Internet altruistic motivation promotes internet altruistic behavior: a moderated mediation model

Xianliang Zheng[1] · Xiaoyu Zhu[2] · Xiangsen Zhou[1] · Fangwei Xie[1] · Lijuan Huang[1]

Abstract

This study proposes and tests a moderated mediation model to explore the relationship between Internet altruistic motivation (IAM) and Internet altruistic behavior (IAB), as well as its underlying and conditional mechanisms. A total of 324 Chinese college students (M age = 20.31 years, SD age = 1.38; 165 females) completed a questionnaire consisting of the IAM Questionnaire, IAB Scale, Mehrabian Trait Empathy Scale and Rosenberg Self-Esteem Scale. Results indicated that IAM was positively correlated with IAB ($r = 0.44$, $p < 0.001$), and self-esteem played a partial mediating role between IAM and IAB. In addition, empathy moderated the relationship between IAM and self-esteem as well as that between IAM and IAB. Specifically, the higher the individual's empathy, the stronger the predictive effect of IAM on IAB and self-esteem. The findings can deepen understanding of how and when IAM promotes IAB.

Keywords Internet altruistic behavior · Internet altruistic motivation · Self-esteem · Empathy · Moderated mediation

Introduction

Internet has become the second space of human daily life, which has an important impact on people's psychology and behavior (Albert et al., 2005). Researchers have paid much attention to the negative effects of Internet, such as Internet addiction, cyber violence, cyber crime and so on (Ikriki, 2019; Popham et al., 2020; Wendy et al., 2020). However, with the rise of positive psychology, researchers began to focus on the positive impact of Internet. Internet altruistic

behavior (IAB) is the action of consciously helping others in the Internet environment, which is a kind of positive online behavior (Wright & Li, 2011; Zheng et al., 2021a, b). Since the outbreak of COVID-19, people have increasingly relied on Internet, such as online learning, online entertainment, and searching for epidemic information online. And providing help and services to others on the Internet is conducive to creating a harmonious Internet atmosphere.

Despite existing research exploring many influencing factors of IAB, such as self-esteem (Zheng et al., 2021b), belief in a just world (Jiang et al., 2017) and social class (Zheng et al., 2021a), little work has investigated the connection between Internet altruistic motivation (IAM) and IAB. It is generally believed that motivation has the function of activating behavior. However, few studies have focused on the association between IAM and IAB, and how and when IAM triggers IAB. Thus, in this study, we fill this gap by examining the relationship between IAM and IAB specifically. In addition, we also aim to identify the underlying mechanism and boundary conditions of this relationship.

IAM and IAB

IAB refers to behavior performed voluntarily to help others on the Internet when there is no expectation of getting any prizes or rewards, such as sending care and blessing

✉ Lijuan Huang
1805172971@qq.com

Xianliang Zheng
zxl2004@sina.com

Xiaoyu Zhu
zhuxiaoyu99999@gmail.com

Xiangsen Zhou
2193462744@qq.com

Fangwei Xie
842935336@qq.com

[1] School of Educational Science, Gannan Normal University, No. 1 Shiyuannan Road, Ganzhou, Jiangxi Province 341000, People's Republic of China

[2] Department of Psychology, Shanghai Kangping Hospital, Shanghai, China

to netizens, exposing illegal incidents on the Internet, or replying to others' questions online, and so on (Zheng et al., 2018). Researchers point out that because of the ubiquity and convenience of Internet, people's helping behavior has expanded from the offline world to online world (Jiang et al., 2017). IAB is the helping behavior online, which is not fundamentally different from the helping behavior offline (Zheng, 2010; Wallace, 2001) argued that people are more willing to help others online (vs. offline). By reviewing previous studies, it has been found that scholars have made much discussion on the influencing factors of IAB. For instance, Leng et al. (2020) examined the relationship between personality and IAB, the results showed that extraversion, agreeableness, conscientiousness and openness are positively related to IAB, while neuroticism is negatively related to IAB. Zheng et al., (2021a, b) explored the relationship between self-esteem and IAB, and found that self-esteem is positively correlated with IAB. However, little work has investigated the connection between IAM and IAB, as well as its underlying mechanisms.

