节省开支拯救我们的地球->自动弹开注册网站 https://raindissertation.wixsite.com/food-waste-challenge/7-day-no-food-waste-challenge-cn
- No, thanks.
- 不参加谢谢。

Perceived Source Credibility (McCroskey & Teven, 1999)

1. The person who wrote this message was very knowledgeable about this topic.
   这篇帖子的作者非常了解这个话题。
2. The person who wrote this message was very competent when writing about this topic.
   这篇帖子的作者非常有能力撰写这个话题。
3. The person who wrote this message is an expert in this area.
   这篇帖子的作者是这个领域的专家。
4. The person who wrote this message is qualified to write about this topic.
   这篇帖子的作者有资质撰写这个话题。
5. The person who wrote this message is honest when writing about this issue.
   这篇帖子的作者在撰写这个话题时是诚实的。
6. The person who wrote this message is fair when discussing this issue.
   这篇帖子的作者在讨论这个问题时是公正的。
7. The person who wrote this message is trustworthy when writing about this topic.
   这篇帖子的作者在撰写这个话题时是值得信赖的。
8. The person who wrote this message is biased when writing about this topic.
   这篇帖子的作者在撰写这个话题时持有偏见。(Excluded from analysis)

Believability of the Message (Beltramini, 1982)

The information you read about food waste prevention from the social media post was…

1.) Believable _ _ _ _ _ Unbelievable

2.) Trustworthy _ _ _ _ _ Untrustworthy

3.) Convincing _ _ _ _ _ Unconvincing

4.) Credible _ _ _ _ _ Not credible

5.) Reasonable _ _ _ _ _Unreasonable

6.) Honest _ _ _ _ _ Dishonest

7.) Unquestionable _ _ _ _ _ Questionable

信息的可信度

您在刚刚那篇社交媒体帖子中看到的关于制止食物浪费的信息是.....

1 可信的_ _ __ _ _ _不可信的

2 值得信赖的_ _ __ _ _ _不值得信赖的

3 有说服力的_ _ __ _ _ _没有说服力的

4 可靠的_ _ __ _ _ _不可靠的

5 合理的_ _ __ _ _ _不合理的

6 真诚的_ _ __ _ _ _不真诚的

7 毫无疑问的_ _ __ _ _ _可疑的

Demographics

Finally, we would like to know a few things about you.

最后,我们想知道您的一些基本情况。

1. Are you
_____ male
_____ female
_____ other (please explain) _____

1. 您的性别

a. 男性　　b. 女性　　c. 其他

如您选择了“c. 其他”请在下方横线处具体解释_____

2-A. How would you describe your ethnicity? (Check one) (For American participants)
_____ African-American
_____ Asian-American
_____ Caucasian-American
_____ Hispanic-American
_____ Native-American
_____ Pacific Islands-American
_____ Mixed (please explain) _____
_____ Other (please explain) _____

2-B. 您的民族是_____

3. How old are you?
_____

3. 您的年龄_____

4. Which one of the following best describes your current employment situation. Are you:
a) Working full-time
b) Working part-time
c) Working and going to school
d) School full-time
e) Homemaker
f) Serving in the Armed Forces
g) Disabled
h) Unemployed, laid off, looking for work
i) Retired
j) Other (please specify)

4. 以下哪一项最能描述您当前的就业情况。您是:
a) 全职工作
b) 兼职工作
c) 半工半读
d) 全日制在校学生
e) 家庭主妇
f) 在部队任职
g) 残疾人员
h) 失业下岗正在寻找工作
i) 已退休
j) 其他 (请具体解释)

5. In which industry are you currently employed? (for those who chose a-c in the previous question)

a. Forestry, fishing, hunting or agriculture
b. Mining; Utilities; Construction
c. Manufacturing; Wholesale trade; Retail trade
d. Transportation or warehousing; Information
e. Finance or insurance; Real estate or rental and leasing
f. Professional, scientific or technical services
g. Management of companies or enterprises
h. Admin, support, waste management or remediation
i. Educational services
j. Health care or social assistance
k. Arts, entertainment or recreation
l. Accommodation or food services
m. Full-time student
n. Other services (except public administration)
o. Other (please explain)

5. 您目前就职于哪个行业? (如果在之前一题中选择了 a-c)

a. 林业渔业或农业
b. 矿业公共设施如水电气等建筑施工
c. 制造业批发贸易零售业
d. 运输或仓储信息业
e. 财务或保险房地产或租赁业
f. 专业人员科学或技术服务
g. 公司或企业管理
h. 管理后勤废物管理或整治
i. 教育服务
j. 医疗保健或社会救助
k. 艺术娱乐或休闲
l. 住宿或食品服务
m. 全日制学生
n. 其他 (服务公共行政除外)
o. 其他 (请具体解释)

6. To get a picture of people's financial situations, we'd like to know the general range of incomes of all people participate this study. Thinking about your household's total annual income from ALL sources (including your job), what was your household's total annual income in 2016?

a. Less than $10,000
b. $10,000 - $19,999
c. $20,000 - $29,999

d. $30,000 - $39,999
e. $40,000 - $49,999
f. $50,000 - $59,999
g. $60,000 - $69,999
h. $70,000 - $79,999
i. $80,000 - $89,999
j. $90,000 - $99,999
k. $100,000 - $149,999
l. $150,000 - $199,999
m. $200,000 - $ 299,999
n. $300,000 - $ 399,999
o. $400,000 - $ 499,999
p. $500,000 - $ 599,999
q. $600,000 - $ 699,999
r. $700,000 - $ 799,999
s. $800,000 - $ 899,999
t. $900,000 - $ 999,999
u. More than $1,000,000

6. 我们希望了解一下这项研究所有参与者的大致收入范围。请考虑您家庭的**所有**经济来源包括您的工作收入 2016 年您全家全年总收入大概是多少?

少于 10,000 一万
10,000 一万 - 19,999
20,000 两万- 29,999
30,000 三万 - 39,999
40,000 四万 - 49,999
50,000 五万- 59,999
60,000 六万- 69,999
70,000 七万- 79,999
80,000 八万- 89,999
90,000 九万- 99,999
100,000 十万- 149,999
150,000 十五万- 199,999
200,000 二十万- 299,999
300,000 三十万 - 399,999
400,000 四十万- 499,999
500,000 五十万- 599,999
600,000 六十万- 699,999
700,000 七十万- 799,999
800,000 八十万- 899,999

900,000 九十万- 999,999
1,000,000 (一百万) 及以上

7. How many people are in your household? _____
7. 您家总共有几口人?_____

8. How many children do you have?
a. I don't have any children
b. 1
c. 2
d. 3
e. 4
f. 5
g. 6
h. 7
i. 8
j. 9
k. 10
l. More than 10

8. 您有几个孩子?
a. 我没有孩子
b. 1 个
c. 2 个
d. 3 个
e. 4 个
f. 5 个
g. 6 个
h. 7 个
i. 8 个
j. 9 个
k. 10 个
l. 10 个及以上

9. How many children are living with you in the same household?
a. 1
b. 2
c. 3
d. 4

e. 5
f. 6
g. 7
h. 8
i. 9
j. 10
k. More than 10

9. 现在有几个孩子跟您住在一起?

a. 1 个
b. 2 个
c. 3 个
d. 4 个
e. 5 个
f. 6 个
g. 7 个
h. 8 个
i. 9 个
j. 10 个
k. 10 个及以上

10. On average, how much money do you spend on food every month?

a. Less than $100
b. $100 - $199
c. $200 - $299
d. $300 - $399
e. $400 - $499
f. $500 - $599
g. $600 - $699
h. $700 - $799
i. $800 - $899
j. $900 - $999
k. $1000 - $1499
l. $1500 - $1999
m. $2000- $2499
n. $2500-$2999
o. More than $3000 (please specify the estimate amount) _____

10. 平均来说您每个月花多少钱在食物上?

a. 少于 100 块
b. 100 - 199

c. 200 - 299
d. 300 - 399
e. 400 - 499
f. 500 - 599
g. 600 - 699
h. 700 - 799
i. 800 - 899
j. 900 - 999
k. 1000 - 1499
l. 1500 - 1999
m. 2000- 2499
n. 2500-2999
o. 超过 3000 (请写出大概金额) _____

11. This food cost is for _____
    a. myself only
    b. 2 people
    c. 3 people
    d. 4 people
    e. 5 people
    f. 6 people
    g. 7 people
    h. 8 people
    i. 9 people
    j. 10 people or more

11. 这个食物开销用于_____
    a. 只有我自己
    b. 2 人
    c. 3 人
    d. 4 人
    e. 5 人
    f. 6 人
    g. 7 人
    h. 8 人
    i. 9 人
    j. 10 人 及以上

12. What is the highest degree or level of school you have completed? If currently enrolled, choose the highest degree received.

a. No schooling completed
b. Nursery school to 8th grade
c. Some high school, no diploma
d. High school graduate, diploma or the equivalent
e. Some college credit, no degree
f. Trade/technical/vocational training
g. Associate degree
h. Bachelor's degree
i. Master's degree
j. Professional degree
k. Doctorate degree

12.您的最高学历是什么? 如果是在校学生请选择已获得的最高学位。

a. 从未上过学
b. 小学
c. 初中
d. 中专
e. 高中
f. 技校/职业高中
g. 大专
h. 本科
i. 硕士
j. 博士

13. Where is your current residence?

State (Province) _____

City _____

13. 您目前的居住地是?

_____省

_____市

This is the end of this survey. Thank you for your participation!

调查问卷已完成,衷心感谢您的耐心配合

Debriefing Procedure

You have participated an experiment about the effects of social norms on the changes of behavioral intention. During the course of the experiment, you were shown a post from a social media website advocating reducing food waste, as well as a request to participate a week long no food waste challenge. In fact, the name of the organization and all the messages were only created for the purpose of this study. We were interested in how normative information could influence people's actions. As a matter of fact, you do not need to participate the challenge activity even if you have indicated your intention of joining in. But we do encourage all kinds of food waste reduction behaviors in your daily life. If you have any questions toward your participation in this study, please contact Dr. Lapinski (lapinsk3@msu.edu) or Rain Liu (liuwuyu@msu.edu) for further information. Thanks for your participation.

实验概述

您刚刚参与了我们的一项实验目的是要考察社会规范对行为意图变化的影响。在实验过程中您阅读了一篇倡议减少食物浪费的社交网络帖子并且被邀请参与一个 7 日杜绝食物浪费的挑战活动。实际上, 该组织的名字以及全部的信息都是专门为这一研究目的而拟定的。我们感兴趣的是规范性信息是怎样影响人们的行为意图的。所以即使您已经表示有意加入该挑战您并不需要进行实际上的参与。但是我们依旧鼓励您在日常生活中采取各种方式来减少事物的浪费。如果您对参与本研究还有任何疑问请联系 Dr. Lapinski (lapinsk3@msu.edu) 或者刘梧雨 (liuwuyu@msu.edu)以作进一步了解。非常感谢您的参与。

APPENDIX E

Figures

Figure 1. Control with message only condition (English).

Figure 2. Control with message only condition (Chinese).

