



Are we braver in cyberspace? Social media anonymity enhances moral courage

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ABSTRACT

The literature has established accumulated evidence on the negative consequences of social media anonymity on behaviors online (e.g., cyber-aggression). Yet the potential benefits of social media anonymity have been largely overlooked, especially when it comes to prosociality. In four studies, we examined the facilitating effect of perceived social media anonymity on online moral courage. We first tested and confirmed the relation of perceived social media anonymity to online moral courage in a correlational study (Study 1) and an experimental study (Study 2). We then tested and revealed the mediating role of perceived risk and the moderating role of moral meaningfulness in the relation between perceived anonymity and moral courage (Study 3). We further used social media behavioral data to examine the association between social media anonymity and moral courage in an ecologically valid context (Study 4). Our findings enrich the research of moral psychology and social media studies by providing the first experimental evidence for the prosocial effect of social media anonymity. They further have important implications for website interface design, social activism, as well as intervention programs to promote constructive civil engagement online.

1. Introduction

In the age of the booming Internet technology, more and more people use online social media as a major platform to communicate and express their views. Discussions in cyberspace, especially those on political and moral issues, in turn have powerful impacts on the real world. Social media sites such as Twitter and Facebook are believed to have profoundly influenced the course of many historical events - including the U.S. presidential election - and policies regarding issues such as same-sex marriage, climate change, and gender equality (Allcott & Gentzkow, 2017; Brady et al., 2017; Metzgar & Maruggi, 2009). As the Internet and social media become increasingly intertwined with critical societal issues, it is timely to examine how the characteristics of social media influence psychological processes and moral behavior in individuals (Christopherson, 2007; Hou et al., 2017; Ran et al., 2022; Sproull, 2011). In particular, the anonymity of social media may play an important role in influencing online moral behavior (Christopherson, 2007; Kiesler et al., 1984; Lapidot-Lefler & Barak, 2012), although studies to date have mainly focused on the negative effects of social

media anonymity (e.g., cyberbullying; Barlett, 2015; Barlett et al., 2016; Christopherson, 2007; Postmes et al., 2001). The current research fills the critical gap by examining the contribution of social media anonymity to moral courage and the boundary conditions of the positive effects.

1.1. Anonymity on social media

Anonymity generally refers to the state of being unidentified, where an individual's identity is unknown to others even after the completion of social interaction (Christie & Dill, 2016; Keipi et al., 2015; Wallace, 1999). It serves many psychosocial functions, including the recovery function (i.e., one gains relaxation via an increased sense of control over personal boundary), the catharsis function (i.e., one is able to express thoughts and feelings without concerns for judgment by others), and the autonomy function (i.e., one is able to act freely without concerns of social consequences) (Pedersen, 1997). At the age of the Internet, anonymity is considered one of the most essential features of social media. It creates a condition under which individuals can freely express their

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views without having to concern about public pressure or regulatory repression, which in turn promotes discussion of controversial issues (Christopherson, 2007; Jardine, 2018; McLeod, 2011). Social media anonymity may also enhance individuals' psychological well-being by increasing their sense of control over privacy and personal boundary (Christopherson, 2007; Pedersen, 1997). On the dark side, however, social media anonymity reduces the cost of immoral behavior and thus makes it difficult to curb cyberaggression (Eastwick & Gardner, 2009; Hoang & Pishva, 2014).

Importantly, individuals may differ in their perceived anonymity, namely, the extent to which individuals view their personal identity as unknown or unidentifiable to others (Hite et al., 2014; Scott, 1998). Most social media platforms require users to provide personal information for registration, such as a valid email address, cell phone number, or even real name verification. Different policies across the platforms as well as other factors (e.g., the number of followers) may bring different feelings of anonymity to social media users (Barlett et al., 2018), which may in turn affect their online behaviors (e.g., Barlett, 2015; Clark-Gordon et al., 2019; Fox et al., 2015; Wu & Atkin, 2018). Indeed, some researchers argue that true anonymity is difficult, if not impossible, to achieve in the Internet age and that individual perceptions of anonymity may better predict online behaviors than actual anonymity (Gavish & Gerdes, 1998; Hite et al., 2014; Robbins & Judge, 2011).

Empirical research has shown that perceived anonymity on social media increases self-disclosure, especially of negative emotions (Ma et al., 2016), and that individuals who perceive more security of privacy are more likely to show openness and agreeableness and more likely to build meaningful relationships online with those who keep distance offline (Zimmerman & Ybarra, 2016). In the moral domain, however, research has long shown that anonymity on Internet brings about a variety of self-serving and antisocial behaviors (e.g., Armstrong & Forde, 2003; Barlett et al., 2016; Waytz & Epley, 2012; Yam & Reynolds, 2016). Individuals with higher perceived anonymity show a greater tendency to commit cyber-aggression (e.g., Barlett, 2015; Barlett et al., 2016; Moore et al., 2012). Perceived anonymity also exacerbates conformity and dehumanization on social media and in turn fosters online violence (Huang & Li, 2016; Lowry et al., 2016; Silke, 2003; Waytz & Epley, 2012). It further eases concerns for the consequences of norm-deviating behaviors and thus increases transgressions on social media (Christopherson, 2007; Zimmerman & Ybarra, 2016). Nonetheless, perceived social media anonymity may enhance moral courage under the right conditions.

