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To cite this article:

Muller Y. M. Cheung, Weiyin Hong, James Y. L. Thong (2026) Culture Priming of Multicultural Individuals on Localized Websites: A Cultural Frame Switching Perspective. *Information Systems Research*

Published online in Articles in Advance 23 Jun 2026

<https://doi.org/10.1287/isre.2024.1665>

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# Culture Priming of Multicultural Individuals on Localized Websites: A Cultural Frame Switching Perspective

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Received: November 16, 2024

Revised: August 20, 2025; February 20, 2026

Accepted: May 1, 2026


Published Online in Articles in Advance:  
June 23, 2026

<https://doi.org/10.1287/isre.2024.1665>

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**Abstract.** Existing website localization efforts primarily focus on the preferences of monocultural users to provide culture-fit website design. However, it is unclear what constitutes a culture-fit design for multicultural individuals. Through five empirical studies and drawing on the cultural frame switching (CFS) theory, we investigate how website localization elements (i.e., language and image) can carry cultural cues that activate the corresponding cultural dimension of individualism/collectivism in multicultural individuals. We also identify depth of processing as a boundary condition for the priming effects of cultural cues. Specifically, cultural cues must be processed at a high semantic level to be effective, whereas a low sensory processing is insufficient. This argument challenges an underlying assumption in CFS that processing cultural cues will always lead to culture activation. Furthermore, we integrate culture priming with the information systems literature on website design to better inform practice. We found that the activated cultural dimension of individualism/collectivism moderates the impact of website design (e.g., social presence) and content factors (e.g., ingroup references) on multicultural individuals' perception and behavior on websites. This research advances the CFS theory by identifying depth of processing as a boundary condition and enriches the website localization literature by challenging the assumption that localization is not necessary for multicultural individuals. Our findings provide practical guidance for culture-fit website design and content selection tailored to multicultural individuals.

**History:** Jason Thatcher, Senior Editor; Chuan-Hoo Tan, Associate Editor.

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**Funding:** This research was supported by the Michael Jebson Professorship Fund and the Hong Kong Research Grants Council [Grant 16505217].

**Supplemental Material:** The online appendices are available at <https://doi.org/10.1287/isre.2024.1665>.

**Keywords:** website localization • multicultural individuals • language • image • cultural frame switching • depth of processing • collectivism • individualism • website design • human-computer interaction

## 1. Introduction

Global companies are increasingly utilizing the internet to expand their reach to online consumers in different countries. For instance, Amazon operates across five continents with around 25+ countries having dedicated websites, and eBay served online sellers and buyers in more than 190 countries in 2025.<sup>1</sup> Given the varied cultural backgrounds and languages of these online consumers, it becomes imperative for global companies to localize their websites. Localization efforts typically encompass language (Liu et al. 2004, Ko et al. 2015), imagery (Badre 2000, Luna et al. 2003), color schemes (Cyr 2008, Cyr et al. 2010), or content (Fang

and Rau 2003), among other elements. Our review of the website localization literature (Online Appendix I) shows a consensus of providing culture-fit contents on localized websites.

However, our review also suggests that the current website localization literature typically assumes individuals to be monocultural or focuses on a dominant culture in a local population, even when the local population may contain a large percentage of multicultural individuals (Chau et al. 2002, Sia et al. 2009). Multicultural individuals are those who identify with and internalize more than one culture (Luna et al. 2008, Fitzsimmons 2013). They often speak more than one

language (Online Appendix II shows many papers using language proficiency in more than one language as an indication of multicultural). Although not explicitly mentioned, there seems to be an assumption in the literature that website localization is not necessary for multicultural individuals who speak multiple languages. For example, in territories with many multicultural individuals, for example, Hong Kong and Singapore, it is unclear whether it is necessary for a global company to provide a localized website in Chinese. Even if localization was implemented (e.g., a website has both an English and a Chinese version), which one should be displayed by default for each individual and does it matter? Furthermore, should website design and content vary between the English and Chinese versions of the website? Understanding the effect of website localization on multicultural individuals is timely and needed, because the global number of international migrants reached 304 million in 2024,<sup>2</sup> and it is estimated that by 2054, immigration will be the main driver for population growth in 52 countries.<sup>3</sup> Increased globalization exposes more individuals to multiple cultures and makes them fluent in multiple languages, both factors facilitating the development of multicultural individuals.

To explore the impact of website localization on multicultural individuals, we draw upon the cultural frame switching (CFS) theory (Hong et al. 2000), which sheds light on how cultural cues, such as language (Luna et al. 2008, Arieli and Sagiv 2018) and image (Chen et al. 2005, Chao et al. 2007), can affect multicultural individuals. Specifically, CFS proposes that cultural cues can prime multicultural individuals into different cultures at a given time. For example, the Chinese language is likely to activate Eastern culture, whereas English is likely to activate Western culture. The activated culture may subsequently affect multicultural individuals' cognition and behavior, such as attribution (Zou et al. 2008, 2009), self-judgement (Seo et al. 2016), and choice of cooperative strategy (Wong and Hong 2005). Applying CFS to our context suggests that the choice of cultural cues on a website is not trivial for multicultural individuals, because it can affect their perception and behavior online by activating different cultures they identify with.

Interestingly, there is a large overlap between the cultural cues examined in the psychology literature applying CFS (Online Appendix III) and the localization elements examined in website localization literature (Online Appendix I), probably because both streams of literature focus on cues with culture implications. In particular, language and image are the two most often studied cultural (Morris and Mok 2011, Ng et al. 2016, Seo et al. 2016, Liu et al. 2021) and localization (Badre 2000, Luna et al. 2003, Petrie et al. 2009, Ko et al. 2015) cues. But their potential priming effects on multicultural individuals have been ignored in the extant website

localization literature, forgoing a potentially effective way for global companies to influence these individuals. Hence, our research objectives are (1) to determine if the culture priming effect (via language and image) will apply to multicultural individuals in the online setting, and (2) if so, how the activated culture, in combination with other website design and content factors, affects multicultural individuals' subsequent perception and behavior online.

To answer the first research objective, we examined the applicability of CFS to the online contexts. Upon reviewing the CFS literature (Online Appendix III), we identified a few reasons why culture priming may not be as effective in a natural online context than in the experiment settings studied in traditional CFS literature. First, in a natural online setting, there is no strong and explicit priming task or irrelevant information to process in order to strengthen the priming effect. Second, the online setting typically features a mix of multimodal information (e.g., text, images, audio, and video), unlike the plain text and image priming contexts commonly used in extant CFS literature. This discrepancy raises questions about users' elaboration of cultural cues amid such rich information. Third, when visiting a website, users primarily focus on specific tasks, such as viewing videos or online shopping, which leave them with less cognitive resources to process the priming cues at the same time; hence reducing the significance of priming cues and further weakening the priming effect. Under such circumstances, we proposed and tested an important boundary condition for the priming effect, that is, *depth of processing*, which refers to a series or hierarchy of processing stages that humans undergo when perceiving visual stimuli ( Craik and Lockhart 1972). We argue that for culture priming cues to be effective at activating culture, they must be processed at a higher semantic level, while a low sensory level processing is insufficient. Study 1 tests the moderating effect for *depth of processing* on culture activation. Study 2 verifies the culture priming effect in a more natural online setting, without instructions to process the cultural cues.

To answer the second research objective, we reviewed the information systems (IS) literature on website design and content factors and mapped them to the key characteristics of an important cultural dimension (i.e., individualism/collectivism; Appendix A) to explore how the activated culture may interact with website design and content factors to affect multicultural individuals' perception and behavior online. Using multicultural Hong Kong subjects in controlled laboratory experiments, we confirm the downstream effects of culture priming in Studies 3, 4, and 5.

This research advances CFS theory by challenging an underlying assumption that processing cultural cues will always lead to culture activation and identifying depth of processing as a boundary condition of the

culture priming effect. Addressing assumptions and identifying boundary conditions are crucial for advancing theories (Alvesson and Sandberg 2011). Our work also contributes to the website localization literature by challenging another assumption that localization is unnecessary for multicultural individuals who speak multiple languages. After confirming the priming effects of language and image in various natural online settings, we demonstrate how culture priming can combine with website design and content factors to influence multicultural individuals' perception and behavior online, providing practical guidance to global companies in designing culture-fit websites for multicultural individuals.

## 2. Theory and Literature Review

### 2.1. Multicultural Individuals

Culture, also referred to as a cultural knowledge system, consists not only of values and norms, but also learned routines of how individuals think and interact with other individuals and their surrounding environment (Chao and Hong 2007, Chiu and Hong 2007). Compared with monocultural individuals who identify with and internalize only one culture, multicultural individuals identify with and internalize more than one culture (Fitzsimmons 2013). Multicultural individuals may identify with one culture at a given time and let different cultures take turns in guiding their cognition and behavior (LaFromboise et al. 1993, Phinney and Devich-Navarro 1997), depending on which culture is activated in that moment (Hong et al. 2000, Chen et al. 2005). In contrast, monocultural individuals identify with only one culture and will not identify with another culture under any circumstances. For example, a monocultural Chinese individual only identifies with the Chinese culture, and a monocultural Western individual only identifies with the Western culture, regardless of any culture priming. However, a multicultural individual identifies with the Chinese culture under some circumstances (e.g., primed with Chinese cultural cues) and identifies with the Western culture under other circumstances (e.g., primed with Western cultural cues). It is possible for multicultural individuals to have a dominating culture, but under a given circumstance at a given time, they can be prompted to use either culture to guide their cognition and behavior, as long as they have internalized both cultures (Kim-Jo et al. 2010, Arieli and Sagiv 2018).

Although the definition of multicultural individuals is clear, the operationalization varies greatly (see Online Appendix II). In general, prior researchers have used three approaches to identify multicultural individuals. The first approach uses self-reported measures (Mok and Morris 2009, Mok 2022) where subjects declare themselves as multicultural individuals. This

measure aligns closely with the definition of multicultural individuals. The second approach uses proficiency in multiple languages (Chao et al. 2007, Laketa et al. 2021), where language is a manifestation and symbol of culture (Luna et al. 2002). The third approach uses various kinds of exposure to multiple cultures, for example, immigrants or expats with a minimum number of years of residence (e.g., >5 years) (Cheng et al. 2008), second-generation immigrants (Kim-Jo et al. 2010, Mok and Morris 2010), students in international schools (Pattaranakun and Mak 2015), or living in a multicultural society like Hong Kong (Briley et al. 2005) or Singapore (Chen et al. 2005). Whether using proficiency in multiple languages or exposure to multiple cultures as the operationalization, the central theme is to ensure adequate exposure to multiple cultures, either through learning and speaking multiple languages or through living in a multicultural society. In our research, we use a combination of all three approaches to ensure appropriate identification of multicultural individuals.

### 2.2. Cultural Frame Switching Theory

For multicultural individuals, there exists more than one internalized cultural knowledge system; each associated with distinct culture-specific cognitive structures and mental frames with their respective values, norms, and behaviors stored in long-term memory (Luna et al. 2008). The competing cultural knowledge systems typically do not guide cognition simultaneously (Hong et al. 2000). Instead, a particular cultural knowledge system will be more accessible and guide the cognition at a given time in response to cultural cues, such as language (Luna et al. 2008, Arieli and Sagiv 2018) or images/symbols/icons (Chen et al. 2005, Wong and Hong 2005, Pouliasi and Verkuyten 2007). The process of shifting cultural knowledge system is called CFS (Hong et al. 2000). When a particular cultural knowledge system is activated by cultural cues and therefore "come to the fore in an individual's mind" (Hong et al. 2000, p. 709), multicultural individuals can shift their values and decision-making strategies accordingly (Briley et al. 2005).

CFS theory has been successfully applied in psychology and marketing research. Online Appendix III illustrates how multicultural individuals could be primed with different cultural cues. The priming can affect their self-esteem (Ng et al. 2016), self-judgement (Seo et al. 2016), pattern of associations (Pouliasi and Verkuyten 2007), impatience (Chen et al. 2005), group attribution (Zou et al. 2008), need for uniqueness (Mok and Morris 2009), choice of cooperative strategy (Wong and Hong 2005), and performance in categorization task (Luna et al. 2008), memory task (Morris and Mok 2011), and solving riddles (Arieli and Sagiv 2018).

