CULTURAL VARIATION IN GRATITUDE DEMONSTRATIONS AND PERCEPTIONS
BETWEEN THE UNITED STATES AND TAIWAN

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# ABSTRACT

Yen-Ping Chang: Cultural Variation in Gratitude Demonstrations and Perceptions
between the United States and Taiwan
(Under the direction of Sara B. Algoe)

Linking two well-developed yet rarely conversing bodies of literature, I propose a general cultural paradigm for testing the functions of emotions. Taking gratitude for example, I predicted that, for gratitude to function, people in Confucius cultures would use self-improvement (cultivating personal skills and living up to social roles) to communicate gratitude, whereas people in individualist cultures would use bodily contact instead. Indeed, although both Taiwanese (Confucius) and American (individualist) participants communicated gratitude by verbal acknowledgment and reciprocating kindness (Study 1 & 2), they spontaneously demonstrated their respective cultural behaviors when being asked to thank someone they chose (Study 1), deliberately listed down such behaviors as their everyday gratitude demonstration strategies more than did the other group (Study 1), and reported applying their cultural behaviors but not those of the other culture similarly to applying non-cultural demonstrations of gratitude (acknowledgment and reciprocity; Study 2). Extending to the perception side of dyadic communication, I further presented participants with manipulated gratitude demonstrations that conveyed the intent of either reciprocity, bodily contact, or self-improvement, and found that Americans perceived gratitude in bodily contact (v. self-improvement) as in reciprocity, whereas the Taiwanese sensed gratitude in self-improvement (v. bodily contact) as in reciprocity (Study 3). Together, this research deconfounds gratitude's underlying relational function from its

ostensible manifestations, bolstering its function over specific behavioral manifestations. The

research, therefore, demonstrates the utility of studying culture to further functionalist emotion

theories; I also developed and demonstrate a new method for de-biasing cross-cultural

comparisons along the way.

# ACKNOWLEDGMENTS

Mom and Dad, this one is for you. You taught me to always try to be a better person, even just a tiny bit every day. So I do, and I'll pass the same gift to little Luxy. Mom, do you know she's born on your birthday, with your eyes, and Dad's silly curiosity about everything in the world? I'll tell her you two's stories, how you raised us with all your love, and made sure we received the best education. This research is my incomparable gratitude for all you did. I owe you too much, and I regret every day that I wasn't there for you before it's too late. Thank you. I miss you so much.

Montine, thank you for being my harbor over the years, with all your patience, support, and wisdom. I know it's hard to be with me, and I've never done enough in return, for you, and our little girl. But you know what, I likely won't achieve that anyway, because you're you, too saintly to match. So sorry in advance. I love you, and thank you.

Everything praiseworthy in the research goes to my wonderful mentors, Drs. Sara Algoe and Yi-Cheng Lin, as well as my committee members. I'm blessed to have you in this journey, guiding me and being my role models. You're not only the sharpest scientists but also the human beings that I'll always look up to. Thank you for picking me in the first place, walking me through all the highs and lows, and showing me hope and the love of truth.

Thank y'all, EASIRers and THISP. I guess we did it. :)

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# INTRODUCTION

In Italy, finishing the plate at a dinner party shows the feeling of gratitude to the host by implying the food is tasty, whereas in Hong Kong, leaving a little behind communicates about the same emotion by implying the food is abundant. This cultural contrast in "how to thank" is apparent; it is thus curious why scant endeavor has been made to investigate how culture influences the communication of the emotion of *gratitude*—including both gratitude demonstrations and perceptions. Indeed, looking into the literature, I find little advancement in how to formally address the interplay between *culture* and *emotion* in interpersonal communication. This is somewhat surprising given that the two bodies of research have each well developed over the past half-century.

Aiming to bring together gratitude and culture, the present research delves into how culture can inform not only the theory of gratitude but also the potential roles of culture in emotion research in general. Specifically, I describe and demonstrate a cultural paradigm for emotion research, using gratitude as an example emotion. Beyond substantive contributions, I also developed and then demonstrate a new statistical procedure that tackles a long known issue in cross-cultural comparisons: culture often distorts respondents' uses of rating scales regardless of the content of the scales (see Boer, Hanke, & He, 2018). Addressing this methodological challenge not only helps practically realize the cultural paradigm being proposed. The method itself is readily adoptable for psychological constructs that have been known to cause a similar cross-sample scale distortion.

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It might be worth noting that, although guided by emotion (expression) research, I intentionally avoid the term emotion *expression* and replace it with *demonstration* throughout. This is because the former has been mostly reserved in the literature for a rather specific, fixed-level unit of analysis focusing on the face—i.e., facial expressions of emotions (Lazarus, 1991, p. 69). This is the case in the foundational work of emotions of Darwin (2009), the subsequent basic-emotion research of Ekman (2007), as well as modern studies either extending (e.g. the current research; Keltner, 1996) or aiming to renovate (e.g. Gendron, Roberson, van der Vyver, & Barrett, 2014) such a tradition. Nonetheless, a large body of recent research has documented that individuals may convey emotional states through several other communicative channels such as verbal and non-verbal acoustics (e.g., Russell, Bachorowski, & Fernández-Dols, 2003; Weninger, Eyben, Schuller, Mortillaro, & Scherer, 2013) as well as gestures and physical bodily contact (e.g. Haidt, 2003; Hertenstein, Keltner, App, Bulleit, & Jaskolka, 2006). Beyond these modes of communication, emotions can also induce and, thus, potentially manifest themselves through a relatively long-lasting repertoire of actions (e.g., seeing pride in social others via their behavioral continuation and persistence; Weidman, Tracy, & Elliot, 2016), interactions (e.g., seeing contempt in relationship partners via sarcasm in arguments;Carstensen, Graff, Levenson, & Gottman, 1996) and even inactions (e.g., seeing frustration via social withdrawal and the so-called "stonewalling"; Gottman & Levenson, 2000).

Together, the emotions that one has may be directly *demonstrated* by, indirectly inferred from[1], and then communicated through intended or unintended behavioral consequences of

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[1] This prediction can be formally deduced from the social projection theory (Krueger, 2007), which states that a person interprets the minds of others following how she interprets her own mind. An example for emotion might be "I kick a vending machine when feeling annoyed; *therefore* they must be feeling annoyed too when doing the same." This formula has been specifically applied in research on social communication of emotions (e.g., Chang, Algoe, & Chen, 2017), but I save it from the main text because it is not the current focus and is not necessary in its full form to support the rather simple point that emotions are communicated beyond the face.

emotions. These demonstrations of emotions may vary in temporal scope as well as levels of subjective conceptualization between individuals around the world (Lazarus, 1991, p. 29); the behavior used to show the focal emotion—gratitude—may similarly be enacted at the level of short-term bodily movements sometimes (e.g., hug; Algoe & Haidt, 2009), but at the level of long-term social activities other times (e.g., hanging out with the one being thanked; Algoe, Haidt, & Gable, 2008). Subsequently, culture may have the potential to moderate how gratitude is socially communicated [2]. Indeed, theories have pointed out the possibility of culture in moderating emotion-behavior associations (e.g., Barrett, 2017b; Baumeister, Vohs, Nathan DeWall, & Zhang, 2007), even though not much has been said on how specifically culture and emotion may be combined in research.

Tackling this issue, I follow these steps in the current cultural investigation into gratitude. First, I introduce the general functionalist approach to emotions and the specific functionalist theory of gratitude that guides the present research. I then bring in the perspective of culture, putting the theorized social function of gratitude into the cultural context. It is argued that the relation-regulatory function of gratitude may be realized through different demonstrations by people in different parts of the world, because cultures have their own relational norms that may require unique regulatory behavior to achieve the same functional goal of gratitude. Following these differential yet specifically predicted demonstrations, corresponding differential perceptions of gratitude may also exist between cultures. To examine both the demonstration and the perception hypothesis, I study two countries—the United States (U.S.) and Taiwan—that would

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[2] There is research on whether the emotion of gratitude would arise in similar social contexts in different cultures and what other emotions would tag along (Morgan, Gulliford, & Kristjánsson, 2014). The findings are informative but not what I focus on here: the differences in gratitude demonstrations *after* gratitude has arisen.

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help derive meaningful emic communication behavior of gratitude and, at the same time, shed light on how culture can be generally factored into the broader emotion research.

**The Functionalism of Emotions**

With variation in specificities, functionalist theories of emotions can be summarized in their shared overarching axiom that emotions are human features that once *functioned*—that is, helped facilitate behavioral tendencies that were advantageous for the reproduction of the human race. Because of being reproductively functional, these tendencies were selected and retained by environmental pressure from the evolutionary history (Lazarus, 1991, pp. 29, 69). This process of emotions is no different from that of many other features of humans; it is *not* limited to biological-genetic inheritance and may work through cross-generational social teaching and learning (i.e., cultural evolution; see Mesoudi, 2011), as well as *not* limited to individual reproduction (i.e., mating and mating-related features) and may happen at the group-to-species level (i.e., general prosperity of the species; Keltner & Haidt, 1999).

In emotion and affective science, functionalist theorists have been focusing on both the general meta-evolutionary structure of emotions, as well as the functions of individual emotions. For the former, scholars debate about theoretical specificities (see the debate of Adolphs, 2017; Barrett, 2017a) [3] such as whether natural selection of emotions happens for discrete emotions individually, or for their underlying affective tones and thus all emotions together; as well as whether emotions have corresponding biological bases (e.g., unique brain regions), or only have shared common biology (e.g., the one brain network) that prepares one to learn emotional reactions

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[3] In the debate, Barrett (2017a) explicitly rejects the concept of functionalism. I however believe the version of functionalism that she refers to is only one of the most elaborated and, thus, restricted interpretation of functionalism. It is because, elsewhere (e.g., Barrett, 2017b, p. 138), I actually find her theorizing on the roles of evolution in emotions to fit with the more liberal and common formulation of functionalism that the current research and, I believe, most emotion research relies on.

prescribed by cultures. These considerations are no doubt enlightening, but as far as I am aware, they do not change the above underlying functionalist idea that, in the end, emotions function, in their ways, in their contexts (Barrett, 2017b; Baumeister et al., 2007; Keltner & Haidt, 1999; Lazarus, 1991, p. 29).

**The Find-Remind-and-Bind Theory of Gratitude**

As an example of the research on the specific functions of emotions, the find-remind-and-bind theory of gratitude (Algoe, 2012) proposes that *gratitude*—the warm and positive emotion people commonly experience after receiving others' goodwill—functions by promoting an individual's relationships with high-quality social partners. Specifically, gratitude fulfills such function by alerting the person feeling grateful that she has *found* a potentially good partner or— if the two are not strangers—by *reminding* her that the partner has indeed been a good one. Subsequently, the emotion of gratitude helps induce the behavioral demonstrations of gratitude from the grateful individual to her partner, so the latter would be more interested and invested in *binding* with the former in the future.

Early work on the behavioral effects of gratitude focused on the grateful person's behavior to compensate her benefactor (e.g., repayment to the benefactor) or to communicate such compensatory cost-balancing intent shortly after the benefiting event has happened (e.g. verbally saying "thank you" to signal "I'll repay you once I can"; McCullough, Kimeldorf, & Cohen, 2008). Recent studies, however, have found that the beneficiary may also demonstrate various situation-dependent behaviors that may strengthen the relationship between both parties in the long run. For example, it has been documented that experiencing gratitude toward a study confederate makes one behaviorally mimic the confederate; the researchers reasoned that gratitude induces mimicry because such action would promote interpersonal liking (Chartrand & Bargh, 1999) and, therefore,

a future relationship between the two (Jia, Lee, & Tong, 2014). Outside the laboratory, studies have also indicated that those who experience more gratitude to their romantic partners report stronger general commitment to the relationships (Gordon, Impett, Kogan, Oveis, & Keltner, 2012) as well as stronger tendencies not only of reciprocity but also of a wide array of concrete bonding behavior in the relationships (Kubacka, Finkenauer, Rusbult, & Keijsers, 2011). Finally, showing the consequences of such relational behavior, researchers examined the role of gratitude in developing relationships between a new member of college sororities (i.e., the little sister) and a more senior member (i.e., the big sister) who was assigned to a little sister and then spent a week doing kind things for her new sister. The results show that the little sister's gratitude accumulated over the week toward her benefactor—her big sister—forecasted the relationship quality experienced by both parties one month later (Algoe et al., 2008), revealing the relational function of gratitude not only for the grateful beneficiary but also for her kind benefactor.

**Culture, the Missing Piece in Gratitude Research**

Notwithstanding the seemingly robust evidence of the relationship promoting the function of gratitude, issues remain for the past research from a cultural perspective. It is easy to see that much of the research on gratitude communication is produced in the U.S. (e.g., Algoe, Kurtz, & Hilaire, 2016) or, at most, primarily-English-speaking countries (e.g., Singapore; Jia et al., 2014). In addition, none of these lines of research have addressed individuals' cultural backgrounds, although cultural differences have been shown to affect interpersonal communication styles generally (Gudykunst, Ting-Toomey, & Chua, 1988) and have existed in the gratitude literature specifically—just because Singapore speaks English does not mean it is culturally equivalent to the U.S. Yet, this difference has never been studied. Consequently, one would not know whether

existing findings on gratitude generalize beyond and even just within the mainly-English-speaking countries that have been studied.