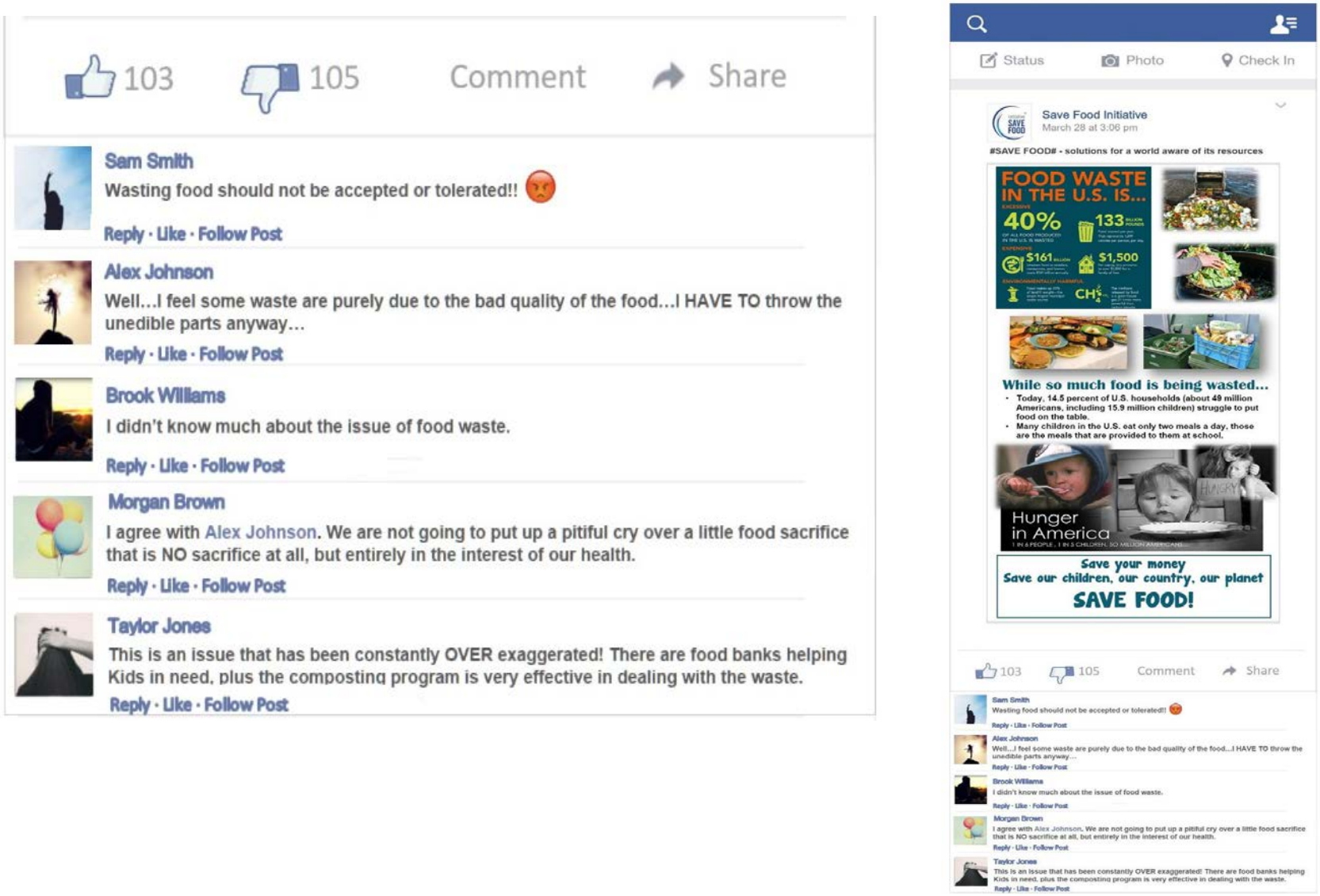

Figure 3. Weak disapproval condition (English).

Figure 4. Weak disapproval condition (Chinese).

Figure 5. Strong disapproval condition (English).

Figure 6. Strong disapproval condition (Chinese).

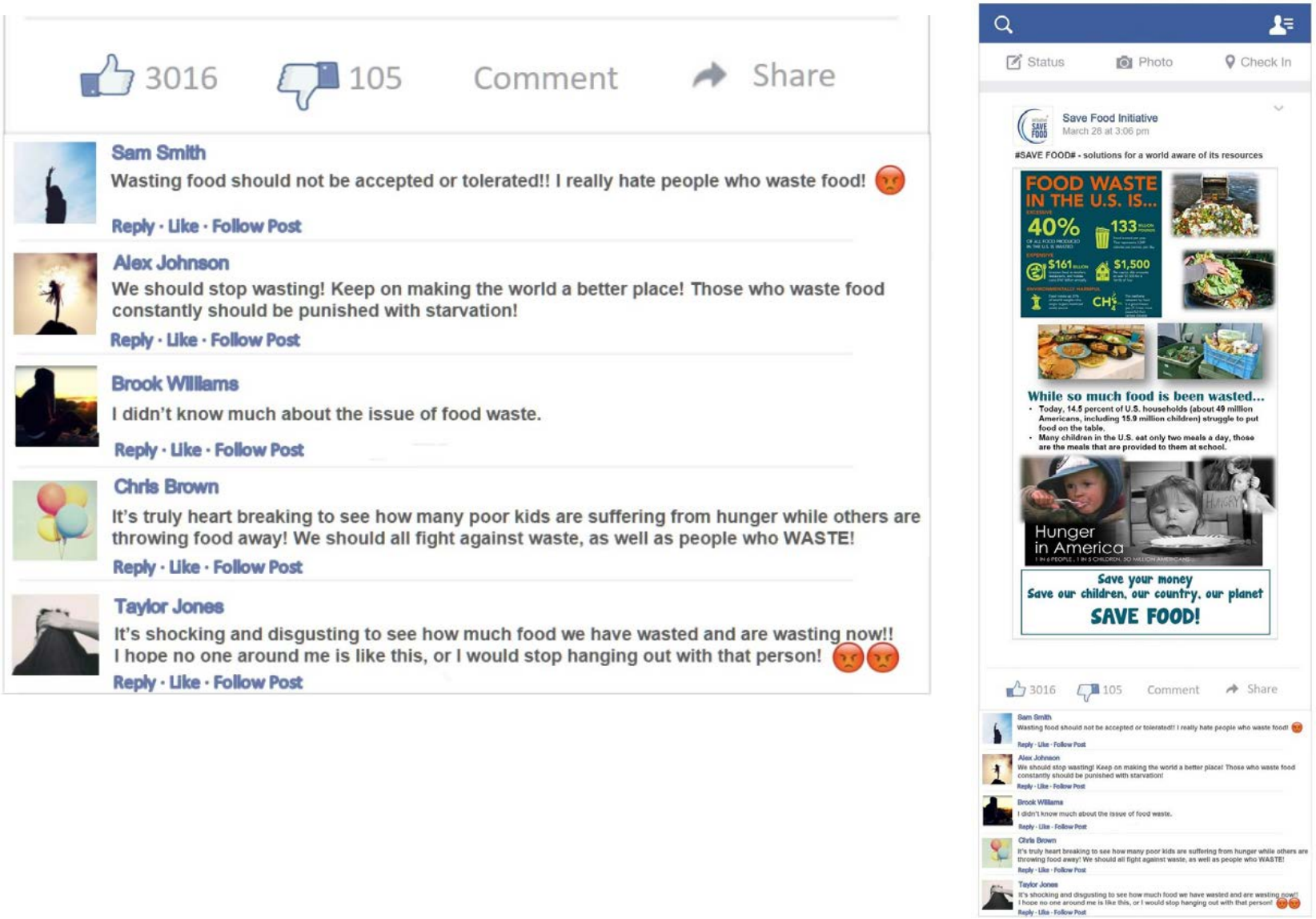

Figure 7. Strong disapproval with sanction condition (English).

Figure 8. Strong disapproval with sanction condition (Chinese).

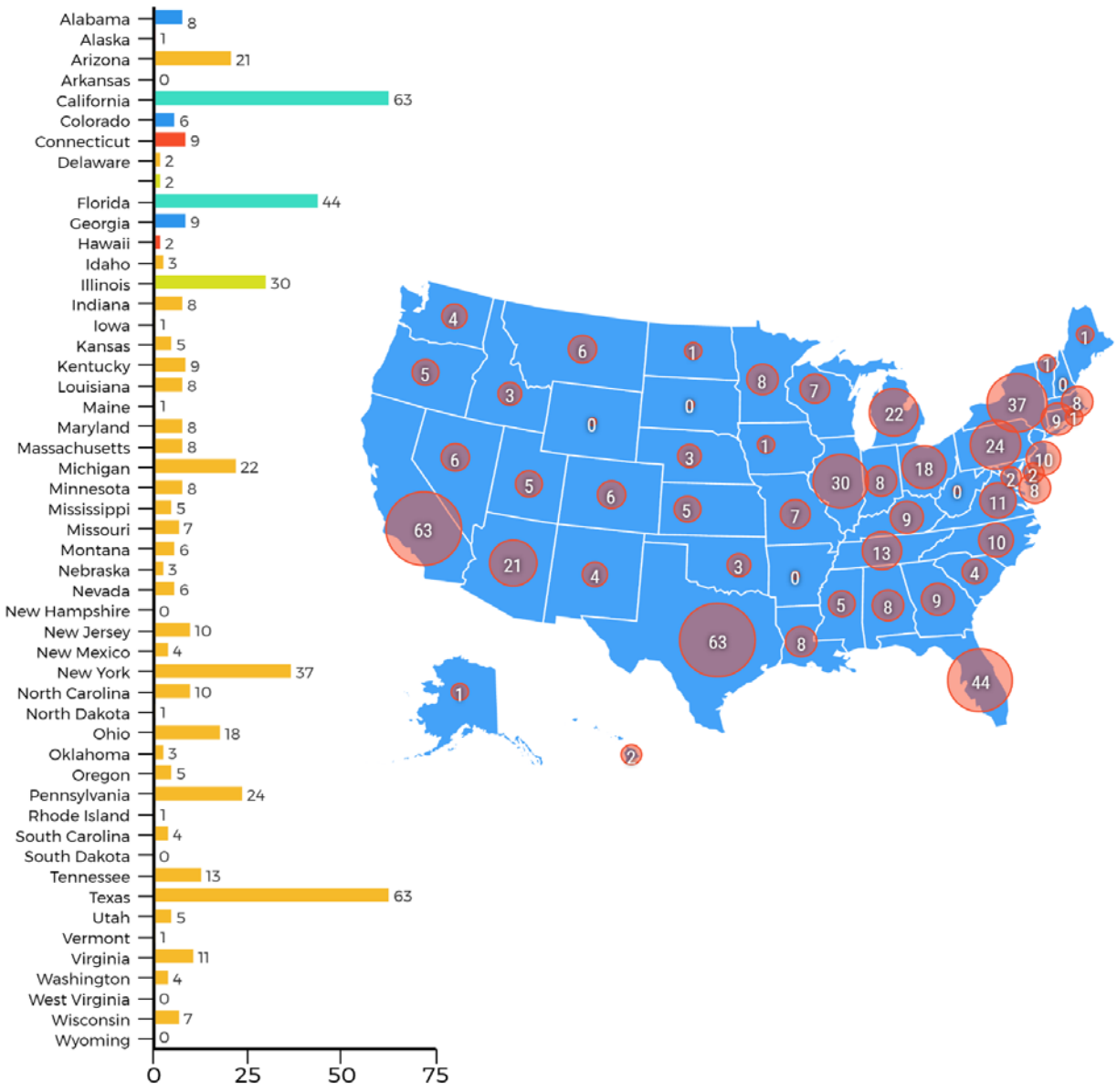

Figure 9. The number of data collected from each state in the U.S. sample.