Although some CFS studies were conducted online (either the priming cues were presented in a digital

format or an online questionnaire was used, or both), whether such priming effects truly exist in the natural online setting remain unclear, because they often used strong and explicit manipulations that are not available in the natural online setting. For example, when priming with images, subjects were typically shown a collage of culture-laden images or icons, then asked to either recall the images (Chen et al. 2005, Ng 2010), write down features of the images (Ng and Lai 2009), or explicitly discuss what these images symbolize (Zou et al. 2008). In other studies, subjects were required to answer irrelevant questions in the priming language to induce the priming effect (Luna et al. 2008, Tam et al. 2012). Alternatively, some studies used audio priming, such as conducting interviews that start with small talk in the priming language (Luna et al. 2008) and holding class sessions where subjects hear, read, and write in the priming language (Lee et al. 2010). These strong and explicit manipulations aim to increase the accessibility of the cultural knowledge system associated with the cultural cues (Hong et al. 2000), ensuring the priming effect. However, such manipulations are not available in the natural online setting.

Second, the online setting typically features a mix of multimodal information (e.g., text, images, audio, and video) on webpages, in contrast to the plain text and image priming contexts commonly used in extant CFS literature. This information diversity raises doubt that individuals will pay attention to the cultural cues. Even if they do notice the cultural cues, the mix of multimodal information may reduce attention needed for deep processing of these cues.

Third, when visiting a website, users primarily focus on specific tasks, such as viewing videos or online shopping, which leave them with less cognitive resources to process the priming cues at the same time, reducing significance of the priming cues, and further weakening the priming effect. In addition, the tasks that subjects were asked to perform (e.g., categorization tasks or solving riddles) and the dependent variables studied (e.g., self-esteem and self-judgment) in extant CFS research are mostly irrelevant in typical online contexts. Thus, it would be interesting to examine if the activated culture can affect the typical dependent variables of interest in IS research, such as users' trust, satisfaction, and behavior in various types of online tasks, especially in conjunction with other website design and content factors.

In summary, our analysis of the literature on multicultural individuals and prior CFS research suggests the possibility of priming multicultural individuals through cultural cues embedded in websites, but it is crucial to assess the extent to which CFS applies to the online settings, especially considering that cultural cues are less likely to be processed fully in a natural online setting.

**2.2.1. Depth of Processing.** We propose depth of processing as a key moderator of culture priming effects. Depth of processing refers to a series or hierarchy of processing stages that humans undergo when perceiving stimuli ( Craik and Lockhart 1972). Specifically, the lower sensory stage involves analysis of physical qualities or sensory features, such as lines, angles, and brightness, whereas the higher semantic stage involves encoding the meaning of a stimulus and relating it to a semantic network that consists of stored abstractions from past learning. A greater processing depth implies a greater degree of semantic or cognitive analysis, and extraction of meaning only happens at the higher semantic stage (Craik and Lockhart 1972). Prior studies show that the depth of processing can be manipulated by experiment tasks and instructions (Craik and Tulving 1975, Childers and Houston 1984). For instance, in a series of experiments, Craik and Tulving (1975) found that participants exhibited greater processing depth when they were asked to determine whether the presented words could fit into given sentences compared with when they were asked to determine whether the words were presented in upper case or lower case. The hierarchical view of processing is also supported by neuroscience research on visual processing (Kandel et al. 2021, chapters 25–28).

Although depth of processing was originally proposed and studied in relation to memory formation and retrieval—showing that stimuli processed more deeply are more likely to be remembered and recalled—it has interesting implications for culture priming and CFS. We argue higher semantic processing is essential for culture activation to occur, because the semantic processing of cultural cues is likely to remind multicultural individuals of the related cultural knowledge they already possess, while low sensory processing of cultural cues will direct their attention toward physical aspects of the cultural cues. This potential moderating role of depth of processing has not been considered in prior CFS literature, probably because strong manipulations are typically applied to ensure adequate processing of cultural cues. Although we expect depth of processing to be applicable across different contexts (online or offline), we argue that it is particularly relevant in the online context due to the lack of motivation to deeply process the priming cues and the elevated competition for attention on websites. Hence, we will examine the moderating role of depth of processing and explore whether high semantic processing of cultural cues can occur naturally in the online setting despite these challenges.

### 2.3. Culture and Website Design

Website design (Hong et al. 2004a, b, 2021; Cheung et al. 2017) is an important topic in IS research. Online

Appendix I summarizes the website localization literature, as well as the literature on how culture may influence website design. The general consensus is that culture affects how individuals perceive website design and content, and thus, website design choices should align with the cultural background, race, and ethnicity of the users (Baack and Singh 2007, Wu et al. 2024). An analysis of this literature reveals a few gaps.

First, these studies typically treat individuals as monoculturals. There is a lack of research on multicultural individuals, especially from a CFS perspective. Specifically, the subjects in these studies are either recruited across different countries (i.e., using country as a surrogate for culture) (Cyr 2008, Herrando et al. 2019) or in the same country but with different culture backgrounds (e.g., local students versus international students) (Faiola and Matei 2005, Gevorgyan and Manucharova 2009). This simplified view assumes a dominant culture in a population (e.g., a country) or in a subpopulation (e.g., international students), and advocates for website design that aligns with the dominant culture. However, the website localization literature does not inform global companies on how websites should be designed for multicultural individuals. This lack of research attention implies a hidden assumption that localization may not be necessary for multicultural individuals who speak multiple languages.

Second, in many studies, localization is treated as a bundled effort involving various localization factors (e.g., language, image, icon, color, layout, and navigation structure) and contents (e.g., product details, local news, and local ads) (Badre 2000, Chau et al. 2002, Fang and Rau 2003, Singh et al. 2004, Steenkamp and Geyskens 2006, Bartikowski et al. 2022). In such cases, it is difficult to tease apart the impact of individual website design or content features. Interestingly, in studies that

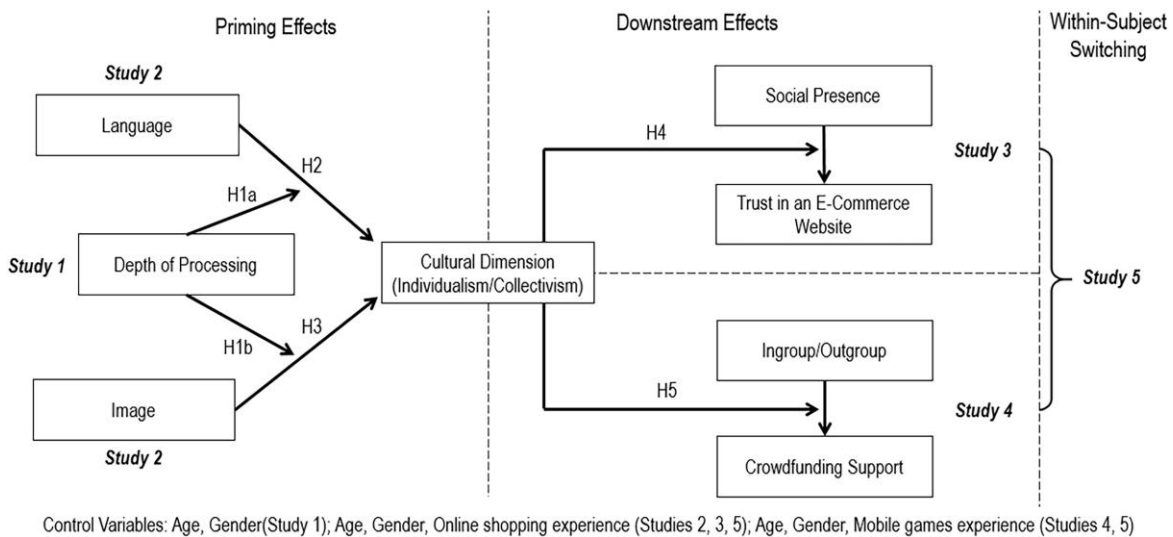
do tease apart the different localization elements, they have found language and image to be the most significant localization features, matching the two most prominent culture priming cues studied in the CFS literature. This coincidence may be driven by the fact that language and image carry strong cultural cues and are relatively easy to manipulate on websites and to be noticed by individuals.

Third, although prior localization studies have acknowledged the importance of culture in shaping individuals' perceptions of the websites, culture is typically not explicitly included in the research model (Petrie et al. 2009, Snelders et al. 2011) or country is often used as a surrogate for culture (Sia et al. 2009, Herrando et al. 2019). Such an approach may introduce confounding effects of other exogenous factors (Chen et al. 2005, Zou et al. 2009, Ganguly et al. 2010); that is, when differences were observed between localized websites in a cross-country study, these differences could be driven by economics, historical, environmental, and social-technical related factors other than the localization elements under scrutiny (Matsumoto and Yoo 2006, Zou et al. 2009, Grossmann et al. 2012). Hence, we argue that it is important to explicitly model culture to avoid potential confounds.

### 3. Research Model

Figure 1 presents our research model. First, we investigate the moderating effect of depth of processing (Study 1). Next, we examine the activation of culture in the online setting through language and image priming cues (Study 2), which are the dominant cultural cues in both the CFS and website localization literatures. We use the individualism/collectivism (IND/COL) cultural dimension as a representative cultural dimension in our research model, because a comprehensive

Figure 1. Research Model



review of the culture priming literature (Online Appendix III) has identified IND/COL as a significant cultural dimension that can explain differences between cultures, particularly between Eastern and Western cultures<sup>4</sup> (Triandis 2001, Singh et al. 2003, Sia et al. 2009, Zou et al. 2009, Wu et al. 2024). Eastern culture is characterized by collectivism, which represents a preference for a tightly-knit framework in society in which “people from birth onward are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty,” whereas Western culture is characterized by individualism, which represents a preference for a loosely knit social framework in which “everyone is expected to look after him- or herself and his or her immediate family” (Hofstede et al. 2010, p. 92). Then, we explore the downstream effects of culture priming by examining how the activated culture interacts with website design and content factors to influence key perceptions (e.g., trust in an e-commerce website in Study 3) and behavioral measures (e.g., crowdfunding support in Study 4). Lastly, we examine if within-subject cultural frame switching can occur (Study 5).

### 3.1. Moderating Effect of Depth of Processing

Culturally relevant information, such as norms, beliefs, and values, is stored in an associative memory network (Hong et al. 2000, Hong 2009, Yap et al. 2019). The associative memory network comprises a collection of nodes with associative links between the relevant nodes (Collins and Loftus 1975, Nelson et al. 1993). Figure 2 illustrates an example of an associative memory network that has nodes related to Chinese culture. When presented with a cultural cue (e.g., “the Great Wall”), if it is processed at a high semantic level then extraction of meaning occurs, which activates

its corresponding memory nodes in the associative memory network. This activation can spread to linked nodes (e.g., to “China,” “Panda,” and “Confucianism”) (Collins and Loftus 1975, Anderson 1983, de Groot 1989), bringing related cultural knowledge to mind. In contrast, a low sensory processing of the Great Wall may activate nodes related to its color, shape, and other visual properties, which are not directly linked to culture-related nodes and unlikely to activate any cultural knowledge system. Hence, we propose depth of processing as a moderator of culture priming effects because it affects the *accessibility* of cultural knowledge systems.