Despite this omission in the literature, there is a wealth of theoretical rationale for considering culture in gratitude communication. First and foremost, since the beginning of the modern psychological investigation into culture, culture research has been defined mostly, if not solely, by a focus on social relationships—the domain in which gratitude functions (Algoe, 2012). For instance, early psychological explorations of culture found the distinction between individualism (i.e., the relational structure in which people associate and dissociate with others freely) to collectivism (i.e., relating following a preexisting social order) to be the most salient cross-cultural individual difference (Hofstede, 1984, pp. 39-64). On emotion demonstrations specifically, Matsumoto, Yoo, and Fontaine (2008) also reviewed the literature and concluded that, because of differential relational goals, collectivists tend to use physically subtler and generally less provocative emotion displays than do individualists, and this presumably includes gratitude.

It might be worth noting that these early investigations of cultural differences are not without criticisms (e.g., Henrich, Heine, & Norenzayan, 2010; McSweeney, 2002) [4]. I, however, believe that they do not change the general point of the current research: to the extent that the evidence is evidential, social relationships were and still are highly relevant to the theorizing of culture and emotion demonstrations. Indeed, a recent investigation takes a different relational angle and analyzes the effects of culture on emotion demonstrations by the cultural *heterogeneity-homogeneity* of society—how many ethnicities the society's population consisted of in the past

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[4] For example, it has been argued that the original finding of the individualism-collectivism dimension is mainly data-driven and has little theoretically grounded justification (McSweeney, 2002). On the empirical side, the evidence cited to support individualism-collectivism differences—e.g., the evidence chosen by Matsumoto et al. (2008)—is almost exclusively from the U.S. for individualism and from the few East Asians countries (i.e., Japan, Hong Kong, Taiwan, and South Korea) for collectivism (Henrich et al., 2010).

five centuries; the larger this number, the more historically heterogeneous and the less homogeneous the culture. Importantly, the researchers argue that this dimension of culture is relevant to interpersonal emotion communication because the more heterogeneous a population was in the past, the less shared knowledge among the people regarding how to convey social intentions in relationships through emotions. To avoid misunderstandings and unnecessary interpersonal conflicts, less subtle, less omissible, and less complex demonstrations of emotions would have been preferred and then selected to form a set of culture-like conventions of how to show emotions between individuals—the *emotion culture* (Rychlowska et al., 2015).

More than raising the quantitative expressivity of demonstrations of all emotions alike, qualitative differences in the uses of specific demonstration behaviors may also have evolved into emotion cultures. Supporting the prediction, empirical evidence reveals that, today, people in more historically heterogeneous societies not only show higher general emotion expressivity (the quantity); they also show a stronger tendency to convey interpersonal affiliation intent by a specific behavior—smile—and a weaker tendency to convey interpersonal dominance by the same demonstration (the quality) than do those in homogenous societies (Rychlowska et al., 2015). Here, the researchers again reason that, in heterogeneous cultures, where *little* shared emotion culture existed in the past, common emotion demonstrations—e.g., smile—might have been prioritized over other behaviors to lower interpersonal uncertainty, possibility of conflicts, and thus been selected to convey friendly affiliative intentions. In homogenous cultures, in contrast, the same behavioral demonstration [5] could have been selected to gently communicate riskier, potentially

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[5] To be clear, there are more than one facial movements in the family of smiles, and research suggests that affiliation- and dominance-showing smiles are systematically different in terms of what facial muscles and features to use (Rychlowska et al., 2017). In other words, they are not the "same" at the physiological level. However, this does not undermine the finding that, when being asked to "smile" without further specifications, individuals around the world use this "same" demonstration to convey different social signals.

conflict generating, yet also highly important relational intentions such as negotiating responsibilities, hierarchical positions, and relative dominance (Rychlowska et al., 2015).

Taken together, the implication is that emotion demonstrations—including those of positive emotions such as smile (Rychlowska et al., 2015) and showing gratitude—may have come a long way to fit into the history and culture of a society and have given the people a unique culture of emotion demonstrations that support the relationship structure in the society. Given that gratitude functions to support relationships and social bonding (Algoe, 2012), this general cultural prediction may be readily observed for gratitude. By studying chosen cultures carefully, specific behavioral predictions may also be made for cross-cultural similarities and differences in gratitude communication.

**Culture, the Needed Piece in Gratitude Research**

More than showing whether a phenomenological association between culture and gratitude communication exists, I would further argue that a consideration of culture may also help examine the underlying function of gratitude and thus advance theoretical understandings of gratitude. This use of culture, critically, may apply to emotions other than gratitude as well. Specifically, it is possible to combine a functionalist theory of emotion—here, the find-remind-and-bind theory of gratitude (Algoe, 2012)—with knowledge of specific cultures—e.g. the U.S. and Taiwan—to generate predictions of concrete emotion-demonstration behavior within the chosen cultures. Comparing the differences and similarities in such behavioral predictions between the cultures, subsequently, may help scrutinize whether the underlying function of the focal emotion generalizes across cultures—showing a *functional universal* (Norenzayan & Heine, 2005).

Take gratitude for example. For the functionalist theory of gratitude to hold, one should expect the ostensible demonstrations of gratitude to be "predictably" flexible between cultures—

e.g., as behavior (set) $B_x$ in culture context (set) $C_x$ yet as behavior $B_y$ in culture context $C_y$. Here, the flexibility should allow and only allow the demonstrations of gratitude that are identified a priori to support the theorized relational function of gratitude in the demonstrations' cultural contexts. Namely, both $B_x$ and $B_y$ may promote relationships in their respective cultures $C_x$ and $C_y$ but not vice versa. In contrast, if the demonstrations vary outside this restriction—e.g., gratitude evokes $B_x$ in both $C_x$ and $C_y$ while $B_x$ only promotes relationships in $C_x$ but not $C_y$—one would instead conclude that gratitude may have a behavioral universal of demonstrations (e.g., $B_x$) instead but not a functional universal underlying those demonstrations. By conceptually deconfounding the behavior of an emotion from its function in this paradigm, culture then becomes an analytical tool to sharpen functionalist theories of emotions; it would test functionalism at the level of functions and help reveal novel functional demonstrations of emotions.

**Culture, Continua or Discrete?**

Following this cultural paradigm for studying emotions, I chose two culturally distinct societies and closely analyzed them as discrete relational contexts. This discrete-culture approach is considered plausible and, indeed, a strength of the current research, because it opens the possibility of culture-centered, emic understandings of a culture beyond the culture's dimensional components. Such understandings, in turn, may provide the strongest base for deriving the demonstration behavior that would best test the function of gratitude in context. For example, even if the U.S. is dimensionally individualist, heterogeneous, and has relative scores on many other cultural dimensions (e.g., relational mobility; Schug, Yuki, & Maddux, 2010), the country is not a mere combination of the scores. It is of itself a culture, so I analyzed the culture, beyond its dimensions. Further, the approach may help circumvent some conditional limits and disadvantages of the traditional dimensional approach to culture. For instance, there are merely 190 irreplaceable

sovereign national states [6] in total in the "world" sample pool, when nation is the operationalization of cultural *dimensions*—as it has been most of the time in the literature (Brewer & Venaik, 2014). On the other hand, using a unit of sampling that is more fine-grained than nation (and therefore a larger pool) would beg the question of whether this smaller unit still reflects the construct of culture—is culture of cities "culture" or group disposition; how about culture of couples? In contrast, given that the present investigation focuses on testing the nature of emotion but not that of culture, so long as the guiding theory of gratitude can be combined with cultural analysis to predict concrete behavior in gratitude demonstrations, I should be able to answer the question about the function of *gratitude* in selected cultures.

Accordingly, the two focal societies chosen in the current research are the U.S. and Taiwan, which are arguably among the most typical instances of their respective cultural types in the literature, that is, individualism and collectivism. Individualism, especially that of the U.S., is the most documented and studied in psychological research (Henrich et al., 2010) and, therefore, a common point of reference. On the other hand, framed as an individualist culture, the U.S. is often contrasted with collectivism, this time, disproportionately represented by East Asian societies such as Japan, South Korea, and Taiwan (Henrich et al., 2010). A possible cause of this biased representation of collectivism might be that, if scaled along the individualism-collectivism dimension, both East Asian and non-East Asian collectivist countries are truly more similar than different and thus might require little distinction from the U.S. Yet, scholars in a broader field of social sciences and humanities have long argued that East Asian societies established collectivism mainly as Confucianism, whereas Italy and Mexico did it through Catholic familialism (see the discussion of Fukuyama, 1995, pp. 3-12, 49-60, & 97-112), and India was and still is

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[6] The number varies a little depending on how/who to define "sovereignty."

predominantly, if not entirely, structured under the caste hierarchy (Heitzman & Worden, 1996, pp. 231-294). Consequently, I limit my interpretation of the culture of Taiwan to Confucianism and closely follow the corresponding literature to derive the hypotheses of the present research.

**Cultural Similarities in Gratitude Demonstrations**

For the U.S. and Taiwan, I identified both cultural similarities as well as differences in how people might demonstrate gratitude. For similarities, I found the behavior of verbal acknowledgment (e.g., saying "thank you") and reciprocating kindness (e.g., returning a favor) to be potentially shared between the U.S. (e.g., Algoe & Haidt, 2009) and Taiwan (e.g., Chen & Li, 2007), because these demonstrations have been regularly reported in research from both cultures; reciprocity has long been theorized as universal in several theories of gratitude and moral norms too (Gächter & Herrmann, 2009; Gouldner, 1960; McCullough et al., 2008). To derive potential differences, below, I first followed the heterogeneity-homogeneity literature because it addresses emotion culture most directly. To go beyond cultural dimensions, I then elaborated general dimensional guidance by cultural considerations specifically for the U.S. and Taiwan.

**Cultural Specialties in Gratitude Demonstrations in the U.S.**

As noted, prior research reasons that cultures that are heterogeneous—e.g., the U.S., one with the highest heterogeneity scores (Putterman & Weil, 2010)—have evolved in the way that the people have not only quantitatively tuned up emotion expressivity but also qualitatively tuned to emotion demonstrations that are direct, unsubtle, and unmistakable (Rychlowska et al., 2015). Specifically for the U.S., a study has also documented that, compared to three other discrete positive emotions—admiration, elevation, and joy—the emotion of gratitude prompts American individuals to show behavior to *acknowledge* the positive actions of their benefactors. Critically, this acknowledgment behavior, coded within open-ended responses of participants, covers both

*verbal* acknowledgments such as saying "thank you" as well as *physical* acknowledgment such as hugging (Algoe & Haidt, 2009). In short, these American authors saw physical gestures and, specifically, hugging, to have the potential to convey the same interpersonal information as a verbal "thank you". Indeed, supporting that such a coding decision may be theoretically sound and not simply anecdotal, past research has theorized and empirically showed that positively valenced bodily touch such as hugging does regularly serve as a channel of social communication for building intimate relationships (Jakubiak & Feeney, 2016).

Further, it is worth noting that the phrase, "stay in *contact*", can often be replaced by the more metaphorical, behavioral, yet same-meaning "stay in *touch*" in daily conversations in the U.S., but never in Taiwan. Such language uses might be of special relevance, because gratitude is about extending relationships (Algoe, 2012) and these phrases are the most common ways to convey such intent when it is needed—when people are saying goodbye and temporarily ending a relationship. Here, I do not have much interest in pursuing a formal cross-cultural linguistic investigation. Yet it is suggestive that, although "stay [保持] in contact [聯絡]" does have a literal translation in Taiwanese Mandarin and is used similarly, this translation only makes sense when contact is translated through its communicative meaning [聯絡; as social connection] but not the behavioral one [碰觸; as bodily contact], and "in touch" simply does not translate. To touch is always to touch physically and is never *in* touch communicatively in the Taiwanese language. Further reflecting the implication that, relatively, behavioral touching helps little with interpersonal communicating in Taiwan, it is also well known that individuals with a Confucian cultural background such as the Taiwanese and the Japanese are used to bowing to each other (thus without physical contact) to show friendliness and to signal their relational potential. Hand-shaking

(thus with physical contact) was traditionally rude and is still somewhat unexpected for people in these cultures.

Overall, I find that "touching to thank" fits well with the cultural conventions of the U.S. and is likely an American demonstration of gratitude that I was looking for. Indeed, *bodily contact* by definition takes extra perceptive qualities and sensational channels—the haptic—than do no-physical-contact demonstrations. It can, in turn, be a relatively "direct, unsubtle, and unmistakable" emotion demonstration suggested by theory (Rychlowska et al., 2015). Consequently, I hypothesize that <u>people in the U.S. may show gratitude with more bodily contact than do those in Taiwan</u>.

**Cultural Specialties in Gratitude Demonstrations in Taiwan**

Compared to heterogeneous societies, which lack a common emotion culture, previous research has argued that people in homogenous societies—e.g., Taiwan, 95% Han in the past five centuries (Putterman & Weil, 2010)—have both a shared emotion culture and a tight pre-structured social network within them. Relative to building new relationships, maintaining existing ones may, therefore, be prioritized in emotion communication (Rychlowska et al., 2015). The question that follows is then what unique features or behavior, if any, would help with the goal of maintaining the relational structure in homogenous and, specifically, Confucian societies such as Taiwan.