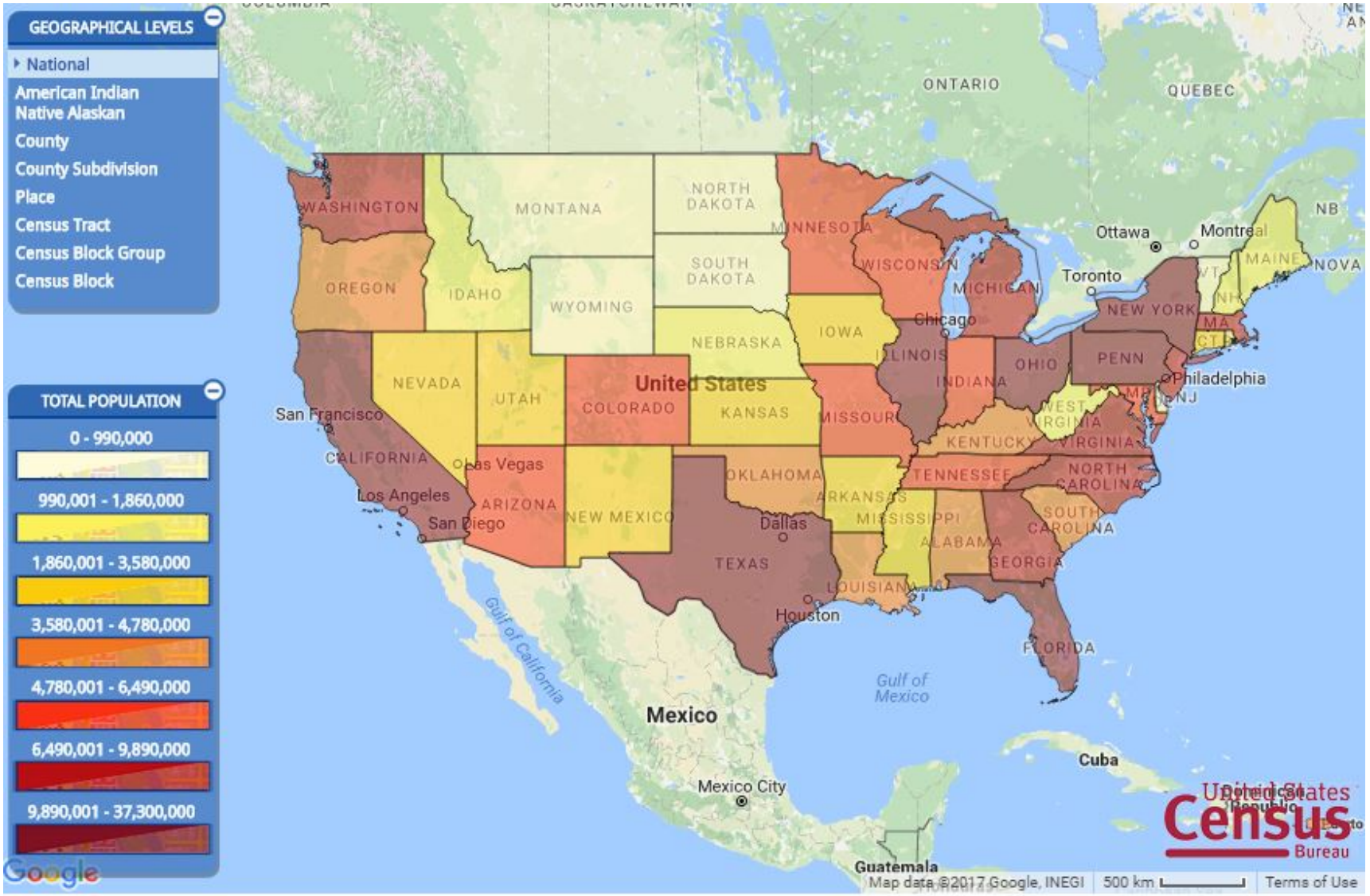

Figure 10. Population density of the U.S. based on 2010 census data by U.S. Census Bureau (2010).

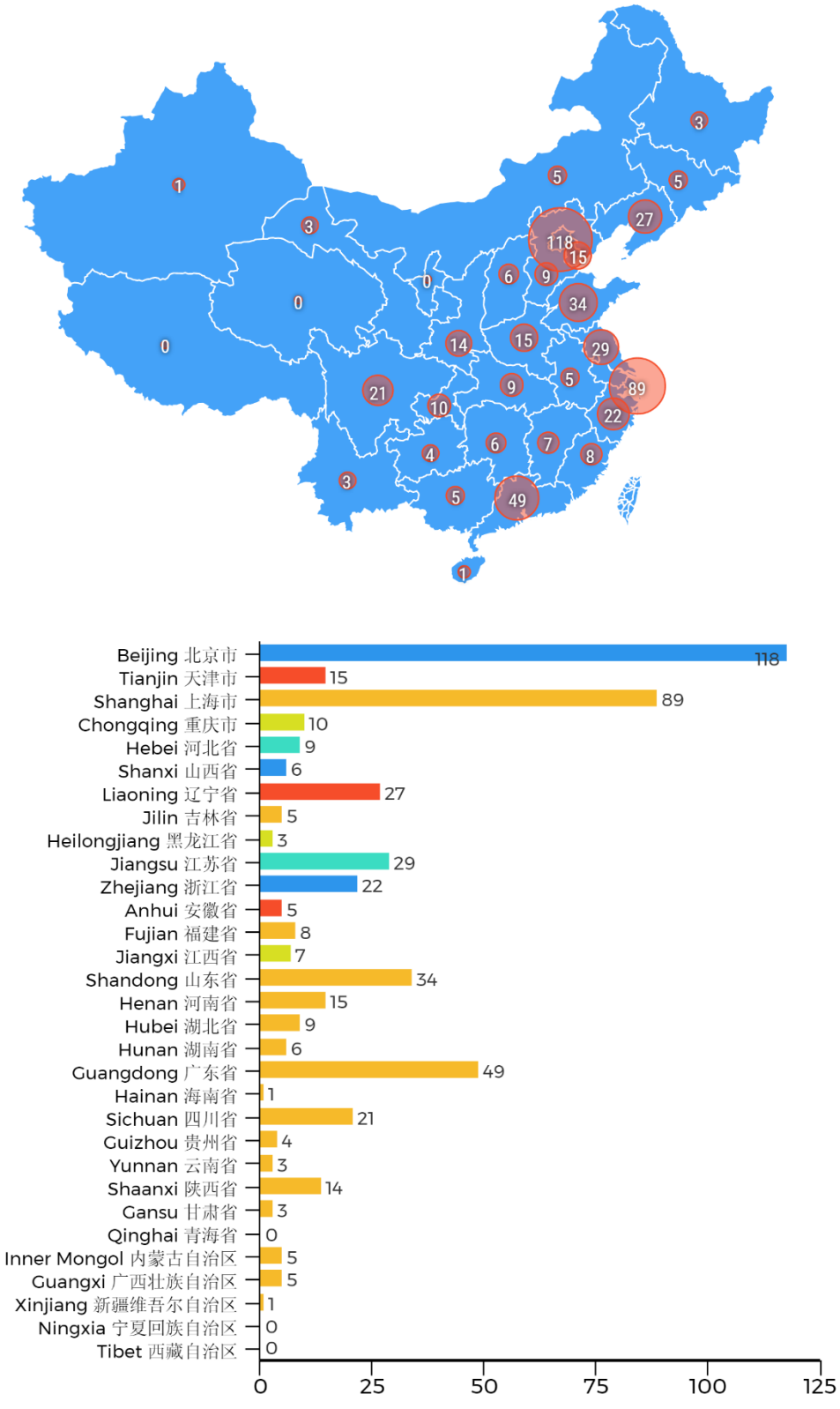

Figure 11. The number of data collected from each province in the China sample.

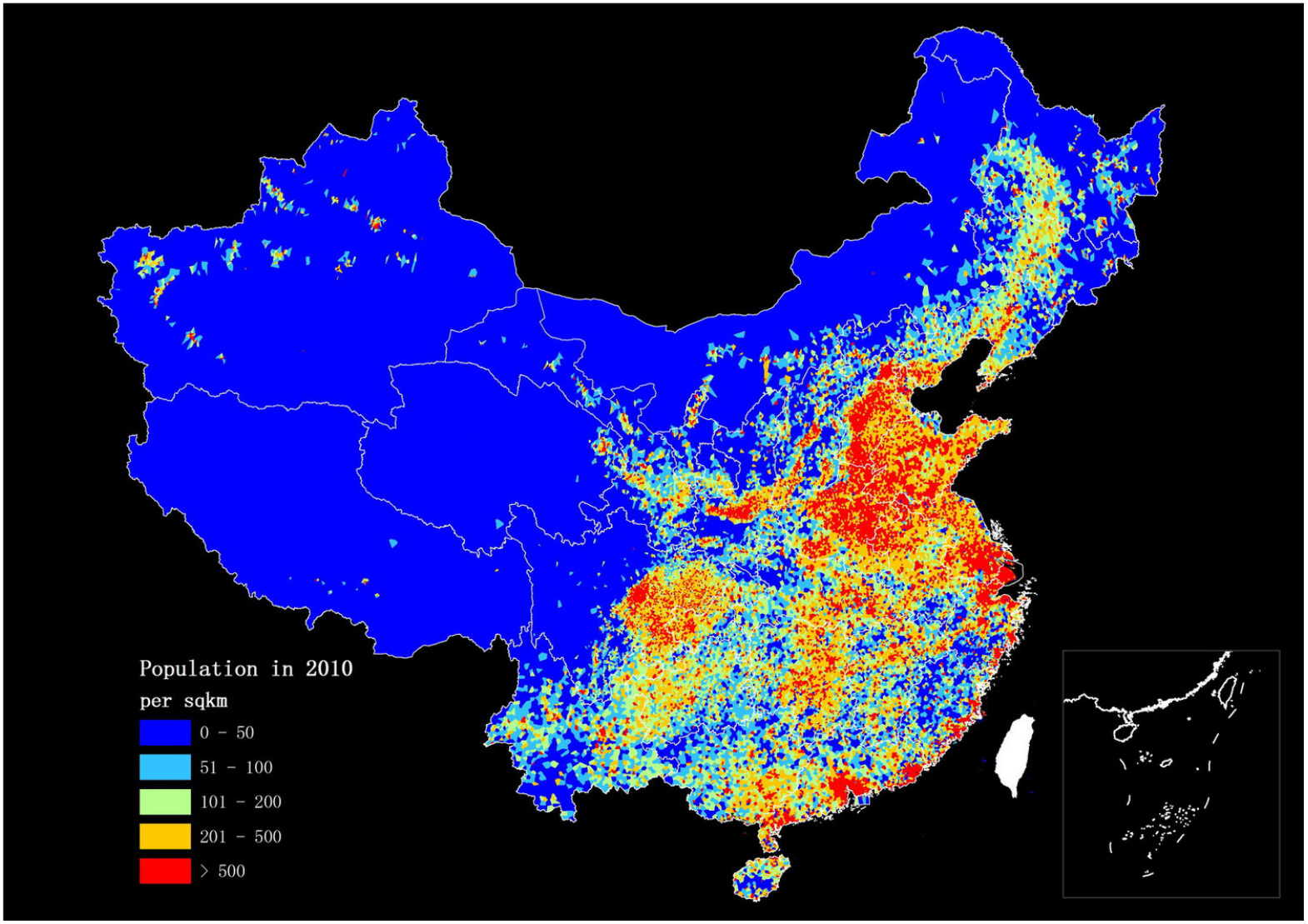

Figure 12. Population density map of China based on 2010 census data by Long, Wu, and Wang (2014).

