

Supplementary Materials

In our study, we also measured some psychological variables that are speculated to influence the blood donation intention of our Chinese non-donors. In this supplementary file, we justified why we included these psychological variables, described how they were measured, and reported the corresponding findings.

1. Theory of planned behaviors and factors influencing blood donation intention

Various psychological factors may affect blood donation intention. Past studies investigating behavioral intention of blood donation usually adopted the Theory of Planned Behavioral (TPB; Ajzen, 1991) model, which suggested that attitude, subjective norm, and self-efficacy (Ajzen called it "perceived behavioral control") are the main predictors of blood donation intention. Prior studies (Armitage & Conner, 2001; Giles et al., 2004; Giles & Cairns, 1995; Lemmens et al., 2005; Masser et al., 2009) using samples of blood donation intentions; as well as 54 to 56% in the actual donation. Masser et al. (2009) incorporated previous research findings (especially by France et al., 2008), and proposed a more comprehensive version of the TPB. They investigated factors contributing to retaining the experienced donor's blood donation intention and actual re-donation behavior. Masser et al.'s (2009) extended model is composed of eight dimensions: attitude, subjective norm, moral norms, self-efficacy, self-identity, anticipated regret, donation anxiety, and intention. Their samples were Australian experienced blood donors.

In our current study, we also measured the above-mentioned eight dimensions. To elaborate, following past studies based on the basic TPB model (Armitage & Conner, 2001; Giles et al., 2004; Giles & Cairns, 1995; Lemmens et al., 2005; Masser et al., 2009), we measured participants' attitude (assessing our non-donor's attitude on performing blood donation), subjective norm (assessing if they perceive their significant others would want them to donate blood), and self-efficacy (assessing their confidence or belief in their ability to donate blood). Following Masser et al.'s (2009) and France et al.'s (2008) extended TPB model, we also measured participants' moral norms (assessing their feeling of personal responsibility or moral obligation to donate blood). According to prior research (Armitage & Conner, 2001; Ferguson et al., 2008; Godin et al., 2005; Lemmens et al., 2005), the moral norm was found to be a significant predictor of blood donation intention for repeated blood donors. However, another study (Holdershaw et al., 2011) has found that moral norm plays an insignificant influence in blood donation. Additionally, we also measured participants' anticipated regret (assessing their expectation of having future regretful feelings if not donating blood, see Godin et al., 2005, 2007). Masser et al. (2009) found that for experienced donors, anticipating the negative emotion of regret for not donating blood showed strong intentions to donate blood. We also measured participants' donation anxiety (feeling anxious about future blood donation related to the inherent fear of needles, blood, or pain, see Armitage & Conner, 2001; Giles & Cairns, 1995; Gillespie & Hillyer, 2002; Labus et al., 2000). Prior research documented that donation anxiety is usually related to past blood donation experiences and is the biggest contributing factor that affects an experienced donor's intention to continue donating blood (Masser et al., 2009; Oborne et al., 1978). Our study explored if such variable would affect blood donation intention for our non-donor sample, who had never had past blood donation experiences. Lastly, we also measured participants' self-identity (whether they conceptualize the self as a person who donates blood, Ferguson et al., 2008). Past studies revealed a significant relationship between self-identity and blood donation intention, particularly for committed donors who gave blood in the past and thus might have internalized their self-identity as a blood donor (Masser et al., 2009). It should be noted that the above findings were all done with experienced blood donors. It remains unclear within the past literature on the direct or indirect predictive roles of the studied variables on blood donating intention of non-blood donors.