Digging in the literature, I found the behavior of *self-improvement* (自我精進)—the behavior of cultivating personal skills needed for better fulfilling one's responsibilities and living up to one's social role (Heine et al., 2001)—to have the potential that I was looking for, because of the behavior's value of communicating, maintaining, and strengthening relationships in

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Confucianism [7]. Specifically, although in practice, self-improvement is helpful to the self and does not come with a limited set of actions as far as I am aware, the cultural value of self-improvement is that—when recognized by others—it can increase a person's social recognition (called *face*; 面子) and then her social others' willingness to affiliate with her in the long run (Heine & Buchtel, 2009; Heine et al., 2001). Indeed, when asked by students what an ideal ("humane") society would be, Confucius (2007, sec. 12) says "Let the ruler be a ruler; the subject, a subject; the father, a father; the son, a son [fulfilling their respective social responsibilities].", emphasizing that "To master the self and return to ritual [interpersonal harmony] is to be humane (the ideal). For one day master the self and return to ritual, and the whole world will become humane. Being humane proceeds from you yourself. How could it proceed from others?" In other words, Confucianism assumes that *ideal interpersonal relationships* start from self-mastering and individual improvement. It is through such a process that social roles are maintained and an ideal, harmonious society would eventually be achieved. Consequently, it seems plausible that one in such a culture might "proceed from the self" when trying to be a responsive societal member. Gratitude, as the emotion that induces behavioral demonstrations to convey interpersonal responsiveness (Algoe, 2012), may thus make people improve themselves in Confucian societies. Together, I, therefore,

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[7] As Heine et al. (2001), I define the construct of self-improvement following a cultural analysis of Confucianism. It might be worth noting that one piece of evidence from a U.S. sample has named a similar construct in a narrower way. There, researchers coded for Americans' spontaneous mentioning of "moral self-improvement"—becoming a more virtuous person—and found the behavior was *not* induced differently by gratitude compared to other positive emotions under investigation (Algoe & Haidt, 2009). In addition, published after the current work was conceptualized and conducted, a recent theoretical review suggests that gratitude intervention may promote "self-improvement" through different intervention mechanisms. The authors of the review, however, define the behavior differently from mine and seemingly allow more positive personal changes (e.g., better peer relations) in their use of the term and rather than basing self-improvement on fulfilling social duties and contributing to the society as I do (Armenta, Fritz, & Lyubomirsky, 2017). Because it is a review, it also provides no direct empirical test for the new theory that it sets forward. Consequently, I believe that it is an open question as to whether self-improvement, as defined by Heine et al. (2001) and us, can be induced by gratitude for the Taiwanese and, critically, more so for them than for Americans.

hypothesized that <u>people in Taiwan may show gratitude with more self-improvement than do those in the U.S.</u>

Before concluding and summarizing the theorizing so far, it might be worth noting that all the above predictions are about relative cultural comparisons between two rather specific cultures chosen. The hypotheses do not imply that bodily contact and self-improvement only exist in exchanges of gratitude as opposed to other emotions. Nor do they assume the two cultural behaviors to be exhaustive and represent every possible difference in demonstrating gratitude in the world. In fact, the rationale for the two behaviors to be chosen is their relative relational use in their cultural contexts, so to the extent that relationships are being concerned, the expected behavioral differences should show up. This relational reasoning puts gratitude and both relational demonstrations under the spotlight, relative to other emotions and demonstrations having been documented in between the two target countries. The current investigation nonetheless does not preclude future extension of the lists of gratitude demonstrations and relational emotions that may also induce bodily contact and self-improvement in U.S. and Taiwan.

**The Current Research**

Investigating the relations between gratitude demonstrations and culture, I propose both cultural similarities and differences between the U.S. and Taiwan. It was hypothesized that both Americans and the Taiwanese would use verbal acknowledgment and reciprocating kindness to show gratitude. However, people in the U.S. would show gratitude with more bodily contact than would those in Taiwan, whereas those in Taiwan would show gratitude with more self-improvement than would those in the U.S.

The cultural differences and similarities posited were first examined in two independent tasks in Study 1 (described separately below as Tasks 1A and 1B). In the study, American and

Taiwanese participants both showed gratitude freely on camera to someone they pre-selected as having done something for which the participants felt grateful (Task 1A), and consciously reflected on and then listed the ways that they show gratitude in typical daily life to anyone (Task 1B). Participants' video-recorded demonstrations (Task 1A) and written answers (Task 1B) were then content-coded to test against the hypotheses.

In Study 2, I conceptually replicated Study 1 using a more restricted top-down approach: participants with either an American or Taiwanese cultural background rated on a scale how likely they would be to perform each of the demonstrations of interest when feeling grateful for a social other. Here, the rated demonstrations included bodily contact, self-improvement, reciprocating kindness, and verbal acknowledgment, as well as two more potential demonstrations of gratitude according to prior research. In addition, I address the theoretical considerations that the predicted effects are due to general positive valence but not gratitude as a discrete emotion, and that the effects are due to specificities of the benefactor-beneficiary relation confounding with culture.

Finally, to advance the theory, I turned to the receiving side of gratitude communication in Study 3. I argue that, so long as a culture (e.g., the U.S.) prefers to *demonstrate* gratitude by some behavior (e.g., bodily contact) over another (e.g., self-improvement), people in the culture would *perceive* gratitude in social others through the preferred demonstrations over the non-preferred behavior. This demonstration-perception matching should be the case because, otherwise, the demonstration would not have been successful and functional in communicating the demonstrator's grateful feelings and would not have been evolutionarily selected to form the emotion culture witnessed today. Accordingly, I presented participants with brief messages wherein the messenger's intent of demonstrating bodily contact, self-improvement, and reciprocating kindness toward her benefactor was systematically manipulated. Participants then

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rated how grateful the manipulated messengers were. It was expected that, following the hypothesized demonstration-perception matching, Americans would rate messengers' whose demonstrations relied on bodily contact to be grateful, whereas the Taiwanese would rate those whose demonstrations relied on self-improvement to be grateful, relative to the other culture.

**STUDY 1**

In this first study, which consists of two independent tasks—reported as Tasks 1A and 1B—I adopted a naturalistic bottom-up approach to explore how individuals in the U.S. and Taiwan demonstrate gratitude. Task 1A, described first, involved participant-recorded webcam videos. In this part of the study, although I had formulated the general cultural paradigm described in the Introduction (Chang, 2015) and had hypothesized self-improvement as a gratitude demonstration for the Taiwanese (Chang & Chen, 2013), I had not yet predicted the specific demonstration of bodily contact for Americans until I watched participants' videos (described below). That is, this one prediction emerged from viewing the empirical evidence through a theoretical lens (i.e., Matsumoto et al., 2008; Rychlowska et al., 2015); I then formalized a behavioral code which was implemented by naïve judges, and tested the hypothesis. For all subsequent tests (Study 1 Task 1B, Study 2, and Study 3), the three predictions—for similarities and for the two predicted behavioral differences—were made a priori. Specifically, in the present video task (1A), a participant in either the U.S. or Taiwan was requested to freely choose a target person who made the participant grateful in the past and for whom the participant would like to show gratitude. I then had the participant actually show gratitude to the target on webcam as if talking to her in person. This demonstration could, therefore, include whatever the participant wanted to say and to do, and was content-coded to test against the hypotheses.

**Task 1 Procedure**

Participants in the U.S. and Taiwan were told to first "think back to a time when a person did something good for you and made you feel positive and grateful" and then to record on webcam [8] a video in which they "showed gratitude to the person as if talking to the person face-to-face". Seven trained coders unaware of the hypotheses then independently coded the videos. Here, the videos were presumably recorded in the participants' primary languages, so coders who spoke either Taiwanese Mandarin, American English, or both were enlisted to the coding team [9]. This resulted in seven coders for each American-English-speaking participant and her video, as well as five coders for each Taiwanese-Mandarin-speaking participant and her video.

**Task 1 Participants**

Undergraduate students in the U.S. (N = 197 [10]; 31.47 % females; age = 20.68, SD = 2.35) and Taiwan (N = 67; 34.33 % females; age = 19.94, SD = 1.46) were recruited for Study 1 in exchange for course credits or monetary compensation. Among the participants, 106 American and 54 Taiwanese participants uploaded a video for the present Task 1A. However, some videos did not show required content (e.g., did not play, had no sound, or contained unrelated cartoons), so the final data were 92 American and 51 Taiwanese videos for the task, and the projected effect sensitivity was a medium $d = .49$ in a t-test design, with power = .80.

**Task 1 Measures**

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[8] Participants were also told they could instead record on another device and then upload the video, in case they did not have a webcam.

[9] Three native American English speakers among whom one is fluent in Taiwanese Mandarin, three native Mandarin speakers fluent in English, and one native South Korean speaker fluent in both Mandarin and English.

[10] Across all studies in the current research, I planned to recruit 70 Taiwanese participants in a study, because I know that was about the number of people that I could practically achieve given my recruitment opportunities. For Americans, the plan was to stop recruiting when the sample size of the Taiwanese hit 70, because I expected it to be easier and faster to recruit Americans as I am based in the U.S. and this strategy, assuming an $\geq 70$ sample size for Americans, would render my target, at-least-medium effect sensitivity $d < .45$ under power = .80 in a two-sample/culture t-test. The effect size was so chosen because, theoretically, I expected cross-cultural comparisons to be usually larger and easier to be observe.

**Bodily contact.** Coders answered two items of bodily contact, one more general and one more specific: "Participant expressed a desire to touch any part of the benefactor's body," (general touch; e.g., hand-shaking and kissing) and "Participant mentioned he/she wanted to hug the benefactor" (hug) [11]. In addition to stating the desire, if either coded *action* appeared in a video—a handful of participants actually made hugging motions toward their webcams—coders checked off a box to indicate the behavior's presence (versus absence). The intra-class correlations (ICCs) of the touch and the hug code were .67 and .93 respectively.

**Self-improvement.** Given the novelty of the demonstration and that I was not aware of a nonverbal indication of self-improvement that could be unambiguously extracted from the recordings, the coding scheme first introduced self-improvement to coders as "actions that an individual takes to make him/herself more competent", and then presented three exemplifying aspects of self-improvement, one by one, in the same check-box format as that of the bodily contact items (i.e., presence/absence). The aspects were "Participant explicitly expressed willingness to improve him/herself" (intention of self-improvement; e.g., to improve skills in sports or understandings of school work), "Participant had improved" (action of self-improvement; descriptions of improvement in skills and performance having been achieved), and "Participant explicitly expressed awareness that self-improvement could be a way to realize thankfulness" (cognition of self-improvement; either of the previous codes with a casual signifier such as "to show how thankful I am, I would improve in…"). Readers are also advised to refer to the short example descriptions of self-improvement provided by participants in Task 1B; I show the exemplars from Task 1B instead of 1A simply because there participants actually wrote down their answers in more concise sentences than they did in recorded videos. Finally, the ICCs of the

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[11] I did not ask coders to exclude hugs from general touches, so the latter might contain the former.

intention, action, and cognition code of self-improvement were .45, .28, and .42 respectively. Here, the internal consistency of the action code did not reach the conventional criterion for ICC (i.e., < .40; Cicchetti, 1994). I, however, did not average across or arbitrate among coders on this or any behavioral code in the current task as is often done in traditional methods. Instead, the data were analyzed in a multilevel framework where such inter-coder variation is explicitly estimated and thus controlled for. Please see Results for more information.

**Reciprocating kindness.** The coding scheme introduced this demonstration as "actions that an individual nicely treats or wants to do so to a person who did something nice to the individual" and then presented two exemplifying aspects of the behavior in the same presence/absence format: "Participant explicitly expressed willingness to reciprocate" (intention; e.g., saying explicitly "I'd like to do *the same* for you.") and "Participant had reciprocated" (action; e.g., "I did the same for you."). The ICCs of the intention and action code here were .91 and .70 respectively.

## Task 1 Results

I tested the effect of culture on each code in a multilevel logistic model where coders' ratings were nested within videos, with videos of American participants being the reference category. This multilevel approach accounts for unexpected missing codes and extracts the most information from the data, while avoiding the need to arbitrate among coders if they disagreed with each other. Compared to the traditional coder-average method, the present modeling would also take within-video variability into account as opposed eliminating it and, therefore, theoretically requires relatively little internal consistency among coders to make an efficient estimation.

As predicted, results in Table 1 showed that the Taiwanese's videos were more likely to contain the intention, action, and cognition of self-improvement, and less likely to contain hug and general bodily touch than were Americans'. In addition, there were no differences between the two cultures in the intention and action of reciprocating kindness. Here it was noticed that the odds ratio and the confidence interval of the hug code were statistically zero and thus mathematically impossible. This modeling error is likely caused by the fact that, in the data, no coder detected Taiwanese participants' inclination to hug. Although this finding supported the hypothesis even more strongly, to still formally test the hypothesis, I supplemented with another analysis in which each video was classified as either with a hug detected by any coder or no hug detected by all coders (and this processing only affected Americans' videos given no detection of hug at all for the Taiwanese). The results confirmed that U.S. videos contained significantly more hug attempts than did Taiwanese videos ($\chi^2 = 4.70$, $df = 1$, $p = .030$).