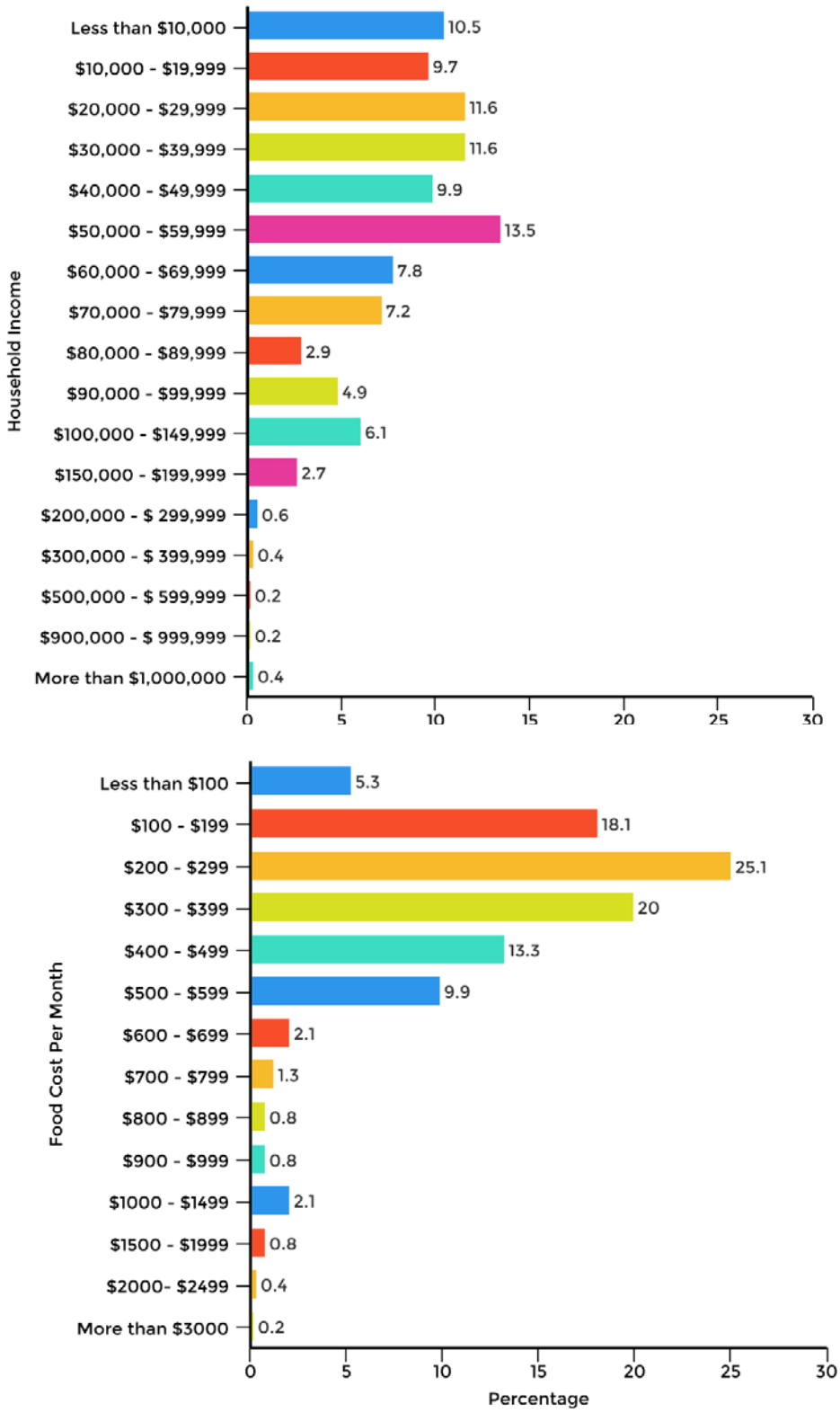

Figure 13. Household income in 2016 and the average cost on food per month (U.S. sample).

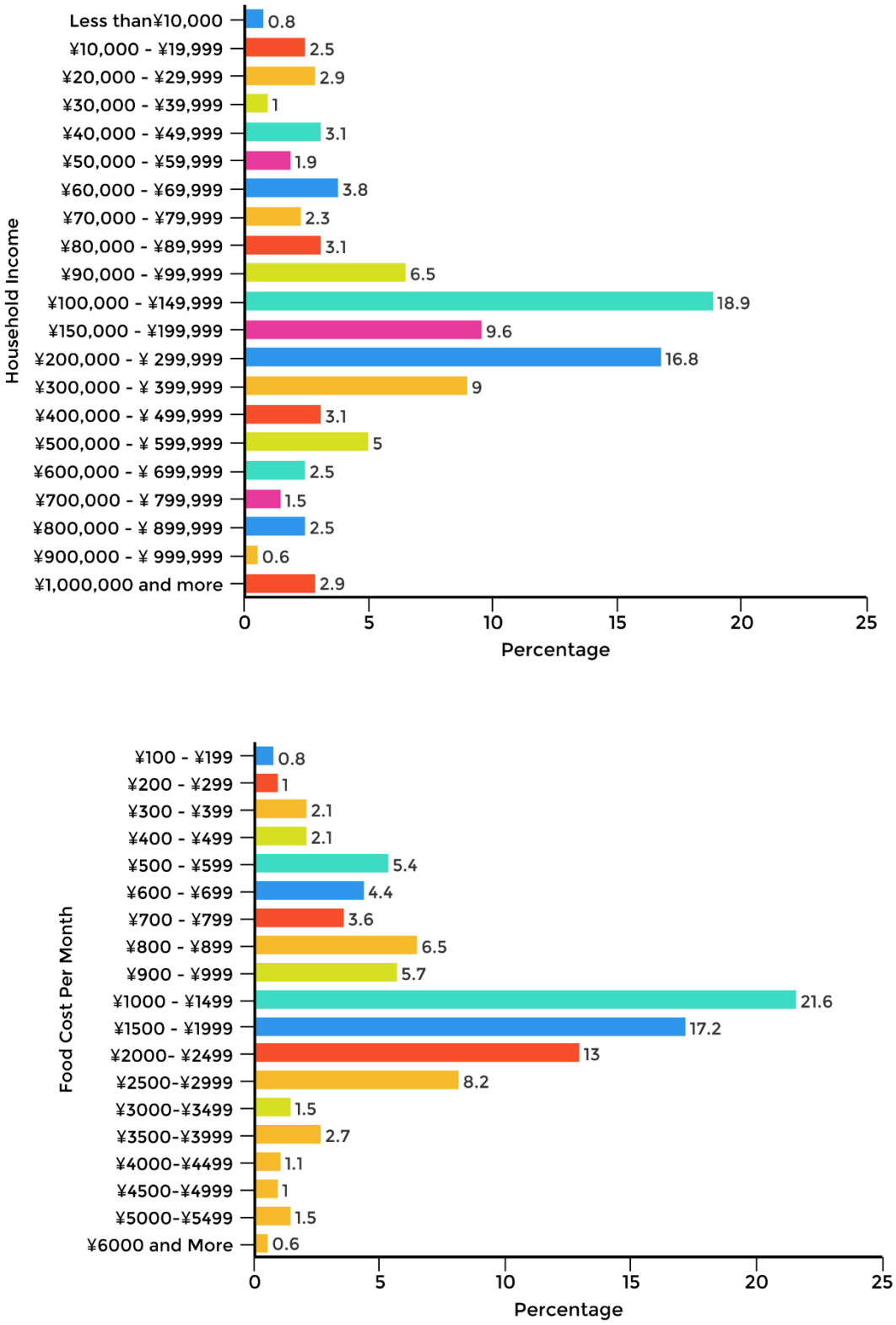

Figure 14. Household income in 2016 and the average cost on food per month (China sample).

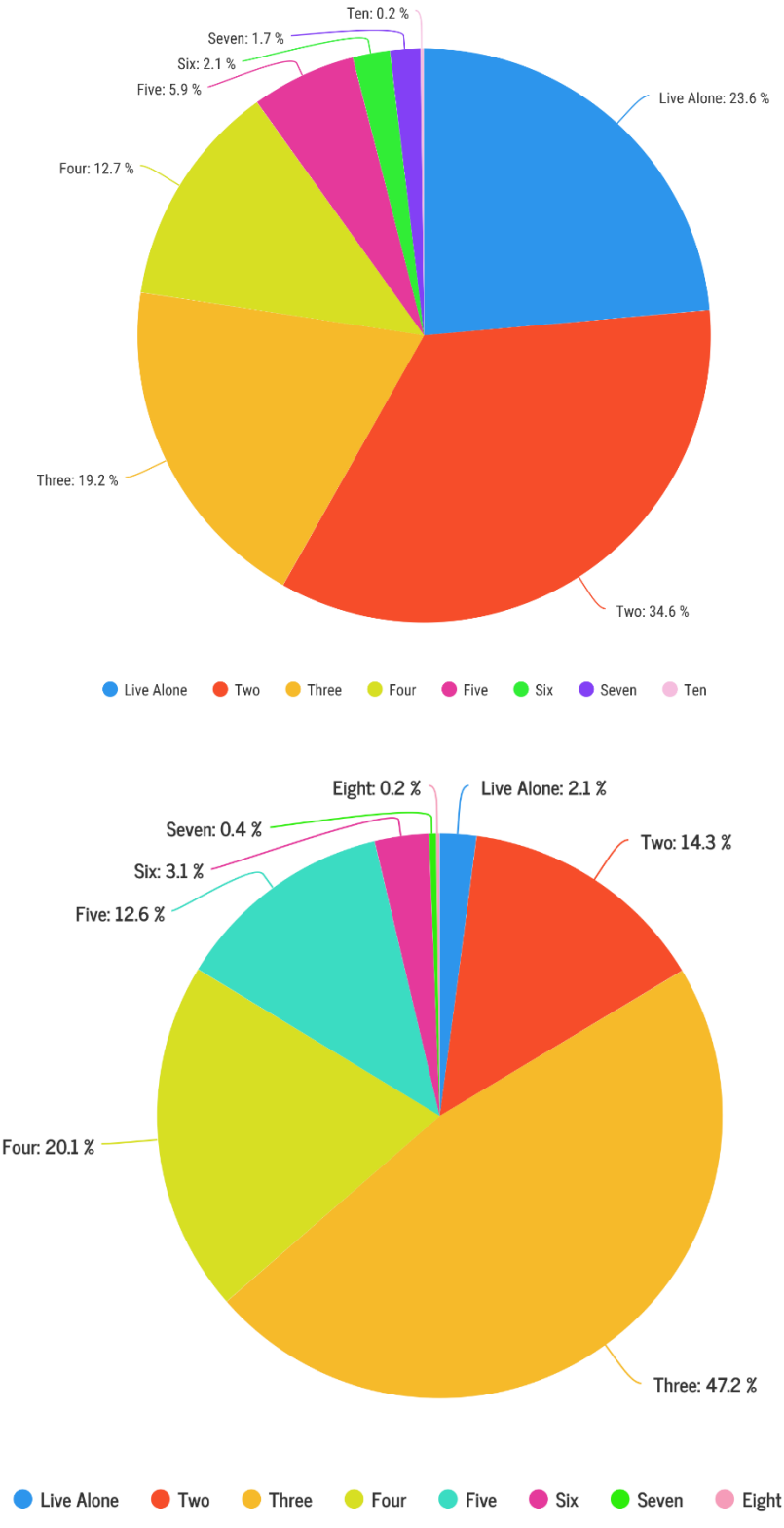

Figure 15. The size of the household (up: U.S. sample; below: China sample).