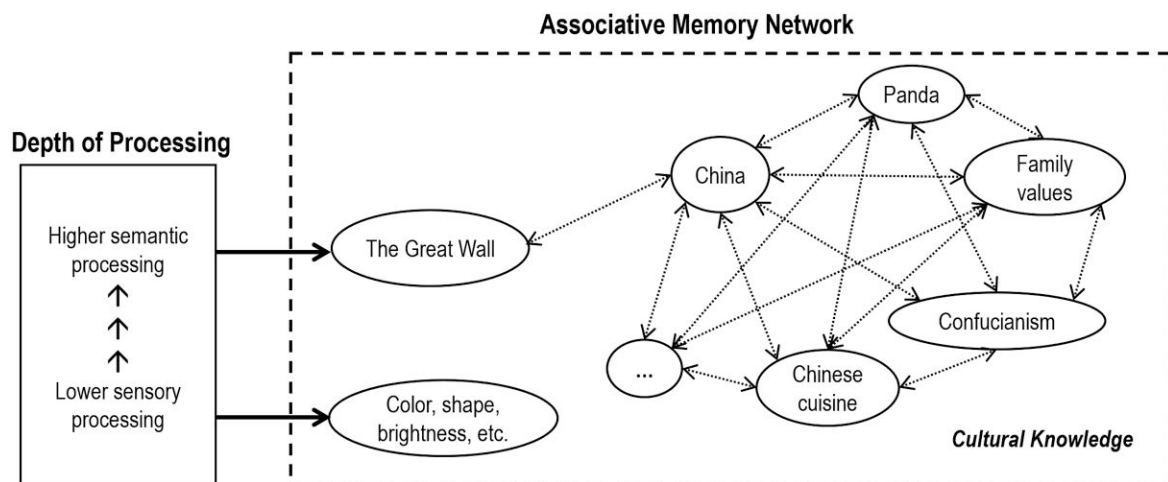
Applying this notion to the context of culture priming as described in CFS, we expect that the priming effect of cultural cues, such as language and image, is stronger when the cues are processed at a greater depth, due to a greater degree of semantic or cognitive analysis, which leads to extraction of meaning and subsequent activation of memory nodes related to the same culture. In contrast, when a cultural cue is processed at a lower depth, extraction of meaning is less likely to occur, failing to activate the memory nodes in the cultural knowledge system. Thus, we propose that depth of processing moderates the priming effects of the two dominant cultural cues: language (Hypothesis 1a) and image (Hypothesis 1b).

**Hypothesis 1.** *The priming effects of both (a) language and (b) image as cultural cues are moderated by the depth of processing, such that it is stronger at a higher (i.e., semantic) level of processing.*

### 3.2. Priming Effects of Language and Image in the Online Context

Next, we examine if the well-established priming effects of language and image can still occur in the natural online setting. First, although online users may not be

**Figure 2.** Activation of Cultural Knowledge System



Note: The diagram illustrates potential connections between memory nodes through associative links. The strength of these links varies among individuals based on their prior cultural knowledge. The nodes and links depicted are not exhaustive.

explicitly instructed to process priming cues on websites and may be preoccupied with other tasks in mind, they nevertheless need to process information, including language and images, on the websites. Language is the building block from which users gain information from a website (Cyr and Trevor-Smith 2004). Important information, such as menu, product categories, product descriptions, articles, and news, are mostly presented as textual information on websites. Meanwhile, images naturally capture attention because they are generally engaging (Li and Xie 2020) and easier to remember and retrieve due to dual coding (Paivio 1986, 1991). Hence, we expect that a reasonable amount of language and images on websites will still be processed.

Second, once texts and images are processed and recognized, the corresponding memory nodes become activated. This activation quickly spreads to other linked nodes, diminishing in strength as it travels outward (Collins and Loftus 1975). Importantly, the activation process is typically described in the psychology literature as automatic and unconscious (Posner and Snyder 1975, Balota and Lorch 1986). Thus, we expect activation to occur without explicit instruction or conscious effort to retrieve related cultural knowledge. This view aligns with the CFS literature, which states that “the activation of these components in the culture network will, in turn, automatically activate other components throughout the network” (Zhang 2009, p. 65).

Third, although various manipulations of text and image priming have been used in the CFS literature, their effect sizes fall into similar ranges (Online Appendix III). For example, language priming has been carried out in mainly two ways, that is, conducting the experiment in a specific language (Ramírez-Esparza et al. 2006, Luna et al. 2008, Lee et al. 2010) or asking subjects to complete a language-related task, such as a scrambled sentence task (Fu et al. 2015, Han and Ling 2016, Arieli and Sagiv 2018), a proverbs rating task (Briley et al. 2005), or a lexical decision task (Mok and Morris 2013). Although using language-related tasks appears to be a stronger manipulation than conducting the experiments in a specific language, the reported effect sizes of language priming vary from small to large for both types of manipulation, confirming the effectiveness of language priming regardless of the context. Similarly, when using images for priming, stronger manipulation involving explicit requests for reporting what country the picture symbolizes (Wang et al. 2025) results in a similar effect size as relatively subtle requests for writing about subjects’ experience of viewing the images (Li et al. 2024). It appears that as long as a sufficient number of memory nodes in a cultural knowledge system is activated, subjects will react in line with the activated culture. Hence, we expect the culture priming effect of language and image to hold in

the online context even with a weaker manipulation and propose the following hypotheses.

**Hypothesis 2.** *Collectivism (individualism) is more likely to be activated among multicultural individuals when the website is presented in Chinese (English) than in English (Chinese) language.*

**Hypothesis 3.** *Collectivism (individualism) is more likely to be activated among multicultural individuals when the website is presented with Chinese (Western) images than with Western (Chinese) images.*

Note that we do not propose an interaction effect between language and image, because (1) it is not the main focus of our research, and (2) there is no theoretical justification based on CFS to propose an interaction effect. Online Appendix III shows that, although there are a handful of CFS studies that used both language and image as priming cues, there is no evidence that the effect size is stronger when using them together versus using one cue only.

### 3.3. Downstream Effects of Culture Priming

Next, we integrate the culture priming effect with the IS literature on website design to explore how the activated culture may interact with other website design and content factors to affect dependent variables of interest to IS researchers. For example, if a website presented in English (or Chinese) can prime multicultural individuals into an individualism (or collectivism) mindset, how can global companies leverage this information when designing other website features and contents to influence online consumers’ perception and behavior?

To explore possible downstream effects, we perform a mapping exercise to identify website design and content factors that may interact with IND/COL. We first reviewed the human-computer interaction literature to identify important website design and content factors that have significant impact on users’ perception and behavior and listed them on the left-hand side of Appendix A. Next, we listed characteristics of IND/COL on the right-hand side of Appendix A. Then, we mapped the website design and content factors to the characteristics of IND/COL based on theoretical reasoning. Our mapping shows that many website design and context factors can be related to characteristics of IND/COL. We chose a website design factor (social presence) and a website content factor (ingroup) for further exploration as they have the most connections between the two sides.

Social presence reflects “the extent to which a medium allows users to experience others as being psychologically present” (Gefen and Straub 2003, p. 11). Social presence develops trust in a website based on the conveyance of social cues in the online context

(Gefen and Straub 2004). We argue that social presence should be more appreciated by collectivists because of their group focus and need for social proof (Bond and Smith 1996, Botha et al. 2017) and social cues (Cialdini et al. 1999, Zou et al. 2009). In contrast, individualists may not value the psychologically enabled presence of others on a website as much because they value personal achievements and independence over social proof (Doney et al. 1998). Hence, we propose the positive effect of social presence on trust to be stronger for multicultural individuals with activated collectivism than for multicultural individuals with activated individualism.

**Hypothesis 4.** *The positive effect of social presence on trust in a website will be stronger among multicultural individuals when collectivism is activated than when individualism is activated.*

In addition, ingroup bias refers to more positive attitudes toward people from one's ingroup than those from one's outgroup (Doney et al. 1998, Lee and Ward 1998, Huff and Kelley 2003). Such preferential treatment of ingroup members has been found to be more prominent for collectivists than individualists in the offline context (Oyserman 1993, Triandis 1995, Huff and Kelley 2003, Guo et al. 2022). We expect a similar ingroup bias online, especially considering that in a virtual environment, users have fewer cues to evaluate a website and are therefore more likely to rely on available cues to make judgments. Under such circumstances, including ingroup contents is a quick way to get users to make connections with the website, and collectivists are likely to value such connections more than individualists. For example, collectivists are likely to act more positively toward crowdfunding projects initiated by local (versus foreign) creators, products made by local (versus foreign) manufacturers, and product reviews written by local (versus foreign) users than individualists. In contrast, although individualists may still form strong attachments to their immediate social groups (such as family) (Hofstede et al. 2010, p. 92), they prioritize personal achievements and independence (Doney et al. 1998, Triandis 2001), which make them less susceptible to ingroup bias. Hence, we propose that a multicultural individual's ingroup bias on a website will be stronger when collectivism is activated than when individualism is activated.

**Hypothesis 5.** *A multicultural individual's ingroup bias on a website will be stronger when collectivism is activated than when individualism is activated.*

## 4. Methodology

Table 1 summarizes our five studies. To address the first research objective, we conducted two online experiments on Prolific (Studies 1 and 2) to test Hypothesis 1,

Hypothesis 2, and Hypothesis 3. To address the second research objective, we conducted two laboratory experiments (Studies 3 and 4) that examine the downstream effects of culture priming using multicultural Hong Kong students (to test Hypothesis 4 and Hypothesis 5 while reconfirming Hypothesis 2). We then conducted another laboratory experiment (Study 5) to show within-subject cultural frame switching between tasks by replicating Studies 3 and 4 (reconfirming Hypothesis 2, Hypothesis 4, and Hypothesis 5). We note that prior literature employs various approaches to identify multicultural individuals, which can be categorized into three groups (Online Appendix II). To be more comprehensive, we employed all three criteria, that is, self-declared multicultural identity, culture exposure, and language proficiency in our studies.

### 4.1. Study 1: Moderating Effect of Depth of Processing

**4.1.1. Experiment Design and Subjects.** We conducted a 2 (*language*: English versus Chinese)  $\times$  2 (*image*: Western versus Chinese)  $\times$  2 (*depth of processing*: low versus high) between-subject experiment on multicultural individuals recruited from Prolific. Prolific allows subjects to declare whether they are multicultural. We used this profile feature as one of our criteria to select multicultural individuals for our sample. We also selected subjects with a minimum of 95% approval rating. A total of 336 subjects participated in the study, but 16 did not pass the manipulation checks and attention checks, leaving us with 320 subjects. They were between 18 and 65 years old (mean = 31.10 years) with 56% female, and paid £4 for their participation. We also measured their language proficiency on a seven-point scale. The subjects had more than adequate proficiency in both English (6.42 out of 7) and Chinese (5.77 out of 7).

**4.1.2. Experiment Manipulation and Procedure.** Subjects were asked to evaluate five images, in a random order, on the experiment website. Image evaluation tasks are commonly used in CFS research on culture priming. Although not a typical online task, it allows us to benchmark our results against prior CFS studies and have a clean test of depth of processing as a boundary condition of CFS. Our remaining studies are conducted in more natural online settings. The language conditions were manipulated by presenting the experiment website in English or Chinese. Priming images were selected following prior studies (Hong et al. 2000, Zou et al. 2008, Liu et al. 2021). For example, images of the Great Wall of China and terracotta warriors in an ancient Chinese tomb were used in the Chinese condition, whereas images of the Statue of Liberty and an American bald eagle were used in the Western

**Table 1.** Overview of Studies

	Moderating effect of depth of processing	Culture priming in online contexts	Downstream effects in online contexts		
	Study 1	Study 2	Study 3	Study 4	Study 5
Setting	Online experiment; Prolific	Online experiment; Prolific	Laboratory experiment; Hong Kong	Laboratory experiment; Hong Kong	Laboratory experiment; Hong Kong
Experiment tasks	Digital image evaluation	Online shopping	Online shopping	Crowdfunding support	Online shopping; Crowdfunding support
Subjects	320	126	216	204	244
Priming	Language; image	Language; image	Language	Language	Language
Independent variables	Language; image; depth of processing	Language; image	IND/COL; social presence	IND/COL; ingroup	IND/COL; social presence; ingroup
Depth of processing	Low versus high processing	High depth of processing	High depth of processing	High depth of processing	High depth of processing
Dependent variables	IND/COL	IND/COL	Trust in the website	Crowdfunding support	Trust in the website; crowdfunding support
Hypotheses	H1	H2, H3	H2, H4	H2, H5	H2, H4, H5
Multicultural identification					
	Study 1	Study 2	Study 3	Study 4	Study 5
Culture identification <sup>a</sup>	West: 4.85 (1.20) <sup>b</sup> Chi: 4.84 (1.31) <sup>c</sup>	West: 4.77 (1.39) Chi: 4.83 (1.24)	West: 4.14 (0.60) Chi: 5.12 (0.73)	West: 4.40 (1.24) Chi: 4.90 (1.13)	West: 4.40 (1.25) Chi: 4.97 (1.16)
Culture exposure	Prolific prescreening	16.24 (9.86) years living in English-speaking and 13.16 (9.69) years living in Chinese-speaking regions	Lived ≥10 years in Hong Kong	Lived ≥10 years in Hong Kong	Lived ≥10 years in Hong Kong
Language proficiency <sup>a</sup>	Eng: 6.42 (0.80) <sup>d</sup> Chi: 5.77 (1.30) <sup>e</sup>	Eng: 6.60 (0.71) Chi: 5.61 (1.30)	Eng: 5.33 (0.91) Chi: 5.38 (1.28)	Eng: 5.12 (1.02) Chi: 6.12 (1.04)	Eng: 5.31 (1.00) Chi: 6.22 (1.01)

<sup>a</sup>Seven-point scale.

