


# “I” Am Willing to Disclose, but “We” are Unwilling: The Impact of Self-Construal on Individuals’ Willingness to Disclose

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**Purpose:** In the big data era, many institutions (ie, hospitals) and firms use various methods to encourage people to disclose more personal information to gain competitive advantages in many businesses, such as healthcare and the Internet of Things (IoT) devices. Discussions on antecedents of individuals’ willingness to reveal private data from individual differences perspective are limited. Drawing on information boundary theory, we examine how self-construal prompts a different regulatory focus (promotion focus versus prevention focus), thus, affects individuals’ willingness to disclose private data.

**Methods:** A mixed-method approach was used to examine our hypothesis. Study 1 (N = 93, participants in China) manipulated self-construal in lab experiments and examined participants’ actual disclosure behavior in the emerging IoT context of connected cars. Study 2 (an online survey, N = 200, participants in US) measured chronic self-construal in another disclosure context (healthcare app), replicating the preliminary effect and examined the mediating effect of the regulatory focus. Study 3 (an online experiment, N = 284, participants in US) tested the moderating effect of message framing.

**Results:** Study 1 showed that participants primed an independent self-construal were more willing to share private information, whether it is real driving data or private identity information. Study 2 showed that independent (interdependent) self-construal individuals tend to have promotion focus (prevention focus), thus leading to higher (lower) willingness to disclose personal health information. Study 3 demonstrated that independent (interdependent) self-construal individuals are more willing to share information when presented with gain-framing (loss-framing) information.

**Conclusion:** Independent (interdependent) self-construal positively (negatively) affects individuals’ willingness to disclose and these effects will be mediated by regulatory focus and moderated by message framing. Our study provides a theoretical paradigm that is new to the willingness to disclose literature, and offers an effective, actionable strategy on how institutions and firms can facilitate individuals’ personal information disclosure.

**Keywords:** self-construal, willingness to disclose, regulatory focus, information boundary theory, message framing, privacy

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## Introduction

In the big data era, many institutions (ie, hospitals) and firms are launching new data-driven businesses to gain competitive advantages and thus profits, such as Internet of Things (IoT) devices and healthcare. Such data-based businesses often require a higher level of personal information collection. Through the collection of individual health information, for example, personalized medicine and precision



medicine are possible, which greatly improves the cost-effectiveness of healthcare, and reduces the overall cost of medical treatment.<sup>1</sup> Given the central role that personal data plays in business models, it is crucial for firms to understand the drivers and inhibitors of individuals' willingness to disclose.

On the one hand, individuals' willingness to disclose is positively correlated with the benefits individuals perceive in disclosure,<sup>2,3</sup> such as personalized product recommendations<sup>4</sup> and financial rewards.<sup>5</sup> On the other hand, individuals' disclosure intention is also negatively related to their perceptions of privacy risks.<sup>6–8</sup> For instance, people may suspect that their data are potentially being commercially misused without their knowledge,<sup>9</sup> such as for economic discrimination<sup>10</sup> or being sold to a third party.<sup>3</sup> Consequently, they tend to be reluctant to disclose their private data.<sup>11</sup> Of note is an emerging stream of studies that has examined how individual factors such as disposition to value privacy (henceforth DTVP)<sup>3,12</sup> and privacy awareness,<sup>13</sup> affect whether people place more emphasis on risk versus benefit associated with information disclosure and then their downstream willingness to disclose. Adding to this literature, we identify another individual factor that may impact individuals' willingness to disclose: self-construal, defined as how individuals view themselves are relevant to others and the social environment.<sup>14</sup> Prior research suggests that self-construal is an important sociopsychological force that affects individuals' risk-benefit preferences.<sup>15</sup> Applied to privacy-related decision-making, we propose that since independent self-construal highlight attaining benefits (eg, recommendation service or financial rewards) in making decision, whereas interdependent self-construal highlight avoiding losses (eg, identity theft or private data breach), independents (interdependents), in general, will be more (less) prone to disclose their personal data. We further suggest that message framing moderates the impact of self-construal on willingness to disclose.

Methodologically, to establish reliability and generalizability, a multimethod approach was used in three studies. We found that independents are more willing to share information by observing participants' willingness to disclose in different operationalizations of self-construal (temporarily priming self-construal in Study 1 and measuring chronic self-construal in Study 2) and different disclosure contexts (IoT and healthcare app). More specifically, Study 1 manipulated self-construal in lab experiments and observed participants' actual disclosure behavior in the emerging IoT context of connected cars. Study 2 (an online survey) measured chronic self-construal

in another disclosure context (healthcare app), replicating the preliminary effect. Furthermore, Study 2 also tested the mediating effect of regulatory focus and ruled out several alternative explanations. Study 3 (an online experiment) tested the moderating effect of message framing. It proposes that the inhibiting impact of interdependent self-construal on willingness to disclose will be reversed when presented with loss-framing information. Furthermore, it holds that the facilitating impact of independent self-construal will be enhanced when presented with gain-framing messages.

This study makes several theoretical contributions. First, we contribute to the body of studies examining the antecedents of willingness to disclose.<sup>3,11,16</sup> By integrating information boundary theory with research on self-construal and message framing, we highlight how personal and contextual factors jointly contribute to individuals' willingness to disclose, using a theoretical paradigm that is new to the willingness to disclose literature. Second, the current findings extend the emerging research stream that advocates for the significance of self-construal in individual behavior by linking self-construal to privacy-related decision-making.<sup>17–19</sup> Furthermore, showing the mediating effect of regulatory focus open up a myriad of potential implications of regulatory focus theory to the privacy literature. Third, prior research suggested that people are reluctant to share their private data when they are exposed to information framed as a threat or danger.<sup>20</sup> Our study further expands on this finding by identifying a significant and unrecognized moderator—self-construal—and indicate that interdependents are more willing to reveal their private data when they learn that they are going to lose something if they limit information disclosure.

This study has significant practical implications. First, firms could gather data about the self-construal aspect by using a self-construal scale when a person tries to register on an app or create a personal profile. They could request more personal information for independents. Second is that making independent self-construal salient to individuals may encourage them to be more inclined to reveal their private data. Hence, institutions (ie, hospitals) and companies could cue the individuals' independent self-construal in ways that emphasize singular pronouns in asking for personal health information (eg, “I” (vs “we”) can ... by providing information).<sup>21</sup> Moreover, they can also use advertising appeal (eg, by emphasizing to patients that sharing information can lead to customized care that meets their health aspirations) to activate individual

promotion focus, thus promoting their information disclosure.<sup>22</sup> Third, practitioner-oriented studies about message framing highlight the importance of gain-framing,<sup>23</sup> we challenge this one-size-fits-all strategy and suggest that we can encourage interdependent (independent) self-construal individuals to share more personal information using loss-framing (gain-framing) messages.