Among the above-mentioned variables, self-efficacy is particularly important. Blood donation is a costly behavior

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in terms of the time consumed, the lethargy after donation, and zero remuneration. Individuals' perceived ability to perform blood donation could be influenced by situational factors like health conditions, time constraints, accessibility to the collection site, and possible deferral after on-site hemoglobin level test. A considerable number of past studies had suggested that self-efficacy is a strong predictor for individuals' intention of blood donation (Giles et al., 2004; Lu, 2010; Masser et al., 2009; Veldhuizen et al., 2011). Moreover, self-identity is another important factor in predicting blood donation intention (Armitage & Conner, 2001; Giles et al., 2004; Lu, 2010). Self-identity, defined as one's perceived societal roles (Turner, 1978), such as the role of blood donor, could be important in a collectivistic society like Hong Kong. In a collectivistic society, social obligations and societal goals are emphasized more than personal achievement and goals. In order to maintain harmony, one's self-identity, which would affect one's behavior, should be subject to the influence of social norms and others' expectations (Markus & Kitayama, 1991; Miller, 1994). In blood donation literature, development of self-identity as a blood donor is identified as the pivotal factor which could influence first-time donors to become repeat donors (Masser et al., 2008). Prior studies also stated that once blood donation becomes part of the self-concept, the influence of other factors (such as attitudes) on future intention would be reduced, and self-identity becomes the driving force of future donation intentions (Charng et al., 1988; Hyde et al., 2013; Masser et al., 2008). Although the relation between self-identity and donation intention may depend on past behavior (i.e., the behavior itself reinforces self-identity and intention), there is evidence suggesting that effects of self-identity on intention were independent of past behavior (Fekadu & Kraft, 2001; Terry et al., 1999).

In addition, Ferguson et al. (2008) reported that prosocial personality orientations (trait empathy) have no correlation with the willingness for blood donation in their Western samples. In the current study, we measured participants' prosocial personality traits (such as other-oriented empathy, and helpfulness) using the Prosocial Personality Battery (PSB; Penner et al., 1995) to check if this was also true for our Chinese participants. Moreover, past research found that both positive (Carlson et al., 1988; George, 1991; Isen & Levin, 1972) and negative moods (Carlson & Miller, 1987) were related to helping behaviors. And when people feel fatigued, their energy is depleted and their intention to help is lower (DeWall et al., 2008; Gailliot et al., 2007; Joosten et al., 2015; Xu et al., 2012). As such, in the current study, participants' positive and negative mood states, as well as their perceived level of fatigue was also measured by the Brief Mood Introspection Scale (BMIS), and the Brief Fatigue Inventory (BFI), respectively.

2. Materials

Self-construal scale. Prior studies suggested that interdependent-oriented Chinese are more likely to be susceptible to negative-framed messages (Uskul et al., 2009). We, therefore, measured participants' self-orientation. We used the Chinese version of Self-Construal Scale (Singelis, 1994) translated by Kwan et al. (1997). This Chinese version has been used to assess self-construal of Hong Kong samples (Kwan et al., 1997). The scale contained 30 items and was in a five-point Likert format (from 1 = strongly disagree, to 5 = strongly agree). Among them, 15 items measured participants' independent self-construal (e.g., "*I try to do what is best for me, regardless of how it might affect others*." Cronbach's $\alpha = .67$), and the remaining 15 items measured their interdependent self-construal (e.g., "*I often have the feeling that my relationships with others are more important than my own accomplishments*." Cronbach's $\alpha = .83$). Independent subscale showed marginally acceptable reliability, while interdependent subscale showed good reliability.

Prosocial Personality Battery. The PSB was adopted from Penner et al. (1995) and back-translated into Chinese. The battery used a five-point Likert scale (from $1 = strongly \ disagree$, to $5 = strongly \ agree$). Twenty-two items measured participants' other-oriented empathy (e.g., "*My decisions are usually based on concern for the welfare of others*." Cronbach's $\alpha = .50$), and the scores were averaged to give a mean other-oriented empathy score. Eight items measured helpfulness (e.g., "*I have offered to help a handicapped or elderly stranger across a street*.") and the scores were averaged to give a mean helpfulness score (Cronbach's $\alpha = .69$).