<sup>b</sup>Western culture: Mean (SD).

<sup>c</sup>Chinese culture: Mean (SD).

<sup>d</sup>English: Mean (SD).

<sup>e</sup>Chinese: Mean (SD).

condition. These images had been found to activate the corresponding culture in traditional offline settings. Depth of processing was manipulated at two levels, that is, a low *sensory* level and a high *semantic* level, following Childers and Houston (1984). In the low sensory level condition, subjects were asked to review each of the five images and answer three questions about the image’s physical properties, such as color, contrast, and orientation of lines. In the high semantic level condition, subjects were asked to answer three questions about the main object in the image and its meaning. A training task was first provided in which subjects were asked to answer three questions (consistent with the depth of processing manipulation) about a culturally neutral image, that is, an image of clouds, following Hong et al. (2000). Finally, subjects completed a questionnaire consisting of IND/COL and

three other cultural dimensions, manipulation and attention checks, and demographic variables.

#### 4.1.3. Measurement Items and Sample Validation.

Online Appendix IV lists the measurement items of the cultural dimensions. Following the culture literature (Srite and Karahanna 2006, Maruping et al. 2019), we conceptualize IND/COL as a bipolar measure with a higher score indicating collectivism and a lower score indicating individualism. We measured IND/COL with items adapted from Maruping et al. (2019) and Srite and Karahanna (2006).<sup>5</sup> Table 2 shows the descriptive statistics of IND/COL across the eight conditions, and Table 3 shows the descriptive statistics of demographic variables. Online Appendix IV shows that the Cronbach’s alphas are higher than the recommended level of 0.70 for all constructs. The average variance

**Table 2.** IND/COL Scores for All Experiments

Study 1: $n = 320$ ; IND/COL = 4.11 (1.11) <sup>a</sup> ; language: partial $\eta^2 = 0.03$ (small); image: partial $\eta^2 = 0.02$ (small)			
English + Western image + low depth of processing ( $n = 40$ ): 4.00 (1.00) <sup>a</sup>	English + Chinese image + low depth of processing ( $n = 41$ ): 3.98 (1.21) <sup>a</sup>	Chinese + Western image + low depth of processing ( $n = 41$ ): 4.05 (1.00) <sup>a</sup>	Chinese + Chinese image + low depth of processing ( $n = 40$ ): 4.03 (1.24) <sup>a</sup>
English + Western image + high depth of processing ( $n = 40$ ): 3.61 (0.95) <sup>a</sup>	English + Chinese image + high depth of processing ( $n = 39$ ): 4.15 (1.16) <sup>a</sup>	Chinese + Western image + high depth of processing ( $n = 39$ ): 4.23 (1.06) <sup>a</sup>	Chinese + Chinese image + high depth of processing ( $n = 40$ ): 4.82 (0.91) <sup>a</sup>
Study 2: $n = 126$ ; IND/COL = 3.99 (1.07) <sup>a</sup> ; language: partial $\eta^2 = 0.06$ (medium); image: partial $\eta^2 = 0.04$ (small)			
English + Western image ( $n = 34$ ): 3.49 (1.05) <sup>a</sup>	English + Chinese image ( $n = 31$ ): 4.06 (1.02) <sup>a</sup>	Chinese + Western image ( $n = 30$ ): 4.17 (1.02) <sup>a</sup>	Chinese + Chinese image ( $n = 31$ ): 4.31 (1.04) <sup>a</sup>
Study 3 (between-subject effect): $n = 216$ ; IND/COL = 4.75 (1.55) <sup>a</sup> ; language: partial $\eta^2 = 0.60$ (large)			
English ( $n = 108$ ): 3.55 (1.05) <sup>a</sup>		Chinese ( $n = 108$ ): 5.95 (0.90) <sup>a</sup>	
Study 4 (between-subject effect): $n = 204$ ; IND/COL = 4.47 (1.01) <sup>a</sup> ; Language: partial $\eta^2 = 0.02$ (small)			
English ( $n = 103$ ): 4.32 (1.02) <sup>a</sup>		Chinese ( $n = 101$ ): 4.63 (0.99) <sup>a</sup>	
Study 5 (within-subject effect): $n = 244$ ; IND/COL = 4.09 (1.15) <sup>a</sup> ; Language: partial $\eta^2 = 0.22$ (large)			
English ( $n = 244$ ): 3.86 (1.11) <sup>a</sup>		Chinese ( $n = 244$ ): 4.32 (1.15) <sup>a</sup>	
Replication of Study 3: $n = 244$ ; IND/COL = 4.09 (1.16) <sup>a</sup> ; Language: partial $\eta^2 = 0.05$ (small)			
English ( $n = 120$ ): 3.83 (1.13) <sup>a</sup>		Chinese ( $n = 124$ ): 4.35 (1.13) <sup>a</sup>	
Replication of Study 4: $n = 244$ ; IND/COL = 4.08 (1.15) <sup>a</sup> ; Language: partial $\eta^2 = 0.03$ (small)			
English ( $n = 124$ ): 3.90 (1.09) <sup>a</sup>		Chinese ( $n = 120$ ): 4.28 (1.18) <sup>a</sup>	

<sup>a</sup>Mean (SD); partial  $\eta^2 \geq 0.0099$ ,  $\geq 0.0588$ , and  $\geq 0.1379$  = small, medium, and large effect sizes, respectively (Cohen 1988).

extracted (AVE) for all constructs exceed the cutoff value of 0.50. In addition, the square roots of AVEs are higher than the interconstruct correlations. Overall, the psychometric tests provide support for reliability, convergent validity, and discriminant validity.

Manipulation checks included asking subjects whether the website language was in Chinese or English; whether the images were related to Chinese or Western culture; and whether they were asked to evaluate images based on their physical properties or the meaning of the displayed object. Two attention check questions were used to verify whether subjects paid attention during the experiment. Age and gender were measured as control.

**4.1.4. Results.** *F*-tests results showed that the random assignment of subjects was successful, because there were no significant differences in age ( $F = 1.38$ ,  $p = 0.21$ ) or gender ( $F = 0.95$ ,  $p = 0.47$ ) across the eight experiment conditions. Averaged item scores were calculated

for the multi-item constructs. Table 4 reports the analysis of covariance (ANCOVA) results with age and gender covariates. The results show a significant interaction effect between *language* and *depth of processing* ( $F = 5.68$ ,  $p = 0.02$ ), supporting Hypothesis 1a, and a significant interaction effect between *image* and *depth of processing* ( $F = 5.62$ ,  $p = 0.02$ ), supporting Hypothesis 1b. There are also significant main effects for *language* ( $F = 9.27$ ,  $p = 0.003$ ) and *image* ( $F = 5.35$ ,  $p = 0.02$ ), in line with traditional culture priming effects. Meanwhile, the main effect of *depth of processing* ( $F = 3.15$ ,  $p = 0.08$ ), the interaction effect between *language* and *image* ( $F = 0.02$ ,  $p = 0.89$ ), and the three-way interaction effect ( $F = 0.01$ ,  $p = 0.91$ ) are not significant.

Figure 3, (a) and (b), depicts the patterns of the two interaction effects. Simple effect analyses show that the priming effect of *language* is only significant when the *depth of processing* is high ( $F = 14.65$ ,  $p < 0.001$ ), but not when it is low ( $F = 0.22$ ,  $p = 0.64$ ). Similarly, the

**Table 3.** Descriptive Statistics of Demographic and Dependent Variables for All Studies

Variables	Study 1		Study 2		Study 3		Study 4		Study 5		Study 5	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	31.10	9.13	28.09	7.98	20.95	0.98	19.34	1.17	19.91	1.52	19.91	1.52
Gender ( $M = 0$ , $F = 1$ )	0.56	0.50	0.66	0.48	0.63	0.48	0.54	0.50	0.50	0.50	0.50	0.50
Online shopping experience			8.46	4.51	3.93	1.47			4.89	2.87		
Mobile games experience							4.57	1.85			4.54	1.86
Trust: Ability					3.94	1.19						
Trust: Benevolence					4.24	1.08						
Trust: Integrity					3.83	1.25						
Trust									4.27	0.92		
Trusting intention									3.46	1.21		
Crowdfunding support							1.70	1.09			1.69	0.97

**Table 4.** ANCOVA Results of Studies 1 and 2 (Dependent Variable: *IND/COL*)

Variables	Study 1		Study 2	
	F-value	p-value	F-value	p-value
Age	0.03	0.87	0.24	0.62
Gender (male = 0, female = 1)	4.70	0.03*	0.48	0.49
Online Shopping Experience			4.60	0.03
Language (English = 0, Chinese = 1)	9.27	0.003**	7.85	0.006**
Image (Western = 0, Chinese = 1)	5.35	0.02*	4.28	0.04*
Depth of Processing (Low = 0, High = 1)	3.15	0.08		
Language × Depth of processing	5.68	0.02*		
Image × Depth of processing	5.62	0.02*		
Language × Image	0.02	0.89	1.76	0.19
Language × Image × Depth of processing	0.01	0.91		

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

priming effect of *image* is only significant when the *depth of processing* is high ( $F = 10.83, p = 0.001$ ), but not when it is low ( $F = 0.02, p = 0.97$ ).

**4.1.5. Discussion.** The results of Study 1 provide strong support for the moderating effect of depth of processing, albeit in a somewhat unnatural setting, with explicit instructions given to manipulate the depth of processing. In the following experiments, we will not manipulate depth of processing. Instead, we will observe whether culture priming effects can be found in a natural online setting without explicit instructions. If there is a low level of processing, then we should not observe any culture priming effect. However, if there is a high level of processing, then we should be able to observe the culture priming effects.

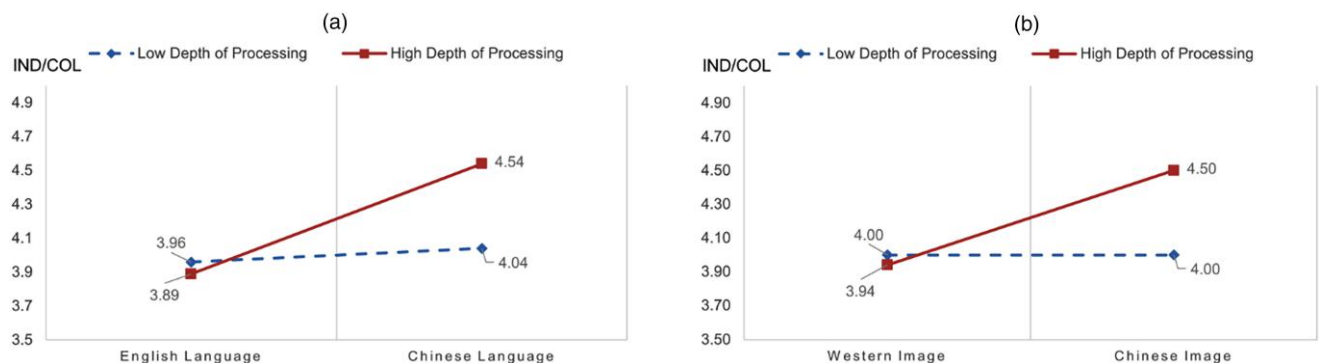
**4.2. Study 2: Culture Priming Effect in the Online Setting**

**4.2.1. Experiment Design and Subjects.** We used a between-subject 2 (*language*: English versus Chinese) × 2 (*image*: Western versus Chinese) design. We recruited 132 multicultural individuals from Prolific after excluding Study 1’s subjects. The screening criteria for multicultural individuals remained the same. A total of 126 subjects

passed the manipulation check and attention checks. The subjects were between 18 and 62 years old (mean = 28.09 years) with 66% female, and paid £4 as incentive.