**Table 1.** Results of Study 1 Task 1A

| Codes | Expected presence | | Observed odds ratios | | | | |
|---|---|---|---|---|---|---|---|
| | Taiwan | U.S. | CI $_{95\%}$ lower | Odds ratio | CI $_{95\%}$ upper | $t$ | $p$ |
| Self-improvement | | | | | | | |
| Intention * | 39.67% | 27.87% | 1.64 | 2.91 | 5.15 | 3.69 | .001 |
| Action * | 34.28% | 24.08% | 1.90 | 3.44 | 6.23 | 4.11 | .000 |
| Cognition * | 30.90% | 23.31% | 1.62 | 2.87 | 5.08 | 3.64 | .001 |
| Bodily contact | | | | | | | |
| Touch * | 17.40% | 24.44% | 0.10 | 0.19 | 0.36 | -5.16 | .000 |
| Hug * | 4.75% | 20.17% | 0.00 | 0.00 | 0.00 | -30.59 | .000 |
| Reciprocating kindness | | | | | | | |
| Intention | 51.40% | 66.50% | 0.37 | 0.64 | 1.13 | -1.54 | .126 |
| Action | 26.62% | 27.07% | 0.47 | 0.94 | 1.88 | -0.17 | .862 |

*Note:* * indicates $p < .05$; model: Logit(E(Code$_{ij}$)) = $\gamma_{00} + \gamma_{01} \times$ Culture$_j + u_{0j}$ , given Code$_{ij}$ | E(Code$_{ij}$) $\sim$ BER(E(Code$_{ij}$)); odds ratios are tested against 1, i.e., no cultural difference, with the U.S. as the reference and $df = 141$; models are fitted by maximum-likelihood estimator with robust standard errors.

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**Task 2 Procedure**

The writing task (Task 1B) took place between the recalling and the recording portion of the video task (Task 1A). The data were coded after Task 1A was fully analyzed, and served to confirm the findings of Task 1A. Specifically, for this part of the study, participants were told to nominate one to seven "strategies that you use to show gratitude to people being kind to you", to give each nominated strategy a name, and then to write a short description of each strategy. Given that participants could list different numbers of strategies and the strategies so listed shared the same space (i.e., one to seven nominations), the current design of Task 1B allowed me to estimate the relative degree to which a demonstration of interest occupies one person's general demonstration "toolbox." This was not the case in Task 1A because a demonstration there could only be present or absent in a video and such presence or absence of a behavior presumably would not influence other demonstration behaviors given their independent measures.

Unaware of the hypotheses, three trained coders who read both American English and Taiwanese Chinese [12] independently categorized each nominated strategy, focusing on whether or not the strategy described bodily contact, self-improvement, or reciprocating kindness—the three strategies studied in Task 1A—in addition to one more that has been widely studied in the literature, verbal acknowledgment (see review of McCulluogh et al., 2008). I then "profiled" each participant's demonstration toolbox by calculating the relative weight of each of these four targeted strategies to the total number of strategies nominated by a participant. For example, if a person nominated total 5 strategies among which 3 were indicated by most coders and thus categorized as reciprocating kindness, the person' reciprocating kindness weight would be 3 / 5 = 60% of her personal toolbox of gratitude demonstrations. It is worth noting that, different from the data

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[12] All coders spoke and read Chinese Mandarin as native language.

processing in Task 1A, I did arbitrate between coders in the current task in order to calculate these percentages and to extract the weight information that was not possible in Task 1A. Unlike those in Task 1A, the ICCs of the codes here were also theoretically high enough (i.e., > .40; Cicchetti, 1994) to support arbitration.

**Task 2 Participants**

The same group of 254 participants of Task 1A generated 980 gratitude demonstration strategies in total as the data of Task 1B. For Americans, the average number of strategies generated by an individual was 3.81 (SD = 1.42); for the Taiwanese, it was 3.42 (SD = 1.51). Different from Task 1A, no participant here was removed from the analysis because everyone had listed at least one demonstration strategy. Accordingly, the projected effect sensitivity was a small-to-medium $d = .40$ in a t-test design, with power = .80.

**Task 2 Measures**

**Bodily contact.** Coders categorized any demonstration strategy that was the behavior of touching the benefactor's body—such as hugging, kissing, and shaking hands—into the bodily contact category. Coders were instructed to only put behavior intended for bodily contact but not those that might lead to such contact unintentionally (e.g., dancing might include touch at some point) into the category. The code thus tapped into how participants consciously construed their gratitude demonstrations. Assuming independence between strategies, the ICC of all strategies collected was .73.

**Self-improvement.** Extrapolating from its definition, coders looked for three types of self-improvement: fulfilling personal responsibilities (e.g., "[…] show up and work hard every day" and "Love life and your purpose!"), performing an activity better (e.g., "[…] show him my best performance in return." and "[…] follow his advice and succeed in achieving my physical

appearance/strength goals") and changing personality in a positive way (e.g., "[…] try to be independent", "Act humbly", and "To smile more"). If a demonstration strategy fit with any of the criteria, it was put into the self-improvement category. The ICC of the current code was .71.

**Reciprocating kindness.** Coders identified the behavior of "providing the benefactor what she's in need of" (e.g., "[…] provide help when he is in need" and "[…] be available to them if they ever need me") as a common way to reciprocate kindness. I did not use the same definition as in Task 1A, because both bodily contact and self-improvement could often be deemed as treating someone nicely in return—the definition in Task 1A—and thus overlap with this broader reciprocating kindness in the current mutually exclusive coding system. In contrast, with a narrowed definition, the present code of reciprocating kindness measured a specific kind of reciprocating kindness that is not bodily contact or self-improvement. The ICC here was .55.

**Verbal acknowledgment.** Coders identified three behaviors for the code: verbally saying "thank you," "thanks," or synonymous phrases; communicating such language through other media such as cards, emails, and social media; and using symbolic acknowledgment *without* bodily contact, such as nodding, smiling, and waving hands. Critically, for this last, relatively ambiguous type of behavior to qualify as language-like acknowledgment, participants needed to explicitly express the purpose of the behavior as conveying gratitude to the receiver. For example, by adding "to let the person know my appreciation" to "nodding". Without the qualification, nodding would not be counted. The ICC of the code was .78.

## Task 2 Results

Having derived the percentage weight of each demonstration of interest, I tested the effect of culture on the percentage by Mann-Whitney U test instead of the t-test, because percentages were by nature non-normally distributed. In addition, U test is almost as efficient as

t-test when the data approaches a normal distribution, so often serves as an alternative to t-test (Conover, 1999, p. 272). Following the analytic plan, results in Table 2 indicate that, as predicted, self-improvement took up significantly more weight in the Taiwanese's self-generated gratitude demonstration strategies than in that of Americans, whereas bodily contact showed an opposite pattern, more likely to occupy Americans' demonstration strategies than the Taiwanese's.

Interestingly, here I found 19.40% Taiwanese to list at least one demonstration of self-improvement as well as 9.14% Americans to do the same. In contrast, only about the same size of Americans—10.66%—had at least one of their demonstrations coded as bodily contact and, again as in Task 1A, there was almost no—merely 2.99%—Taiwanese who listed such behavior in their responses. Together, the results seem to suggest that, although self-improvement might be conceptually novel relative to bodily contact, it may, in fact, be equally or even more prevalent in both cultures than bodily contact.

Turning to the two potentially cross-culturally shared demonstrations, as expected, I found no difference detected between cultures in reciprocating kindness or verbal acknowledgment. Additionally, it was observed that the prevalence of reciprocating kindness was considerably lower than that in Task 1A, potentially because of its narrower definition in the current coding. Specifically, there were only 17.91% Taiwanese and 26.90% Americans who mentioned reciprocating kindness at least once in the current task, compared to more than half of participants in both cultures who did the same in Task 1A. Finally, the results showed that almost all participants—92.54% Taiwanese and 96.95% Americans—included at least one demonstration coded as acknowledgment among their gratitude demonstrations. Together, the

analyses reveal expected cultural differences, while also showing great cross-cultural similarities between the U.S. and Taiwan in demonstrations of gratitude.

**Table 2.** Results of Study 1 Task 1B

| Codes | Taiwan | | | | U.S. | | | | U | p |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | RM | RS | Sk | Mean | RM | RS | Sk | | |
| Self-improvement * | 5.71% | 142.41 | 9542.50 | 2.34 | 3.21% | 129.13 | 25438.50 | 5.56 | 5935.500 | .028 |
| Bodily contact † | 0.71% | 124.94 | 8371.00 | 6.79 | 2.49% | 135.07 | 26609.00 | 2.86 | 6093.000 | .055 |
| Reciprocating kindness | 6.41% | 124.05 | 8311.50 | 3.52 | 8.13% | 135.37 | 26668.50 | 2.21 | 6033.500 | .165 |
| Verbal acknowledgment | 68.34% | 133.08 | 8916.50 | -0.71 | 69.04% | 132.30 | 26063.50 | -0.10 | 6560. 500 | .941 |

*Note:* * and † indicate $p < .05$ and .06 respectively; RM and RS indicate rank mean and sum respectively; Sk indicates skewness.

**Discussion**

With ecologically rich data, Study 1 indicates that Americans and the Taiwanese tend to spontaneously (Task 1A) and deliberately (Task 1B) show bodily contact and self-improvement, respectively, in demonstrations of gratitude, more than does the other culture. The finding supports the hypotheses of the current research, showing both bodily contact and self-improvement as novel and theoretically derived cultural demonstrations of gratitude. Together, the results bolster a functional universal (Heine & Buchtel, 2009) of gratitude in facilitating human social bonding (Algoe, 2012), over and above its observable behavioral manifestations. As a reference, I also find reciprocating kindness and verbal acknowledgment to be the more commonly-used demonstration of gratitude than self-improvement and bodily contact, and there is no statistically significant difference in the uses of the two demonstrations between the U.S. and Taiwan.

A key strength of this study was the opportunity for internal conceptual replication using two methods with high ecological validity. At the same time, in terms of theory-testing, questions remain, which I address in Study 2. First, although there were always multiple codes of each demonstration to triangulate the construct, one of ten content codes did show unsatisfactory (i.e., < .40; Cicchetti, 1994) internal consistency among coders. To complement the coding, in Study 2, I instead used participants' ratings of the pre-defined behaviors. Second, I argue that these demonstrations are due to gratitude, but in this study, I did not address the possibility that they would be due to positive valence more generally (e.g., George, 1991), and took the opportunity in Study 2 to test for that possibility. Third, I did not know to whom and in what social relations American and Taiwanese participants showed gratitude. It is, therefore, possible that participants in different cultures thought of targets in different relationships with the participants to thank. If so, then, to fit with the relational norms, people might opt for different

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demonstrations. To address this, I systematically varied relationship type in Study 2. Lastly, I conducted the study for American and Taiwanese participants in the U.S. and Taiwan, respectively, and in American English and Taiwanese Chinese, respectively. An alternative explanation of the findings was thus that these confounding linguistic features, not individuals' cultures, caused the results; if individuals are put to the other culture, they might be primed and as well show the behavioral pattern expected for the other culture as opposed that for their own. For theory, the implication is then that culture influences people merely by setting up their external situations and has little to do with their internal cultures as personalities. The next study controls for this possibility because it is conducted in a single country and in a single language for participants from both the U.S. and Taiwan.

# STUDY 2

Complementing the previous study, I turned to a more top-down approach to again examine bodily contact, self-improvement, reciprocating kindness, verbal acknowledgement, as well two more demonstrations that have been documented in past research—socializing (see the review of Algoe, 2012) and paying it forward (Chang, Lin, & Chen, 2012; DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010; McCullough et al., 2008). I included the two new behaviors from the literature to be inclusive of prior gratitude scholarship and for exploration without specific hypotheses. For each of the six potential demonstrations, a closed-ended rating scale was used to measure the likelihood that participants would use the demonstration in common daily life to show gratitude.

<div style="border:1px solid #000; padding:10px;">

<u>When a close other makes you feel grateful, would you...</u>
(By "closer other," we mean someone you've interacted with at least once a week in the recent past)

<u>Thank the person verbally.</u>

This might include
o   Verbally saying thanks, thank you, or I appreciate it;
o   Expressing thanks in writing, e.g., emails, cards, facebook posts;
o   Explaining to the person why you feel thankful.

| Extremely Unlikely | Somewhat Unlikely | Somewhat Likely | Extremely Likely |
|---|---|---|---|
| -50    -40 | -30    -20    -10    0 | 10    20    30 | 40    50 |

</div>

*Figure 1.* Exemplar stimulus of Study 2

*Note:* This example trial tests the condition of close other X verbal acknowledgment.