1.2. Anonymity and moral courage

Moral courage is defined as a special type of prosocial behavior that has relatively high social cost but little reward to the person (Bierhoff, 2002; Greitemeyer et al., 2006; Osswald et al., 2010). It entails the ability to act for moral or ethical reasons despite countervailing pressure to do otherwise. Whereas individuals often anticipate positive outcomes such as praise and commendation from others when conducting good deeds, they tend to expect negative outcomes such as humiliation, rejection, or even aggression when they engage in moral courage (Greitemeyer et al., 2006; Osswald et al., 2010). As such, moral courage is distinctly different from general helping behavior. Research has shown that individuals readily attribute prosocial behaviors with adverse consequences to moral courage rather than general helping behavior (Fischer et al., 2004; Greitemeyer et al., 2006), and that individuals with higher moral courage tend to exhibit a greater sense of responsibility to intervene against unethical behaviors as well as a greater capacity to take action (Frey et al., 2007; Miller, 2005; Osswald et al., 2010).

Anonymity may influence individuals' exercise of moral courage in life generally and online in particular. According to the Social Identity Model of Deindividuation Effects (SIDE, Reicher et al., 1995),

anonymity reduces individual self-awareness and increases social identity salience, which in turn intensifies group influence. SIDE has received much empirical support in explaining the anonymity effects on behavior (e.g., Postmes et al., 2001; Tanis & Postmes, 2007; Wodzicki et al., 2011), and it has been applied to the context of social media particularly with regard to the negative consequences of anonymity online, such as cyberbullying and cyberhate (Chan et al., 2022; Christie & Dill, 2016; Douglas et al., 2005). Yet this theoretical model also suggests potential positive outcomes of social media anonymity: When individuals feel anonymous within an online community, they may experience an enhanced social identification with the community and a desire to engage in behaviors that are consistent with the norms and moral standards of the community, even if doing so potentially comes with a personal cost. Perceived anonymity may thus facilitate online moral courage. Critically, this process can be further influenced by factors, including perceived risk and moral meaningfulness, that may create boundary conditions for individuals' expression of moral courage online.

1.3. The roles of perceived risk and moral meaningfulness

Given that moral courage is often associated with adverse consequences (Fischer et al., 2004; Greitemeyer et al., 2006), perceived risk can be a significant factor that prevents individuals from engaging in moral courage behaviors. According to the integrative model of moral courage (Halmburger et al., 2016), moral courage involves careful deliberation and weighing the costs and benefits of taking action. Whether an individual exhibits an act of moral courage is influenced by his or her psychological expectation of the magnitude and likelihood of harm from the act: The higher perceived risk in the face of a threatening situation, the lower the motivation to engage in an act of moral courage (Brandstätter et al., 2016; Fischer et al., 2006). Importantly, social media anonymity may reduce individuals' perceived risk of adverse consequences for their moral actions. Research has suggested that anonymity generally reduces perceived risk and encourages individuals to act in ways they would not do otherwise when anonymity is not assured (Andalibi et al., 2016; Forte et al., 2017). Although a variety of potential risks exist on social media, such as surveillance, harassment, loss of reputation, threats to loved ones, and social pressure or exclusion (Lu et al., 2005; Subrahmanyam & Greenfield, 2008; Valkenburg & Peter, 2011), social media anonymity may reduce one's perceived risk, which may in turn enhance moral courage when it is called for. In other words, perceived risk may mediate the effect of social media anonymity on moral courage.

Furthermore, individual differences in moral meaningfulness may also play a role in affecting moral courage on social media. Moral meaningfulness refers to the extent to which individuals derive meaning from their moral behavior and further incorporate morality into their value system (May et al., 2014). According to the moral decision model (Schwartz, 2016), moral decision begins with an awareness of potential moral problems, which is determined by one's moral capacity and moral willingness (Tenbrunsel et al., 2003) and in turn positively predicts one's moral behavior (Craft, 2013). Individuals with high moral meaningfulness are more likely to perceive moral problems, view relevant moral behavior as part of their identity, and actively engage in the problem resolution (May & Luth, 2013; May et al., 2014). As a result, their moral courage may be less influenced by social media anonymity. In contrast, individuals with lower moral meaningfulness often show lower levels of moral willingness (May et al., 2014) and may depend more on social media anonymity to exercise moral courage online. In other words, moral meaningfulness may moderate the effect of social media anonymity on moral courage online.