Theory of Planned Behavioral questionnaire. Participants' intention to donate blood was measured by eight dimensions of the TPB model (Masser et al., 2009). The model consists of 22 items and was back-translated into Chinese. It was in a seven-point Likert format (from $1 = strongly \ disagree$, to $7 = strongly \ agree$). Cronbach's alphas showed good reliability across all dimensions (attitude: four items, e.g., "*participating in blood donation would be satisfying*.", $\alpha = .85$; subjective norm: three items, e.g., "*People who are important to me would think I should donate*"

blood.", $\alpha = .91$; moral norm: four items, e.g., "I believe I have a moral obligation to donate blood.", $\alpha = .92$; self-efficacy: two items, e.g., "I am confident that I will be able to donate blood in the next 3 months.", $\alpha = .87$; self-identity: three items, e.g., "I am the kind of person who donates blood.", $\alpha = .89$; anticipated regret: three items, e.g., "In the future if I did not donate blood, I would regret it.", $\alpha = .91$; and donation anxiety: three items, e.g., "In the future if I donate blood, I would regret it.", $\alpha = .91$; and donation anxiety: three items, e.g., "In the future if I donate blood, I would feel distressed.", $\alpha = .97$).

Brief Mood Introspection Scale. We adopted Xiao's (2004) Chinese version of the BMIS (Mayer & Gaschke, 1988) to assess participants' current mood, including positive mood (eight items, e.g., '*happy*', Cronbach's $\alpha = .82$) and negative mood (eight items, e.g., '*sad*', Cronbach's $\alpha = .85$) on a four-point scale (from 1 = definitely do not feel, to 4 = definitely feel). Ratings of positive (negative) mood items were averaged to give a mean positive (negative) mood score.

Brief Fatigue Inventory. We adopted Lin et al.'s (2006) Chinese version of the BFI (Mendoza et al., 1999) to measure participants' perceived fatigue level (9 items, Cronbach's $\alpha = .83$). Three items measured the severity of fatigue (from 1 = not fatigue, to 10 = as bad as you can imagine, Cronbach's $\alpha = .86$), and six items measured how much their fatigue had interfered with their daily activities in the past 24 hours (from 1 = fatigue did not interfere me, to 10 = completely interfere, Cronbach's $\alpha = .79$).

The first two scales were measured in part 1, and the remaining three scales were measured in part 2 of the study.

3. Results

Our Chinese participants showed only a slightly higher interdependent self-construal (M = 3.61, SD = .40) relative to independent self-construal (M = 3.50, SD = .33), t(50) = -1.83, p = .07. In line with the past findings (Giles et al., 2004; Lu, 2010; Masser et al., 2009; Veldhuizen et al., 2011), self-efficacy was found to be a significant predictor for blood donation intention, b = .49, t(49) = 3.79, p < .001. This suggests that blood donation intention could be affected by participants' perceived ability (i.e., self-efficacy). Since our study aimed at examining the relative effectiveness of altruistic vs. egoistic messages in influencing young adults' intention to donate blood *regardless of their perceived ability in blood donation*, other than the 2 x 2 ANOVA analysis reported in the main manuscript, here in the supplementary file, we also like to report a 2 x 2 ANCOVA in which the variable self-efficacy was controlled.

A two-way ANCOVA was conducted with message focus (altruistic vs. egoistic) and framing (positive vs. negative) as the between-subject independent variable, and blood donation intention as the dependent variable, controlling for participants' self-efficacy score. The main effect of message focus was significant, F(1, 46) = 14.45, p < .001, $\eta_p^2 = .24$, observed power = .96. Participants reported a greater intention to donate blood when the messages were altruistic-focused (M = 3.98, SD = 1.11) than when the messages were egoistic-focused (M = 2.75, SD = 1.12). The main effect of framing was also found to be significant, F(1, 46) = 7.89, p = .007, $\eta_p^2 = .15$, observed power = .79. Participants reported a greater intention to donate blood when the messages were positively-framed (M = 3.82, SD = 1.13) than when the messages were positively-framed (M = 3.82, SD = 1.13) than when the messages were negatively-framed (M = 2.92, SD = 1.17). The interaction effect of message focus and framing was also significant, F(1, 46) = 4.08, p = .049, $\eta_p^2 = .08$, observed power = .51. The results pattern followed the one reported in the main manuscript. Since our findings were more or less the same when self-efficacy was being controlled for (vs. not controlled), a mediation analysis (Preacher & Hayes, 2004) using the bootstrapping method with biascorrected confidence estimates was conducted to examine if self-efficacy mediates the relationship between message type and blood donation intention. Our data did not support self-efficacy being a significant mediator [the *a* path was not significant, b = .30, t(49) = 1.64, p = .11; overall, b = .13, CI(-.03, .34)].