Maslow's motivation theory (1970) points out that motivation is the internal force to promote individuals behavior. And motivation has the function of activation, that is, motivation has the function of initiating behavior, thus promoting individuals to produce a certain activity, from the static state to active state. Researchers point out that IAM refers to the selfless desire or demand generated by individuals to help others online, which contains four factors: care altruism motivation, self- determination motivation, social identity motivation and self-growth motivation (Zhao, 2016). According to Maslow's motivation theory (1970), just as altruistic motivation can trigger altruistic behavior in the offline world, IAM can also motivates altruistic behavior in the online world. In addition, social responsibility norms theory (Berkowitz, 1972) suggests that individual altruism originates from social norms and morality, and such social responsibility norms expect individuals to help others in distress. And IAM, as a kind of prosocial motivation, contains contents conforming to social norms. Therefore, individuals with IAM are more likely to help others online. That is, the higher the IAM, the more the IAB. Given the above, we speculate that IAM and IAB are closely related.

Mediating role of self-esteem

How does IAM promote IAB? Due to the lack of in-depth research on IAM in the existing literature, the underlying mechanism by which IAM influences IAB is unclear. On the basis of literature review, this study proposes that self-esteem may play an important "bridge" role in the process of IAM influencing IAB. Self-esteem refers to people's overall evaluation or appraisal of their worth (Rosenberg, 1965). According to self-determination theory (Deci &

Ryan, 2000), people have three basic psychological needs: autonomy, relevance, and competence. Existing studies have found that prosocial motivation can promote the satisfaction of these three basic needs (Gagné, 2003), which in turn improves individuals' self-esteem (Lardi et al., 1993). That is, prosocial motivation can promote individuals' self-esteem. The empirical study also found that there is a significant positive correlation between prosocial motivation and self-esteem (Bear & Hwang, 2015). And IAM is a prosocial motivation on the Internet (Zhao, 2016). Therefore, we believe that IAM will have a positive impact on self-esteem. In addition, MacDonald et al. (2003) pointed out that self-esteem is an important factor affecting individuals' altruistic behavior. Compared with individuals with high self-esteem, those with low self-esteem are more worried about being misunderstood or ignored by others in the process of helping others, thus showing less altruistic behavior. Empirical studies have shown that there is a positive correlation between self-esteem and IAB, and self-esteem can significantly predict IAB (Jiang et al., 2017; Zheng et al., 2021a, b). Therefore, it can be seen that IAM is likely to affect IAB through self-esteem. That is, self-esteem may be a mediating variable between IAM and IAB.

Moderating role of empathy

Maslow (1943) pointed out that motivation and action are often inconsistent: one action can be produced by many motives, while one motive can produce many actions. Therefore, the same level of IAM may elicit different degrees of IAB. In order to reveal the conditional mechanism explaining the role of IAM on IAB, based on the mediating model of self-esteem, this study further introduces the moderating variable (empathy) and constructs a moderated mediating model to specifically answer "when" an individual will produce IAB after the generation of IAM. Empathy refers to the psychological process in which one identifies and experiences the emotions of others by standing in their shoes (Cohen & Strayer, 1996; Hoffman, 1994) believed that the development of adolescents' empathy is a process in which individuals recognize others and themselves and abandon egocentrism. Thus, empathy is closely related to the development of one's sense of self (self-esteem). That is, empathy can promote self-esteem. Empirical studies have also shown a significant correlation between empathy and self-esteem (Loinaz et al., 2021; Martínez et al., 2020). In addition, the perceived behavioral pattern of empathy (Decety & Grèzes, 2006) also suggests that empathy can generate altruistic motivation that improve others' welfare. That is, high level of empathy will promote individuals to perceive and share the misfortune of others, thus stimulating individuals to generate altruistic motivation, whereas low level

of empathy will not promote the generation of altruistic motivation due to the inability to perceive the misfortune of others. Therefore, we speculate that, when individuals interact with each other in the Internet environment, if the individual has a high level of empathy, it will promote the individual to generate a higher level of IAM, thus strengthening the positive correlation between IAM and self-esteem, and the individual's self-esteem will be higher. By contrast, if the individual's empathy is low, it will weaken the positive association between IAM and self-esteem, thus lowering the individual's self-esteem. That is, empathy may moderate the positive predictive effect of IAM on self-esteem.