1.4. The present research

We conducted four studies to examine the relation of social media

anonymity to moral courage and further test the mediating role of perceived risk and the moderating role of moral meaningfulness in the relation. Fig. 1 illustrates our theoretical model in connection with our hypotheses. Study 1 used a correlational design to test the association between perceived anonymity on social media and moral courage. We predicted that participants with greater perceived anonymity on social media would exhibit greater moral courage online (H1). Study 2 provided experimental evidence for the positive effect of perceived social media anonymity on moral courage online. We expected that participants who were induced to perceive high anonymity on social media would exhibit increased tendency to conduct moral courage behavior online (H2). Study 3 replicated the findings of Study 2 while using a new measure of moral courage and further tested the mediating role of perceived risk and the moderating role of moral meaningfulness in the effect of social media anonymity on moral courage. We predicted that perceived anonymity would reduce the perceived risk, which would in turn contribute to moral courage behavior online (H3). We further predicted that perceived anonymity would influence moral courage to a greater extent among those with low moral meaningfulness than those with high moral meaningfulness (H4). Study 4 extended the laboratory research to the real world, testing the main hypothesis using behavioral data from a social media platform, which establishes the ecological validity of the relation of perceived social media anonymity to moral courage (H1).

1.5. IRB and data availability

This project was approved by Peking University University's Institutional Review Board for Human Participants (IRB) (Protocol ID #: 2022-02-15). All participants provided informed consent. The project was not preregistered. Data and research materials of all studies can be accessed at https://osf.io/z9ef6/?view_only=77d20912ff02466b91177899fc7e7adb.

2. Study 1

The aim of Study 1 is to establish the positive association between perceived social media anonymity and online moral courage across individuals (H1).

2.1. Method

2.1.1. Participants

Schonbrodt and Perugini (2013) recommended having a sample of at least 250 participants for stable estimates of bi-variate correlations based on Monte Carlo simulations. Following the recommendation, we recruited 499 participants (266 women; $M_{age} = 26.03$, $SD_{age} = 6.42$) via the Chinese online platform Wenjuanxing. An additional 223 participants who did not pass the two attention check questions or complete the survey were excluded. Of the participants, 13.83% had a high school degree or below, 15.63% had a two-year college degree, 54.31% had a Bachelor's degree, and 16.23% had a Master's or Ph.D. degree. Each

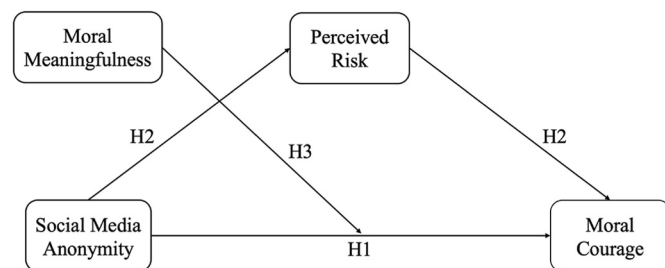


Fig. 1. The relation of social media anonymity to moral courage and its influencing factors.

participant received CHN\$2 (US\$0.3) for their participation.

2.1.2. Procedure and materials

Participants completed an online survey which took approximately 5 min. They were first asked to select a social media platform on which they often log on to post status updates (i.e., WeChat, Weibo). They then filled out the 4-item Perceived Anonymity Scale (Jung et al., 2012) and the 10-item Online Moral Courage Scale (Kinnunen et al., 2016) based on their general experience on the selected platform. For example, if a participant chose WeChat as the target platform, they would report their perceived anonymity of WeChat and their moral courage behavior on WeChat.

The Perceived Anonymity Scale was adapted from Jung et al. (2012), where participants rated each of the four items (e.g., "I can control the level of my anonymity on the platform.") on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The Cronbach's $\alpha = 0.85$ in the current sample. The Online Moral Courage Scale was developed by Kinnunen et al. (2016), where participants rated each item (e.g., "I actively take part in action that tries to influence moral issues by, for example, signing petitions and appeals on the internet.") on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The Cronbach's $\alpha = 0.91$ in the current sample. Participants then provided demographic information and were thanked.

2.2. Results

Pearson correlations between perceived social media anonymity, moral courage, and demographic variables are presented in Table 1. Perceived anonymity was positively associated with moral courage. In addition, moral courage was significantly correlated with gender, age, and education, whereby men, older participants, and those with less education scored higher on moral courage than women, younger participants, and those with more education, respectively. Controlling for gender, age, and education, the positive association between perceived anonymity and moral courage remained significant, $r(490) = 0.37$, $p < .001$. Thus, consistent with our prediction (H1), participants who perceived higher anonymity on social media exhibited more moral courage online.