## Conceptual Background and Hypothesize Development

### Willingness to Disclose

Willingness to disclose refers to “an individual’s willingness to share private information with a firm.”<sup>6</sup> Since firms are exceedingly dependent on individual information for competitive advantage and thus profits, they use various methods to encourage people to disclose more information on a daily basis. However, individuals’ willingness to disclose personal information varies from person to person. Some people may be willing to share private information in exchange for some benefits, that is, if they believe that their private information can bring sufficient benefits. It is well known that personalized services can reduce individuals’ search costs and thus increase their satisfaction.<sup>24</sup> Moreover, improved products and services based on individuals’ personal information can bring various advantages, such as efficiency and convenience.<sup>25</sup>

However, some people may be reluctant to reveal their personal data, as they are concerned about potential commercial misuse. Companies may sell information to third parties for a profit without their consent, exposing them to highly targeted and obtrusive marketing communications,<sup>26</sup> such as unsolicited commercial e-mail and unwanted pop-up advertisements.<sup>27</sup> In addition, firms may analyze personal information to reveal individuals’ behavior, preferences, and personality, with potentially negative consequences for the individuals; for example, price discrimination is implemented by dividing individuals into different segments.<sup>10</sup> Moreover, claims of data breaches and identity theft also can be unsettling to individuals.<sup>26</sup> Considering these potential risks, these people will be less willing to share private information.

These differences in individuals’ information disclosure are increasingly gaining scholarly attention.<sup>13,28</sup> In Table 1, we summarize existing research on the relationship between individual factors and willingness to disclose. Information boundary theory<sup>29</sup> has suggested that individuals rely on their traits to develop rules to form an

informational territory around themselves with explicitly defined boundaries. Such boundaries can be changed depending on the degree of benefits versus risks people perceived in sharing personal information.<sup>3</sup> Recent studies have found that individuals with low DTVP<sup>3</sup> and low privacy awareness<sup>13</sup> place less value on privacy, leading to lower perceived risks of data sharing; therefore, they are more willing to share private information. However, investigations exploring the reason for individual differences on willingness to disclose is limited. In addition to this literature, we proposed that independents (interdependents), in general, will be more (less) willing to disclose. Understanding the effect of self-construal on willingness to disclose is extremely important. On the one hand, self-construal plays a pivotal role in perspectives on life, from how individuals perceive themselves in relation to others to how they perceive society.<sup>30</sup> On the other hand, the approaches of facilitating private information sharing by individuals based on individual differences have not been adequately studied.

### Self-Construal

The information boundary theory recognizes that individuals’ personality traits act a pivotal part in managing the individuals’ information boundaries and thus the resulting personal data-sharing.<sup>38</sup> Although previous research examined the influence of an individual’s DTVP<sup>3</sup> and privacy awareness<sup>13</sup> on information disclosure, we concentrate on the impact of self-construal as another facet of individuals’ personality traits. Prior studies show that self-construal is a critical determinant of various aspects of individual behavior, such as impulsive consumption,<sup>39</sup> sustainable consumption behaviors,<sup>40</sup> consumer-brand relationships,<sup>41</sup> and mobile TV acceptance.<sup>42</sup> However, in the era of big data, as a result of legislation driving stricter privacy policies, firms have never needed voluntary data disclosure from consumers more. Thus, exploring the impact of self-construal on willingness to disclose now warrants dedicated research attention, to facilitate individuals’ information disclosure.

Each person has two distinctive ways to construct the self: interdependent and independent self-construals.<sup>14</sup> Although both independent and interdependent are well developed in an individual, for most people, one aspect may be more prominent.<sup>43</sup> Based on prior research, independents are inclined to define themselves by their unique achievements and by what distinguishes or separates them from others. Due to the significance of this being distinct

Table 1 Summary of Previous Research on Willingness to Disclose

| Authors                                     | Context                                      | Theoretical Basis or Key Variables  | Method                   | Main Findings  |
|---|--|---|--------------------------|--|
| Belk (2013) <sup>31</sup>                   | Digital world                                |   | Conceptual               | -The impetuses for confession and disinhibition have a positive effect on self-disclosure.   |
| Berendt et al, (2005) <sup>32</sup>         | Online store with an agent's recommendations | Privacy attitudes and behavior  | Experiment               | -Individuals vary in their disclosure intention of private data and can be classified into privacy fundamentalists, profiling averse, marginally concerned, and identity concerned.  |
| Cheng, Hou, and Mou (2021) <sup>13</sup>    | IT-enabled ride-sharing                      | Disclosure intention  | Interviews, Survey       | -Privacy awareness positively affected perceived risks, and thus negatively correlated to the willingness to reveal personal information.  |
| Ghose et al, (2020) <sup>33</sup>           | Digital contact tracing                      | Location data   | Secondary, Archival data | -High-income individuals and males were more privacy-conscious and unwilling to disclose private information than low-income people and females.   |
| Hann et al, (2007) <sup>34</sup>            | Financial website                            | Information-processing theories   | Experiment               | -Websters can be classified into information sellers, convenience seekers, and privacy guardians based on their willingness to disclose information.   |
| Karwatzki et al. (2017) <sup>3</sup>        | Personalized event recommendation services   | Information boundary theory, DTVP   | Experiment               | -A high (low) DTVP individuals are reluctant (willing) to reveal private information.  |
| Li (2014) <sup>12</sup>                     | Websites                                     | Information boundary theory   | Survey                   | -DTVP positively impacts situational privacy concerns and individual' disclosure intentions.   |
| Li, Lin, and Wang (2015) <sup>28</sup>      | Social network sites                         | Willingness to disclose   | Survey                   | -Individuals who are more young, female, and self-confident are more likely to reveal their private data.<br>-The disclosure of sensitive information negatively affects the breadth and depth of disclosure.  |
| Thomaz et al, (2020) <sup>35</sup>          | Websites in general                          |   | Conceptual               | -People can be categorized into two distinct types:(1) those generally are prone to disclose their data with firms (Buffs), and (2) those who generally reject sharing personal data (Ghosts).   |
| Treibmaier and Pollach (2007) <sup>36</sup> | Purchase decision-making or advertisements   | Users' perceptions of benefits and costs of disclosure                                | Survey                   | -Individuals' general attitude against private information (ie, their perceived level of risk related to the sharing of various information types) depends on their privacy valuation and the context.   |
| Xu et al, (2011) <sup>37</sup>              | Websites                                     | DTVP  | Survey                   | -DTVP positively impacts individuals' privacy concerns and risks and then the resulting information disclosure, but is a rudimentary construct that needs further attention.   |
| Own study                                   | IoT and healthcare app                       | Information boundary theory, Self-construal, Message framing, Willingness to disclose | Survey, Experiment       | -Independent (interdependent) self-construal individuals tend to be promotion focus (prevention focus), thus leading to higher (lower) willingness to share information.<br>-The inhibiting impact of interdependent self-construal on willingness to disclose will be reversed when presented with loss-framing information and the facilitating impact of independent self-construal will be enhanced when presented with gain-framing messages. |

from others, independents highlight self-advancement.<sup>15,30,44</sup> In accordance with the motivation for self-enhancement, independents are inclined to engage in more advancement-related activities, which can lead them to focus on positive information that benefits themselves.<sup>15</sup> Therefore, they may be more inclined to share and trade their private data for benefits, as they value the benefits associated with information disclosure (eg, recommendation service and financial rewards).