**4.2.2. Experiment Manipulation and Procedure.** We chose an e-commerce setting as it is a very popular online context. A hypothetical shopping website was developed to eliminate any potential bias due to individuals’ familiarity with well-known websites or established brands (Online Appendix V). We enhanced the depth of processing of images by *repetition* on the experiment website.<sup>6</sup> We embedded culture-rich image cues in both the background and the navigation bar. This way, when subjects browse the website for products to buy, they would be exposed repeatedly to these images, increasing their depth of processing. We conducted a pretest with 10 culture-rich images that were fitted into the background and the navigation bar, on 30 Prolific and 21 Hong Kong multicultural individuals. Based on their ratings (seven-point scale with 1 = Western culture and 7 = Chinese culture), we selected the two most representative Western images (i.e., heraldry, mean = 1.59, standard deviation (SD) = 0.94; British afternoon tea set, mean = 1.51, SD = 0.76) and the two most representative Chinese images (i.e., ancient

**Figure 3.** (Color online) Study 1: Interaction Effects



Notes. (a) Study 1: Language × depth of processing. (b) Study 1: Image × depth of processing.

Chinese fan, mean = 6.47, SD = 0.70; Chinese painting, mean = 6.65, SD = 0.59). We used one of the images as the background for the website and applied the other image in the navigational bar as well as in the background of the product images (see Online Appendix V). We deliberately made the images subtle and therefore more natural and realistic for the website. Such a manipulation provides a more conservative test of the hypotheses.

As a cover story, the subjects were told that a foreign e-commerce website that specialized in apparel was entering the local market. Subjects were instructed to choose a product from the website as a gift for a friend. Similar to prior studies (Hassanein and Head 2007), we asked the subjects to browse the website at their own pace before making their purchase decision, and they have a chance to win the product they picked through a lucky draw after completion of the experiment. A pilot study with 30 subjects was conducted to evaluate the experiment procedure, website, and product pages. Based on their feedback, minor changes were made to fine-tune the size, opacity, and position of the images.

**4.2.3. Measurement Items and Results.** *IND/COL* was measured similarly to Study 1. Online Appendix V presents reliabilities and correlations between constructs. Cronbach's alpha for *IND/COL* is 0.75. *F*-tests results showed that the random assignment of subjects was successful, with no differences in age ( $F = 1.07, p = 0.36$ ) or gender ( $F = 0.03, p = 0.99$ ) across the four experiment conditions. Table 2 shows a medium effect size for *language* and a small effect size for *image*. Table 3 presents the descriptive statistics. Table 4 reports a two-way ANCOVA with age, gender, and online shopping experience as covariates. The results show significant main effects for *language* ( $F = 7.85, p = 0.006$ ) and *image* ( $F = 4.28, p = 0.04$ ) on *IND/COL*, supporting Hypothesis 2 and Hypothesis 3, whereas the interaction effect between *language* and *image* was not significant ( $F = 1.76, p = 0.19$ ).

**4.2.4. Discussion.** The findings of Study 2 support the language priming effect and the image priming effect with no explicit instruction to process these cultural cues, providing evidence of high semantic processing of the priming cues in the natural online setting.

Next, we proceed with testing the downstream effects of the activated culture, using language as the only priming cue for three reasons. First, Study 2 has found a stronger priming effect for language than for images in a typical online shopping setting. Second, there is no interaction between these two priming cues, implying that a single cultural cue is sufficient to activate a specific cultural knowledge system and adding another cue aligned with the same culture will not enhance activation. Thus, for parsimony of the study design, including one priming cue is adequate for

culture activation. Third, incorporating images would significantly complicate the experimental design and data analysis (e.g., changing from a  $2 \times 2$  to a  $2 \times 2 \times 2$  design) without yielding additional insights.

### 4.3. Study 3: Downstream Effects of Culture Priming on Trust in Website

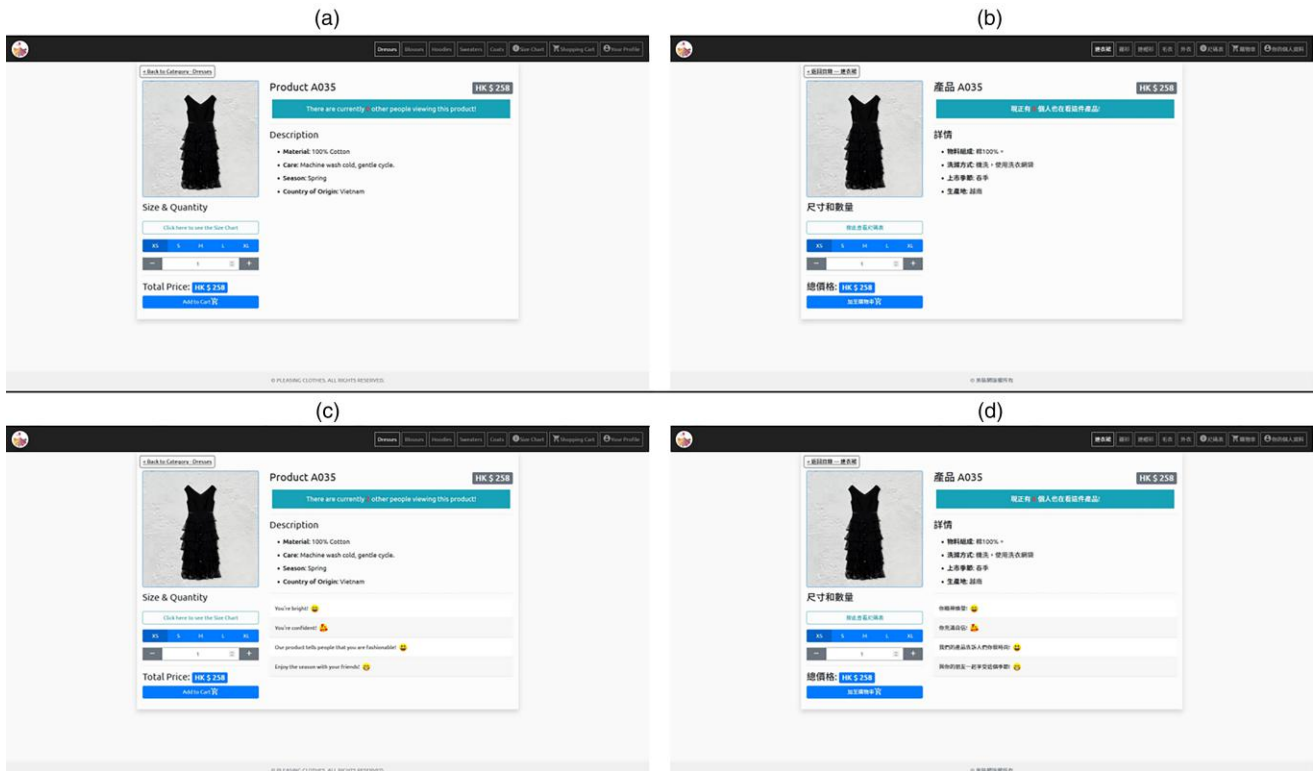
**4.3.1. Experiment Design and Subjects.** We conducted a 2 (*language*: English versus Chinese)  $\times$  2 (*social presence*: low versus high) between-subject laboratory experiment on multicultural Hong Kong subjects. Hong Kong students have been widely used in CFS research because of their heavy exposure to both Eastern and Western cultures and their fluency in both Chinese and English languages (Briley et al. 2005, Wong and Hong 2005, Tam et al. 2012). We recruited subjects who were undergraduate students at a public university in Hong Kong and had lived in Hong Kong for at least 10 years. A total of 228 subjects participated in the study, but 12 did not pass the manipulation checks and attention checks, leaving us with 216 subjects. The subjects were between 19 and 24 years old (mean = 20.95 years) with 63% female, and paid HK\$100 for their participation.

**4.3.2. Experiment Website, Procedure, and Measurement Items.** The cover story and the shopping task are the same as in Study 2. We manipulated social presence in the product pages (Figure 4, (a)–(d)) by adapting the *low* and *medium* social presence manipulations in Hassanein and Head (2007) and Hassanein et al. (2009). The *medium* manipulation includes social-rich information about the products that are generated by the website, whereas the *low* manipulation does not have such information. We did not use their *high* social presence manipulation, which has human images, because human images can carry culture identity (e.g., an Asian girl image can remind one of Eastern culture). We also added emoticons to increase social presence following Park and Sundar (2015).

Our experiment was conducted in a behavioral laboratory, which has tall separators on three sides (front, left and right) of each subject's desk, so that they cannot see each other or the experimenter during the experiment, minimizing potential audience effect. After the subjects completed the online shopping task, they answered an online questionnaire measuring *trust* (adapted from McKnight et al. (2002)), *IND/COL*, manipulation checks, attention checks, and demographics. *Trust* was measured as a multidimensional construct following prior literature (McKnight et al. 2002, Gefen and Straub 2004) (Online Appendix VI).

**4.3.3. Manipulation Checks.** All subjects passed the manipulation check for language. We used perceived social presence (Gefen and Straub 2004) as a manipulation check for social presence. Appendix B presents the

Figure 4. (Color online) Study 3: Screenshots



Notes. (a) English web page (low social presence). (b) Chinese web page (low social presence). (c) English web page (high social presence). (d) Chinese web page (high social presence).

measurement items of perceived social presence. An analysis of variance (ANOVA) test ( $F = 535.40$ ,  $p < 0.001$ ) indicated that perceived social presence was significantly higher in the high social presence condition (mean = 5.33) than in the low social presence condition (mean = 2.43).

**4.3.4. Results.** The random assignment of subjects was successful, as the subjects did not differ in age ( $F = 0.40$ ,  $p = 0.75$ ) or gender ( $F = 0.47$ ,  $p = 0.70$ ) across the different experiment conditions. Online Appendix VI presents the measurement items, reliabilities, and

correlations. *Language* has a significant effect on *IND/COL* ( $\beta = 0.77$ ,  $p < 0.001$ ), reconfirming Hypothesis 2. Table 2 shows *language* has a large effect size. Table 3 presents the descriptive statistics. We regressed the three *trust* dimensions on *IND/COL*, *social presence*, and their interaction. Using ANCOVA, with mean split to convert *IND/COL* into a binary variable, generated similar results. We present the hierarchical regression analysis because it better captures the variation in *IND/COL* and highlights the additional  $R^2$  explained by the interaction effect. Table 5 shows that the control variables are entered first (Model 1), followed by the

Table 5. Study 3: Hierarchical Regression Results on Trust in a Website

Model	Trust: Ability			Trust: Benevolence			Trust: Integrity			Aggregated trust		
	1	2	3	1	2	3	1	2	3	1	2	3
$R^2$	0.02	0.47	0.52	0.03	0.32	0.46	0.02	0.44	0.52	0.03	0.50	0.60
$\Delta R^2$		0.45	0.05		0.29	0.14		0.42	0.08		0.47	0.10
<i>Age</i>	0.07	0.05	0.03	0.13	0.12*	0.09	0.05	0.03	0.01	0.09	0.07	0.04
<i>Gender (M = 0, F = 1)</i>	0.05	0.04	0.001	-0.01	-0.01	-0.08	0.06	0.05	-0.01	0.04	0.03	-0.03
<i>Online Shopping Experience</i>	0.13	0.10	0.07	0.11	0.09	0.05	0.13	0.10	0.07	0.14	0.11	0.07
<i>IND/COL</i>		0.34***	0.31***		0.34***	0.30***		0.27***	0.24***		0.35***	0.31***
<i>Social Presence</i>		0.60***	0.60***		0.45***	0.46***		0.61***	0.61***		0.62***	0.62***
<i>IND/COL × Social Presence</i>			0.23***			0.38***			0.29***			0.33***

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

main effects (Model 2), and finally the interaction effect (Model 3). The interaction effect between *IND/COL* and *social presence* on *trust* is significant for *ability* ( $\beta = 0.23, p < 0.001$ ), *benevolence* ( $\beta = 0.38, p < 0.001$ ), *integrity* ( $\beta = 0.29, p < 0.001$ ), and the aggregated measure of *trust* ( $\beta = 0.33, p < 0.001$ ), providing support for Hypothesis 4.<sup>7</sup> The plots of the interaction effect (Figure 5(a)) and simple effects analyses show a superadditive pattern in which the positive effect of *social presence* on *trust* became more significant when *IND/COL* is high than when it is low. Specifically, when *IND/COL* is high, *social presence* positively affects *ability* ( $\beta = 0.83, p < 0.001$ ), *benevolence* ( $\beta = 0.84, p < 0.001$ ), *integrity* ( $\beta = 0.90, p < 0.001$ ), and the aggregated measure of *trust* ( $\beta = 0.95, p < 0.001$ ). When *IND/COL* is low, *social presence* positively affects *ability* ( $\beta = 0.37, p < 0.001$ ), *integrity* ( $\beta = 0.32, p < 0.001$ ) and the aggregated measure of *trust* ( $\beta = 0.29, p < 0.001$ ), but not *benevolence* ( $\beta = 0.08, p = 0.30$ ).