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Blood Donation Intention	-													
2. Attitude	.21	-												
3. Subjective Norm	.30*	.44*												
4. Self-efficacy	.48**	.27 ⁺	.52**											
5. Moral Norm	.33*	.70**	.44**	.19										
6. Anticipated Regret	.42**	.32*	.19	.05	.40*									
7. Self-identity	.56**	.47**	.40**	.38**	.50**	.49**								
8. Donation Anxiety	.23	003	.14	.02	.15	.71**	.23							
9. Other-oriented Empathy	08	.18	.09	02	.22	004	.01	05						
10. Helpfulness	21	.12	.04	02	.22	.20	.24	.05	.16					
11. Independent Self-construal	.02	.34*	.29*	.30*	.15	.24	.30*	.19	16	.03				
12. Interdependent Self-construal	.17	.25	.20	.34*	.26 ⁺	.23	.18	.40**	.27 ⁺	.27+	.35*			
13. Positive Mood	.35*	.22	.21	.27 ⁺	.35*	.33*	.53**	.16	.22	.25	.08	0.21		
14. Negative Mood	.04	08	17	17	.07	.25	.03	.10	.17	.11	23+	09	.11	
15. Perceived Fatigue Level	.08	.04	.10	.08	03	.24	.04	.16	08	07	02	12	08	.48**

Table 1. Correlation matrix of blood donation intention and other variables (N = 51)

Note: ^+p ranges from .052 to .10; $^*p < .05$; $^{**}p < .01$ (two-tailed).

Table 1 presents the correlations among all the variables measured. Our results showed that attitude, donation anxiety, independent and interdependent self-construal, negative mood, and perceived fatigue level were not significantly correlated with blood donation intention, all ps > .05. Consistent with Ferguson et al. (2008), prosocial personality traits (other-oriented empathy, and helpfulness) also did not significantly correlate with blood donation intention, $p_{\rm S} > .05$. While negative mood state was found to be negatively associated with perceived fatigue level, it did not significantly relate to donation intention. Instead, consistent with Ferguson et al. (2008), positive mood (which could be a sense of potential emotional reward) was found to be positively associated with blood donation intention. In fact, only positive mood, subjective norm, self-efficacy, moral norm, anticipated regret, and self-identity were positively correlated with blood donation intention. To check whether these variables differed across the four conditions, ANOVAs were conducted with message focus and framing as within-subject variables and each of these variables as the dependent variable. Results showed that the four conditions did not differ in their subjective norm, moral norm, selfefficacy, and anticipated regret, all ps > .05. However, the main effect of message focus was significant for self-identity (the extent to which participants identified as potential blood donors, and recognize being a blood donor is part of their self-concept), F(1, 47) = 4.79, p = .03, $\eta_p^2 = .09$, observed power = .57. Participants reported a higher self-identity score when they read altruistic-focused (M = 4.34, SD = 1.16) than egoistic-focused (M = 3.63, SD = 1.32) messages. The main effect of framing was not significant, F(1, 47) = 1.27, p = .27, $\eta_p^2 = .03$, observed power = .20. The interaction effect of the two was marginally significant, F(1, 47) = 3.27, p = .077, $\eta_p^2 = .07$, observed power = .43. Since regression analysis showed that self-identity was a significant predictor for blood donation intention, b = .65, t(49) = 4.70, p < .001. We further conducted a follow-up ANCOVA to examine the differences between groups in blood donation intention while controlling self-identity. Our data showed that the main effect of message focus $[F(1, 46) = 2.03, p = .16, \eta_p^2 =$.04, observed power = .29], the main effect of framing [F(1, 46) = 1.42, p = .24, $\eta_p^2 = .03$, observed power = .21], and the interaction effect of the two [F(1, 46) = 1.42, p = .24, $\eta_p^2 = .03$, observed power = .22] became non-significant. A mediation analysis (Preacher & Hayes, 2004) was carried out to investigate if self-identity is a mediator between message type and blood donation intention. Our results showed that message type was significantly associated with selfidentity [a path: b = -.34, t(49) = -2.14, p = .04]; and social-identity was significantly associated with blood donation intention [b path: b = .59, t(48) = 4.11, p = .0002]. Message type was significantly associated with blood donation intention, indicating a significant predictor-outcome association [c path: b = -.45, t(49) = -2.47, p = .02]. The direct effect of message type on blood donation intention became insignificant when controlling for self-identity [path c': b =