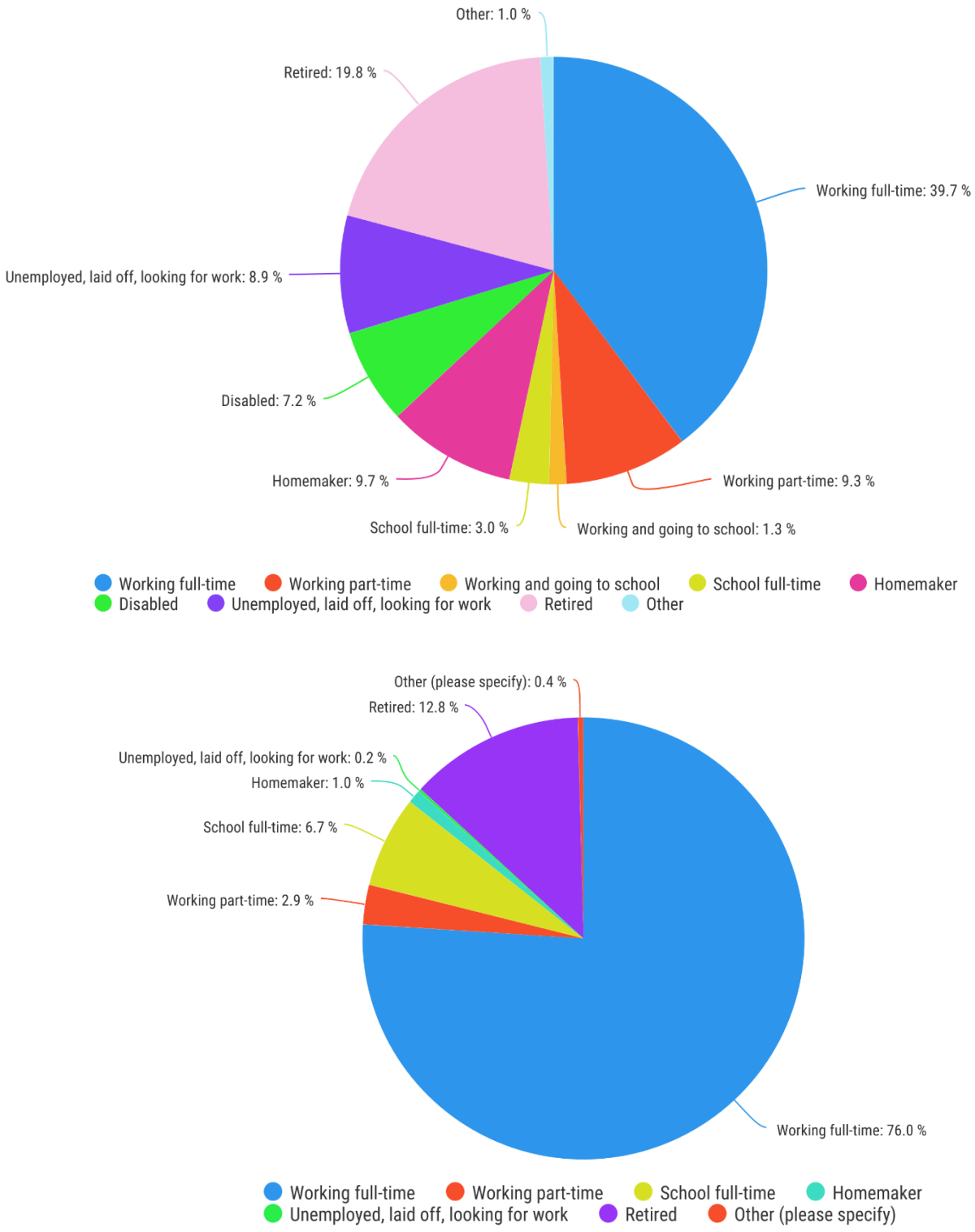

Figure 16. The employment status among the participants (up: U.S. sample; below: China sample).

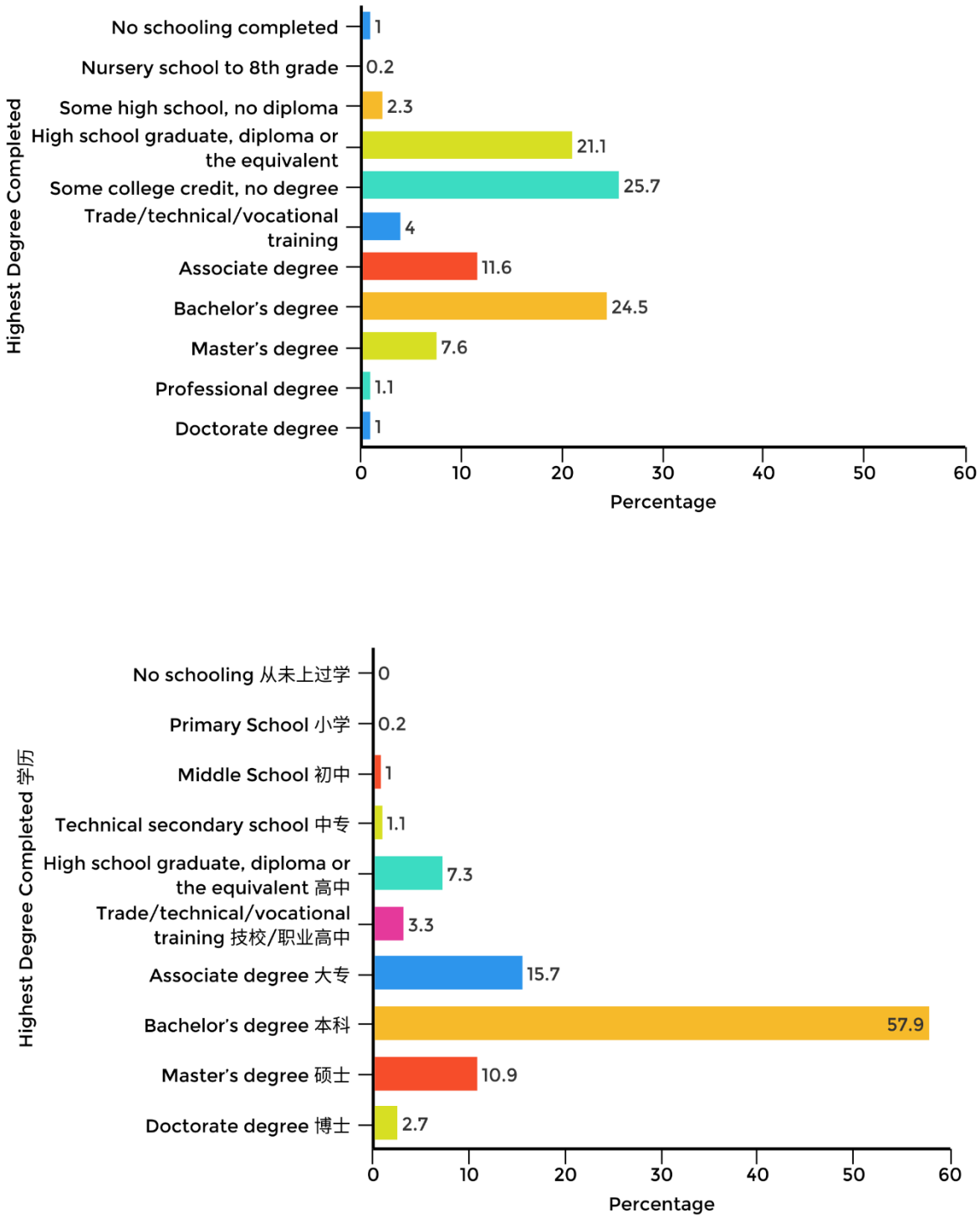

Figure 17. Highest degree completed among the participants (up: U.S. sample; below: China sample).

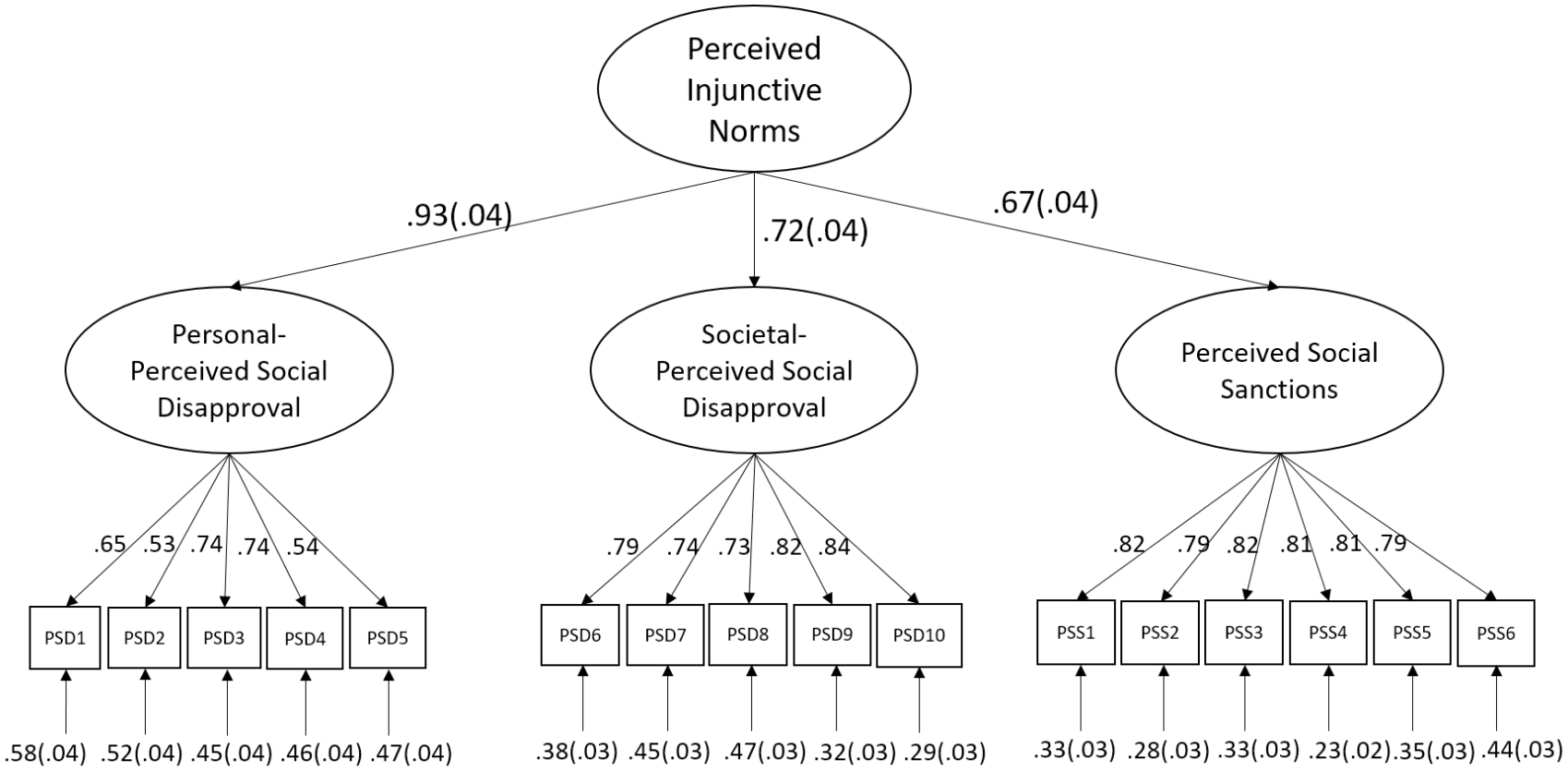

Figure 18. Second-order confirmatory factor analysis for the perceived injunctive norms in the U.S. sample (N = 526). All factor loadings are standardized and are statistically significant.