By contrast, interdependents are inclined to define themselves through their relationships with others. Due to the significance of connection with others, interdependents emphasize security and safety.<sup>15,30,44</sup> As such, interdependents are motivated to maintain harmonious relationships with others and are concerned with others' evaluations of them, which can lead them to focus on avoiding negative consequences.<sup>45</sup> Therefore, they may attribute a high value to privacy and be reluctant to disclose their personal data, as they highly weight the risks and consequent negative outcomes associated with personal data disclosure (eg, identity theft or private data breach).<sup>26</sup> Based on information boundary theory, we propose that compared to interdependent individuals, independent individuals have a thinner information boundary, as they value the benefits and positive outcomes associated with personal data disclosure, and ultimately are more inclined to share personal data.

Taking these previous findings and their implications together, we hypothesize:

Hypothesis 1: Independent self-construal individuals are more willing to disclose personal data than interdependent self-construal individuals are.

## The Mediating Role of Regulatory Focus

Based on regulatory focus theory,<sup>46</sup> two underlying regulatory focus—promotion focus and prevention focus—drive individual judgment and decision-making. Individuals with a promotion focus orientation strive to attain positive consequences, such as advancement, achievement, and aspirations, whereas those with a prevention focus orientation aim to prevent negative consequences such as failure and losses.<sup>47</sup> Previous studies have revealed aspects of the link between self-construal and regulatory focus.<sup>15,45,48</sup> For example, compared to prevention focus information, independent self-construal individuals viewed promotion framed information as more important, while interdependent self-construal individuals exhibit the opposite pattern.<sup>48</sup> More

specifically, for independent self-construal individuals, it is essential to pursue their aspirations and advance themselves, consistent with a promotion focus's pursuit of ideal goals. Maintaining relational harmony and avoiding making mistakes in a group, however, is essential for interdependents, which is consistent with the goal of a prevention focus: to avoid losses. Hence, independents are inclined to show promotion focus, whereas interdependents may maintain prevention focus during decision-making.

Regulatory focus has proven to be essential in understanding individuals' decision-making in different areas of individual behavior,<sup>30</sup> while its application to privacy research,<sup>49</sup> especially disclosure decision research<sup>6</sup> has not been fully explored. According to the information boundary theory, the boundaries formed by individuals might be loosely or tightly controlled based on the level of risk related to the information disclosure.<sup>3</sup> Several studies have supported different risk preferences in decision-making between promotion focus and prevention focus. For instance, individuals with a promotion focus tend to use an eager approach to goals, which may cause them to ignore potential risks,<sup>15</sup> such as engaging in unethical behavior to attain more money.<sup>50</sup> In the face of the information requirement, the nature of sharing information in exchange for benefits is consistent with the desire to attain gains that characterize a promotion focus. By contrast, a prevention focus uses an avoidance approach to goals—avoiding losses and mistakes and not taking risks.<sup>15</sup> Moreover, regarding the privacy-related context, privacy is generally relevant to prevention focus users' goals,<sup>51</sup> since trading privacy for profits is inconsistent with the desire to avoid losses. We propose that individuals with a promotion (prevention) focus tend to be more prone to reveal (conceal) their private information.

These key findings propose that regulatory focus may mediate the impact of self-construal on willingness to disclose. We argue that compared to interdependents, independents will have a more positive attitude toward personal information disclosure, as they are more interested in achieving benefits (ie, promotion focus). Consequently, we propose that they form a thinner information boundary and are thus more willing to reveal personal information. Taking these points together, we hypothesize the following:

Hypothesis 2: The effect of self-construal on individuals' willingness to disclose is mediated by regulatory focus. Specifically, independent (interdependent) self-construal

individuals tend to be promotion focus (prevention focus), leading to higher (lower) willingness to disclose.

## The Moderating Role of Message Framing

Information boundary theory also suggests that individuals' decisions on managing their informational boundaries are a joint product of both personal traits and contextual factors.<sup>3</sup> Integrating the information boundary theory with research on self-construal, we propose that message framing is a contextual factor that could moderate the link between self-construal and willingness to disclose. To reduce individuals' concerns about privacy and thereby increase their willingness to engage in data disclosure, previous research has investigated the role of message framing.<sup>20,52</sup> This term refers to strategies that focus on depicting positive- (or gain-) framed information (that is, to emphasize the positive outcomes of participating in a particular behavior) or negative- (or loss-) framed messages (that is, to emphasize the negative outcomes of not taking action).<sup>53</sup>

Prior work has indicated that gain-framing is more persuasive than loss-framing in the information disclosure context. For example, to increase individuals' willingness to actually disclose, the practice-oriented report emphasizes the significance of highlighting the benefits of information sharing to individuals: 83% of participants are more likely to share their personal information if the company indicates the relationship between the disclosed information and the benefits involved.<sup>23</sup> Similarly, Angst and Agarwal<sup>52</sup> provide empirical evidence that a gain-framing message can alleviate greater privacy concerns. Moreover, loss-framing-related research also points out that information framed as a threat or danger can directly increase individuals' privacy concerns and risk perception, thereby leading to a lower willingness to disclose.<sup>20</sup>

However, given the risk-averse nature of interdependents, we made a more counterintuitive prediction—that for these persons, loss-framing information will be more persuasive than gain-framing information. As discussed in our conceptualization, interdependents focus on avoiding potential losses rather than achieving gains, thus leading them to disclose less personal information. Given this reasoning, information that emphasizes the loss of such information protective behavior should reverse the observed effects, since interdependents are inclined to weight loss information as more important.<sup>48</sup> That is, if people learn that they will lose something (eg, personalization services) because of their unwillingness to disclose

personal information, this should reverse the observed tendency for interdependent self-construal to disclose less. Contrarily, the independents put more emphasis on attaining benefits and are more persuaded by gain information.<sup>48</sup> Therefore, messages that emphasize the benefit of revealing personal data should enhance the observed effects.

Taken together, we hypothesize the following:

**Hypothesis 3:** When presented with gain-framed (vs loss-framed) messages, independent self-construal individuals are more willing to disclose their information. By contrast, when presented with loss-framed (vs gain-framed) messages, interdependents are more prone to reveal their information.

## Overview of the Studies

We tested our hypothesis using a combination of survey and experimental methodologies. Previous research indicates that individuals vary in their levels of interdependent versus independent self-construal within a culture,<sup>47,54</sup> and self-construal is not only a chronic individual personality trait,<sup>48,54</sup> but also can be temporarily manipulated.<sup>21,44,55</sup> In addition, recent studies have shown that cultural differences do not have an impact on their research results.<sup>21,30</sup> Therefore, to increase the generalizability of our results across three studies, participants' self-construal was either manipulated or measured and we recruited Chinese participants in Study 1 and US participants in Study 2 and 3.