3. Study 2

In Study 2, we manipulated perceived social media anonymity via a reading task and measured subsequent moral courage in participants. We predicted that participants in the anonymity condition would report greater moral courage than those in the non-anonymity condition (H2).

3.1. Method

3.1.1. Participants

A G*Power analysis (Faul et al., 2007) showed that at least 172 participants were needed to detect a medium effect size ($d = 0.50$) for a two-group between-subjects design with a power of .90 ($\alpha = 0.05$). We recruited 180 participants via the Chinese online platform Credamo. After excluding 2 participants who failed an attention check, 178

Table 1
Intercorrelations between variables in study 1.

Variables	M	SD	1	2	3	4
1. Gender	–	–	–			
2. Age	26.03	6.42	-.02	–		
3. Education Level	–	–	.07	-.10*	–	
4. Perceived Anonymity	4.70	1.44	-.06	.03	-.05	–
5. Online Moral Courage	4.47	1.43	–	.14**	–	.37***
			.13**		.16***	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

participants (89 women; $M_{age} = 27.35$, $SD_{age} = 6.07$) were in the final sample. Among the participants, 1.12% had a high school degree, 8.99% had a two-year college degree, 82.58% had a Bachelor's degree, and 7.30% had a Master's or Ph.D. degree. Each participant received CHN\$2 (US\$0.3) for their participation.

3.1.2. Procedure and materials

Participants were randomly assigned to an anonymity condition ($n = 90$) or a non-anonymity condition ($n = 88$). They completed an online survey that took approximately 5 min. To manipulate the perceived social media anonymity, participants were first instructed to read a passage and immerse themselves in it, a method adapted from prior research (Christie & Dill, 2016; Fox et al., 2015; Rains, 2007). Participants in the anonymity condition read a text depicting a person using an anonymous social media App:

"A few months ago, you downloaded a social app called Linster, which allows users to post their personal status of life in the form of text and pictures on the Linster App, as well as to like, comment, and retweet content posted by other users. You registered this App under the nickname abc987 and used a web-saved landscape image as your avatar. The App will not recommend to the user contacts that you may know. You post your experiences, attitudes, and feelings on this social media platform, and browse other people's daily activities."

Participants in the non-anonymity condition were first asked to write down their real organization and specific job title for the convenience of receiving the participant fee. They then read a text depicting a person using a non-anonymous social media App:

"A few months ago, you downloaded a social App called Linster, which allows users to post their personal status of life in the form of text and pictures on the Linster App, as well as to like, comment, and retweet content posted by other users. You registered this App under your real name, used your own photo as your avatar, and filled in your real information according to the registration requirements, such as your workplace and specific position. The App will recommend to the user contacts that you may know. You post your experiences, attitudes, and feelings on this social media platform, and browse other people's daily activities."

After reading the text passage, participants completed the 5-item Online Moral Courage Scale adapted from Kinnunen et al. (2016). They were asked to indicate to what extent (1 = *not at all*, 7 = *very likely*) they were likely to perform various activities of moral courage on the *Linster App* mentioned in the passage they just read (e.g., "I will post on this platform against social injustice, such as gender inequality or unreasonable dismissal of employees."). The scores of the 5 items were averaged to index moral courage (Cronbach's $\alpha = 0.78$). A manipulation check then followed, in which participants answered the questions in the Perceived Anonymity Scale (Jung et al., 2012) about the fictitious social media platform (Cronbach's $\alpha = 0.90$). Finally, participants provided demographic information and were debriefed and thanked.

3.2. Results

There were no significant differences in age, gender, or education between the two conditions. These variables were therefore not considered further in analysis.

Manipulation check: An Independent t -test showed that participants in the anonymity condition ($M = 5.38$, $SD = 1.13$) reported greater perceived anonymity than those in the non-anonymity condition ($M = 3.37$, $SD = 1.40$), $t(176) = 10.55$, $p < .001$, Cohen's $d = 1.58$. The manipulation was thus effective.

An independent t -test on moral courage revealed a significant condition effect, whereby participants in the anonymity condition ($M = 4.83$, $SD = 1.25$) reported greater moral courage than those in the non-anonymity condition ($M = 4.36$, $SD = 1.22$), $t(176) = 2.54$, $p = .012$,

Cohen's $d = 0.38$. Thus, the findings provide experimental evidence that perceived social media anonymity contributes to moral courage online (H2).

4. Study 3

Based on the causal link of perceived social media anonymity to moral courage established in Study 2, we measured in Study 3 participants' perceived risk and their moral meaningfulness to test the hypotheses that perceived risk would mediate the relation between perceived anonymity and moral courage (H3), and that moral meaningfulness would play a moderating role such that perceived anonymity would influence moral courage to a greater extent among those with low moral meaningfulness than those with high moral meaningfulness (H4). To self-replicate and obtain converging evidence, we used a new measure for moral courage.