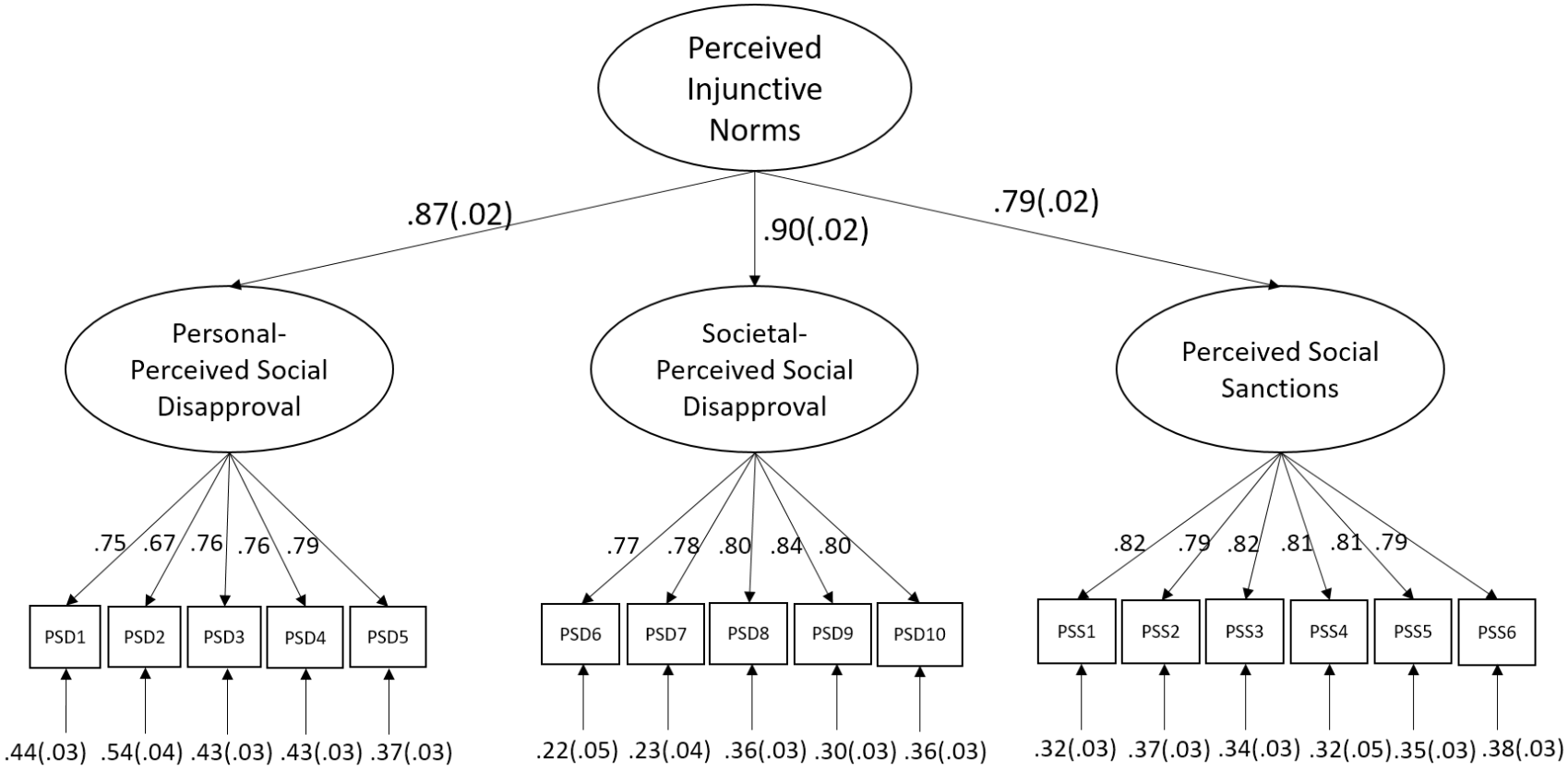

Figure 19. Second-order confirmatory factor analysis for the perceived injunctive norms in the China sample (N = 523). All factor loadings are standardized and are statistically significant.

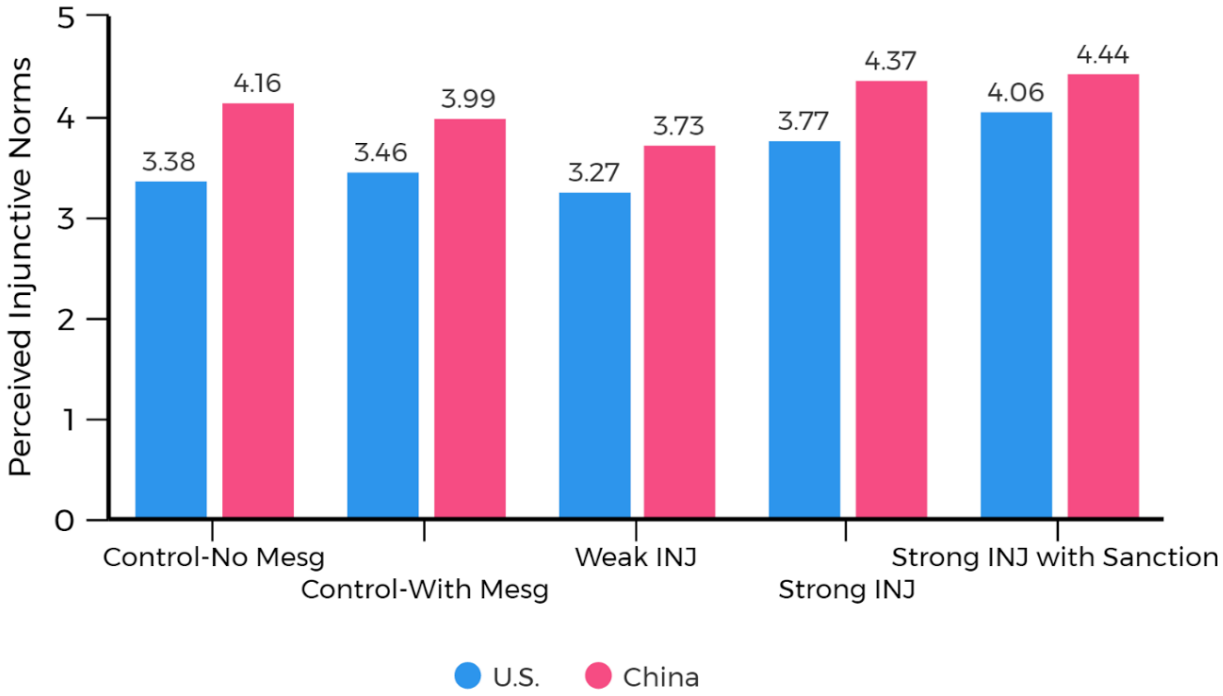

Figure 20. Manipulation checks for perceived injunctive norms as a function of the message inductions in both samples.

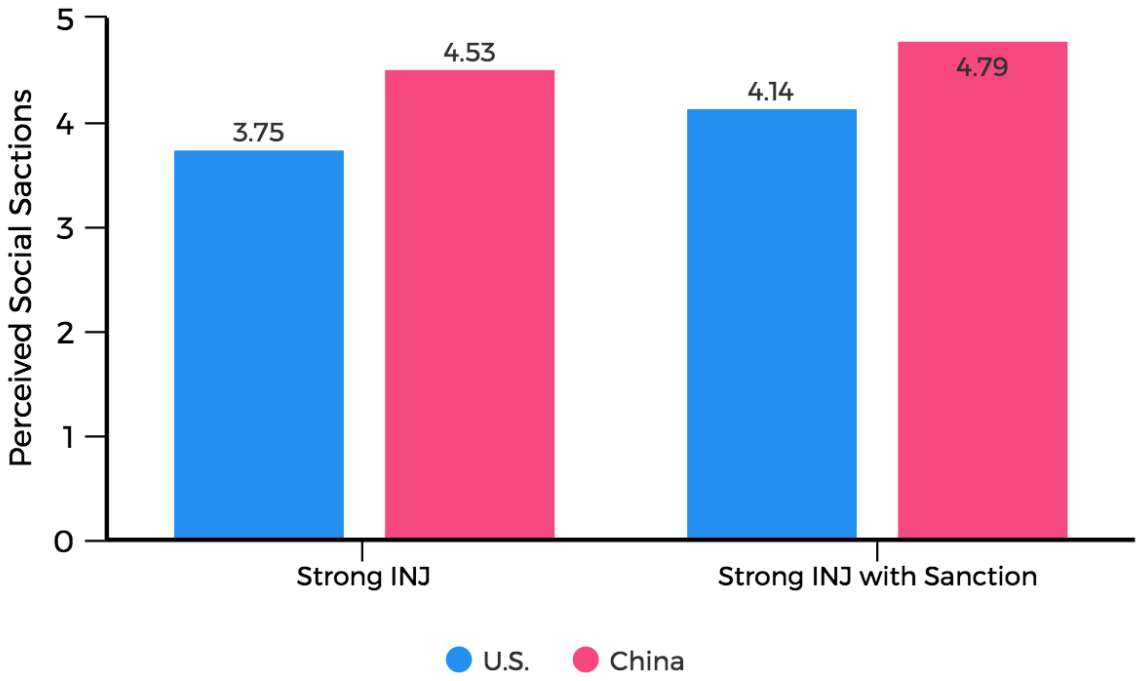

Figure 21. Manipulation checks for perceived social sanctions as a function of the message inductions in both samples.