The purpose of Study 1 is to provide more accurate conclusions for our study and improve the internal validity of the study by manipulating individuals' self-construal and observing their real behaviors. Study 2's purpose is to measure participants' self-construal to provide a more general perspective and to explore the reasons for individual disclosure differences and their internal psychological mechanism. Moreover, a variety of disclosure environments (ie, an emerging tech context of connected cars in Study 1 and the context of healthcare app in Study 2) was also used to provide converging evidence for our propositions. The objective of study 3 is to provide useful operational suggestions for institutions and companies to promote individual information disclosure by finding boundary conditions. Furthermore, we conducted a laboratory experiment using car drivers recruited from offline (Study 1), and two online studies (Studies 2 and 3) using a more diverse sample recruited from Prolific Academic (ProA), an online crowdsourcing platform that

has become more and more popular among scholars because its samples are more representative and validated.<sup>11,56,57</sup> The rest of the paper presents these three studies, conclusions, theoretical and managerial implications.

## Study I

Study I examines the basic hypothesis that independents are more willing to disclose their private information than interdependents in the connected cars context. To test our prediction, we manipulated self-construal and observed drivers' actual data sharing decisions in a real app. This approach is appropriate for studying novel technology context<sup>58</sup> and is commonly used in the privacy literature.<sup>10,59,60</sup> By using the real-time driving analysis app, we can obtain the data disclosed by drivers in real time in the background of the application, to improve the authenticity and robustness of our experiment. Moreover, such app often needs unrestricted data access to fully function. Here, the unrestricted access to information and the realization of full functions makes risks and benefits more prominent and can be more perceived by individuals, thus the differences of willingness to disclose of different self-construal individuals will be more obvious. We predict that compared to activating participants' interdependent self-construal, activating participants' independent self-construal can facilitate them to share more information.

## Method

### Participants and Design

Study I was a laboratory experiment. G\*Power was used to test sample size. In the absence of previous studies testing the influence of self-construal on willingness to disclose, a generic overall medium effect size was combined ( $f = 0.25$ )<sup>61</sup> with previous research on the direct role of self-construal on individual behavior ( $f = 0.35$ ).<sup>30</sup> This study conducted a similar experimental design and manipulation of self-construal. The power test ( $f = 0.30$ ) results indicated that for the one-way analysis with two groups with power = 0.8 and  $\alpha = 0.05$ , the desired sample size was 90 participants. Based on past experiences, we aimed to recruit three additional participants per condition. Through the questionnaire we sent out outside the school, we identified 96 car drivers as our final sample, who met our selection criteria of (1) owning or having regular access to a car, and (2) having a smartphone with a mobile data plan. Three of them were excluded because they chose to

quit the task. Thus, 93 car drivers in Chongqing, China, joined in this laboratory experiment for payment. An experimenter randomly assigned them to an interdependent self-construal group or an independent self-construal group. The demographic profiles of the three studies' samples are presented in Table 2.

## Procedures

After qualification for our sample, the participants were led into a room where the research assistants were waiting. The research assistants explained that the study was a pilot study involving the installation and use of a mobile app with real-time driving analysis capabilities. First, participants had to complete a task to determine whether they

**Table 2** Demographic Information of Participants

|                         | <b>Study 1<br/>N = 93 Car<br/>Driver<br/>Sample<br/>Recruited<br/>in China</b> | <b>Study 2<br/>N = 200<br/>ProA<br/>Members<br/>The U.S.</b> | <b>Study 3<br/>N = 284<br/>ProA<br/>Members<br/>The U.S.</b> |
|-------------------------|--|--|--|
| Gender                  |  |  |  |
| Male                    | 51.6   | 51   | 44.1   |
| Female                  | 48.4   | 49   | 55.9   |
| Age                     |  |  |  |
| 18–29                   | 25.8   | 29   | 69.4   |
| 30–39                   | 45.2   | 27   | 20.4   |
| 40–49                   | 21.5   | 28.5   | 6.7  |
| 50–59                   | 7.5  | 15.5   | 2.1  |
| ≥60                     | 0  | 0  | 1.4  |
| Education               |  |  |  |
| Less than high school   | 0  | 3.5  | 2.5  |
| High school graduate    | 9.6  | 9.5  | 31.7   |
| College                 | 14.0   | 20   | 19.4   |
| Bachelor's degree       | 72.0   | 52.5   | 29.9   |
| Master                  | 4.4  | 13   | 12.3   |
| Professional degree     | 0  | 1.5  | 2.5  |
| Doctorate               | 0  | 0  | 1.7  |
| Annual household income |  |  |  |
| Less than \$20,000      | 23.2   | 33   | 63.0   |
| \$20,000 to \$39,999    | 44   | 29.5   | 21.1   |
| \$40,000 to \$59,999    | 23   | 30.5   | 8.5  |
| \$60,000 to \$79,999    | 8  | 5  | 4.6  |
| \$80,000 to \$99,999    | 1.1  | 1.5  | 1.7  |
| \$100,000 or more       | 0.7  | 0.5  | 1.1  |

met the requirements for becoming a pilot tester. To induce self-construal, an approach was adopted to manipulate participants' self-construal that has been widely employed in previous research.<sup>62</sup> Specifically, we asked participants to read a short story and circle the pronouns (see [Figure A1 in the appendix](#)). In the independent self-construal condition, the texts used singular pronouns (ie, I, me), while in the interdependent self-construal condition, the pronouns in the texts were all plural (ie, we, us, our). We then asked participants to answer a self-construal manipulation check question ("The tasks encourage me to focus on myself") on a 7-point Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree.<sup>18</sup> After the self-construal manipulation, participants were asked to download JiaShiZhuShou, a smartphone app with real-time driving analysis capabilities. Through this app, participants obtained full access to all its functionalities—real-time feedback on acceleration, cornering, and braking; insights into car performance; trip review; and driving style badges. To enable informed decisions, we provided individuals with background information on the underlying technology and associated data flows. The drivers retained the right to opt out at any time. This scenario was adapted from Cichy et al with minor modification.<sup>63</sup>

After downloading this app, participants were asked if they wanted to provide their real-time driving data (see [Figure A2 in the appendix](#)) and if they wanted to share their private identity information (ie, full name, date of birth, and mobile number) (see [Figure A3 in the appendix](#)). One of our dependent variables, sharing of driving data, constitutes a discrete choice and is hence measured by a binary variable taking a value of "1" if the participant allowed this permission on the app and of "0" otherwise; another dependent variable, sharing personal identity information, also follows the same standards. Finally, participants answered their demographic information and were thanked.

## Results

### Manipulation Check

A one-way ANOVA test was carried out to determine if the manipulation of self-construal was successful, which yielded statistically significant main effect for self-construal ( $F(1,91) = 131.07, p < 0.001$ ). Our results indicated that participants primed on independence argued that the tasks made them pay more attention to themselves ( $M_{\text{int}} = 2.33, SD = 1.21$  vs  $M_{\text{ind}} = 5.34, SD = 1.32, p < 0.001$ ) than those primed on interdependence self-construal.