Empathy-altruism hypothesis (Batson & Shaw, 1991) pointed out that empathy has a incentive function, individuals' altruistic behavior is aroused by their empathy for others in distress, empathy stimulates altruistic behavior by triggering altruistic motivation, and individuals with high empathy will show high altruistic behavior. It is found that empathy is closely related to altruistic behavior, and individuals with higher (vs. lower) empathy engage in more altruistic behavior (Balconi & Canavesio, 2013; Zheng & Zhao, 2015) explored the relationship between empathy and IAB, and found that empathy had a significant positive correlation with IAB. That is, the higher the empathy, the higher the IAB. In conclusion, empathy can effectively promote IAB and is an important protective factor of IAB. In addition, the "protector-protector-model" facilitation hypothesis suggests that the predictive effect of one protective factor on outcome variables may vary with the level of another protective factor (Fergus & Zimmerman, 2005). That is, there is an interaction effect between different protective factors in predicting outcome variables. In this study, IAM and empathy are both the protective factors of IAB. Thus, IAM and empathy may interact in predicting IAB. That is, the prediction effect of IAM on IAB may be enhanced with the increase of the level of empathy. As reviewed above, we propose that empathy may play a moderating role in the relationship between IAM and IAB.

Previous studies have explored the relationship between empathy, self-esteem and IAB, and found significant correlation between them (Zheng et al., 2012). Researchers believe that it is ideal when the correlation between the moderating variable and the independent and dependent variables is not significant (Wen & Ye, 2014). Therefore, empathy is not an ideal moderating variable between self-esteem and IAB. Existing research on the relationship between self-esteem, empathy and prosocial behavior used empathy as a mediating rather than a moderating variable (Zheng et al., 2012). As reviewed above, we suggest that empathy has no moderating effect on the relationship between self-esteem and IAB, so this study did not analyze the moderating role of the latter half path of self-esteem's mediation effect.

The current study

Although researchers believe that motivation can trigger behavior, few studies have explored how IAM produces IAB. That is, the underlying mechanism of IAM influencing IAB remains unclear. Based on the relevant literature, we propose a moderated mediation model (Fig. 1) to test the relationship between IAM and IAB, as well as the mediating role of self-esteem and the moderating role of empathy, so as to answer "how IAM affects IAB" and "when IAM affects IAB". We formulate the following hypotheses:

H1: IAM can positively predict IAB.
H2: Self-esteem plays a mediating role in the link between IAM and IAB.
H3: Empathy moderates the relationship between IAM and self-esteem. The relationship between IAM and self-esteem will be stronger for individuals with higher (vs. lower) levels of empathy.
H4: Empathy moderates the relationship between IAM and IAB. With the improvement of empathy, the predictive effect of IAM on IAB will increase.

Methods

Participants and procedure

We recruited college students from a university in Jiangxi province, China as volunteers to take part in the study. A total of 350 questionnaires were distributed in the classroom environment after receiving the informed consent of these participants, and 324 valid samples were obtained after eliminating the invalid questionnaires. In the sample, there were 159 boys (49.10%) and 165 girls (50.90%). Among them, 76 (23.46%) were freshmen, 88 (27.16%) were sophomores, 97(29.94%) were juniors and 63 (19.44%) were seniors. The participants were aged from 17 to 22 years (M age = 20.31 years, SD age = 1.38) with the mean daily online time of 3.78 h (SD = 2.69). The test begins by emphasizing that
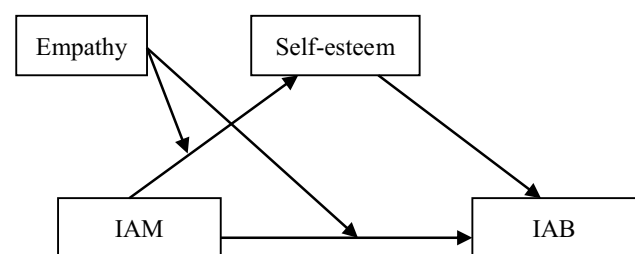

Fig. 1 Hypothesized conceptual models. IAM = Internet altruistic motivation, IAB = Internet altruistic behavior (IAM and IAB have the same meaning in next tables and figures)

there are no right or wrong answers, that all information is confidential, and that the test is anonymous and voluntary. The entire test lasted about 15 min. No monetary incentives were provided for participation. All materials and procedures were approved by the Ethics in Human Research Committee of our university.