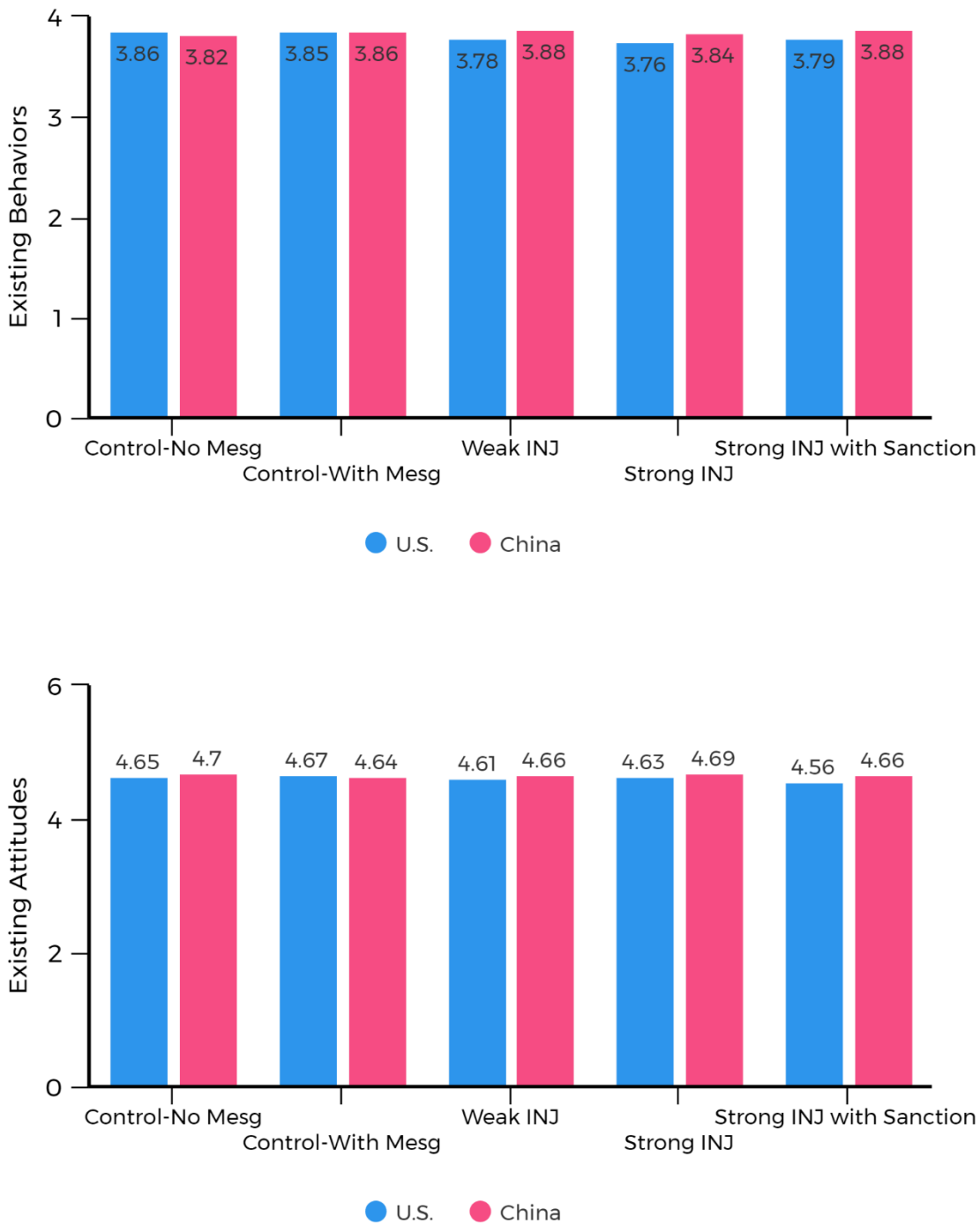

Figure 22. Existing attitudes and behaviors in both samples across the five conditions.

US

China

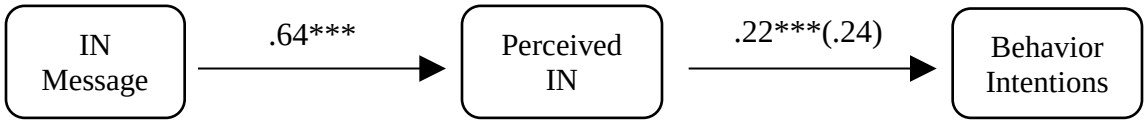

Figure 23. Causal models illustrating the mediated effects of injunctive normative message on behavioral intentions through perceived injunctive norms in the U.S. and China sample. (Path coefficients corrected for measurement error in parentheses; ****p* < .001.). (H1)

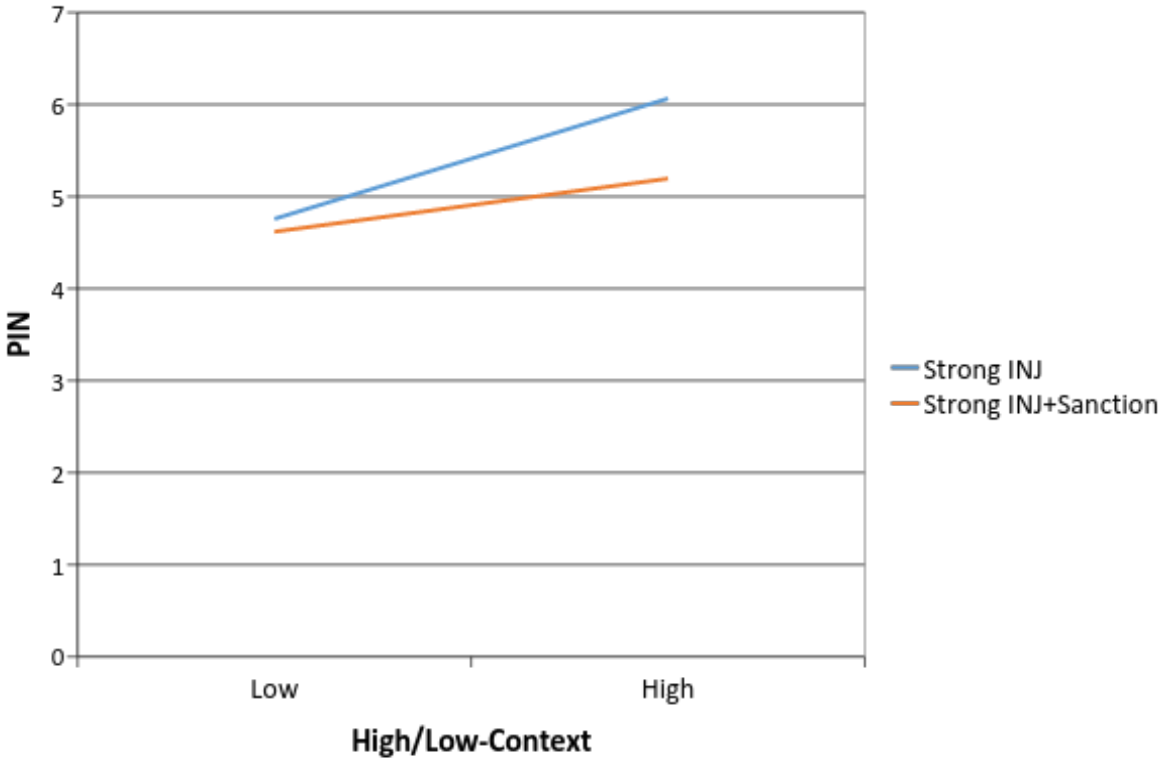

Figure 24. Moderation effect of high/low-context culture on the relationship between injunctive norm messages and perceived injunctive norms (PIN). (RQ1)

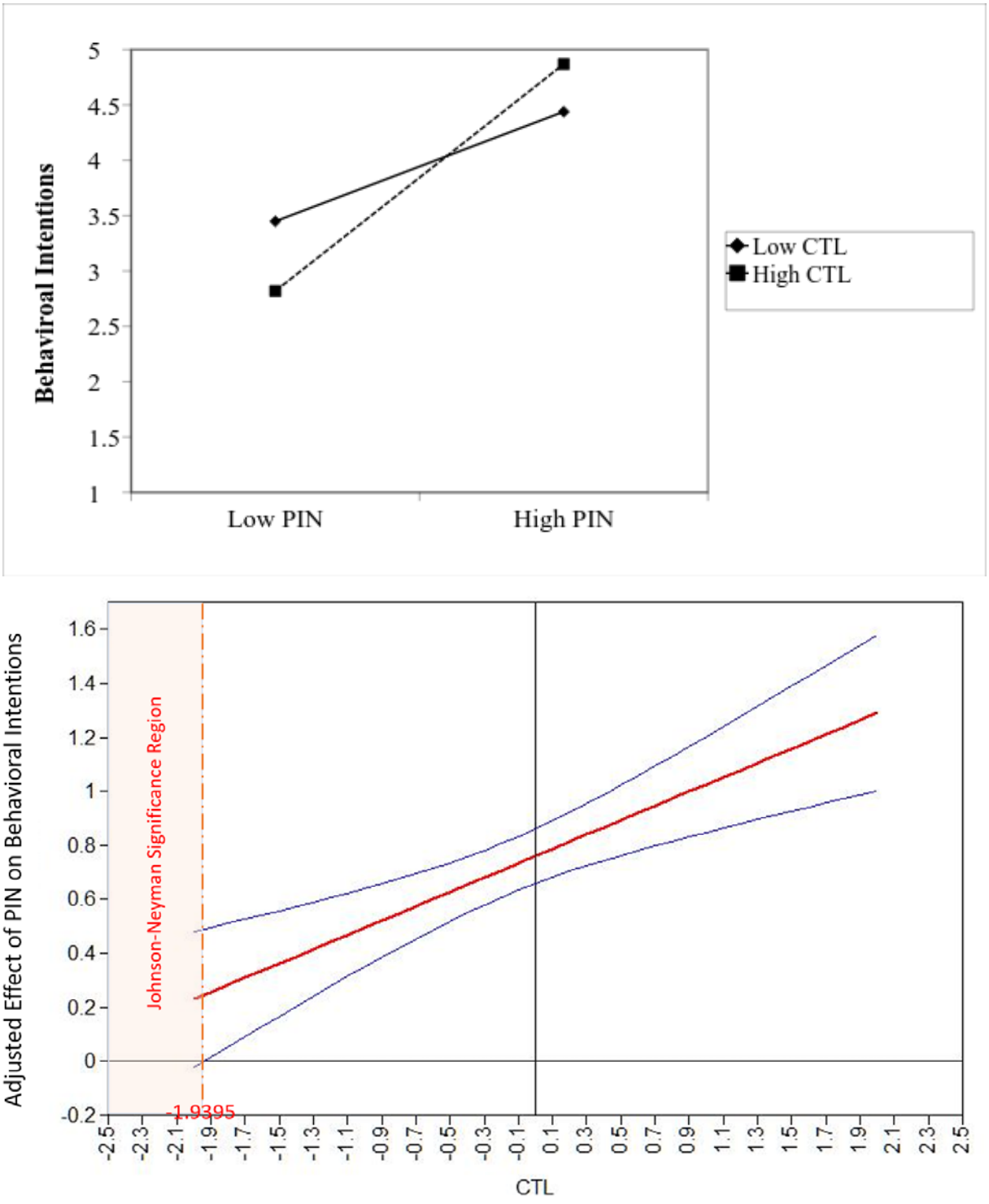

Figure 25. Adjusted effect of perceived injunctive norms (PIN) on behavioral intentions of preventing food waste as a function of cultural tightness-looseness in the Chinese sample. (H6)

APPENDIX F

Tables

Table 1.

Percentage of Age Groups from the 2010 Census and the Sample from Both Nations

Age Groups	U.S. 2010 Census (%)	U.S. Sample (%)	China 2010 Census (%)	Chines Sample (%)
18-24	11.3	11.2	15.71	15.72
25-34	17.8	17.7	18.34	18.35
35-44	17.3	17.3	22.47	22.46
45-54	19.1	19	17.06	17.07
55-64	16.5	16.5	12.95	12.94
65 and over	18	18.3	13.46	13.46

Table 2.