### Sharing of Driving Data

A chi-squared test indicated a significant impact of self-construal on participants' willingness to share their driving data ( $\chi^2(1) = 37.43, p < 0.001$ ; see [Figure 1](#)). As predicted, independent self-construal participants were more prone to reveal their driving information (83.0%) than interdependent self-construal participants (19.6%); by contrast, interdependents were more willing to reject sharing driving data (80.4%) than independents (17.0%).

#### Sharing of Personal Identity Information

For the sharing of personal identity information, the chi-squared test results indicated a significant impact of self-construal ( $\chi^2(1) = 9.07, p < 0.01$ ; [Figure 2](#)). Consistent with H1, in the independent self-construal group, participants were more prone to share their personal identity information (70.2%) than those in the interdependent self-construal group (39.1%). Our results also suggested that participants primed on interdependence were more likely to reject sharing their personal identity information (60.9%) than those activated with an independent self-construal (29.8%).

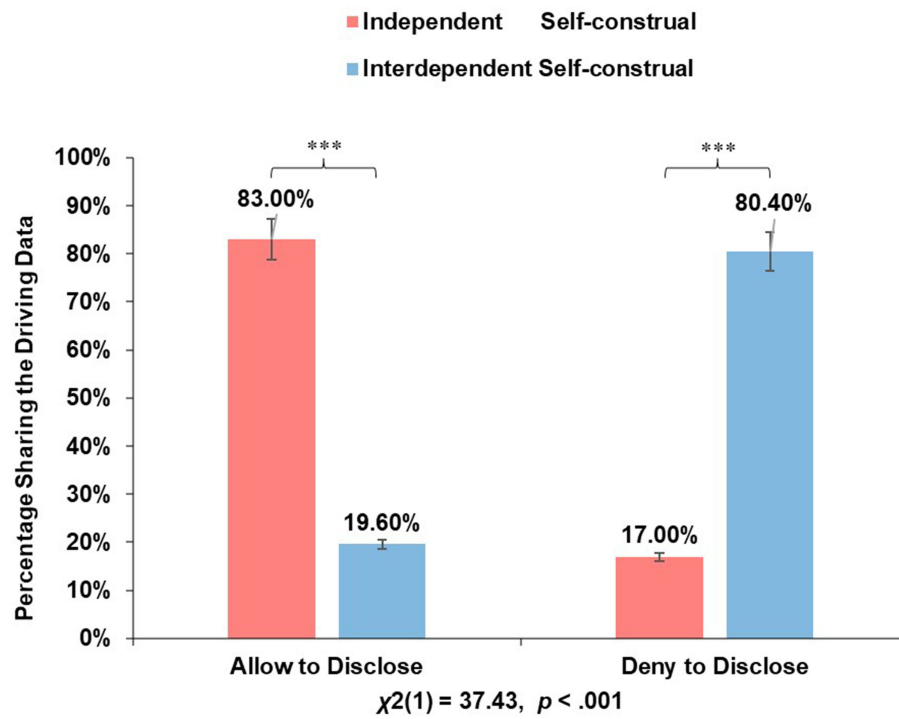
## Discussion

This study provides preliminary support for the prediction that activating an independent self-construal is more willing to share private information, whether it is real driving data or private identity information. However, this finding does not reveal the underlying mechanism to disclose personal information for independent or interdependent self-construal individuals, which led to the implementation of Study 2.

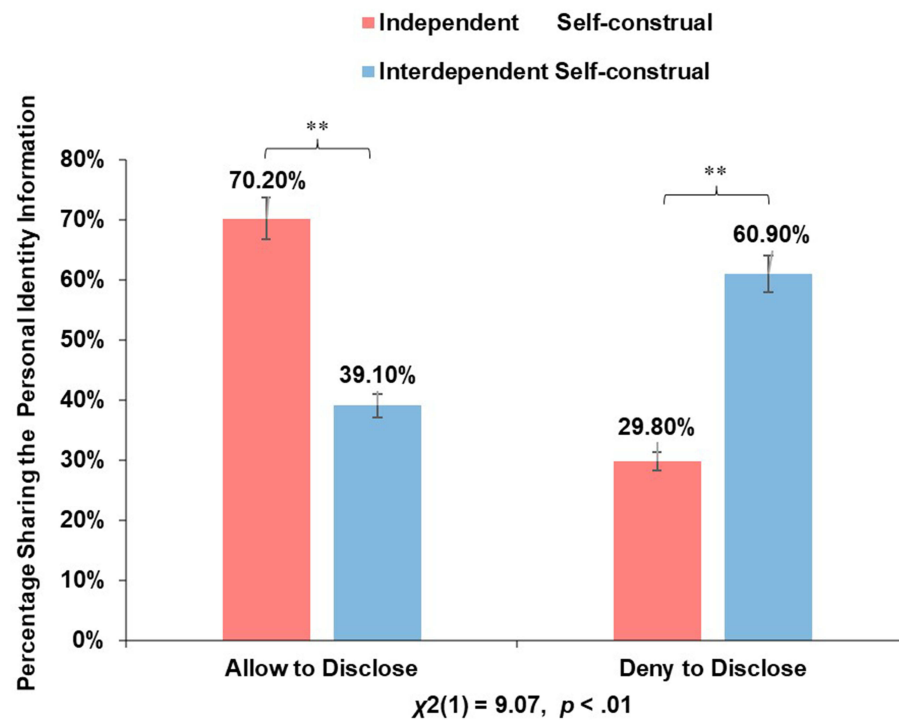
### Study 2

Study 2 was designed with several objectives: first, in Study 1, our findings showed that activating participants' independent self-construal could increase their willingness to share information than priming participants' interdependent self-construal. Although we have preliminarily tested the effect of self-construal on willingness to disclose through manipulating participants' self-construal, we did not measure the individuals' chronic self-construal. By doing so in Study 2, we can explore its effect on individuals' willingness to disclose from the perspective of chronological individual traits. Second, as healthcare is increasingly digital, institutions (eg, hospitals) and medical company often require higher levels of information collection, analysis, and accumulation. As a result, people are increasingly concerned about the privacy of their health





**Figure 1** Effect of self-construal on sharing the driving data.  
**Note:** \*\*\* $p < 0.001$ .



**Figure 2** Effect of self-construal on sharing the personal identity information.  
**Note:** \*\* $p < 0.01$ .

information.<sup>64,65</sup> In this context, it's crucial to explore individuals' health information disclosure in the healthcare context based on individuals' differences in self-construal. Consequently, we employed the healthcare app as our disclosure context. Third, by directly measuring regulatory focus, we wish to provide direct evidence for the mechanism underlying the main impact of self-construal on willingness to disclose. Finally, we measured additional previous Internet experience ("experience with the Internet," EXPI) and experiences with online personalization (EXPP) to examine their possible impact on the results; these variables have been employed in previous studies.<sup>12,66</sup>

## Method

### Participants and Design

Study 2 was an online survey using ProA. Multiple studies have examined the validity of ProA samples in surveys.<sup>11,56</sup> We conducted a power analysis in G\*Power to test the desired sample size.<sup>67</sup> We assumed a medium effect size (ie, 0.3) with power = 0.8 and  $\alpha = 0.05$ , a sample size of 80 participants was required. Given these results, we wished to recruit as many participants as possible, taking into account budget constraints and participant enrollment. In total, 200 US participants joined in the study for payment.