4.1. Method

4.1.1. Participants

A G*Power analysis (Faul et al., 2007) showed that at least 172 participants were needed to detect a medium effect size ($d = 0.50$) for a two-group between-subject design with a power of .90 ($\alpha = 0.05$). We recruited 212 participants via Credamo. After excluding 18 participants who failed two attention check questions, 194 participants (97 women; $M_{age} = 26.99$, $SD_{age} = 5.57$) were included in the final sample. Among the participants, 1.55% had a high school degree, 7.22% had a two-year college degree, 79.90% had a Bachelor's degree, and 11.34% had a Master's or Ph.D. degree. Each participant received CHN\$2 (US\$0.3) for their participation.

4.1.2. Procedure and materials

Participants were randomly assigned to an anonymity ($n = 99$) or a non-anonymity ($n = 95$) condition. They completed an online survey which took approximately 5 min. They were first asked to complete the 4-item Moral Meaningfulness Scale (May et al., 2014) based on their general experience, where they rated each item (e.g., "Behaving consistently with my morals is quite important to me.") on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*). The mean score across the 4 items was used to index moral meaningfulness (Cronbach's $\alpha = 0.85$). The anonymity manipulation was then conducted in the same way as in Study 2. After reading the text passage, participants' moral courage tendency was measured with 6 moral dilemma vignettes framed in the context of social media. We constructed the vignettes based on the definition of moral courage and real-life examples (Greitemeyer et al., 2006; Kinnunen et al., 2016; Osswald et al., 2010). For each vignette, participants were asked to indicate to what extent they were likely to engage in a prosocial behavior that could be somehow damaging to themselves (1 = *not at all*, 7 = *very likely*). For example:

"You see a posting from a job seeker asking about the working culture of your company. You know that the company always requires employees to work overtime and withholds overtime pay, and that many of your co-workers suffer from health issues due to continuous overtime. How likely are you to reply to this posting and inform the job seeker of the real culture of your company?"

In addition, participants were asked to indicate how risky the behavior would be to them in each vignette was on a 7-point scale (1 = *no risk at all*, 7 = *a lot of risks*). Average scores across the 6 vignettes were used to index moral courage (Cronbach's $\alpha = 0.78$) and perceived risk (Cronbach's $\alpha = 0.90$), respectively. For a manipulation check, participants completed the 4-item Perceived Anonymity Scale (Jung et al., 2012) about the fictitious platform (Cronbach's $\alpha = 0.92$). Finally, they provided demographic information and were debriefed and thanked.

4.2. Results

The two groups were similar in gender and education, but participants in the anonymous condition ($M = 28.80$, $SD = 5.27$) were older than those in the control condition ($M = 25.12$, $SD = 5.26$), $t(192) = 4.87$, $p < .001$, Cohen's $d = 0.70$. Analyses with or without age as a covariate yielded the same pattern of results. We reported both sets of results below.

Manipulation check: An independent t -test indicated that participants in the anonymity condition ($M = 5.27$, $SD = 1.36$) felt more anonymous than those in the non-anonymity condition ($M = 3.24$, $SD = 1.34$), $t(192) = 10.46$, $p < .001$, Cohen's $d = 1.50$. Controlling for age, the between-group difference remained significant, $F(1, 191) = 112.77$, $p < .001$, $\eta_p^2 = 0.371$. The manipulation was therefore effective.

Independent t -tests were conducted on perceived risk and moral courage. Participants in the anonymity condition reported lower perceived risk ($M = 3.11$, $SD = 1.41$) than participants in the non-anonymity condition ($M = 4.47$, $SD = 1.22$), $t(192) = -7.15$, $p < .001$, Cohen's $d = -1.03$. and controlling for age, $F(1, 191) = 51.79$, $p < .001$, $\eta_p^2 = 0.213$. Furthermore, consistent with Study 2 findings, participants in the anonymity condition reported higher tendency for moral courage act ($M = 5.93$, $SD = 0.81$) than those in the non-anonymity condition ($M = 5.49$, $SD = 0.92$), $t(192) = 3.58$, $p < .001$, Cohen's $d = 0.51$, and controlling for age, $F(1, 191) = 15.38$, $p < .001$, $\eta_p^2 = 0.075$.

A bootstrapping mediation analysis (Preacher & Hayes, 2008) with 5000 iterations was conducted to examine whether perceived risk mediated the relation between perceived anonymity and moral courage. We entered the manipulation of anonymity as the independent variable (anonymity condition was coded as 1, non-anonymity condition as 0), perceived risk as the mediator, and moral courage as the dependent variable in model 4. The indirect effect was significant $b = 0.21$, $SE = 0.07$, 95% CI [0.08, 0.37] (see Fig. 2). Controlling for age, the indirect effect remained significant, $b = 0.21$, $SE = 0.08$, 95% CI [0.08, 0.38]. The results thus support our hypothesis that perceived risk mediated the effect of anonymity on moral courage (H3).