Beyond conceptually replicating the results of Study 1, the current study also sought to address the alternative explanations laid out in the above sectional discussion. First, I crossed each demonstration strategy by two emotion conditions: gratitude as the target emotion, and amusement as the positive emotion comparison. This design would help rule out the possibility that the findings in Study 1 were mere manifestations of the association between general positive affect and prosociality that has been suggested in the literature (George, 1991) and is not specific to gratitude but rather general to all positively valenced emotions. Following the theory of gratitude as a relationship-specialized emotion, I expected the effects of gratitude to be beyond the effects of other positive emotions—here, amusement. Accordingly, participants reported the extent to which they would show each of the six demonstrations, once assuming that they were feeling grateful, and once when assuming they were feeling amused (within-participant and counter-balanced). Following the template of an actual stimulus in Figure 1, participants thus made 12 ratings in total—6 demonstrations x 2 emotions—with which I could then estimate the unique contribution of gratitude to each demonstration over and above that of amusement.

Second, I standardized the relationship that the participant had with the interaction partner by systematically varying a common dimension of social relations: social distance, the frequency and intensity of interactions between people, with higher frequency and intensity defining a shorter the distance (Nedim, 2009). Here, social distance was selected because the dimension is among one of the most classic, well-studied, and indeed, general aspects of relationships (Nedim, 2009); the dimension is also theoretically continuous and a part of all social relations. Therefore, studying social distance would most efficiently if not exhaustively take the issue of relationship variation into account and help generalize the results of the present study to other relational contexts. Finally,

it seems plausible that physical bodily contact may appear more in closer, shorter-distance relationships (Debrot, Schoebi, Perrez, & Horn, 2013), whereas self-improvement can happen with theoretically infinitely long distance, that is, without actual future interactions between the thanks-giving and the thanks-receiving party. As such, social distance—currently operationalized as two discrete conditions of close versus distant relationships (between-participant)—may not only be a theoretically informative choice but also be a potential confounding variable that should be considered.

Third, individuals may show culture-like behaviors (e.g., being more collectivist and thus cooperative v. individualist and thus competitive) when being primed by their surroundings to use specific culture-like mindsets in the moment (e.g., using a collectivist v. individualist mindset after seeing people practicing Kung Fu v. playing football respectively; Wong & Hong, 2005). As such, it was unclear whether participants in Study 1 showed predicted cultural behaviors merely because they were primed by their different study surroundings consisting of the locations (the U.S. for Americans but Taiwan for the Taiwanese) and the languages (American English for Americans but Taiwanese Chinese for the Taiwanese). The current study helped examine this possibility of culture as relatively stable individual differences against culture as environmental setups by recruiting American and Taiwanese participants only in the U.S. and testing both groups only in English. I again expected the same patterns of cross-cultural behavioral consistency and variability, because emotion culture is theoretically gradually formed in the history and then gradually learned by individuals through acculturation; it could depend on the situation and change swiftly to some degree, but should not be only so.

**Analytical Approach to Account for Culture**

As alluded to in the beginning of the paper, unlike the traditional approach, I did not directly compare the mean level ratings of each demonstration between cultures (e.g., by mixed ANOVA or multiple independent-culture/group t-tests) because such comparisons have been shown to be highly problematic in cross-cultural contexts (see the review of Boer et al., 2018). Specifically for the present research, it has indeed been documented that individuals with Eastern-Asian cultural heritage (e.g., the Taiwanese) show less positivity bias in attribution (Mezulis, Abramson, Hyde, & Hankin, 2004) and more dialectical thinking (Hamamura, Heine, & Paulhus, 2008) than do those with European cultural heritage (e.g., Americans). As a result, the former may center their responses to a rating scale around a lower set point (because of low positivity bias) and then avoid scoring extremely (because of dialectical thinking) on the scale around the point— on both the high and the low end—regardless of what the scale measures (Hamamura et al., 2008). For instance, the Taiwanese might anchor their neutral responses around 0 with a modest variability of ± 3 on a [-5, 5] scale, therefore only using the range of [-3, 3] on the scale. In contrast, Americans might start from a higher set point of 1 and then vary their answered a little more— say, ± 4. Together, the scale range utilized in the U.S. would be [-3, 5] and intrinsically wider and higher than that in Taiwan. Comparing the means of the cultures, in turn, would be equivocal and reveal little substantive meaning; the comparison itself might also violate the universal-metric assumption required by traditional methods.

Tackling the problem, I developed a statistical procedure in which I introduced theoretically-derived cross-cultural anchor variables—analogous to what Poortinga and Van De Vijver (1987) call "context variables" [13]—and only analyzed the data *within* cultures using such

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[13] I did not conduct exactly the same analysis as do Poortinga and Van De Vijver (1987), so did not call the variables the same way they do, as I believe the current research took their insight of finding an external variable to be the translational bridge between cultures a bit further when I combined their method with a more modern,

anchors, so that the resulting *intra*-cultural analytical approach would conceptually standardize individuals' mental metrics—including both the set points and the units—and test how multiple gratitude demonstrations are structured into different behavioral (principal) components *within* the groups of Americans and the Taiwanese. Cross-cultural comparisons would be made conceptually after conclusions are drawn for each culture from its respective quantitative analyses.

Specifically, to derive one score for each behavior for each participant, I first estimated the extent to which a demonstration of interest was induced by gratitude relative to by amusement by subtracting the rating of each behavior in the amusement condition from its counterpart in the gratitude condition. I then conducted principal component analysis (PCA) *within* each of the two cultures on the six difference scores of demonstrations, in order to profile how the demonstrations bundle and structure together into the cultural toolbox of gratitude demonstrations in each culture. To put it another way, consistent with Study 1B, I again "profiled" the gratitude demonstration toolbox of the culture.

Accordingly, the predictions of the present study were, for Americans, bodily contact but not self-improvement would be under the same principal component as verbal acknowledgment and reciprocating kindness—the two most common, non-cultural-specific *anchor* demonstrations—implying bodily contact is treated and preferred similarly as the anchors. In contrast, I expected bodily contact to be replaced by self-improvement for the Taiwanese to indicate that, for the Taiwanese, self-improvement is deemed similar to verbal acknowledgment and reciprocating kindness in gratitude demonstrations but bodily contact is not.

**Design and Procedure**

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comprehensive, analysis of the variance-covariance matrix—i.e., PCA. Yet I was largely inspired by Poortinga and Van De Vijver (1987) and believe the current method is consistent with their work.

The study followed a two-by-two, emotion (gratitude v. amusement; within-participant, counter-balanced)-by-social distance (close v. distant; between-participant) design. The same six demonstration behaviors were rated on their likelihood of happening in the assigned emotion-social distance combination, for each of the four conditions. Specifically, participants first answered questions on demographics, including the countries in which they considered themselves to have mainly grown up. This was the operationalization of culture in the present and the next study, and I removed the data of those who chose countries other than the U.S. and Taiwan.

Participants then responded to the question "When someone makes you feel grateful, would you…" followed by a rating question of the *likelihood* that they would use a given demonstration strategy. The survey turned to a new page for every demonstration to rate, so participants could focus on one behavior at a time. The demonstration behavior was always ordered from more short-term to more longer-term behavior—that is, in the order of verbal acknowledgment, bodily contact, reciprocating kindness, paying-it-forward, socializing, and then self-improvement. After having rated all six demonstrations, the emotion-condition prompt changed to the next emotion, showing "When someone makes you feel amused, would you…", followed by ratings of the same six demonstrations in the same order. The two emotions were counter-balanced.

To build social distance into the procedure, the "someone" in the prompts was in fact never merely "someone" but were randomly assigned between subjects to read "a close other" for a shorter distance or by "an acquaintance" for farther distance for a given participant. "Close other" was described to the participant as "someone you've interacted with at least once a week in the recent past" and "acquaintance" was "someone you've not interacted with before". The goal of this aspect of the procedure was simply to experimentally balance social distance and deconfound it from culture. The factor was not the focus of the current investigation; I had no specific

hypotheses about this factor and did not plan for statistical power to test it as a moderator. I thus collapsed cross the two conditions of social distance in all following analyses.

Finally, it might be worth noting that each demonstration strategy had examples of how the behavior might be manifested. The information was provided to participants to communicate in detail what kinds of demonstration behaviors that I referred to, circumventing the issue of inter-rater consistency in Study 1. By providing examples, it was believed that participants' understandings of the demonstrations would be relatively restricted and, thus, enhanced in terms of consistency. Together with the above, please find in Figure 1 an example of the full rating prompt of "verbal acknowledgement (v. other five demonstrations) for a close other (v. an acquaintance) when feeling grateful (v. amused)," as well as the key information of other demonstrations in Measures following the same template.

**Participants**

I recruited participants who aged between twenty-five to thirty-five through the listserv and the Taiwanese student association of a public university in the U.S. The age requirement was so set because it was identified that most Taiwanese nationals at the university fell in such range as international graduate students or visiting scholars, as opposed to most American nationals at the university, who were younger undergraduates. The requirement would thus help prevent unnecessary confounding from age and related demographic variables such as education. Having specified the culture requirement for participation in the consent form, I received total 161 completed surveys among which 89, 69, and 3 were from participants who had self-reported as having mainly grown up in the U.S. (77.53 % females; age = 29.88, SD = 3.46), Taiwan (49.28 % females; age = 31.03, SD = 2.88) and other countries respectively. I removed the data of the last three participants because they did not fulfill the participation requirement. I also removed the data

of 1 Americans and 7 Taiwanese because they failed at least one of the two attention checks. The checks were, first, choosing the correct planet in the solar system (i.e., Earth) when being asked about the planet one is on; this happened in between demographic questions and ratings of demonstrations. Having rated all demonstrations in the first emotion condition and switching to the next, participants then answered the second check that explicitly asked one to scroll a bar to "negative 20" between negative and positive 50. Together, the projected effect sensitivity was thus a medium $d = .47$ in a t-test design, with power = .80.

**Measures**

For each demonstration strategy, as in the example above, I presented the name of the strategy, followed by a few examples and/or explanations, and then the likelihood rating. The rating used a negative-to-positive-50 scroll bar, with the two ends labeled "extremely unlikely" and "extremely likely". Below I describe the specific prompt of each demonstration.

**Verbal acknowledgment.** The demonstration was named "Thank the person [who either made them feel grateful or amused] verbally" with examples of "Verbally saying thanks, thank you, or I appreciate it; Expressing thanks in writing, e.g., emails, cards, Facebook posts; Explaining to the person why you feel thankful".

**Bodily contact.** The demonstration was named "Touch the person" with examples of "Hugging; Kissing; Shaking hands; Any other behavior that leads to physical touch".

**Reciprocating kindness.** The demonstration was named "Repay the person" with an explanation of "Anything, as long as what the person did for you and what you'd do for her/him are similar."

**Paying it forward.** The demonstration was named "Pay it forward" with an explanation of "Anything, as long as what the person did for you and what you'd do for others are similar."

**Socializing.** The demonstration was named "Socialize with the person" with examples of "Doing pleasurable activities with the person, e.g., hanging out together, shopping together; Showing care of her/his life and well-being, e.g., calling/mailing the person to talk about her life, listening to her frustration, giving her birthday gifts, food, prayers, kindness, or affection; Sharing things with the person, e.g., course notes, kitchenware, other resources, and positive or negative emotions; Showing respect to the person, e.g., listening to her advice, valuing her opinions".

**Self-improvement.** The demonstration was named "Improve yourself" with examples of "changing personal character or doing something to change personality in a positive way, e.g., trying to be a more humble, thankful, diligent, or forgiving person; working harder, e.g., studying harder, or practicing sports harder; fulfilling personal responsibilities, e.g., doing one's share of housework".

**Results**

Having extracted the effects of gratitude beyond those of amusement, I subjected the gratitude-amusement behavioral-likelihood difference scores to a PCA for each culture individually as planned. The results shown in Figure 2 indicated that, in either of the target cultures, the behavioral consequences of gratitude, beyond those of amusement, could be similarly summarized by one (following parallel analysis) to two (following the eigenvalue criteria) components. Here, because of the inconsistent numbers of components and the fact that the method supporting the lower number of components (i.e., 1) was also very close to suggesting one more (i.e., 2), I followed the strategy of estimating the higher number of component (i.e., 2) and letting the later rotation "rotate out" the component if it is superfluous. I also ran the low-number model for comparison.

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As noted in Table 3 and visualized in Figure 3, in either culture, the first component in the two-component model likely summarized the immediate "demonstration" aspect of the behavior of gratitude, as it consisted mainly of verbal acknowledgment, reciprocating kindness, and paying it forward. By contrast, the second component likely summarized a more prolonged "affiliation" aspect of gratitude as it consisted mainly of socializing, reciprocating kindness, and paying it forward, again, within either culture. Critically, supporting the research hypotheses, the results in Table 3 showed that bodily contact and self-improvement loaded highly on the demonstration component for the U.S. and for Taiwan respectively and, in line with the predictions, *not* vice versa. Specifically, on the demonstration component for the U.S., the bodily contact loading was .684 whereas the self-improvement loading was .132; on the demonstration component for Taiwan the bodily contact loading was .341 whereas the self-improvement loading was .700. These findings were further complemented by the results of the single-component model that showed loadings of bodily contact and self-improvement were .544 and .336 respectively for Americans, and the pattern reversed to that the loadings were .513 and .660 respectively for the Taiwanese.