**4.3.5. Discussion.** Study 3's results confirm the priming effect of language on multicultural Hong Kong subjects and show a moderating effect of activated *IND/COL* on trust; that is, multicultural Hong Kong subjects respond more favorably to social presence embedded in the design of the website when collectivism is activated, leading to higher trust in the website.

#### 4.4. Study 4: Downstream Effects of Culture Priming on Crowdfunding Support

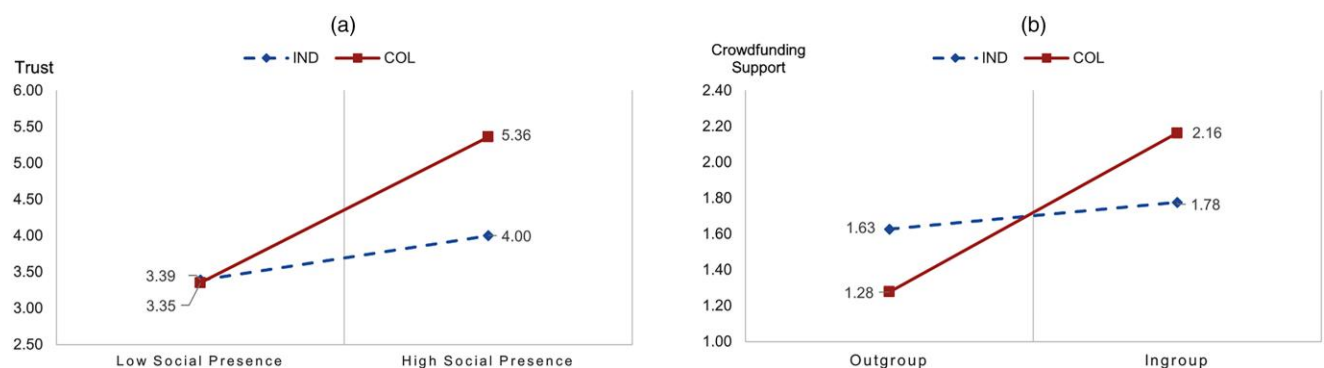
**4.4.1. Experiment Design and Subjects.** We conducted a 2 (*language*: English versus Chinese)  $\times$  2 (*ingroup*: outgroup versus ingroup) between-subject laboratory experiment with a new sample of multicultural Hong Kong subjects, with the same requirements as in Study 3. A total of 216 subjects participated, but 12 did not pass the manipulation checks and attention checks, leaving us with 204 subjects. They were between 18 and 25 years old (mean = 19.34 years) with 54% female,

and paid HK\$100 as incentive for their participation. We developed a crowdfunding website, which enabled us to directly measure the crowdfunding support in a laboratory setting. Following prior studies (Greenberg and Mollick 2017), a budget of HK\$25 was allocated to each subject to support crowdfunding projects. The subjects could decide whether to support the crowdfunding project and the amount of their support.

#### 4.4.2. Experiment Website, Materials, and Procedure.

A cover story was provided about a company wanting to promote its mobile games among our subjects, as well as ask for their funding support for a new mobile game project under development. Mobile games were selected as the main theme of the crowdfunding website, because they were likely to hold our subjects' interest. Online Appendix VII presents a screenshot of the experiment website. On the upper part of the web page, four mobile games framed as completed projects were displayed. Subjects were asked to rate each game after viewing a short gameplay video of that game.<sup>8</sup> The purpose of this exercise was to increase subjects' engagement with the crowdfunding website. On the lower part of the web page, the crowdfunding project framed as a new mobile game under development was displayed. We followed the general layout of popular crowdfunding websites for the bottom half of our web page to increase the realism of our experiment website. We presented a video that introduces the new game under development, followed by four support options. We operationalize *crowdfunding support* as the level of support that a subject is committing to the new project: level 1, HK\$0; level 2, HK\$10 (get game characters' stickers); level 3, HK\$20 (get a digital copy of the game); and level 4, HK\$25 (get stickers and a digital copy of the game). A pilot study with 10 subjects validated the experiment procedures and fine-tuned the website design. After performing the experiment task, the subjects completed an online questionnaire

**Figure 5.** (Color online) Studies 3 and 4: Interaction Effects



Notes. (a) Study 3: Trust in the website (aggregated). (b) Study 4: Crowdfunding support behavior.

measuring the research variables, manipulation checks, attention checks, and demographics.

Following the manipulation of ingroup in prior literature (Foddy et al. 2009, Cho et al. 2023), we framed the new game project as under development by graduates from the same university as the subjects in the ingroup condition and graduates from a similarly ranked (Times Higher Education ranking) university in the United States in the outgroup condition. The name and logo of the corresponding university were displayed next to the video of the game on the website, as well as at the beginning of the video itself.

**4.4.3. Manipulation Checks.** All subjects passed the manipulation checks for language and ingroup (i.e., “Which university is this game in development affiliated with?”). The subjects also confirmed that the crowdfunding website looked authentic to them (mean = 5.00 out of 7, SD = 1.19).

**4.4.4. Results.** The random assignment of subjects was successful because the *F*-tests showed that the subjects did not differ in age ( $F = 2.05, p = 0.11$ ) and gender ( $F = 0.49, p = 0.69$ ) across the four experiment conditions. Table 2 presents the means of *IND/COL* across conditions and the effect size of *language*. Table 3 presents the descriptive statistics. Online Appendix VII presents the reliabilities and correlations between constructs. Cronbach’s alpha for *IND/COL* is 0.73. *Language* has a significant effect on *IND/COL* ( $\beta = 0.14, p = 0.04$ ), reconfirming Hypothesis 2. Table 6 presents the hierarchical regression results. The interaction effect between *IND/COL* and *ingroup* on *crowdfunding support* is significant ( $\beta = 0.17, p = 0.02$ ), supporting Hypothesis 5. Using ANCOVA, with mean split to convert *IND/COL* into a binary variable, generated similar results.<sup>9</sup> The pattern of the interaction effect (Figure 5(b)) and the simple effect tests show that *ingroup* has a positive effect ( $\beta = 0.41, p < 0.001$ ) on *crowdfunding support* when *IND/COL* is high, but no

effect ( $\beta = 0.07, p = 0.48$ ) on *crowdfunding support* when *IND/COL* is low.

**4.4.5. Discussion.** The results of Study 4 reconfirm the priming effect of language on multicultural Hong Kong subjects and show a moderating effect of activated *IND/COL* on crowdfunding support; that is, multicultural Hong Kong subjects respond more favorably to crowdfunding projects associated with their ingroup than with their outgroup when collectivism is activated than when individualism is activated.

#### 4.5. Study 5: Replicating Studies 3 and 4 and Testing Within-Subject Cultural Frame Switching

**4.5.1. Experiment Design and Subjects.** Although Studies 3 and 4 using between-subject design confirmed our hypotheses, we further examined whether cultural frame switching can occur for a multicultural individual when completing different tasks on different websites. In reality, users often switch between different tasks and different websites. Hence, showing that cultural frame switching can happen within a relatively short period of time is of practical importance. We combined Studies 3 and 4 into a within-subject design (Table 7) and added a filler task in between to minimize any carryover effects (Online Appendix VIII). Each subject was randomly assigned to one of four conditions. In each condition, subjects completed one task in English and one in Chinese. The order of the language and the order of the two tasks (online shopping versus crowdfunding) were balanced. To increase generalizability of our findings, we also employ a new manipulation of social presence using human images (Hassanein and Head 2007, Cyr et al. 2009) as the background and a new measure of trusting belief (Sia et al. 2009, Gefen and Pavlou 2011) and trusting intention (Lankton et al. 2015). The human image was designed (without showing the head that might indicate ethnicity) and pretested to be culture neutral. Details of the manipulation, measurement, validity tests, and data analysis results are included in Appendix C and Online Appendix VIII.

Subjects were recruited from the same subject pool as in Studies 3 and 4 by excluding subjects from all previous studies. A total of 260 subjects participated in the study, but 16 did not pass the manipulation checks and attention checks, leaving us with 244 subjects. The subjects were between 18 and 23 years old, 50% were female, and they were paid HK\$150 for their participation.

**4.5.2. Results.** Data analyses include three parts: (1) replication of Study 3, (2) replication of Study 4, and (3) test for within-subject cultural frame switching between tasks. The results of the first two analyses are

**Table 6.** Study 4: Hierarchical Regression Results on Crowdfunding Support Behavior

	Model		
	1	2	3
$R^2$	0.02	0.07	0.10
$\Delta R^2$		0.05	0.03
Age	0.03	0.01	0.01
Gender (male = 0, female = 1)	-0.11	-0.12	-0.14
Mobile Games Experience	0.05	0.06	0.08
Ingroup (outgroup = 0, ingroup = 1)		0.24***	0.24***
<i>IND/COL</i>		0.03	0.01
<i>IND/COL</i> × <i>Ingroup</i>			0.17*

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table 7.** Study 5: Experiment Design

	Task 1	Filler task	Task 2
Condition 1	Online shopping–English website	Filler task	Crowdfunding–Chinese website
Condition 2	Crowdfunding–Chinese website	Filler task	Online shopping–English website
Condition 3	Online shopping–Chinese website	Filler task	Crowdfunding–English website
Condition 4	Crowdfunding–English website	Filler task	Online shopping–Chinese website

consistent with those of Studies 3 and 4 and reported in Appendix C and Online Appendix VIII. For the third analysis, because each subject was assigned two different language priming conditions (either English first or Chinese first), we expect a change in activated culture across the two tasks. A repeated measures ANCOVA test (with age and gender as covariates) shows that cultural frame switching happened within subjects ( $F = 69.64, p < 0.001$ ). This finding complements prior findings that multicultural individuals can be primed into either culture that they identify with by directly showing that cultural frame switching can occur within a relatively short time interval. Table 2 shows the descriptive statistics of *IND/COL* and the effect size of *language*. Table 3 presents the descriptive statistics of demographic and dependent variables.

## 5. Discussion

Through a series of experiments, we were able to (1) establish the boundary condition of CFS by identifying depth of processing as a moderator of culture priming effects; (2) verify that culture activation may occur in natural online settings; (3) examine two examples of downstream effects; and (4) show within-subject cultural frame switching in multiple online sessions. The series of experiments increase realism progressively, strengthening our confidence in generalizability of our findings.

### 5.1. Theoretical Implications

Our research makes five theoretical contributions to the extant literature. First, a major theoretical contribution lies in challenging an underlying assumption in CFS theory that processing priming cues will always lead to culture activation. By integrating the psychology literature on depth of processing with the CFS literature, we identify depth of processing as an important boundary condition of the culture priming effect. This boundary condition is particularly relevant in the natural online setting, where culture priming will not be implemented before subjects embark on their online activities, and processing cultural cues is not part of users' online tasks. Note that this boundary condition is applicable to CFS regardless of the context, that is, whether online or offline. It shows that the effectiveness of cultural cues on priming depends on the depth with which the cues are processed. Addressing

assumptions and identifying boundary conditions are crucial for advancing theories (Alvesson and Sandberg 2011).

Second, our research contributes to the website localization literature by challenging another assumption that localization may not be necessary for multicultural individuals, because they speak multiple languages and internalize multiple cultures. Prior research on localized websites typically assumes that the subjects are monocultural individuals and advocates for culture-fit design. This oversimplified view may have contributed to the insignificant effects of localization elements in prior studies, conducted in countries with a significant proportion of multicultural individuals, such as among college student samples (Liu et al. 2004, Gevorgyan and Manucharova 2009). For example, using a convenience sample of American and Chinese college students at a California-based public university, Gevorgyan and Manucharova (2009) found no significant differences between American and Chinese participants' favorite websites in terms of individualism and power distance ( $p = .403$ ), as many of the Chinese participants could indeed be multicultural. Because of this potential confound, some researchers deliberately excluded subjects who might have internalized more than one culture from their studies (Simon 2001). Our work formally extends website localization research to multicultural individuals, who are becoming more prevalent with increased globalization. Our research highlights the importance of understanding the unique characteristics of multicultural individuals, who are adaptable in responding to cultural cues embedded in localized websites. In contrast, monocultural individuals tend to respond favorably only to cultural cues that align with their own cultures.