### Procedures

This study comprised three tasks: a chronic self-construal scale, health information disclosure scenario, and regulatory-focus scale. The order of the self-construal scale and health information disclosure scenario was counterbalanced to avoid demand effects.

Participants completed self-construal scale (see [Table B1 in the appendix](#))<sup>68</sup> that consisted of ten items, 5 ( $\alpha = 0.84$ ) relevant to independent self-construal (eg, "I prefer to be direct and forthright when dealing with people I have just met") and 5 ( $\alpha = 0.78$ ) to interdependent self-construal (eg, "I often have the feeling that my relationships with others are more important than my own accomplishments"). We asked participants to answer the extent to which each of the ten items described them on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Following past research,<sup>21,30</sup> we calculated the chronic self-construal score through subtracting the average score of respondents on interdependent items from their average score on independent items. A higher score

represents a salient independent self-construal, and a lower score represents a salient interdependent self-construal.

For the health information disclosure scenario, we asked participants to read a scenario (see [Table B2 in the appendix](#)):

please imagine that a new healthcare app is being used by your doctor's office to help manage patient records. To better manage your records, you will be asked to provide some general health information. (ie, cholesterol level, blood pressure, fitness, weight, and overall medical condition)

The scenarios were adapted from privacy scenarios used in a study by Pew Research Center with minor modifications.<sup>69</sup> Afterwards, we asked participants to answer about the extent to which they disclosed the information using three items (eg, "I am willing to provide the relevant data"; 1 = strongly disagree to 7 = strongly agree). (see [Table B1 in the appendix](#))<sup>70</sup> The scores on the three items were averaged to form a willingness to disclose index, and higher numbers indicated a greater willingness to disclose ( $\alpha = 0.94$ ).

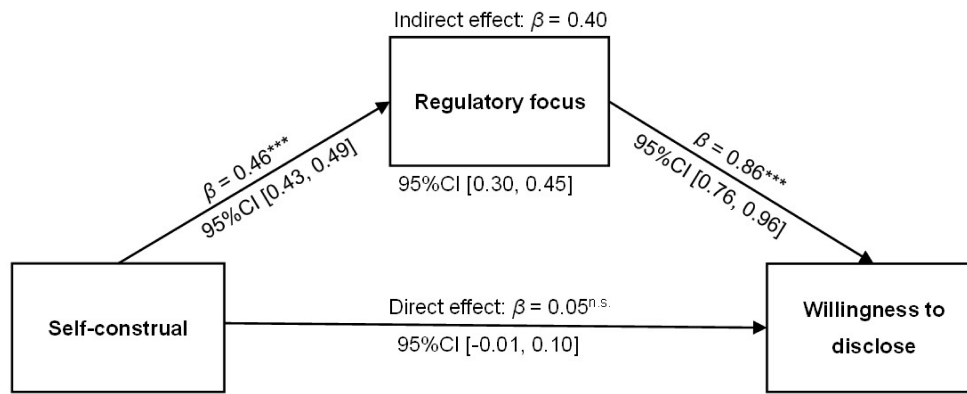
To measure regulatory focus, respondents were presented with four pairs of common goals and asked to answer the extent to how important each pair was to them. A sample item is 1 = safety is more important to me now; 4 = equally important to me now; 7 = achievement is more important to me now. This scale was adopted from Fei et al (see [Table B1 in the appendix](#)).<sup>71</sup> The scores on the four items were averaged to form a regulatory focus index; higher (lower) numbers represent a greater promotion (prevention) focus ( $\alpha = 0.92$ ).

With reference to previous studies,<sup>12,66</sup> control variables such as age, income level, gender, education, and EXPI ( $\alpha = 0.94$ )<sup>3</sup> were also included; in addition, we also measured EXPP ( $\alpha = 0.87$ ). (see [Table B1 in the appendix](#))<sup>72</sup>

## Results

### Self-Construal (Interdependent vs Independent) and Willingness to Disclose

We conducted a regression analysis using the chronic self-construal score (mean-centered) as the predictor, it indicated a significant impact of self-construal. That is, independent self-construal participants exhibited higher relative willingness to disclose ( $\beta = 0.45$ , SE = 0.02,  $t(199) = 26.10$ ,  $p < 0.001$ ). This effect persisted after controlling for



**Figure 3** The mediating role of regulatory focus (Study 2).  
**Note:** \*\*\* $p < 0.001$ ; n.s. = not significant.

participants' age, education, gender, EXPI, and EXPP ( $\beta = 0.06$ ,  $SE = 0.03$ ,  $t(199) = 2.04$ ,  $p < 0.05$ ). Thus, Hypothesis 1 was supported.

## Mediation Analysis

Path analysis confirmed that self-construal could positively predict willingness to disclose ( $\beta = 0.45$ ,  $SE = 0.02$ ,  $t(199) = 26.10$ ,  $p < 0.001$ ) and was positively associated with one's regulatory focus ( $\beta = 0.46$ ,  $SE = 0.02$ ,  $t(199) = 30.23$ ,  $p < 0.001$ ). The results thus showed that independents reported a greater relative promotion focus than prevention focus compared to interdependents. After incorporating self-construal and regulatory focus as predictors, a greater relative promotion (vs prevention) focus was associated with a greater willingness to disclose ( $\beta = 0.86$ ,  $SE = 0.05$ ,  $t(199) = 16.75$ ,  $p < 0.001$ ). Meanwhile, the positive impact of self-construal on participants' willingness to disclose became non-significant ( $\beta = 0.05$ ,  $t(199) = 1.92$ ,  $p = 0.06$ ; see Figure 3). Therefore, such results support the hypothesis that regulatory focus can mediate the impact of self-construal on participants' willingness to disclose. The results of Model 4 with 5000 bootstrap samples<sup>73</sup> also confirmed the mediating effect of regulatory focus as the 95% confidence interval does not carry any zero [0.30, 0.45]. Therefore, the results support Hypothesis 2.

## Discussion

Study 1 findings were replicated in Study 2 by measuring chronic self-construal in a different disclosure environment. Our results indicated that chronic independents were more willing to reveal their personal information than chronic interdependents. Moreover, chronic independents reported

higher promotion orientation than chronic interdependents. In addition, our mediation analysis results show that regulatory focus mediates the impact of self-construal on willingness to disclose in making a disclosure decision, which provides direct process evidence for our hypothesis. Specifically, independents are inclined to be promotion focused, whereas interdependents are inclined to be prevention focused on decision-making.

Taken together, we found consistent evidence across two studies for the impact of self-construal on willingness to disclose by observing participants' disclosure intention in a connected car context or a healthcare app. In the next study, we tested the boundary conditions of the theoretical derivation.