Measures

IAM The IAM Questionnaire (Zhao, 2016) was adopted. The questionnaire consists of 24 items including 4 dimensions: self-growth motivation (e.g., "Helping others online makes me more confident"), social identity motivation (e.g., "I can get social recognition by helping others online"), self-determination motivation (e.g., "Helping others online can be self-fulfilling") and caring altruism motivation (e.g., "I help others online because I want to make them happy"). The items were rated on a 5-point scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree". High scores indicate high IAM. Confirmatory factor analysis supported the structure of the questionnaire, $x^2/df = 2.78$, $RMSEA = 0.07$, $GFI = 0.92$, $NFI = 0.91$, $NNFI = 0.91$, $CFI = 0.93$. The factor load of the item was between 0.42 and 0.70. The entire questionnaire had a Cronbach's α of 0.87, whereas the dimensions had Cronbach's α values ranging from 0.69 to 0.82.

IAB We used the IAB Scale (Zheng, 2010). This scale comprises 26 items including 4 dimensions: Internet support (e.g., "Give netizens attention and encouragement"), Internet guidance (e.g., "Instruct netizens how to use the Internet better"), Internet sharing (e.g., "Share your success with others online") and Internet reminding (e.g., "Tell netizens about some network traps"). The items were rated on a 4-point scale, with 1 indicating "never" and 4 indicating "always". High scores imply high IAB. Confirmatory factor analysis supported the structure of the scale, $x^2/df = 2.56$, $RMSEA = 0.07$, $GFI = 0.92$, $NFI = 0.95$, $NNFI = 0.97$, $CFI = 0.96$. The factor load of the item was between 0.43 and 0.79. The entire scale had a Cronbach's α of 0.92, whereas the subscales had Cronbach's α values ranging from 0.72 to 0.88.

Self-esteem We used the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This scale consists of 10 items (e.g., "I feel that I have a number of good qualities") rated on a 4-point scale, with 1 indicating "strongly disagree" and 4 indicating "strongly agree". High scores indicate high self-esteem. The confirmatory factor analysis supported the structure of the scale, $x^2/df = 4.56$, $RMSEA = 0.07$, $GFI = 0.90$, $NFI = 0.90$, $NNFI = 0.91$, $CFI = 0.90$. The factor load of the item was between 0.36 and 0.79. The Cronbach's α of the scale was 0.83.

Empathy The Mehrabian Trait Empathy Scale was revised by Han (2005). This scale consists of 28 items that are responded on a 9-point scale ranging from 1 ("absolute objection") to 9 ("absolute approval"). A sample item is "It makes me uneasy to watch others cry". Higher scores indicate greater empathy. Confirmatory factor analysis supported the structure of the scale, $x^2/df = 4.38$, $RMSEA = 0.07$, $GFI = 0.91$, $NFI = 0.91$, $NNFI = 0.92$, $CFI = 0.91$. The factor load of the item was between 0.41 and 0.76. The Cronbach's α of the scale was 0.85.

Control variables Previous research indicated that gender is an important influencing factor of IAB (Jiang et al., 2017). In addition, the results of the slope homogeneity test showed that the interaction between gender and IAM was not significant ($p > 0.05$). Thus, gender was used as a control variable in this study.

Statistical analyses

First, we used SPSS 23.0 for descriptive statistics and Pearson correlation analysis. Next, we used PROCESS 3.2 macro to construct a structural equation model of IAM, self-esteem, empathy, and IAB. PROCESS is a plug-in added to SPSS to evaluate the mediation and moderation relationships among multiple variables. The model 8 of PROCESS macro is used for measure variables' moderated mediation relationship. We used the model to test the direct and indirect effects of IAM on IAB through self-esteem. In addition, we examined whether empathy play a moderating role between these relationships. We ran this model with 5000 resamples bootstrapping and a 95% confidence interval (95% CI). It statistically significant, if values of the lower and upper limits of the 95% CIs did not include "0" (Hayes, 2017). We used $p < 0.05$ as the criterion to determine the statistical significance.

Results

Common method deviation

We used program control and statistical control for common method deviation. First, program control was adopted, such as the questionnaire adopted the unified class test form, emphasizing the anonymity and confidentiality of the questionnaire in the process of the test, and some questionnaires were provided with reverse scoring questions. Second, Harman single factor test was used for statistical control. That is, all variables were analyzed by principal component analysis without rotation. The results showed that there were 24 distinct factors with eigenvalues bigger than 1, and the variance explained by the first factor was only 16.75%, which was far

less than 40%, indicating that there was no significant common method bias in this study.