Third, we integrate two distinct streams of literature—culture priming and IS literature on website design—to explore potential interactions between them. This integration of cultural cues with website design and content factors can meaningfully extend CFS to the online context and provide practical guidance for website designers. Note that the downstream effects are obtained via an activated cultural dimension, and not through the priming cues directly. Hence, we do not intend to use CFS as an overarching theory. Because multiple cultural dimensions within a particular culture can be activated, and each cultural dimension may interact with a different set

of website design and content factors, it is unlikely that such diverse downstream effects can be captured by one overarching theory. The mapping exercise we proposed in this paper provides a practical approach for researchers to identify potential website design and content factors that may work well with a particular cultural dimension of interest.

Fourth, we extend website localization research by demonstrating the importance of teasing apart different localization elements, because each of them may be processed differently in terms of depth, and thus have different priming effects on multicultural individuals. Note that this also applies to research on monocultural individuals, because teasing apart the different localization elements is necessary to evaluate their respective impacts on monocultural individuals' perceptions and behavior on websites.

Fifth, although culture has been generally acknowledged as an important factor in website localization research, its specific effects are not well understood, contributing to inconsistent findings in prior research. For example, Ko et al. (2015) and Moura et al. (2014) investigated online users' perception of travel websites. In both studies, localized and nonlocalized websites were compared, but opposite findings were observed. A closer examination of the inconsistent findings shows that they could be driven by the different culture adopted by the subjects in the respective studies; that is, Ko et al. (2015) used Korean subjects who are more collectivistic and prefer culturally congruent websites, whereas Moura et al. (2014) used New Zealanders who are more individualistic and prefer culturally incongruent websites. By explicitly modeling the effects of culture, we were able to better understand its role in website localization research.

## 5.2. Practical Implications

Our practical implications are three folded. First, existing localization efforts have focused on predicting users' preferences instead of proactively influencing their choices. This strategy works for monocultural individuals as they likely have relatively stable preferences that are consistent with one culture only. However, there is a lack of awareness of the potential impact of localization elements on multicultural individuals. Our research shows that global companies can proactively leverage website localization elements, such as language and image, to prime multicultural individuals into different cultural knowledge systems. Specifically, language has a strong and stable priming effect. Image priming may not be as effective, but repeated exposure to the same set of images can increase their chances of being processed deeply and activating related cultural knowledge system. Hence, global companies interested in implementing image priming effect need to find ways to

increase repeated exposure to culture-rich images on their localized websites.

Second, our research addressed the question of whether creating localized websites is still necessary or relevant for multicultural individuals. Just because multicultural individuals can speak multiple languages, global companies should not assume that providing their websites in one of these languages is adequate. In fact, our research underscores the significance of aligning the culture that can be activated by localization elements (i.e., language and images) with other website design and content factors to achieve desirable perceptions and behavioral outcomes. For example, a foreign company that intends to extend its products and services to Hong Kong may want to include more design elements that promote social presence on their Chinese website (which promotes collectivism) than on their English website (which promotes individualism). In another example, a crowdfunding website will be better off launching projects that are considered ingroup for multicultural individuals after priming them into collectivism through language, images or other cultural cues.

Interestingly, our review of the top 50 websites (rated by Alexa) shows that many localization efforts are incomplete, with only 28 (56%) websites providing localized languages. Among the 28 websites, only 10 provide localized languages for third-party information (e.g., product description provided by third parties), and only one provided localized language for user-generated contents (e.g., reviews and comments). More importantly, when users change language or location on a website, the contents and design may not change at all (e.g., only 20% also changed the images; only 10% changed the navigation structure; only 4% changed icons; 0% changed color; only 28% changed contents). This reflects a lack of awareness of the potential conflicting priming effects from cultural cues representing different cultures, and the potential synergy between cultural cues, the activated culture, and other design choices. Our work advocates for a complete localization strategy, which incorporates the consideration of priming effects, activated cultural knowledge systems, and proper design and content choices simultaneously.

Lastly, the downstream effects we observed are also relevant for websites targeting monocultural individuals. Currently, a culture-fit design for monocultural individuals typically emphasizes local language, images, and content. Our results indicate that, in addition to cultural elements, other website design and content factors should also be considered alongside cultural cues. Adhering to this guideline will allow global companies to develop localized websites to effectively serve both monocultural and multicultural individuals.

### 5.3. Limitations and Future Research

We acknowledge some limitations with our research. First, because Studies 3, 4, and 5 used student subjects, the findings may be biased toward the younger generation and experienced internet users. However, we believe that our results are generalizable to other populations as cultural values are stable long-term characteristics of an individual that change slowly over one's lifetime (Hofstede et al. 2010) and are immune to the degree of Internet experience or an individual's age. Studies 1 and 2 used Prolific subjects who have more diverse demographics. Further, the language priming effect is robust across both samples in five studies, providing confirmation that our results are not biased by sample selection.

Second, we have focused on enhancing experiment realism (whether subjects experience the experimental situation as intended) and psychological realism (whether the psychological processes that occur in the experiment are similar to those in real life) (Wilson et al. 2010), instead of mundane realism in our experiment design. Maruping et al. (2025) state that "True experiments are generally more concerned with experimental realism and psychological realism than mundane realism" and that "... attempts to increase mundane realism may defeat the experiment's purpose by impairing internal or construct validity" (p. xii). Using controlled laboratory experiment websites allows us to enhance internal validity by ruling out potential confounding effects of many variables (e.g., brand effect, familiarity, etc.) that may interact with the manipulation of the website localization elements. We designed realistic looking websites as much as possible and used tasks that are relevant to our subjects. Care was also taken to ensure that cultural cues are embedded in the websites in a natural and nonintrusive manner. Hence, we believe that our experiments design provides adequate experimental and psychological realism. Although we do not intend to provide a full ecological replication of a commercial website, we encourage future research to incorporate greater variation in cue complexity and partner with industry websites to conduct randomized field experiments.

Third, we have examined two priming cues (i.e., language and image), one cultural dimension (i.e., IND/COL), one website design factor (i.e., social presence), and one website content factor (i.e., ingroup). Future research can investigate the priming effect of other cultural cues, such as layout and navigation structure, on

other cultural dimensions, for example, uncertainty avoidance and long-term orientation, and see if they will moderate the effects of other website design and content factors. For instance, on an insurance website, a multicultural individual primed into uncertainty-avoidance may be more willing to purchase insurance products; on a shopping website, a multicultural individual primed into short-term orientation may prefer fast food or other items that offer instant gratification.

Fourth, although the language used for instructions and the questionnaire may strengthen the priming effect, we have minimized the amount of instructions and measured direct behavior (i.e., crowdfunding support) before presenting the questionnaire to reduce their potential effect. Fifth, we found relatively weaker priming effects when there is a large amount of multimodal information (e.g., videos) on the website. Future research may explore ways to strengthen the priming effect under such circumstances. Lastly, future research can extend our research to other multicultural populations and across other online contexts.

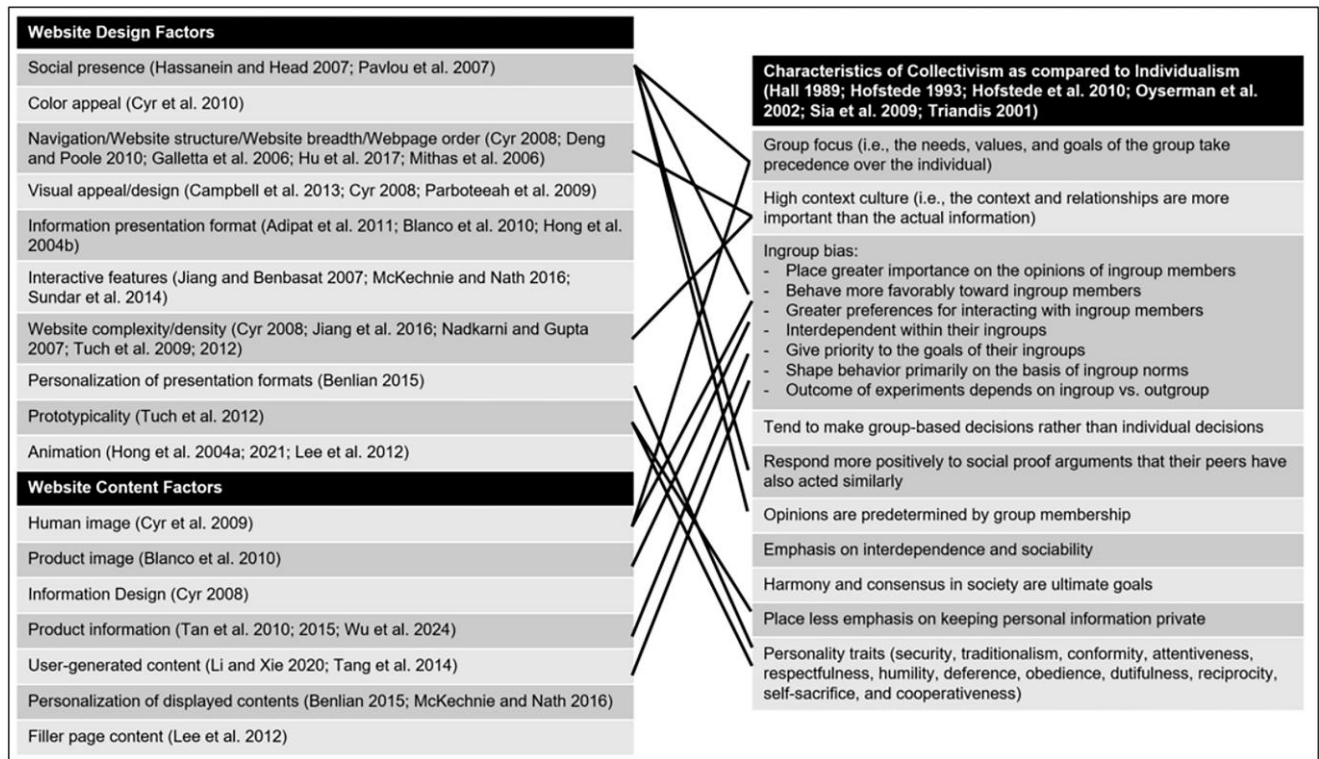
## 6. Conclusion

We investigated the priming effects of cultural cues on multicultural individuals across multiple online settings. In general, there is a robust priming effect for language and image on IND/COL, moderated by depth of processing. We also examined the downstream effects of activated IND/COL on multicultural individuals' trust in a website and crowdfunding support behavior. We found that activated IND/COL increases the effect of social presence on trust in the website, as well as strengthens the effect of ingroup on crowdfunding support behavior. We contribute to CFS theory by identifying an important boundary condition of the priming effect. We also contribute to website localization research by challenging an assumption that localization may not be necessary for multicultural individuals. In addition, our results identify the importance of choosing website design and content factors that align with appropriate localization elements when developing localized websites for multicultural individuals.

## Acknowledgments

The authors thank the senior editor, associate editor, and three anonymous reviewers for constructive comments throughout the review process.

## Appendix A. Mapping Between Website Design and Content Factors with Characteristics of IND/COL



*Notes.* Website design factors pertain to design features that create visual effects on the website. Website content factors refer to the information and messages that the website intends to convey. The factors are not meant to be comprehensive or mutually exclusive. Additional references for Appendix A are provided at the end of the Online Appendices.

## Appendix B. Social Presence Items in Studies 3 and 5

1. There is a sense of human contact on this shopping website.
2. There is a sense of sociability on this shopping website.
3. There is a sense of human warmth on this shopping website.
4. There is a sense of personalness in the shopping website.
5. There is a sense of human sensitivity in the shopping website.