-.25, t(48) = -1.51, p = .13]. Such mediation effect, however, was not supported by the 95% confidence interval of the indirect effect with 5,000 bootstrapped samples [b = -.20, CI (-.47, .02)].

4. Discussion

We found that self-efficacy and self-identity were significant predictors for the Chinese non-donors' blood donation intention. Our participants with *no donation experience* reported a higher blood donation intention when reading positively-framed than negatively-framed messages *under the condition when their self-efficacy was controlled*.

Results of the current study highlight the importance of self-efficacy and self-identity in understanding public health-related issues in collectivistic societies. In line with the past Western and Chinese research on blood donation intention (Armitage & Conner, 2001; Giles et al., 2004; Lu, 2010), our study suggested that self-efficacy and self-identity were important predictors of blood donation intention (they were not significant mediators between message type and blood donation intention). Our results showed that young Chinese non-donors have a greater willingness to donate blood when they perceived themselves to possess a higher self-efficacy to donate blood and when they recognize being a blood donor as a part of their self-identity. Given the importance of perceived self-efficacy on donors' intention, it is suggested that future campaigns could adopt educational materials that aim at enhancing self-efficacy. Future promotion campaigns and advertisements could present an altruistic-focused message highlighting the importance of self-identity (one as a potential blood donor) and empowering their self-efficacy (one has the efficacy to donate blood) to attract new donors.

Our data showed significant positive correlations between behavioral intention and factors/dimensions proposed by the extended TPB (Masser et al., 2009) model, including subjective norm, self-efficacy, moral norm, anticipated regret, and self-identity (see Table 1). Yet, the correlation between behavioral intention and donation anxiety was not significant. One possible reason is that severe body reactions, like nausea and dizziness, are not captured by the donation anxiety subscale, and these reactions are important in assessing donation anxiety as suggested by Meade et al. (1996). While Masser et al. (2009) found a significant correlation between attitude and intention using experienced donors, our data did not show any significant correlation between the two using non-donors. Future studies should explore if donors and non-donors differ in their general blood donation attitude.

It should be noted that the Self-construal scale (Singelis, 1994) and the PSB have suboptimal reliability. The independent Self-construal scale (Singelis, 1994) has a Cronbach's α of .67. This is consistent with that reported by Singelis (1994): the Cronbach's α reliability for independent subscale was .69 and it was regarded as acceptable (p.586). Perhaps, future study shall adopt another scale which has higher reliability to measure Asian participants' self-construal (e.g., Hashimoto & Yamagishi's [2013] eight-item independence subscale: Cronbach's α are .50 and .69 for other-oriented empathy and helpfulness, respectively. In Penner et al.'s (1995) paper, the reported Cronbach's α for the subscales ranged from .51 to .83 with Western samples. Future study could consider using an alternative scale measuring participants' prosocial personality tendency (e.g., the prosocial act subscale of the Adolescent Behavior Questionnaire, which reported Cronbach's α ranged from .80 to .90 for Hong Kong samples, Lai et al., 2015).

Lastly, although the TPB subscales measured separate constructs (eight different dimensions), the inter-correlations of the subscales are quite high. Nevertheless, this is comparable to Masser et al.'s (2009) findings which also reported significantly high inter-correlations among the eight variables.

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