## Study 3

Study 3 aimed to examine the boundary condition for the impact of self-construal on willingness to disclose. As discussed above, one rationale for this impact associated with how self-construal produces a different emphasis on benefits versus risks in making disclosure decisions. For independent self-construal individuals, they emphasize individual advancement and should therefore focus more on benefits in decision-making; conversely, interdependents emphasize security and safety and thus should focus more on risks in decision-making. Based on this premise, we should expect that the impact of self-construal on individuals' willingness to disclose will be moderated by whether the message is presented as gain or loss framed. If participants learn that they will lose personalization of services due to their rejection of personal information, we should expect that interdependent

participants will be more prone to reveal their private data to avoid visible losses than independent participants.

## Method

### Participants and Design

G\*Power was used to test the desired sample size for a medium-sized effect ( $f = 0.25$ ); it showed that 128 participants would be needed for the study to be powered at 80%. Thus, we wished to recruit as many participants as possible given budget constraints and participant enrollment. In total, 284 US participants joined in this online experiment for payment. Participants were randomly assigned to the gain-framing or loss-framing groups. Furthermore, we measured chronic self-construal (independent self-construal scale:  $\alpha = 0.75$ ; interdependent self-construal scale:  $\alpha = 0.82$ ) as in Study 2.

### Procedure

Similar to procedures used in Study 2, we only added message framing manipulation in data-sharing scenario (see [Table C1 in the appendix](#)).<sup>74</sup> Gain-framing listed the benefits of disclosing personal information.

If you choose to provide, you will gain the opportunity to immediate access to individualized medical care. You will gain some functionalities that helps you save time on booking, changing, or canceling a doctor's appointment. You will gain some functionalities that helps you quickly track information and review data.

Loss-framing listed the losses that might be caused by not disclosing personal information.

If you don't provide, you will lose the opportunity to immediate access to individualized medical care. You will lose some functionalities that helps you save time on booking, changing, or canceling a doctor's appointment. You will lose some functionalities that helps you quickly track information and review data.

After reading the scenario, we asked participants to answer about if the message was gain or loss framed on a 7-point Likert-type scale (1: loss framed, 7: gain framed). The main dependent variable was measured using the willingness to disclose scale from Study 2 ( $\alpha = 0.92$ ). As in study 2, higher numbers indicated a greater willingness to disclose. Participants then reported their demographic information. No significant covariates were found in the main hypothesis test.

## Results

### Manipulation Check

An independent sample *t*-tests indicated that the gain-framing information ( $M = 4.85$ ,  $SD = 1.73$ ) was significantly more gain focused than the loss-framing information ( $M = 3.03$ ,  $SD = 1.90$ ;  $t(282) = 8.40$ ,  $p < 0.001$ ).

### Willingness to Disclose

The chronic self-construal score was calculated as in Study 2. We conducted a regression analysis using the chronic self-construal score (mean centered), framing ( $-1 =$  loss framing;  $1 =$  gain framing), and their interaction term as predictors of participants' willingness to disclose to test our prediction. The self-construal  $\times$  framing interaction had a significant influence on participants' willingness to disclose index ( $\beta = 0.257$ ,  $SE = 0.08$ ,  $t = 3.38$ ,  $p < 0.001$ ).

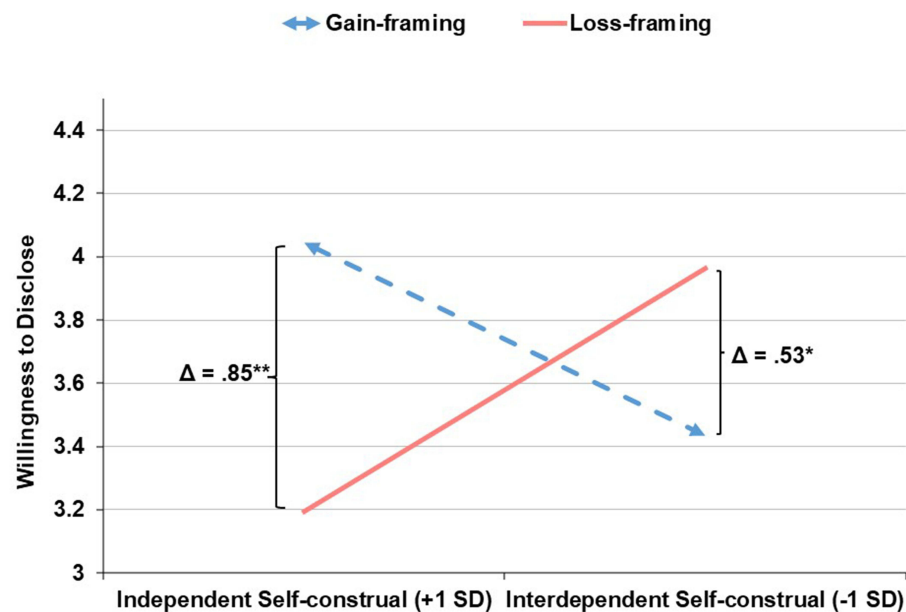
To thoroughly understand the nature of the interaction, following Yang et al,<sup>44</sup> we conducted spotlight analyses at one standard deviation above and below the mean score of the self-construal (see [Figure 4](#)). In line with our predictions, among independent participants (ie, + 1 SD above the self-construal mean), a gain (vs loss) framing of the personal information request led to a higher willingness to disclose ( $\beta = 0.41$ ,  $SE = 0.15$ ,  $t = 2.78$ ,  $p < 0.01$ ; 95% CI: [0.12, 0.70]; see [Figure 4](#)). By contrast, among interdependent participants (ie, at 1 SD below the mean), a loss (vs gain) framing of the personal information request led to a higher willingness to disclose ( $\beta = -0.29$ ,  $SE = 0.15$ ,  $t = -2.00$ ,  $p < 0.05$ ; 95% CI: [-.58, -0.01]; see [Figure 4](#)).

## Discussion

Study 3 found a boundary condition of the influence observed in Studies 1 and 2, extending our earlier findings. Our findings indicated that message framing moderated the impact of self-construal on participants' willingness to disclose; specifically, independents were more prone to share personal data than interdependents when presented with gain-framed information; by contrast, interdependents were more prone to reveal their personal data than independent self-construal participants when presented with loss-framed messages.

### General Discussion

In this study, we tested the impact of self-construal on willingness to disclose. Specifically, Study 1 illustrates our main effect: activating an individual's independent self-construal can increase their willingness to disclose private data as compared to priming an individual's



**Figure 4** The interaction effect of self-construal and message framing on willingness to disclose.

**Note:** \* $p < 0.05$ ; \*\* $p < 0.01$ .

interdependent self-construal. Importantly, we replicated our main effect in Study 2 in another disclosure environment and with another operationalization of self-construal, increasing the generalizability of our effect. In summary, in a novel technology context of connected cars (Study 1) and a healthcare app context (Study 2) and across different operationalizations of self-construal (temporarily primed self-construal in Study 1 and chronic self-construal in Study 2), we found consistent evidence for our basic hypothesis that independents are more willing to disclose their private information than interdependents.