## Appendix C. Study 5

### C.1. Replication of Study 3

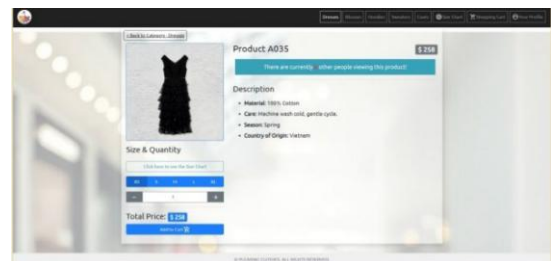
We replicate Study 3 by reusing its experiment materials with two changes. First, we employed a new manipulation of social presence using human images (Figures C.1–C.4). Including human images can induce high social presence (Hassanein and Head 2007), but we did not use this manipulation in the main study to avoid subjects inferring culture information from the human images. When replicating Study 3, we manipulated the background image of the website by including (high social presence) or not including human images (low social presence) after carefully

removing the head of the humans in the image to avoid any ethnic or culture indication. The background image with and without humans were pretested with 51 Prolific subjects to ensure that they are culturally neutral. Second, because we did not propose separate hypotheses for different dimensions of trust, we adopted a new unified measure of trust (Sia et al. 2009, Gefen and Pavlou 2011) and included an additional measure of trusting intention (Lankton et al. 2015). The measurement items in the replication of Study 3 and Study 4 are presented in Table C.1.

### C.2. Results

All subjects passed the manipulation check for language. We used perceived social presence (Gefen and Straub 2004) as a manipulation check for social presence. An ANOVA test ( $F = 126.73, p < 0.001$ ) indicated that perceived social presence was significantly higher in the high social presence condition (mean = 4.75) than in the low social presence condition (mean = 3.36). Table 2 presents the means of IND/COL across

**Figure C.1.** (Color online) English Product Page (Low Social Presence)



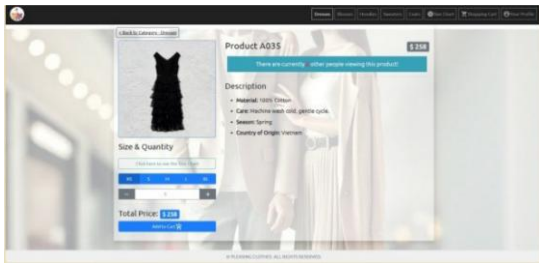
**Figure C.2.** (Color online) Chinese Product Page (Low Social Presence)



**Figure C.4.** (Color online) Chinese Product Page (High Social Presence)



**Figure C.3.** (Color online) English Product Page (High Social Presence)



**Table C.2.** Replication of Study 3: Hierarchical Regression Results on Trust

	Model		
	1	2	3
$R^2$	0.01	0.19	0.21
$\Delta R^2$		0.18	0.03
Age	-0.06	-0.03	-0.02
Gender (male = 0, female = 1)	0.06	0.06	0.05
Online Shopping Experience	-0.002	-0.01	-0.01
Social Presence (low = 0, high = 1)		0.17**	0.17**
IND/COL		0.38***	0.37***
IND/COL × Social Presence			0.12*

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

the four conditions, and Table 3 shows the descriptive statistics of demographic and dependent variables. Online Appendix VIII presents the reliabilities and correlations between constructs. The Cronbach’s alphas are higher than the recommended level of 0.70 for all constructs. Average variance extracted (AVE) for all constructs exceed the cutoff value of 0.50, and square roots of AVEs are higher than the interconstruct correlations. Table C.1 shows that all items exhibit satisfactory factor loadings on the intended constructs (>0.70).

Table C.2 presents the results of the hierarchical regression analysis. The results are consistent with the results of Study 3. In particular, *language* has a significant effect on *IND/COL* ( $\beta = 0.23, p < 0.001$ ) such that the *IND/COL* was significantly higher in the Chinese language condition (mean = 4.35) than in the English language condition (mean = 3.83), reconfirming Hypothesis 2. The interaction effect between *IND/COL* and *social presence* on *trust* is significant

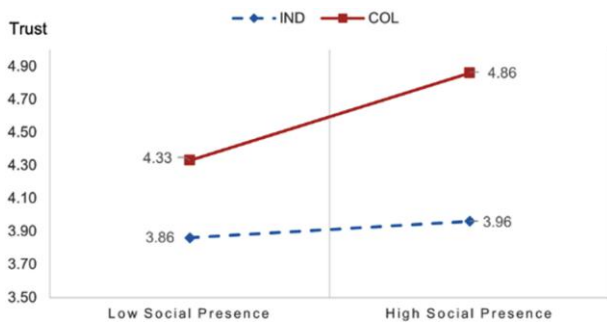
**Table C.1.** Measurement Items and Factor Analysis Results (Replication of Studies 3 and 4)

Measurement Items	Study 3	Study 4
IND/COL (Srite and Karahanna 2006, Maruping et al. 2019)		
IND/COL1. Being accepted as a member of a group is more important than having autonomy and independence.	0.87 <sup>a</sup>	0.87
IND/COL2. Group success is more important than individual success.	0.78	0.80
IND/COL3. Being loyal to a group is more important than individual gain.	0.92	0.91
Trust (Sia et al. 2009, Gefen and Pavlou 2011)		
TRU1. I believe that this shopping website keeps its promises and commitments.	0.79	
TRU2. I trust this shopping website keeps customers’ best interests in mind.	0.77	
TRU3. This shopping website is trustworthy.	0.80	
TRU4. This shopping website is honest.	0.86	
TRU5. This shopping website is reliable.	0.86	
Trusting Intention (Lankton et al. 2015)		
TI1. When I shop for clothes online, I feel I can depend on this shopping website.	0.89	
TI2. I can always rely on this shopping website for online shopping.	0.92	
TI3. I feel I can count on this shopping website when shopping online.	0.91	

Note. Likert scales: 1 = strongly disagree, 4 = neither agree nor disagree, 7 = strongly agree.

<sup>a</sup>Factor loading.

**Figure C.5.** (Color online) Replication of Study 3 (Trust)



( $\beta = 0.12, p = 0.04$ ), reconfirming Hypothesis 4. The plot of the interaction effect (Figure C.5) and the simple test shows that social presence has a positive effect ( $\beta = 0.54, p = 0.001$ ) on trust when IND/COL is high, but not when IND/COL is low ( $\beta = 0.1, p = 0.52$ ). As an additional test, we performed a regression with trust as the independent variable and trusting intention as the dependent variable. Trust has a positive effect on trusting intention ( $\beta = 0.41, p < 0.001$ ).

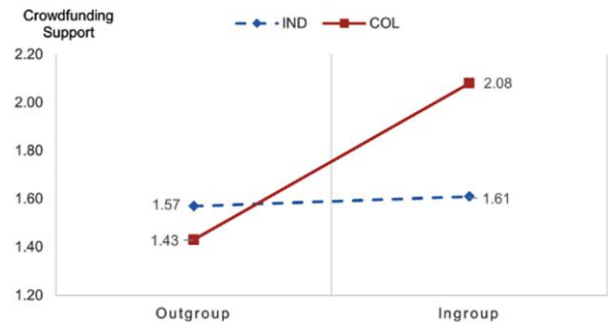
**C.3. Replication of Study 3 Results**

We replicated Study 4 without making any changes. All subjects passed the manipulation checks for language and ingroup (i.e., “Which university is this game in development affiliated with?”). Table 2 presents the means of IND/COL across the four conditions, and Table 3 shows the descriptive statistics of demographic and dependent variables. Online Appendix VIII presents the reliabilities and correlations between constructs. Cronbach’s alpha for IND/COL is 0.83.

**C.4. Replication of Study 4 Results**

Table C.3 presents the results of the hierarchical regression analysis. The results are consistent with the results of Study 4. Language has a positive effect on IND/COL ( $\beta = 0.17, p = 0.01$ ), such that IND/COL was significantly higher in the Chinese language condition (mean = 4.28) than in the English language condition (mean = 3.90), reconfirming Hypothesis 2. The interaction effect between IND/COL and ingroup on crowdfunding support is significant ( $\beta = 0.15, p = 0.01$ ), reconfirming Hypothesis 5. The pattern of the interaction effect (Figure C.6) and the simple effect tests

**Figure C.6.** (Color online) Replication of Study 4 (Crowdfunding Support)



show that ingroup has a positive effect ( $\beta = 0.64, p < 0.001$ ) on crowdfunding support when IND/COL is high, but not when it is low ( $\beta = 0.04, p = 0.80$ ).

**Endnotes**

<sup>1</sup> See <https://www.gourmetads.com/articles/what-countries-does-amazon-operate/> and <https://www.ebayinc.com/company/>. Accessed June 8, 2025.

<sup>2</sup> United Nations. Global issues: International migration. Accessed June 8, 2025, <https://www.un.org/en/global-issues/migration>.

<sup>3</sup> United Nations. Global issues: Population. Accessed June 8, 2025, <https://www.un.org/en/global-issues/population>.

<sup>4</sup> Culture is a multidimensional construct, including IND/COL, power distance, uncertainty avoidance, masculinity/femininity, and long-term orientation (Hofstede 1993). Although most culture priming papers that we have reviewed do not measure cultural dimensions explicitly, the four papers that did so all chose IND/COL. There is also empirical evidence that IND/COL has the largest absolute difference between Eastern and Western subjects as compared to other cultural dimensions at the individual level (Li et al. 2009, Ganguly et al. 2010). Hence, we choose IND/COL as the main cultural dimension in our research model.

<sup>5</sup> For comparison, we also measured masculinity, uncertainty avoidance, and power distance, which have been studied in prior IS research (Li et al. 2009, Maruping et al. 2019). Online Appendix IV shows that all items exhibit satisfactory factor loadings on their intended constructs (>0.70) and all cross loadings on other constructs are low (<0.32). As expected, IND/COL has the largest difference (1.24) between the Chinese priming (Chinese language + Chinese image) condition and English priming (English language + Western image) condition compared with masculinity (0.77), uncertainty avoidance (0.29), and power distance (1.14), confirming it is one of the dominant cultural dimensions that differentiates the two cultures.

<sup>6</sup> MacInnis et al. (1991) theorized that repetition may enhance encoding opportunities that lead to higher levels of processing and recall. Neuroscience research has also found that repetition may enhance object recognition and processing because it “leads to improvements in visual discrimination and object recognition ability” (Kandel et al. 2021, chapter 28, p. 12). When a visual object is recognized, the corresponding memory node in the associative memory network will be activated, and such activation may spread to adjacent nodes that contain cultural knowledge (Collins and Loftus 1975, Anderson 1983, Nelson et al. 1993). Hence, repetition of a culture-rich image increases the possibility of recognizing the image and in turn increases the possibility of activating knowledge structure associated with this image, including the relevant cultural knowledge system.

<sup>7</sup> As a robustness check, we used language as the IV and tested its interaction with social presence on trust. The interaction effect

**Table C.3.** Replication of Study 4: Hierarchical Regression Results on Crowdfunding Support Behavior

	Model		
	1	2	3
$R^2$	0.02	0.06	0.09
$\Delta R^2$		0.04	0.03
Age	-0.10	-0.10	-0.08
Gender (male = 0, female = 1)	0.05	0.03	0.03
Mobile Games Experience	0.09	0.09	0.09
Ingroup (outgroup = 0, ingroup = 1)		0.18**	0.18**
IND/COL		0.09	0.08
IND/COL × Ingroup			0.15*

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

remains significant for ability ( $F = 52.17, p < 0.001$ ), benevolence ( $F = 81.37, p < 0.001$ ), integrity ( $F = 46.13, p < 0.001$ ), and the aggregated measure of trust ( $F = 97.56, p < 0.001$ ).

<sup>8</sup> We pretested 12 mobile game videos with 40 subjects from the same subject pool to select 5 game videos (4 used as completed projects and 1 used as the new project) that (1) have not been seen before by our subjects, (2) moderately liked by our subjects, and (3) contain minimal Eastern or Western cultural elements.

<sup>9</sup> As a robustness check, we used language as the IV and examined its interaction with ingroup on crowdfunding support. The interaction effect was insignificant ( $F = 0.35, p = 0.56$ ). A possible explanation is that the crowdfunding website features many engaging game videos, which may divert subjects' attention from the plain text information, thereby weakening the language priming effect. In fact, the effect size of the priming was larger in Study 3 (partial  $\eta^2 = 0.60$ ) compared to Study 4 (partial  $\eta^2 = 0.02$ ). The weakened priming effect reduces the direct effect from language. However, it does not invalidate our hypothesis, which theorizes that priming cues affect the relationship between social presence and trust via activated collectivism.

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