Preliminary analyses

Means, standard deviations, and zero-order correlations for all variables are presented in Table 1. It can be seen that IAM had significant positive correlation with self-esteem and IAB, but no significant correlation with empathy. IAB was significantly positively correlated with self-esteem and empathy.

Testing for moderated mediation

We used PROCESS (Model 8) (Hayes, 2017) to test the moderated mediation analysis. Previous research observed significant differences in gender in IAB (Jiang et al., 2017), so gender was treated as a control variable in our study. All predictive variables were standardized before data processing. Firstly, a regression equation was established:

$$IAB = c_0 + c_1\ IAM + c_2\ empathy + c_3\ IAM \times empathy + \varepsilon_1 \tag{1}$$

to test whether the direct effect of IAM on IAB was moderated by empathy. The results showed that IAM had significant effect on IAB ($\beta = 0.45$, $t = 9.14$, $p < 0.001$), and the interaction between IAM and empathy had significant effect on IAB ($\beta = 0.11$, $t = 2.36$, $p < 0.05$) (see Table 2). Secondly, the following two regression equations were established:

$$self - esteem = a_0 + a_1\ IAM + a_2\ empathy \\ + a_3\ IAM \times empathy + m\varepsilon_2; \tag{2}$$

$$IAB = c'_0 + c'_1\ IAM + c'_2\ empathy \\ + b_1\ self - esteem + c'_3\ IAM \times empathy + \varepsilon_3, \tag{3}$$

to explore whether the mediating effect of IAM on IAB through self-esteem was moderated by empathy. The results were shown in Table 2. In regression Eq. 2, the effect of IAM on self-esteem was significant ($\beta = 0.31$, $t = 5.78$, $p < 0.001$), and the interaction of IAM and empathy had significant effect on self-esteem ($\beta = 0.19$, $t = 2.52$, $p < 0.05$). In regression

Table 1 Descriptive statistics and Pearson correlation coefficient

	M	SD	IAM	Self-esteem	Empathy	IAB
IAM	3.25	0.66	1.00			
Self-esteem	2.86	0.40	0.38***	1.00		
Empathy	5.72	0.76	0.07	0.13*	1.00	
IAB	2.19	0.48	0.44***	0.20***	0.15*	1.00

* $p < 0.05$

*** $p < 0.001$

Table 2 The moderated mediating effect of IAM on IAB

| Regression equation		Fit indices			Significance of regression coefficient		
Outcome variables	Predictive variables	R	R^2	F	β	95%CIs	t
IAB	Gender	0.52	0.28	30.23***	0.29	0.18, 0.35	5.84***
	IAM				0.45	0.38, 0.49	9.14***
	Empathy				0.04	-0.03, 0.07	0.85
	IAM×Empathy				0.11	0.04, 0.23	2.36*
Self-esteem	Gender	0.41	0.17	16.32***	0.04	-0.21, 1.43	0.66
	IAM				0.31	0.12, 0.51	5.78***
	Empathy				0.08	-0.03, 0.13	1.45
	IAM×Empathy				0.19	0.06, 0.26	2.52*
IAB	Gender	0.52	0.27	24.11***	0.29	0.20, 0.36	5.81***
	IAM				0.45	0.33, 0.56	8.34***
	Self-esteem				0.20	0.09, 0.32	2.87*
	Empathy				0.04	-0.03, 0.08	0.85
	IAM×Empathy				0.11	0.02, 0.21	2.33*