Moreover, behaviors not loading on the demonstration component in the two-component model (i.e., bodily contact for the Taiwanese, self-improvement for Americans, and socializing for both cultures) were pushed to load on the affiliation component, manifesting divergent effects for both cultures. These findings for the uniqueness of bodily contact for grateful Americans and self-improvement for grateful Taiwanese thus fortify the evidence from Study 1, while ruling out several methodological and theoretical alternative explanations. At the same time, these findings extend the research to two more demonstrations of gratitude that have been of interest to the field for the past decade (i.e., socializing and paying it forward).

**Table 3.** Results of Pattern Matrices of Study 2

| Culture | The U.S. | | | Taiwan | | |
|---|---|---|---|---|---|---|
| Component | Demonstration | Affiliation | Sole component | Demonstration | Affiliation | Sole component |
| Verbal acknowledgement | .804 | -.050 | .755 | .712 | .021 | .687 |
| Bodily contact | .684 | -.383 | .544 | .341 | .644 | .513 |
| Reciprocating kindness | .543 | .326 | .614 | .796 | .080 | .785 |
| Paying it forward | .650 | .424 | .745 | .769 | .288 | .819 |
| Socializing | -.045 | .456 | .089 | -.141 | .853 | .112 |
| Self-improvement | .132 | .726 | .336 | .700 | -.035 | .660 |

*Note*: The demonstration and the affiliation component were estimated together in a two-component PCA, and the sole-component component was estimated solely in a one-component PCA; two-component models were varimax-rotated, loadings > .5 are underscored; although socializing does not load highly by itself on either component for Americans, the discrepancy between its loadings on the components indicates that it belongs to affiliation; although bodily contact loads highly by itself on the sole component for the Taiwanese, the discrepancy between the loadings on the component indicates that bodily is relatively different from verbal acknowledgment, reciprocating kindness, paying it forward, and self-improvement.

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*Figure 2.* Scree Plots of PCA of Study 2

*Note:* The solid lines are of the raw data; the higher dashed lines are of the mean eigenvalues of roots of simulated data based on the raw data; the lower dashed lines are of the 95<sup>th</sup> percentiles of the same simulated data.

## Demonstration

## Affiliation



*Figure 3.* Profiles of Americans' and the Taiwanese's Likelihoods of each demonstration of Gratitude beyond Amusement

*Note:* The data are each demonstration's varimax-rotated principal component loading on either the demonstration or the affiliation component in different cultures; legends are in the right, affiliation, profile.

# STUDY 3

Studies 1 and 2 used various designs to provide convergent evidence that individuals in the U.S. and Taiwan systematically show gratitude to so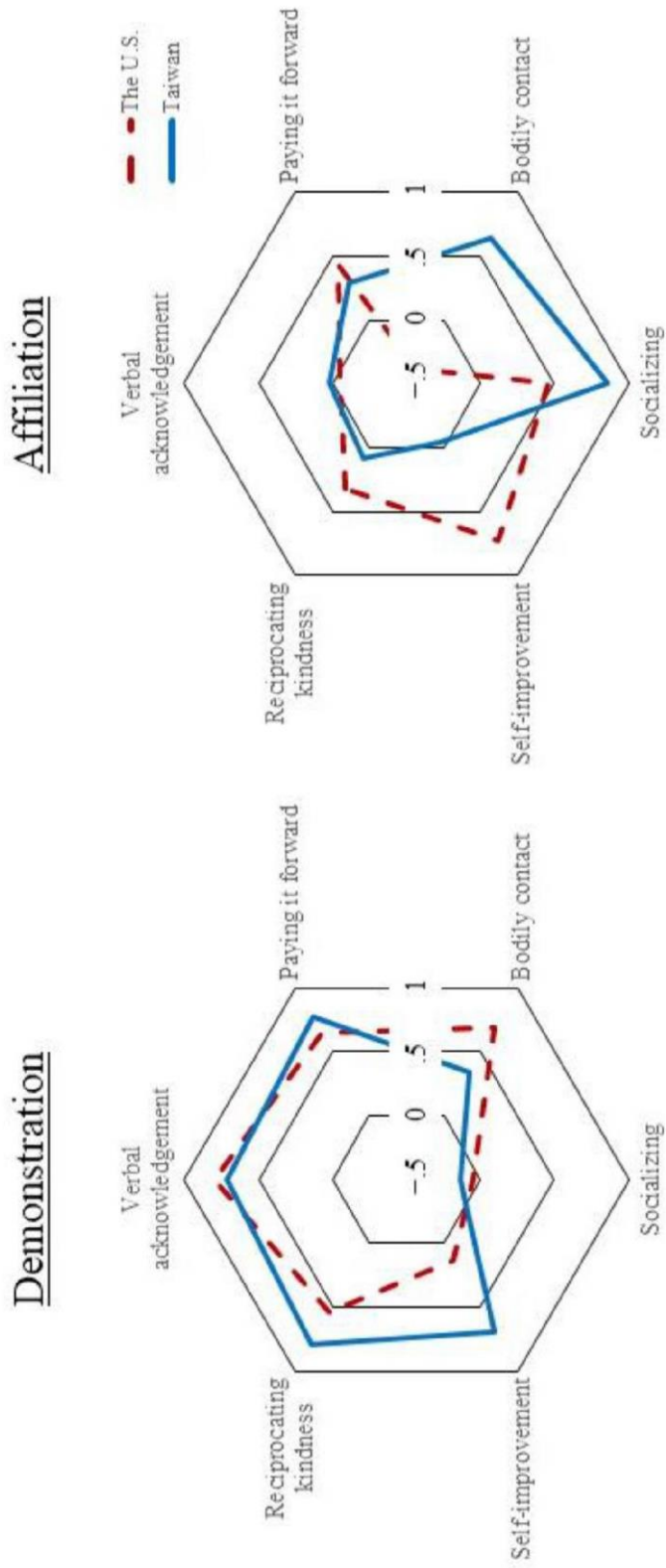cial others using behavioral demonstrations that would theoretically fit with the demonstrators' cultural-relational contexts. Now in Study 3, I turned the focus to the reception side in order to complete this gratitude communication interaction. The study followed the premise that the social signal of the demonstrations of emotion—including that of gratitude—must be effectively received as what it is supposed to be. Otherwise, the communication of the emotion would not have been successful in human cultural-evolutionary history. The demonstrations, in turn, would not have been selected and fixed as a stable functional part of emotion culture as people see the demonstrations today.

Following the logic, the hypothesis of the present study was that there should exist a matching between emotion demonstrations and emotion perceptions: how an emotion is demonstrated in a culture is how the emotion would be perceived in the culture. For the two focal cultures, I thus predicted that, relatively, bodily contact may convey gratitude among Americans, whereas self-improvement may do the same work among the Taiwanese. To test the predictions, participants were presented with a series of interpersonal messages—voicemails or hand-written post-it notes—wherein a fictional messenger first referred to an event having happened between her and the message receiver and then expressed her willingness to take a specific action presumably to demonstrate her feeling for the receiver. Here, the demonstrations were manipulated to imply one of the three behaviors of interest—bodily contact, self-improvement, or again

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reciprocating kindness as the cross-cultural anchor. I did not include verbal acknowledgment as another anchor, so it was less obvious that the messages were demonstrations of *gratitude*, and participants could be reasonably asked to rate each of the stimuli in how grateful the demonstrator was (perceived gratitude of the demonstration).

Analogous to the design of Study 2, participants also rated perceived amusement in the demonstrator, so I could again control for the alterative explanation of general positivity and estimate the effects of gratitude above and beyond those of amusement. Based on a similar analytical rationale in Study 2, I predicted that, for Americans, perceived gratitude in bodily contact would track with perceived gratitude in reciprocating kindness more than does perceived gratitude in self-improvement. For the Taiwanese, however, I predicted that a reversed pattern would emerge in which perceived gratitude in self-improvement would track with perceived gratitude in reciprocating kindness more than does perceived gratitude in bodily contact. Together, the predictions would support that Americans treat bodily contact as a more typical way to show gratitude—more similar to reciprocating kindness—whereas the Taiwanese treat self-improvement as more typical and similar to reciprocating kindness.

**Design and Procedure**

After answering the same demographic questions used in Study 2, a participant was presented with 12 randomly ordered gratitude demonstrations to rate on both perceived gratitude and amusement, one stimulus after another. Among the stimuli, 6 were voicemail messages—3 focal demonstrations x 2 speakers, one male and one female—and the other 6 were photographs of post-it notes—again, 3 focal demonstrations x 2 writers, one each sex. All 12 stimuli were created in a single scripting procedure that gave every stimulus a few carefully designed sentence that together lasted about 10 seconds (± 2 secs.) in recorded messages and filled up the space of

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one post-it note. For instance, a script was "Hi girl. I want to tell you that the gift you gave me yesterday really made my day, and I want to do the same for you. Alright, see you soon."

In the sentences, "to do the same for you" and "to repay you" were used to signal intent of reciprocating kindness, "to make myself a better person" and "to improve myself" showed self-improvement, and "to give you a big hug" and "to hug you" demonstrated bodily contact. All these 6 options appeared once for each format of stimuli and, therefore, twice in the study for a participant. To increase psychological realism and to again address potentially confounded relationships as in Study 2, several linguistic components were also considered. For instance, I systematically varied the social distance between the demonstrator and the receiver by, say, using "Hi dear" to signal a closer distance than did "Hi friend". I also randomized the gender of the receiver (e.g., by inserting the most typical first names of woman and men in participants' age range), the objects of the feelings of the demonstrator (e.g., "the gift you gave me" and "what you did"), the temporal distance to these objects of feelings (e.g., "yesterday" and "the other day"), and arguably the formality of the language (e.g., "Hello" is likely more formal than "Hey"). Here, even though I did not plan for statistical power to fully cross all these speech components and I indeed included more options for each of these components that then required even higher power (as detailed in the scripting procedure in Appendix), the 12 scripts were first carefully made in American English and then translated to Taiwanese Chinese for American and Taiwanese participants respectively. As a result, the two groups of people received the same stimuli and study setups except for stimulus languages. This design, in turn, balanced all the linguistic components factored in between the two cultures.

**Participants**

As in Study 2, I recruited participants who aged between twenty-five to thirty-five through a U.S. public university listserv and a Taiwanese graduate student association based in the U.S., this time, not associated with a specific university. Using the same "self-identified places of growth" item used in Study 2 for culture screening, I received total 134 completed surveys from 72 Americans (76.39 % females; age = 29.41, SD = 3.83) and 62 Taiwanese participants (69.35 % females; age = 29.18, SD = 3.71). Among the participants, 5 Americans and 5 Taiwanese failed at least one of the same two attention checks used in Study 2 in the current survey; their data were removed. The projected effect sensitivity was, therefore, a small-to-medium $d = .42$ in a t-test design, with power = .80.

**Measures**

For each stimulus, participants rated the emotions that the speaker/writer of the voice message/post-it note was perceived to be experiencing while recording/writing the stimulus. For perceived gratitude, the emotion was rated by the item "grateful, appreciative, and thankful"; for perceived amusement, the item was "amused, fun-loving, and silly". Both items were directly adopted from a well-validated questionnaire—the Modified Deferential Emotion Scale (Fredrickson, 2013)—and rated on a 7-point Likert-type scale with points 1, 4, and 7 labeled "Not at all", "Moderately", and "Extremely", respectively.

**Results**

As in Study 2, I first subtracted amusement that a participant perceived in a given stimulus from gratitude that the participant perceived in the same stimulus. For each participant, this processing produced 12 difference scores of purified gratitude—for 3 demonstrations of interest x 4 demonstrators each demonstration—over and above amusement. I then regressed purified gratitude perceived in bodily contact and that in self-improvement together on perceived gratitude

in reciprocating kindness. As in Study 2, this was done for each culture individually. I used this rather straightforward multiple regressions framework as opposed to a PCA as in Study 2, because I did not have multiple anchor variables (only reciprocating kindness here; cf. three anchors in Study 2) to be correlated with the non-anchors. This then, mathematically, reduced PCA to regression. Finally, I conducted the regression in a multilevel (two-level, with demonstrators nested in participants) framework to account for the fact each rating of reciprocating kindness had its own same-demonstrator ratings of bodily contact and self-improvement nested in a participant, that is, four such three-behavior sets nested in participants.

Supporting the predictions, the modeling revealed that American participants' slope coefficient of bodily contact was .38 ($df = 238.45$, $t = 6.74$, $p < .001$, $CI_{95\%} = [.27, .49]$) and significantly larger than that of self-improvement at .21 ($df = 258.87$, $t = 3.32$, $p < .001$, $CI_{95\%} = [.10, .33]$) given that the confidence intervals of the slopes did not cover each other. In contrast, an opposite pattern emerged for the Taiwanese: their slope of bodily contact was .26 ($df = 219.34$, $t = 3.91$, $p < .001$, $CI_{95\%} = [.13, .39]$) and *smaller*—although non-significantly—than that of self-improvement at .36 ($df = 220.02$, $t = 5.60$, $p < .001$, $CI_{95\%} = [.23, .44]$). Here, because of the trending difference between both slopes, multi-cultural data scarcity, and a lack of power in traditional methods thereof, I supplemented the analysis with 5000-resample bootstrapping and found that, as predicted, the effect of bodily contact was indeed significantly smaller than that of self-improvement for the Taiwanese in predicting perceived gratitude in reciprocating kindness (bodily contact percentile $CI_{95\%} = [.00, .34]$, not covering the effect of self-improvement at .36). On the other hand, the same analysis confirmed that, for Americans, the effect of self-improvement was smaller than that of bodily contact (self-improvement percentile $CI_{95\%} = [.02 .27]$, not covering the effect of bodily contact at .38). Together, the results strengthened the

predictions that the Taiwanese deem self-improvement more as a typical demonstration of gratitude than bodily contact, whereas Americans deem bodily contact more so than self-improvement.