Zero-Order Correlations, Means, and Standard Deviations of Measured Variables in the U.S. Sample

	CTL	HC/LC	PIN	FBI	EATT	EBEH
CTL	.72					
HC/LC	.40**	.81				
PIN	.31**	.42**	.91			
FBI	.15**	.06	.52**	.79		
EATT	.23**	.09*	.24**	.32**	.84	
EBEH	.16**	.08	.18**	.34**	.47**	.67
M	3.15	3.29	3.60	3.72	4.62	3.81
SD	0.80	0.82	0.79	0.79	0.52	0.49

Note. CTL = Cultural Tightness-Looseness, HC/LC = High-Low Context Cultural Tendency, PIN = Perceived Injunctive Norms, FBI = Future Behavioral Intentions, EATT = Existing Attitudes, EBEH = Existing Behaviors; **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed); Scale reliabilities presented on the diagonal.

Table 3.

Zero-Order Correlations, Means, and Standard Deviations of Measured Variables in the Chinese Sample

	CTL	HC/LC	PIN	FBI	EATT	EBEH
CTL	.74					
HC/LC	.35**	.73				
PIN	.35**	.25**	.93			
FBI	.13**	.04	.53**	.89		
EATT	.10*	.08	.32**	.25**	.82	
EBEH	.22**	.17**	.28**	.20**	.41**	.76
M	3.95	3.73	4.14	3.93	4.67	3.86
SD	0.65	0.50	0.61	0.79	0.42	0.49

Note. CTL = Cultural Tightness-Looseness, HC/LC = High-Low Context Cultural Tendency, PIN = Perceived Injunctive Norms, FBI = Future Behavioral Intentions, EATT = Existing Attitudes, EBEH = Existing Behaviors; **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed); Scale reliabilities presented on the diagonal.

Table 4.

Fit Indices for Baseline Measurement Models in Both Nations

	U.S.				China			
Variable	χ^2 (*df*)	CFI	RMSEA (90% CI)	SRMR	χ^2 (*df*)	CFI	RMSEA (90% CI)	SRMR
CTL	.58 (5)	1.00	.00 [.00, .06]	.01	3.24 (5)	1.00	.06 [.00, .15]	.01
HC/LC	7.96 (9)	1.00	.00 [.00, .05]	.01	9.03 (9)	1.00	.02 [.00, .06]	.02
PPSD	5.79 (5)	1.00	.06 [.00, .12]	.01	9.67 (5)	1.00	.04 [.00, .08]	.01
SPSD	11.57 (5)	1.00	.05 [.01, 09]	.01	6.80 (5)	1.00	.03 [.00, .07]	.01
PSS	5.77 (9)	1.00	.02 [.00, .07]	.01	11.28 (9)	1.00	.03 [.01, .07]	.01
BI	5.15 (9)	1.00	.00 [.00, .04]	.01	26.30 (9)	.99	.06 [.04, .10]	.02
EATT	1.19 (5)	1.00	.00 [.00, .03]	.01	8.42 (5)	1.00	.04 [.01, .08]	.02

Note. CTL = Cultural Tightness-Looseness, HC/LC = High-Low Context Cultural Tendency, PPSD = Personal Level Perceived Social Disapproval, SPSD = Societal Level Perceived Social Disapproval, PSS = Perceived Social Sanctions, BI = Behavioral Intentions, EATT = Existing Attitudes; **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Table 5.

Fit Indices for Measurement Invariance Tests for Measured Variables

Variable	Model	χ^2 (*df*)	CFI (ΔCFI)	RMSEA (90% CI)	SRMR	Δχ2 (Δ*df*)	Comparison
CTL	Model 1: Configural invariance	3.83 (10)	1.00	.00 [.00, .08]	.01		
	Model 2: Metric invariance	13.16 (14)	.99 (.01)	.05 [.01, .08]	.04	9.33 (4)	Model 1 vs. Model 2
	Model 3: Scalar invariance	17.11 (18)	.98 (.01)	.04 [.05, .14]	.04	3.95 (4)	Model 2 vs. Model 3
HC/LC	Model 1: Configural invariance	16.98 (18)	1.00	.01 [.00, .04]	.02		
	Model 2: Metric invariance	17.37 (23)	1.00 (.00)	.01 [.00, .04]	.02	0.39 (5)	Model 1 vs. Model 2
	Model 3: Scalar invariance	28.27 (28)	.99 (.01)	.03 [.00, .06]	.02	10.90 (5)	Model 2 vs. Model 3
Personal Perceived Social Disapproval	Model 1: Configural invariance	15.46 (10)	1.00	.05 [.01, .08]	.01		
	Model 2: Metric invariance	24.07 (14)	.99 (.01)	.06 [.03, .08]	.04	8.61 (4)	Model 1 vs. Model 2
	Model 3: Scalar invariance	27.66 (18)	.99 (.00)	.06 [.03, .08]	.04	3.59 (4)	Model 2 vs. Model 3
Societal Perceived Social Disapproval	Model 1: Configural invariance	18.37 (10)	1.00	.04 [.00, .07]	.01		
	Model 2: Metric invariance	22.91 (14)	1.00 (.00)	.04 [.00, .06]	.04	4.54 (4)	Model 1 vs. Model 2
	Model 3: Scalar invariance	26.61 (18)	1.00 (.00)	.04 [.01, .06]	.04	3.70 (4)	Model 2 vs. Model 3
Perceived Social Sanctions	Model 1: Configural invariance	17.05 (18)	1.00	.03 [.00, .06]	.02		
	Model 2: Metric invariance	18.35 (23)	1.00 (.00)	.03 [.00, .06]	.02	1.3 (5)	Model 1 vs. Model 2
	Model 3: Scalar invariance	55.56 (28)	.98 (.02)	.06 [.04, .07]	.05	33.21*** (5)	Model 2 vs. Model 3
Behavioral Intentions	Model 1: Configural invariance	31.45 (18)	.99	.05 [.03, .07]	.02		
	Model 2: Metric invariance	32.52 (23)	.99 (.00)	.05 [.03, .07]	.02	1.07 (5)	Model 1 vs. Model 2
	Model 3: Scalar invariance	32.59 (28)	.99 (.00)	.04 [.02, .07]	.02	0.07(5)	Model 2 vs. Model 3
Existing Attitudes	Model 1: Configural invariance	9.61 (10)	1.00	.02 [.00, .06]	.01		
	Model 2: Metric invariance	10.29 (14)	1.00 (.00)	.02 [.00, .05]	.02	0.67 (4)	Model 1 vs. Model 2
	Model 3: Scalar invariance	18.71 (18)	1.00 (.00)	.04 [.00, .06]	.03	8.43 (4)	Model 2 vs. Model 3

Note. RMSEA = root mean square error approximation; SRMR = standardized root mean square residual; CI = confidence interval; CFI = comparative fit index; ****p* < .001. Partial scalar invariance was achieved for Perceived Social Sanctions.

Table 6.

ANOVA Comparisons of Perceived Injunctive Norms across Five Conditions in both National Samples

Conditions	*n*	Mean	*SD*	Tukey's HSD Comparisons Sig.			
				C-NM	C-Msg	Weak INJ	Strong INJ
U.S.							
Control-No Msg	102	3.38	0.78				
Control-Msg Only	106	3.46	0.81	.947			
Weak INJ	102	3.27	0.77	.845	.39		
Strong INJ	105	3.77	0.73	.002	.02	<.001	
Strong INJ with Sanction	111	4.06	0.63	<.001	<.001	<.001	.032
China							
Control-No Msg	105	4.16	0.52				
Control-Msg Only	105	3.99	0.60	.175			
Weak INJ	104	3.73	0.68	<.001	.006		
Strong INJ	105	4.37	0.52	.038	<.001	<.001	
Strong INJ with Sanction	104	4.44	0.39	.002	<.001	<.001	.895

Note. INJ = Injunctive Norms, Msg = Message, C-NM = Control-No Message, C-Msg = Control with Message only.

Table 7.

ANOVA Comparisons of Perceived Message Believability across Four Conditions in both National Samples

Conditions	*n*	Mean	*SD*	Tukey's HSD Comparisons Sig.		
				C-Msg	Weak INJ	Strong INJ
U.S.						
Control-Msg Only	106	4.38	0.77			
Weak INJ	102	4.16	0.80	.185		
Strong INJ	105	4.15	0.77	.153	1.00	
Strong INJ with Sanction	111	4.15	0.84	.143	1.00	1.00
China						
Control-Msg Only	105	4.45	0.63			
Weak INJ	104	4.31	0.59	.358		
Strong INJ	105	4.51	0.53	.844	.068	
Strong INJ with Sanction	104	4.43	0.60	.993	.521	.696

Note. Perceived message believability was not measured in the control-no message condition. INJ = Injunctive Norms, Msg = Message, C-Msg = Control with Message only.

Table 8.

ANOVA Comparisons of Perceived Source Credibility across Four Conditions in both National Samples

Conditions	*n*	Mean	*SD*	Tukey's HSD Comparisons Sig.		
				C-Msg	Weak INJ	Strong INJ
U.S.						
Control-Msg Only	106	4.19	0.66			
Weak INJ	102	4.10	0.74	.615		
Strong INJ	105	4.21	0.78	.905	.718	
Strong INJ with Sanction	111	4.17	0.79	.647	.993	.536
China						
Control-Msg Only	105	4.31	0.63			
Weak INJ	104	4.28	0.49	.990		
Strong INJ	105	4.41	0.50	.519	.337	
Strong INJ with Sanction	104	4.22	0.53	.632	.815	.053

Note. Perceived message credibility was not measured in the control-no message condition. INJ = Injunctive Norms, Msg = Message, C-Msg = Control with Message only.

Table 9.

Conditional Effect of Injunctive Norm Treatments on Perceived Injunctive Norms at Values of the Moderator High/Low-Context Culture (RQ1)

	Effect (Simple Slope)	Standard Error	*t*	*p*	LLCI	ULCI
High HC/LC (M+1SD)	.05	.08	.59	.55	-.11	.20
Low HC/LC (M-1SD)	.34	.08	4.36	.000	.19	.50

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval; HC/LC = High/Low-Context Cultures.

Table 10.

Regression Results for the Interaction between Perceived Injunctive Norms and Cultural Tightness-Looseness on Behavioral Intentions (H6)

	U.S.				China			
	β (B for interaction)	*t*	Block ΔR^2	Total R^2	*β* (B for interaction)	*t*	Block ΔR^2	Total R^2
Block 1:				.28				.28
PIN	.53	13.51***			.55	13.78***		
CTL	-.02	-.40			-.06	-1.55		
Block 2:			.00	.28			.02	.30
PIN × CTL	-.05	-1.27			.27	4.13***		

Note: PIN = Perceived Injunctive Norms, CTL = Cultural Tightness-Looseness; * $p < .05$, ** $p < .01$, and *** $p < .001$.

Table 11.

Conditional Effect of Perceived Injunctive Norms on Behavioral Intentions of Preventing Food Waste at Values of the Moderator Cultural Tightness-Looseness within the Chinese Sample (H6)

	Effect (Simple Slope)	Standard Error	*t*	*p*	LLCI	ULCI
High CTL (M+1SD)	.93	.07	9.77	.000	.79	1.08
Low CTL (M-1SD)	.59	.06	12.72	.000	.47	.70

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval; CTL = Cultural Tightness-Looseness.

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