* $p < 0.05$

*** $p < 0.001$
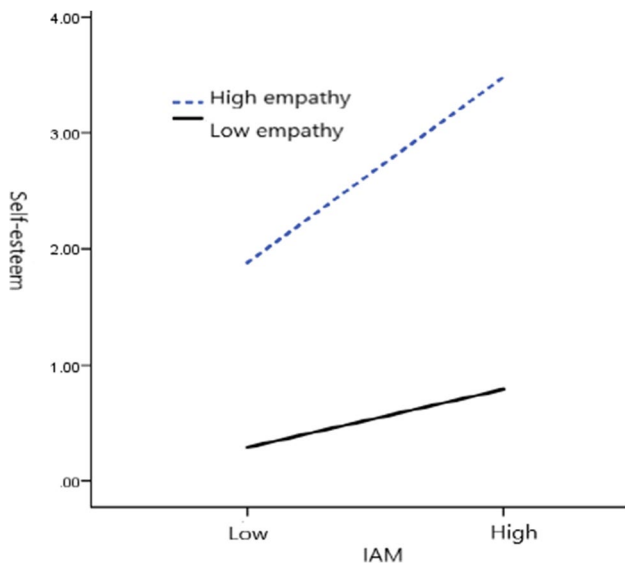
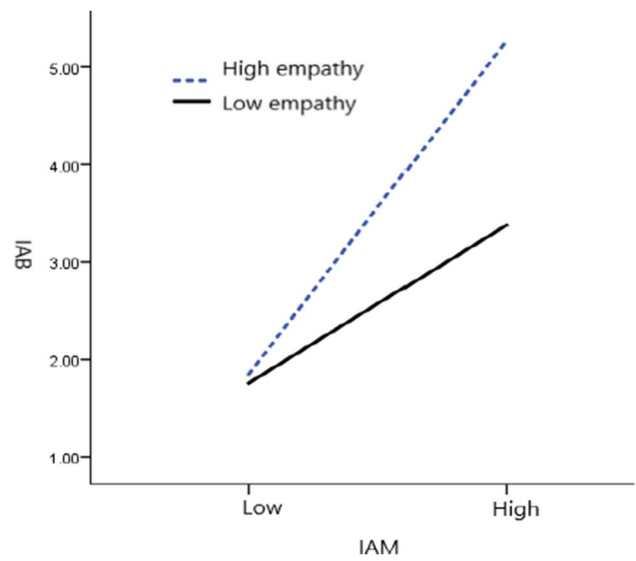**Fig. 2** The moderating role of empathy in the relationship between IAM and self-esteem

Fig. 3 The moderating role of empathy in the relationship between IAM and IAB

Eq. 3, the effect of IAM on IAB was significant ($\beta = 0.45$, $t = 8.34$, $p < 0.001$), the effect of self-esteem on IAB was significant ($\beta = 0.20$, $t = 2.87$, $p < 0.05$), and the interaction of IAM and empathy on IAB was also significant ($\beta = 0.11$, $t = 2.33$, $p < 0.05$). It can be seen that self-esteem has a significant mediating effect on the relationship between IAM and IAB, the mediating effect value is 0.06, and the mediating effect accounts for 12.16% of the total effect, and the mediating effect of IAM on IAB through self-esteem is mediated by empathy in the first half path and the direct path.

In order to explain the moderating effect of empathy more clearly, empathy was divided into high and low groups according to the mean plus or minus one standard deviation, and a simple slope test was conducted (see Figs. 2 and 3). As shown in Fig. 2, with the increase of empathy, the predictive effect of IAM on self-esteem gradually increased ($\beta = 0.11$, 95% CI [−0.02, 0.19], $p > 0.05$ increased to $\beta = 0.50$, 95% CI [0.35, 0.58], $p < 0.001$). Figure 3 demonstrated that with the improvement of empathy, the predictive effect of IAM on IAB was gradually increasing ($\beta = 0.34$, 95% CI [0.21, 0.43], $p < 0.01$ enhanced to $\beta = 0.56$, 95% CI [0.40, 0.62], $p < 0.001$). The prediction effect of IAM on IAB at different levels of empathy is shown in Fig. 4. The mediating effect values and confidence intervals of self-esteem with different levels of empathy are shown in Table 3.
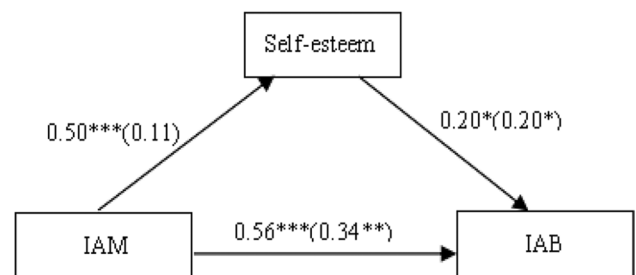
Discussion

Based on the relevant theoretical and empirical findings, we develop a moderated mediation model to test the inter-relations between IAM, IAB, self-esteem, and empathy.

Fig. 4 The predictive effect of IAM on IAB under different levels of empathy. Note: high empathy group outside brackets, low empathy group inside brackets.