**GENERAL DISCUSSION**

Combining existing theory of the emotion of gratitude with that of culture, I derived and tested the prediction that gratitude would be communicated differently yet predictably in Taiwan and in the United States. The results support the specific predictions that, while individuals in both cultures similarly show gratitude by verbal acknowledgment and reciprocating kindness, Americans use bodily contact as an extra demonstration of gratitude and the Taiwanese instead use self-improvement. Extending the investigation to the perception side of communication, I further argue and show that how people demonstrate gratitude in a culture translates to whether they perceive gratitude in the same demonstrations enacted by social others. Together, the present research connects both the signal sending and the signal receiving party in gratitude communication, revealing not only cross-cultural variants in gratitude demonstrations and perceptions but also a potential invariant in the matching between such demonstrations and perceptions in a culture. The results, therefore, not only speak to the literature of gratitude, introducing the novel cultural behaviors that I identified, but also shed light on the general nature of emotion communication, as well as highlight the benefits of considering culture in emotion research. Along the way, I also developed and demonstrate a new statistical method for de-biasing comparisons of rating scales between cultures. This method is readily applicable to other psychological constructs that cause a similar distortion of rating scale responses like culture does.

Specifically, culturally-derived behavioral codes applied to video-recorded demonstrations of gratitude show that, although both Americans and Taiwanese have non-differentiable tendencies

of reciprocating kindness, Americans demonstrate bodily contact and the Taiwanese show self-improvement more than the other group in their spontaneous gratitude demonstrations (Study 1A). Beyond these potentially automatic demonstrations, I also find that individuals in both cultures deliberately report that they use their respective cultural demonstrations to show gratitude in typical daily life more than does the other group: more bodily contact for Americans, more self-improvement for the Taiwanese, and same levels of verbal acknowledgment and reciprocating kindness for both cultures (Study 1B). Indeed, I document that, in gratitude demonstrations, Americans use bodily contact in a similar way to using verbal acknowledgment and reciprocating kindness, and they separate self-improvement in another category of behavior and use it differently than the previous three. On the other hand, the Taiwanese use self-improvement, but not bodily contact, in a similar way to using verbal acknowledgment and reciprocating kindness in gratitude demonstrations (Study 2). Finally, building off the findings for demonstrations of gratitude, I report that Americans perceive gratitude in demonstrations by bodily contact in a similar way to perceiving gratitude in demonstrations by reciprocating kindness, relative to perceiving gratitude in demonstrations by self-improvement. The Taiwanese, in contrast, perceive gratitude in demonstrations by self-improvement in a similar way to perceiving gratitude in demonstrations by reciprocating kindness, relative to doing so in demonstrations by bodily contact (Study 3). Here, these divergent patterns of perceptions of gratitude in Americans and Taiwanese map squarely on the cultures' divergent patterns of demonstrations of gratitude found in Studies 1 and 2. The results, therefore, bolster the underlying functional universal of gratitude communication in social relations, over and above its ostensible behavioral manifestations.

**Alternative Explanations**

Beyond evidence for the hypothesis, I also address several alternative explanations for the results. First, the findings cannot be explained away by the possibility that Americans and the Taiwanese make bodily contact and self-improvement, respectively, simply due to feeling positive in general or due to potential base rate differences in the behaviors between the cultures. These are formally ruled out for both gratitude demonstrations (Studies 2) and perceptions (Study 3), because the cultural effects on communication styles predicted to be specifically induced by gratitude emerged after I controlled for the corresponding effects induced by another positive emotion—amusement—which theoretically shares gratitude's positive valence as well as its base rates to induce behaviors in a culture. Although indirect, the findings in Study 1B may also help rule out this alternative explanation, since Americans and the Taiwanese consciously aim to apply bodily contact and self-improvement respectively in order to show *gratitude*, as opposed to another emotional feeling.

Further, Studies 2 and 3 tackle the possibility that cultures might be confounded with social relationships, which I address both in domains of gratitude demonstrations and gratitude perceptions. Specifically, I experimentally manipulated and controlled for a general and well-studied aspect of relationships—social distance (Nedim, 2009)—and the predicted cultural differences still showed even when the relationships in which participants give and take thanks have balanced social distance between the U.S. and Taiwan. Since such distance was systematically varied, the design also helps generalize the results across relationships with different "emotional" distance.

Finally, I partially consider cultural priming (Wong & Hong, 2005), the possibility that individuals show cultural-like behaviors because they are in situations where such behaviors are more mentally accessible and therefore more likely to appear. In the present research, specifically,

this possibility might reside in the fact that participants in Study 1 were presented with—potentially primed with—study materials only in their languages and only took the studies in their countries. These environmental factors might be confounding priming sources that temporarily induced behaviors that conformed to the cultural contexts as well as my hypotheses. Ruling out the confounding, Study 2 was conducted in single language and single country for all, and I still find the hypothesized results in demonstrations of gratitude.

For perceptions of gratitude, even though I only partially installed this design in Study 3 [14], I believe that situational cultural priming cannot be the only driving force underlying the findings. It is because, practically, the design was at least partially if not entirely realized and, theoretically, I have argued that demonstrations and perceptions of a social emotion rely on each other to be evolutionarily functional and eventually retained. In other words, even if demonstrations and perceptions of gratitude could be situationally but not dispositionally functional in moderating behavior, both need to be so *together,* in succession, to maintain a match. The proposal that gratitude demonstrations attach to the person (found in Study 2) but gratitude perceptions attach to the situation (possible in Study 3), in turn, would violate such matching and beg a new and likely less parsimonious theory to explain the present results.

**Implications and Future Directions**

The current research deduces hypotheses from a theory of a functional universal of an emotion—of gratitude's underlying function of promoting human social bonding (Algoe, 2012). Combing this functionalist theory with knowledge of the social uses of various specific behaviors in their cultural contexts, I then derive the present predictions of both differences and

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[14] Study 3 was in single country and was mostly in single language, but the key stimuli were in participants' languages because I chose to trade the possibility of confounding with listening comprehension. That is, if Taiwanese participants had a hard time understanding the stimuli in English to the same level as Americans did, this discrepancy might itself create another, potentially more serious confounding factor.

similarities in social regulatory behavior in cultural contexts. Compared to only documenting cultural differences in emotion communication behavior, this approach may further reveal the level to which such communication is universal and *cross*-cultural. Critically, given that this cultural paradigm that I propose in the current research is not customized for gratitude and would likely fit with all functionalist theories of social emotions including but not limited to those of anger (Fischer & Roseman, 2007), awe (Bai et al., 2017), contempt (Fischer & Giner-Sorolla, 2016), disgust (Hutcherson & Gross, 2011; Schnall, Haidt, Clore, & Jordan, 2008), fear (Marsh, Adams, & Kleck, 2005), pride (Tracy & Robins, 2007), sadness (Clark, Pataki, & Carver, 1996); I believe the demonstrated cultural paradigm to emotions would benefit the broader literature on emotion demonstrations in and *as* interpersonal communication (Scarantino, 2017). Indeed, the field has witnessed the budding theoretical fertility of moving beyond borders (e.g. Cordaro et al., 2018; Floyd et al., 2018; Gendron et al., 2014). I nonetheless would like to reemphasize the possibility and—to some degree—the necessity of explicitly considering culture in advancing emotion and affective science.

        **Culture in gratitude communication.** More than formulating and demonstrating a general paradigm of using culture to further emotion knowledge, the current research also offers the first set of empirical evidence that self-improvement can be a way to communicate gratitude. I consider the finding an example of how a cultural approach can help not only examine emotions but also reveal novel cultural practices around the world. Further, although I argue and find the behavior to be more prevalent among the Taiwanese than among Americans, around one-fourth Americans in Study 1A have self-improved, wanted to, and/or indicated that these are *for the purpose of* demonstrating gratitude. As such, I suggest attention to self-improvement in the American cultural context as well. Given the high contrast of both cultures—as I intended to

maximize the generalizability of findings—I further believe the current research implies that self-improving in fulfilling social roles and related responsibilities may exist as a demonstration of gratitude beyond the U.S. and Taiwan. In line with the conjecture, a recent survey finds that, somewhat surprisingly, individuals in eight distinct cultures spreading across the world and *not* including the U.S. and Taiwan only "say" thanks about 5% of the time when such behavior can be naturally used. The authors suggest that this might be because human interactions including exchanges of goodwill have largely been written into the scripts of social roles and responsibilities—potentially the remaining 95% demonstrations of gratitude, subsequently, might be less an issue of "saying" thanks than actually "doing" it (Floyd et al., 2018), as in the case of self-improvement. Supporting the reasoning, even though I derived self-improvement specifically from the cultural script of Confucianism and the culture's emphasis on personal duties, social duties are in no way unique to Confucianism (Floyd et al., 2018). A role-responsibility-based demonstration of gratitude such as self-improvement, in turn, might not be special to Confucian cultures either.

As for self-improvement, some intriguing findings surface for bodily contact too. That is, there was nearly zero inclination of the Taiwanese participants to touch and, specifically, to hug people that they felt thankful for. The results stand out given that, on the other hand, Americans do show a fair amount of self-improvement, albeit not as much as the Taiwanese. Researchers interested in the link between bodily demonstrations of emotions and interpersonal relationships (e.g., Jankowiak, Volsche, & Garcia, 2015) may thus want to dig deeper into the social communicative uses of touching and hugging, paying special attention to cultural context. This is not only for the Taiwanese—who seem to highly hug-avoiding—not only for gratitude communication in relationships but also for what roles affectionate and emotional physical

contact generally play in human relational processes. To these questions, I have little doubt that the benefits of physical touch may be universal as implied by theory (Jakubiak & Feeney, 2016) once individuals feel touched—are touched in such a positive and affectionate fashion. The current research, nonetheless, opens the possibility that, even if bodily contact may be cross-culturally rewarding, it might not be necessary to the same degree in different cultures. Together, the present research then invites future investigation in physical contact to consider the roles of culture in "touchy" interpersonal communication.

**Culture in emotion communication.** Beyond gratitude, the present research also provides implications for the general research on emotions in social communication. Although existing cross-cultural literature on emotions has (un)covered a broad range of demonstrations of discrete negative emotions (e.g., Sauter, Eisner, Ekman, & Scott, 2010), most work in the positive emotion domain has mostly focused on happiness and general positive emotion (e.g., Kitayama, Markus, & Kurokawa, 2000; Oishi, 2010). Recently, emerging evidence has indicated extensive cross-cultural variations as well as fair commonalities in facial and gestural expressions of twenty-two positive and negative discrete emotions (yet still without gratitude; Cordaro et al., 2018). The study, nonetheless, identifies the *expressions* of emotions as does traditional research by coding the objective in-the-moment patterns of body (including facial) movements. The results, therefore, might say little about how individuals subjectively understand and make sense of their body movements—e.g., it is unclear whether someone's hand-waving means interpersonal welcoming or rejecting for the waver and, in turn, the receiver; the movement is just a waving. In contrast, the present research recognizes culturally meaningful *demonstrations* of emotions (e.g., self-improvement) that can vary in time spans, forms to appear in different domains of life and, certainly, different corresponding muscular movements (e.g.,

muscles for improving in chess and basketball are very different). Indeed, even though these demonstrations do not conform to a fixed-level, body-moment analysis, I show that such demonstrations can still be functionally equivalent while being similarly perceived within their cultural contexts as conveying gratitude. Accordingly, I believe the present, subjective-meaning-oriented approach to emotions undertakes an informative role in understanding emotions in interpersonal communication that would, hopefully, help with communication in everyday life.

**Emotions in cultural social scripts.** Not only can culture enlighten emotion theory; emotion can shed light on the nature of culture too. For example, at surface-level, the results seem to directly contradict previous cultural analyses of Mesquita (2001), who found that emotional feelings in collectivism (e.g., Taiwan) are generally more socially oriented than those in individualism (e.g., the U.S.). To the analyses, the present research seems to report that, in contrast, the Taiwanese prefer to use a less expressive and less socially interactive behavior of self-improvement to show gratitude, whereas Americans do the opposite, choosing the more socially expressive and interactive bodily contact for the same goal. Nonetheless, I believe it is possible that Americans appear to be more socially interactive in gratitude demonstrations than do the Taiwanese exactly because, as reviewed, the former relatively lack shared (i.e. homogeneous) emotion culture (Rychlowska et al., 2015), preexisting social bonds (Mesquita, 2001), and gratitude is for promoting such bonds (Algoe, 2012). To fulfill the need for relationships within this context, gratitude demonstrations may then have evolved to be compensatorily social and, as I report, extra "touchy" in the U.S. On the other hand, the Taiwanese have over-socialized personal lives following a collectivist norm (Mesquita, 2001); self-improvement may simply have evolved as an example of how ostensibly personal actions transform to conceptually and functionally relational ones in such culture. This indeed echoes

with the argument of Mesquita (2001) that individuals' personal abilities, achievements, and honor are deemed social and relational in collectivist cultures. Finally, my findings on the differential patterns of gratitude perceptions also support this argument of Mesquita (2001), revealing that, relatively, the Taiwanese do functionally perceive gratitude in self-improvement while Americans do so in bodily contact, even if one type of the behavior is superficially social and the other is superficially asocial. For the broader literature, the current research, therefore, fortifies the social function (and relationship-building) theory of gratitude, and further shows the possibility of deepening cultural understandings through analyzing emotions in them.