Furthermore, we show that these effects are mediated by regulatory focus (Study 2). By directly measuring individuals' self-construal and regulatory focus, Study 2 results show that regulatory focus is the underlying mechanism of the effect of self-construal on willingness to disclose. In addition, we also find the boundary conditions for this effect and show that message framing will moderate the effect of self-construal on individuals' willingness to disclose. Specifically, Study 3 results indicate that communicating the benefits of information disclosure can increase the disclosure willingness of independents by 26%, whereas emphasizing the loss of non-disclosure will enhance interdependent self-construal individuals' willingness to disclose by 15%.

## Implications for Research

Our three studies' findings contribute to several streams of research. First, this research expands the literature on

the willingness to disclose<sup>10,60</sup> by examining the role of individuals' self-construal. The present research identifies that individuals' self-construal is a main determinant of individuals' willingness to disclose. We also contribute to integrating information boundary theory with research on self-construal and message framing to highlight how personal and contextual factors jointly contribute to individuals' willingness to disclose, and do so using a theoretical paradigm that is new to the willingness to disclose literature. Moreover, our findings inform researchers who are interested in the individual and contextual factors that influence individuals' willingness to disclose.<sup>3,63</sup> We show that the interdependent self-construal will be reluctant to disclose more personal information and that this inhibiting effect will be moderated by loss-framing. Moreover, independents will be more willing to share information and this facilitating effect will be enhanced by gain-framing.

Second, the current findings also have theoretical implications for the literature on self-construal. Although prior studies have shown the impact of self-construal on individual behavior, such as brand evaluation<sup>18</sup> and self-service retail technology,<sup>19</sup> few studies have linked self-construal to individual privacy-related decision-making. We extend this previous research by linking self-construal to the downstream consequences of information disclosure and by showing what and why people are more willing to share their private data. Moreover, regulatory

focus has been demonstrated to be essential in understanding individuals' decision-making in different areas of individual behavior, such as help-seeking behavior,<sup>15</sup> alternative search behavior,<sup>75</sup> social media users' preference settings behavior,<sup>76</sup> while its potential effect to disclosure decision has not been explored. The findings of Study 2 open up a myriad of potential implications of regulatory focus theory to the privacy literature. Specifically, Study 2 provides a new theoretical paradigm for understanding the antecedents of individuals' willingness to disclose by directly measuring individuals' regulatory focus and their disclosure intentions. More importantly, to our knowledge, this paper is the first to empirically test the mediating role of regulatory focus in the relationship between self-construal and willingness to disclose, which not only advances our understanding about why differences in consumers' willingness to disclose arise but also greatly improves researchers' and practitioners' understanding of consumers' privacy decisions.

Third, our highlight on individual difference factors (ie, information disclosure generated by matching individuals' self-construal orientation with gain/loss-framing information) means a very unique literature contribution to message-framing research. Following recent recommendations to explore the role of individual difference factors on message-framing effects,<sup>74</sup> the current study observed participants' self-construal and message framing (gain vs loss) that generated different levels of information disclosure. More specifically, when presented with gain-framed (vs loss-framed) messages, independents are more prone to disclose their information. By contrast, when presented with loss-framed (gain-framed) messages, interdependents are more willing to share information. Furthermore, previous research has shown that loss framing inhibits individuals' willingness to disclose,<sup>20</sup> our study shows that the effect of loss-framing messages on individuals' willingness to disclose will be reversed when an interdependent self-construal is salient.

## Implications for Practice

This study offers managerial insights on institutions and firms. Institutions (ie, hospitals) and firms can benefit from knowledge about the self-construal of their patients or customers. Independent self-construal individuals are more willing to disclose their personal information, while interdependents seem to be more skeptical and are reluctant to share information. According to recent research, data collectors can gather data based on individual differences,

particularly self-construal-related information.<sup>77</sup> The psychological scale can be used to examine and identify interdependent (or independent) self-construal, for instance, in the process of one person applying for registration on an app or establishing a personal profile. Based on individuals' self-construal orientation, services providers and companies can encourage independents to share more information.

From institutions and firm perspective, collecting individuals' private data is of paramount significance (eg, for treating patients effectively or gaining advantages). Unfortunately, with the development of Internet technology, the collection of personal data is becoming ubiquitous, which increases individuals' privacy concerns. Our findings help facilitate the disclosure of more personal information by individuals without activating privacy concerns. Specifically, making patients or customers independent selves salient may facilitate them to reveal their personal data. Accordingly, institutions and firms could cue the individual's independent self-construal in ways that emphasize singular pronouns in asking for personal information (eg, "I" (vs "we") can ... by providing information).<sup>21</sup> In addition to self-construal, regulatory focus can also be activated in other ways. Institutions and companies can also use advertising appeal<sup>22</sup> to activate individual promotion focus, thus promoting their information disclosure. They can activate consumers' promotion focus by stressing consumer hopes and aspirations for the information disclosure. For example, hospitals can emphasize to patients that sharing information can lead to customized care that meets their health aspirations; and health management apps can emphasize to users that sharing information can help you stay in better shape and achieve self-advancement.

An additional practical implication of our study is that we showed that message framing would moderate the effect of self-construal on willingness to disclose. Designing an effective data requests strategy by targeting the right people is crucial, yet challenging for institutions and firms. Past practitioner-oriented studies emphasize the use of gain-framing (ie, communicating the benefits of data sharing).<sup>23</sup> Our findings showed that this one-size-fits-all strategy to encourage people to reveal data is unlikely to have universal appeal or success. We offer an effective and actionable lever to reach the best interest of institutions and firms and suggest that they should ensure a match with message framing and individuals' self-construal orientation. That is, they can encourage interdependent (independent) self-construal individuals to

reveal more personal data by emphasizing the loss attendant on less disclosure of personal information (communicating the benefit of information disclosure).

## Limitations and Future Research

One limitation of the present study is that we explore only the effect of self-construal on individuals' willingness to disclose. Future studies can explore the influence of other individual variables such as power<sup>78</sup> and power distance belief<sup>79</sup> on individuals' willingness to disclose, since these factors have been demonstrated to affect individuals' risk perception. Furthermore, the main perspective of our research is to focus on the two-dimensional view of self-construal (ie, comparisons between independent and interdependent self-construal individuals), while some researchers suggested that self-construal is an orthogonal construct.<sup>80</sup> Future research can explore the orthogonality nature of self-construal to help us better understand individual differences in willingness to disclose. Lastly, our study examined the impact of message framing on our main effect, future research could explore the impact of other types of message framing on this effect. Although this study used a mixed approach to examine our hypotheses, the current results would be reinforced if they could be reproduced by capturing a large sample of secondary data.

## Ethics Statement

We declare that participants in our research study allow us to use their data for academic research and publication. All the participants were anonymous and their data was protected. All participants provided informed consent and this study was conducted in accordance with the Declaration of Helsinki. All the programs in our research study were approved by the Institutional Review Board of Chongqing University.

## Author Contributions

All authors contributed equally in the realization of the manuscript. All authors have read and agreed to the published version of the manuscript.

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## Disclosure

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