A bootstrapping moderation analysis (Preacher & Hayes, 2008) with 5000 iterations was conducted to test the moderating roles of moral meaningfulness ($M = 5.98$, $SD = 0.76$). The manipulation of anonymity was entered as the independent variable (anonymity condition was coded as 1, non-anonymity condition as 0), moral meaningfulness as the moderator, and moral courage as the dependent variable in model 1. The interaction between anonymity and moral meaningfulness was significant $b = -0.32$, $SE = 0.15$, 95% CI [-0.62, -0.01], and marginally significant after controlling for age, $b = -0.30$, $SE = 0.15$, $p = .0504$, 95% CI [-0.5945, 0.0006]. When the moral meaningfulness was low (-1 SD), anonymity positively predicted moral courage: $b = 0.66$, $SE = 0.18$, $t = 3.64$, $p < .001$, and controlling for age, $b = 0.73$, $SE = 0.18$, $t = 4.03$, $p < .001$. When the moral meaningfulness was high ($+1$ SD), anonymity had no significant effect on moral courage: $b = 0.12$, $SE = 0.17$, $t = 0.75$, $p = .455$, and controlling for age, $b = 0.23$, $SE = 0.17$, $t = 1.35$, $p = .179$ (see Fig. 3). Thus, consistent with our hypothesis (H4), the effect of perceived anonymity on moral courage was qualified by individuals' moral meaningfulness.

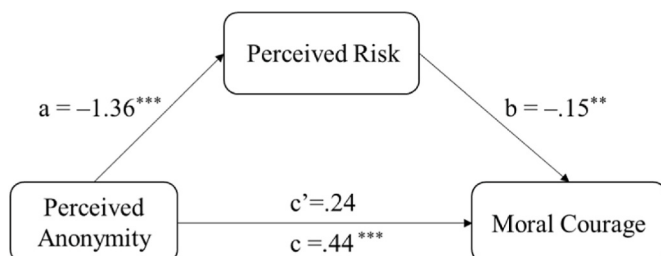


Fig. 2. Perceived risk mediated the effect of anonymity on moral courage.

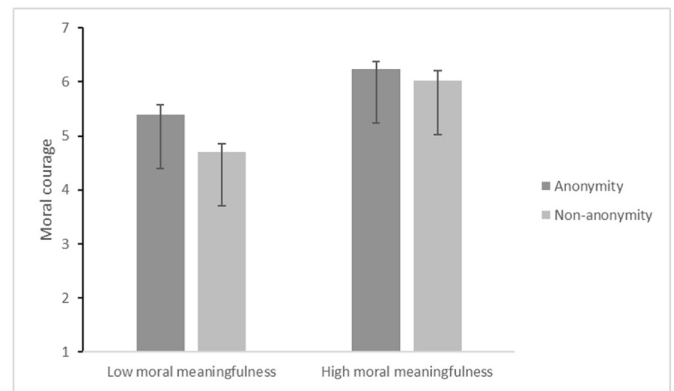


Fig. 3. Moral courage moderated by moral meaningfulness in study 3.

Taken together, Study 3 replicated the findings of Study 2 to show that the perceived social media anonymity contributed to moral courage online (H2). Furthermore, Study 3 showed that the perceived risk operated as an underlying mechanism for the effect of perceived anonymity on moral courage (H3). The findings also revealed a boundary condition for the relation between perceived anonymity and moral courage (H4): Whereas the perceived anonymity promoted moral courage among individuals with low moral meaningfulness, those with high moral meaningfulness demonstrated moral courage regardless of the level of social media anonymity.

5. Study 4

To replicate the findings in an ecologically valid context, Study 4 tested the main hypothesis of the relation of perceived anonymity to moral courage (H1) using actual behavioral data online. We selected Sina Weibo, one of the most popular social media platforms in China (e. g., Chen et al., 2011; Wang et al., 2020; Wu et al., 2015), to collect the behavioral data.

5.1. Method

5.1.1. Participants

A total of 96 Chinese college students who were active Sina Weibo users were recruited and each received CHN\$5 (US\$0.7) for their participation. Participants were informed of the purpose and procedure of the study and they authorized the researcher to collect their digital behavioral data on Sina Weibo. Ten participants were excluded for invalid account information and three for failing one attention check question. The final sample included 83 participants (71 women; $M_{age} = 22.46$, $SD_{age} = 2.32$). Among the participants, 2.41% had a high school degree, 3.61% had a two-year college degree, 69.88% had a Bachelor's degree, and 24.09% had a Master's or Ph.D. degree.