**De-biasing cultural comparisons.** Beyond substantive contributions, the current research also developed and demonstrated a novel method for studying psychological constructs in the cross-cultural context. Specifically, I tackle the issue of *measurement invariance*, the phenomenon that a measure manifests its latent construct in the same way between contexts, the button line for comparing the construct being measured between those contexts. This methodological requirement can be especially if not only violated in cross-cultural research where most measures are likely variant (Hamamura et al., 2008), but cross-cultural research has been falling behind, too often ignoring the issue by directly presuming invariance (Boer et al., 2018). To address the problem, several general methods have been proposed to detect measurement variance, yet a recent review finds that the methods are highly underused (Boer et al., 2018) and, even if they are, to my knowledge, not much has been said about how to restore invariance once variance is detected.

This is where the present research comes in. Inspired by the insight of finding new common currencies when the conventional ones—the measurement scale, points, and labels—are failing (Poortinga & Van De Vijver, 1987), I developed the method where measures (e.g.,

reciprocating kindness) with theoretically or empirically derived cross-culturally shared

meanings (e.g., showing gratitude in both the U.S. and Taiwan) would be identified to serve as

the common *anchors*. The anchors would replace the measurement scale, and be associated—in

a PCA, regression, or even just t-test, depending on research questions—to the measures of

interest (e.g., bodily contact and self-improvement) only *within* cultures (e.g., once for

Americans and another for the Taiwanese separately), therefore bypassing the point where cross-

cultural measurement variance can happen, that is, *between* cultures.

To some degree, this procedure is analogous to meta-analysis, where a common

currency—an effect size measure—would be chosen to help individual studies with different

designs and measures (e.g., measuring prejudice by reaction time to racial faces or by the

frequency of actual racist behavior) converse with one another. The major distinction between

the method proposed and meta-analysis, nonetheless, lies in researchers' conscious cultural

awareness. That is, the cultures to study in the procedure that I propose are analyzed with theory,

as in the present research, so cultural implications and cross-cultural generalizability of results

can be derived, with theory. In contrast, the differences between individual studies and their

effect sizes in the meta-analysis are often acultural, even atheoretical, and surely cannot be

controlled by researchers. Therefore, even if the number of studies on some research topic grows

fast, the "cultural coverage" of the research body can still be low (as in the case of gratitude

research). Finally, because of no control over where effect sizes are collected in the meta-

analysis, even if the effect sizes collected support some kind of cultural comparisons, such

comparison still does not guarantee help with the theory of focus; it might, but only when one is

lucky. Consequently, I believe that the new method can complement the meta-analytical

approach by being more active and culturally aware. Beyond cross-cultural research, the general

analytical framework that I suggest may also be adopted by non-cultural research as is the meta-analysis, in order to restore measurement variance caused by constructs including and beyond culture and to tackle those constructs systematically.

**Limitations**

As potentially all psychological constructs do, culture theoretically varies on multiple continuous dimensions within and between societies and across time. For the current investigation, I study two countries that represent the cultures on which much has been written—be it individualism/collectivism (Hofstede, 1984, pp. 39-64), in/inter-dependent self (Markus & Kitayama, 2010), historical hetero/homogeneity (Rychlowska et al., 2015), or simply West/East. This facilitated the goal of providing initial tests of the suggestion that the relationship-promoting function of gratitude (Algoe, 2012) can and should be combined with culture to predict social regulatory behavior (e.g., Heine et al., 2001; Rychlowska et al., 2015). As such, I identified the demonstration behaviors with which the effect in question would be maximized in the focal cultures. In exchange, I cannot (and did not intend to) tease out what cultural dimension leads to such effects reported; nor can I prove that the similarities found generalize across any cultural dimension beyond the two countries chosen. Consequently, I look forward to future research that will address these issues and see to what extent the current findings map on known or unknown cultural dimensions.

In addition, the two target social regulatory behaviors of gratitude—bodily contact and self-improvement—were identified carefully in theoretical analyses of their functions in their respective cultures. The functionalist analyses are supported directly by the literature, indirectly by the findings, but not explicitly measured in the present research. Therefore, even though participants did perceive gratitude differently through their cultural communication channels, it is

still an open question as to whether perceived gratitude would eventually lead to the functional

relationship fortification suggested by theory (Algoe, 2012). I believe it will; it is hard to imagine

that individuals see social others in one way, but interact with them in another way regardless of

the perception. Although how grateful one seems should not be the only determinant of

relationships, it has been demonstrated frequently as a key factor of relationships (e.g., Algoe,

Fredrickson, & Gable, 2013). This prediction, nonetheless, awaits future empirical examinations

and will help substantiate the present research.

Beyond the theory, I also encountered methodological challenges in the present research,

which, if solved, may inform theory as well. For example, the age and presumably social-economic

status of participants were likely limited, because all participants were recruited through higher

education institutes and I actually set up an explicit age requirement for participation in Studies 2

and 3. All these were due to practical considerations of data availability, quality, and

interpretability in a cross-cultural-research context; I do not believe that they undermine the broad

point that cultural knowledge of behavior can help guide the study of their adaptive functions (e.g.,

to demonstrate that one is a good social partner). Nonetheless, future researchers might want to

broaden the scope in order to test—for instance—if there is a generational shift in how individuals

prefer to communicate gratitude or if generations have their own cultures of emotions (as

suggested by Twenge, 2006; Varnum & Grossmann, 2017).

In addition, the current investigation has not moved from a cross-cultural investigation to

a *crossing*-cultural investigation, where the focus would shift from the cultural differences that

exist in themselves—as in the present research—to the differences that meet each other on a global

platform. That is, when a person from one culture expresses gratitude to a person from another.

Indeed, it is arguably the case that, when participants answered the surveys in Studies 1B and 2

and actually showed gratitude to someone in Study 1A, participants were thanking or thinking about thanking a target in their own cultures. That is, Americans thanked Americans, the Taiwanese thanked the Taiwanese. On the perception side, Study 3 may have even stipulated such assumption when presenting stimuli only in participants' languages. It is, therefore, an open question as to what people would do and what they should do to successfully communicate gratitude with people from the other and even any other culture. Given the trend of globalization, I believe this question would be increasingly relevant and worthy of research attention (as suggested by Hinds, Liu, & Lyon, 2011).

**Conclusion**

The current research argues that the relationship promoting the function of gratitude (Algoe, 2012) may be realized by different types of behavior in different cultures. It is because the behaviors that fit with the relational norms of a culture and promote relationships in that culture might not do the same in other cultures given these other cultures' different relational norms. Carefully analyzing the literature and the cultures of the U.S. and Taiwan, I then hypothesize that, while individuals in both cultures may similarly show gratitude by verbal acknowledgment and reciprocating kindness, Americans may have bodily contact added to their gratitude demonstrations, whereas the Taiwanese may use self-improvement to demonstrate gratitude. Testing the predictions in Studies 1 and 2, I report evidence supporting the predictions concerning gratitude demonstrations. In Study 3, I further argue that what behavior a culture would like to use to show gratitude is linked to whether the culture would also perceive gratitude, because otherwise, the demonstration would not have been successful in history and been retained as what can be seen today. Bolstering the prediction, I find that Americans perceive gratitude in bodily contact as they demonstrate gratitude using the behavior. Relatively, the Taiwanese perceive gratitude in self-

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improvement, again, as they demonstrate the emotion by the behavior. Together, the present research provides insights not only for gratitude research but also for the broader literature on the roles of culture in emotion communication as well as the importance of studying culture in functionalist emotion research. Along the way, I further demonstrate a new statistical method for de-biasing cross-cultural comparisons, and document the novel cultural behavior of self-improvement and bodily contact.

# APPENDIX: STUDY 3 STIMULUS SCRIPTING

I first generated 12 American-English scripts consisting of 4 versions—each version voiced by a different native-English professional voice actor, 2 of each gender—for each of the 3 demonstrations of gratitude. The stimuli each contained three—an opening, a body, and an ending—sentences. To balance the compatibility and the diversity between stimuli, as detailed in Tables 4 to 6, each of the three sentences was broken down to components, and each component had a few options. Take the opening sentence for example. A greeting option was randomly chosen from Table 4 to match with a random target and a random speaker, so the sentence would be "Hi, it's me." if options "Hi", "(none)", and ", it's me." were chosen for the greeting, the target, and the speaker component of the sentence, respectively. The same design applied to the ending sentence using the materials in the same table, as well as to the body sentence combining the materials listed in Tables 5 and 6.

To make the scripts more realistic, the female and male name option for the speaker component of the opening sentence used three female (Jessica, Sarah, and Emily) and three male (Matthew, James, and Daniel) first names, respectively, that were the most popular for people born in 1990—those who currently age 28 and thus at about the center of the participants age range. That said, unlike options for other components, each name only appeared once for a participant. Further, I strategically manipulated the relationship between the speaker and the target in a message by combining options of the opening sentence. For instance, "Hi dear." might imply an intimate romantic relationship, while "Hey, it's me." and "Hello there, it's Jessica." might imply relatively close and far friendships respectively. Following the same design, the event component of the body sentence also helped vary scripts in the specificity of the reason of gratitude (e.g., a gift is more specific and concrete than "what you did") and the event's temporal distance (e.g.,

"yesterday"). Together with different formations (e.g., in active or passive voice; see the emotion component in Table 5) and various options of other sentence components, the scripting procedure might increase the realism of stimuli, address some factors touched upon in previous studies (e.g., relationship distance in Study 2), while systematically holding enough compatibility between stimuli. Finally, it is worth noting that the procedure was solely designed for generating complex yet balanced and realistic experiences for participants (e.g., script "Hey friend, it's Matthew. I just wanna tell you what you said yesterday made me think a lot and want to make myself a better person. That's it. Talk to you soon."; all chunks underscored were replaceable). I was not interested in examining the effects of any linguistic components factored in here—say, the object of gratitude or temporal distance of the object—nor did the study have the statistical power to assess the effects.

After creating and testing which 2 out of the four voices of actors—one of each gender—sounded more realistic in English in the pilot study, I had 4 native Taiwanese-Chinese professional voice actors (again 2 of each gender) who read and speak both languages translate all four versions of English scripts to Chinese. The actors discussed and finalized the translations together, and then recorded in Chinese only the 2 sets of messages that had their genders and were judged to be more realistic in English. Subsequently, the 2 more realistic Chinese recordings, with their 2 more realistic English counterparts, were chosen to be the final audio stimuli. The 2 sets of English and Chinese scripts not preferred to be presented as voice messages were then hand-written on post-it notes by research assistants who speak American English or Taiwanese Chinese as native languages and have the same genders as the voice actors of the scripts. Together the procedure produced 24 stimuli—3 demonstrations of gratitude x 4 versions (2 genders nested in 2 formats) x 2 languages, and participants were presented the half of this set that matched the main languages of their cultures.

**Table 4.** Composition of Opening and Ending Sentence of Voice Messages

| Opening sentence | | | Ending sentence | |
|---|---|---|---|---|
| Greeting | Target | Speaker | Transition | Farewell |
| Hello | (none) | (none) | (none) | See you later |
| Hey | dear | , it's me. | That's it. | See you around. |
| Hi | friend | , it's [a female first name]. | That's all. | See you soon. |
| | there | , it's [a male first name]. | Anyway. | Talk to you later. |
| | | | | Talk to you soon. |
| | | | | We'll catch up. |

*Note:* Unlike other options of components of sentences, each name only appeared once so there were six female and six male names.

**Table 5.** Composition of Emotion Manipulation of Body Sentence of Voice Messages

| Purpose | | Event | | | Emotion |
|---------|--------|-------|---------|-----------|---------|
| Part 1 | Part 2 | Object | Time | | |
| I wanna | let you know | what you did | (none) | | I thought a lot about * |
| I just wanna | say | what you said | the other day | | was awesome |
| I want to | tell you | the gift you gave me | yesterday | | made me really happy |
| I just want to | | the joke you made | | | |

*Note:* * indicates Event and Emotion switched the order in the sentence.

**Table 6.** Composition of Expression Manipulation of Body Sentence of Voice Messages

| Transition | | Expression |
|---|---|---|
| Emotion | Causal link | |
| I thought a lot about * | and want to | give you a big hug.   (Bodily contact) |
| was awesome | , and got me want to | hug you. |
| made me really happy | , and let me want to | make myself a better person.   (Self-improvement) |
| | | improve myself. |
| | | do the same for you.   (reciprocating kindness) |
| | | repay you. |

*Note*: Emotion is only to show the condition of Causal link here; they were not randomly matched.

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