5.1.2. Procedure and materials

Participants completed an online survey that took approximately 3 min. Participants completed the Perceived Anonymity Scale (Jung et al., 2012) to report their perceived anonymity on Sina Weibo based on their general experience on the platform (Cronbach's $\alpha = 0.80$). They then provided their Sina Weibo user name for behavioral data collection. Participants were assured that the content analysis involved in the present study was for scientific research purposes only and that their personal information would be hidden. Participants confirmed their authorization for the data collection and content analysis of their posts on Sina Weibo and that their approval would expire after one month.

Using the existing GitHub crawler package (<https://github.com/dataabc/weiboSpider>), we downloaded the content posted under the participants' Sina Weibo accounts via the Application Programming Interfaces (APIs) of Sina Weibo. Only the information that regular

visitors could reach was downloaded to protect privacy. To obtain on-line behavioral data over a considerable period and to eliminate potential influence of the perceived anonymity measure on the participants' behavior, we crawled the text of all posts in the participants' accounts for three years up until the time they completed the perceived anonymity measure (i.e., from March 31, 2018 to March 31, 2021), including original posts and retweeted posts. The total number of crawled posts of each participant ranged from 21 to 3918 ($M = 665$, $SD = 734$).

Then we used the Chinese version of the Moral Foundations Dictionary to filter the crawled posts that contained moral words. The Chinese version of the Moral Foundations Dictionary (Wu et al., 2019) was revised from the original version developed by Graham et al. (2009). The dictionary contains 590 Chinese words in five dimensions (i.e., care, fairness, loyalty, authority, purity), and has been validated across several studies analyzing textual data in the Chinese context (e.g., Huang & Li, 2016; Li et al., 2021). We used Python to filter the posts containing moral words. If a moral word appeared in the text of a post, the post would be filtered out and counted as a moral-related post (Huang & Li, 2016; Li et al., 2021). The moral index of each participant was then calculated ($M = 0.23$, $SD = 0.08$) as:

Moral index = number of moral-related posts / total number of crawled posts

Furthermore, after the moral-related posts were filtered, a research assistant coded whether the text of each post demonstrated the moral courage of the author (0 = not an act of moral courage, 1 = act of moral courage). A second research assistant coded randomly selected 100 posts for reliability estimate. The consistency between the two coders was $r = 0.91$. After the coding of each moral-related post, the index of moral courage was calculated for each participant ($M = 0.03$, $SD = 0.02$) as:

Moral courage index = number of moral courage posts / total number of crawled posts.

5.2. Results

Pearson correlations between perceived social media anonymity, moral index, moral courage index, and demographic variables are presented in Table 2. Perceived social media anonymity was positively associated with moral index and moral courage index. In addition, education level was correlated with perceived anonymity, whereby participants with less education perceived greater anonymity than those with more education.

We then conducted linear regression analyses with education level being controlled. The results showed that independent of education, perceived anonymity positively predicted moral index, $b = 0.02$, $SE = 0.01$, $t = 2.75$, $p = .007$. Similarly, perceived anonymity positively predicted moral courage index, $b = 0.01$, $SE = 0.002$, $t = 5.58$, $p < .001$. Thus, individuals who perceived greater anonymity on Sina Weibo made most posts related to moral issues and demonstrated greater moral courage on the platform (H1). Notably, this study did not include measures for moral meaningfulness and perceived risk that would have allowed us to replicate the findings of Study 3. Future research should

address this limitation.

6. General discussion

The current studies provide the first experimental evidence for the positive effect of social media anonymity on moral behaviors online. Previous research has mainly focused on the harmful effects of social media anonymity, especially regarding moral issues. An extensive suite of studies has demonstrated that anonymity on social media leads to increased hostility, aggression, and violence online (e.g., Barlett, 2015; Moore et al., 2012; Zimmerman & Ybarra, 2016). Yet examining the prosocial consequences of anonymity is essential for a comprehensive understanding of the impact of social media on individuals and the society at large (Christopherson, 2007; Rosenberry, 2011; Sardá et al., 2019). With the gradual introduction of restrictions on Internet anonymity in many countries such as China, South Korea, Germany, France, and India in recent years, it has become particularly urgent to identify positive moral behavioral outcomes of social media anonymity and their boundary conditions so as to inform relevant policies and regulations.

Converging evidence emerged in the present four studies that perceived social media anonymity enhances moral courage online. In Study 1, we conducted a correlational study and found a positive link between perceived anonymity on social media and moral courage. In Study 2, we manipulated perceived anonymity on social media and validated the effect of social media anonymity on moral courage. In Study 3, we replicated the findings of Study 2 and further found that perceived risk mediated the effect of social media anonymity on moral courage and that anonymity only influenced moral courage in individuals with low moral meaningfulness but not those with high moral meaningfulness. In Study 4, we analyzed behavioral data from a social media platform and confirmed the positive relation of perceived anonymity to moral courage in an ecologically valid context. Collectively, these results support our hypotheses that social media anonymity serves an important function for individuals to exercise their moral courage online.

These findings fill the theoretical and empirical gap by revealing that perceived social media anonymity, beyond its many damaging effects as identified in previous research, can indeed foster moral courage online by reducing perceived risk of one's moral actions, especially among those who typically exhibit low moral meaningfulness. These findings are in line with the Social Identity Model of Deindividuation Effects (SIDE, Reicher et al., 1995), showing that anonymity can encourage individuals to exercise moral courage in the online community. They further extend SIDE by identifying boundary conditions under which the prosocial effect of anonymity takes place. The findings also lend support to the integrative model of moral courage (Halmburger et al., 2016) to demonstrate the important role of perceived risk in moral courage behavior, as well as the moral decision model (Schwartz, 2016) for the interplay between moral meaningfulness and anonymity in affecting moral courage.

Furthermore, our findings speak to the popularity of online discussion of controversial issues as well as the spread of moral emotions on social media (e.g., Bennett, 2012; Brady et al., 2017; Crockett, 2017). Social media anonymity has been found in previous studies to promote people's engagement with online discussion about moral and political issues, and users are more likely to break social norms and fiercely discuss such issues on anonymous social media platforms (Li et al., 2010; Schoenebeck, 2013; Shim & Oh, 2018). Also, it has been observed that anonymous users are more likely to share ethically controversial content (Zhang & Kizilcec, 2014). The present research identified a mechanism for the enhancing effect of social media anonymity on moral courage behaviors online: Under the perceived protection of anonymity, people may consider their ethical or political actions to be of low risk of adverse personal consequences and thus are more likely to take such actions. Notably, the perceived anonymity and low risk on social media appears to be particularly important for individuals with low levels of moral

Table 2
Intercorrelations between variables measured in study 4.

Variables	1	2	3	4	5
1. Age	–				
2. Gender	–.10	–			
3. Education	.25*	.07	–		
4. Perceived Anonymity	–.002	.03	–.28**	–	
5. Moral Index	.14	.11	.11	.25*	–
6. Moral Courage Index	.05	–.02	–.03	.52***	.62***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

meaningfulness to engage in moral courage behaviors online. These findings may explain why discussions in cyberspace about critical societal issues often involve so many people and have become a form of social activism in the digital age, which has powerful impacts on the real world (Allcott & Gentzkow, 2017; Brady et al., 2017; Metzgar & Maruggi, 2009).

Despite the original contributions, the current studies have limitations that should be addressed in future research. First of all, in addition to the contextual factors of perceived anonymity and risk on social media and the personal factor of moral meaningfulness, moral courage may be influenced by many other factors such as personality, identification with the online community, moral efficacy, and the sense of justice. Future studies may examine how these factors interact with the characteristics of social media in influencing moral courage online. Second, we examined the general experience of anonymity, and yet anonymity can have different types, such as physical anonymity, visual anonymity, and personal information anonymity, which tend to have different effects on behavior (e.g., Huang & Li, 2016; Wodzicki et al., 2011). Future research should examine how different types of anonymity influence moral courage online. Third, our studies focused on Chinese participants beyond the WEIRD (Western-Educated-Industrialized-Rich-Democratic) population, which is important for building a true psychological science (Henrich et al., 2010; Wang, 2016). Future studies may further test the research question in a cross-cultural context, examining how cultural factors such as risk perception preference (Weber & Hsee, 1998) and moral rectitude (Wang, 2013) influence people's perceived anonymity and moral courage on social media. Fourth, perceived social media anonymity can result in increased moral courage as shown in the current findings or cyber-aggression as previous studies have found (e.g., Barlett et al., 2016; Zimmerman & Ybarra, 2016). It is therefore important to identify conditions under which people exhibit prosocial behaviors versus transgressions online and further develop targeted interventions. Finally, future studies should examine whether moral courage enhanced by social media anonymity can increase prosocial behavior in real life. Given the similarities between one's online and offline identities (Subrahmanyam et al., 2006; Wang, 2022) as well as online and offline behaviors (Wright & Li, 2011), one may expect the spillover effect, which may be further utilized to promote interpersonal and societal cohesion.

In conclusion, the present studies show that perceived anonymity on social media reduces perceived risk and in turn enhances moral courage, especially among those with low moral meaningfulness. These findings reveal the complexity of the social media ecology that interacts with individual characteristics in shaping online behavior. They enrich the research of moral psychology and social media studies by providing the first experimental evidence for the prosocial effect of social media anonymity. They further have important implications for website interface design, social activism, as well as intervention programs to promote constructive civil engagement online.

Author's note

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data and research materials of all studies can be accessed at https://osf.io/z9ef6/?view_only=77d20912ff02466b91177899fc7e7adb.

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