Table 3 The mediating effect of self-esteem in different empathy levels

Empathy level	Mediating effect value	95%CIs
M+SD	0.10**	0.02, 0.16
M	0.06*	0.01, 0.10
M-SD	0.02	-0.02, 0.06

Specifically, the purpose of this study is to examine the indirect relationship between IAM and IAB through self-esteem, as well as the moderating role of empathy. We find that self-esteem mediates the relationship between IAM and IAB. And empathy moderated the relationship between IAM and self-esteem as well as that between IAM and IAB. The results deepen our understanding of how and when IAM promotes IAB.

Correlation analysis showed that there was a significant positive correlation between IAM and IAB. And further regression analysis showed that IAM positively predicted IAB. That is, the higher the IAM, the more the IAB. The results support and extend the theory of motivational activation function, indicating that IAM is the internal driving force of IAB, which can effectively promote the generation of IAB. According to self-concordant theory (Sheldon & Elliot, 1999), individuals will get positive emotions such as satisfaction and pleasure when they pursue goals consistent with their own values and interests, especially when they pursue goals independently chosen rather than externally imposed. IAM is an individual's desire to help others as a goal, which is an internal motivation rather than driven by external pressure. Therefore, IAM can enable individuals to achieve self-harmony and produce positive emotional experience in their hearts. And researchers suggest that, when individuals have positive emotional experiences such as satisfaction and happiness, they tend to be more willing to help others and engage in more altruistic behaviors (Joyce et al., 2007). Therefore, the higher an individual's IAM, the more likely they are to help others online. In addition, the results also provide an empirical basis for social responsibility norms theory of altruistic behavior (Berkowitz, 1972), indicating that this theory can be applied not only in offline but also online environments. That is, people on the Internet also have the responsibility and obligation to help those who are in trouble.

As hypothesized, the results indicated that self-esteem played a partial mediating role in the relationship between IAM and IAB. That is, IAM not only promoted the occurrence of IAB, but also improved the level of self-esteem, thus promoting the increase of IAB. The findings support self-determination theory (Deci & Ryan, 2000), which suggests that individuals who feel that their basic psychological needs of autonomy, competence, and relatedness are satisfied in an activity are more likely to glean positive psychological outcomes (e.g., self-esteem) from that activity. Existing studies have shown that when people conceive their behavior as internally motivated, as determined by their own volition, there are stronger consequences for the self, and emphasize autonomy as a source of self-esteem (Gecas & Schwalbe, 1983; Owens et al., 1996). IAM is an individual's desire to help others voluntarily, which is an intrinsic motivation. Thus, we speculate that IAM will have positive implications for self-esteem. Prosocial behavior theory (Eisenberg, 1986) pointed out that individual personality characteristics (e.g., self-esteem) play an important role in producing prosocial behavior. Some studies have found that self-esteem is an important personality factor affecting altruistic behavior and can effectively predict altruistic behavior (Afolabi, 2014; Fu et al., 2017). Recent studies have also shown a significant positive correlation between self-esteem and IAB (Jiang et al., 2017; Zheng et al., 2021a, b). In conclusion, IAM positively predicted self-esteem, which in turn positively predicted IAB, suggesting that high levels of self-esteem could be one of the explanatory mechanisms of the positive link between IAM and IAB.

As predicted, the moderated mediating effect test showed that the interaction between IAM and empathy had a significant effect on IAB, the positive predictive effect of IAM on IAB increased with the increase of empathy. According to empathy-altruism hypothesis (Batson & Shaw, 1991), when others are in trouble, bystanders will have an emotion towards the recipient, including empathy, sympathy, compassion, and so on. The stronger the emotion, the greater the individual's desire to relieve others' dilemma, and the more likely they are to help others. That is, people with high empathy are able to put themselves in others' shoes, establish a universal connection with their emotional experiences, and have better emotional resonance with others (Batson et al., 1995). When people with high empathy produce IAM, they will have a stronger ability to identify the needs of others in the process of online interpersonal communication, and can better understand the needs of help-seekers, thus promoting them to engage in more IAB. Therefore, with the increase of the level of empathy, the predictive effect of IAM on IAB is gradually enhanced.

The results indicated that empathy also moderated the relationship between IAM and self-esteem. Specifically, IAM had no significant predictive effect on self-esteem in individuals with low empathy, whereas IAM had a significant positive predictive effect on self-esteem in those with high empathy. Researchers suggest that individuals with strong internal motivation will produce more positive emotions (Won-moo et al., 2016). And IAM is generated voluntarily, which belongs to internal motivation (Zhao, 2016). Therefore, the stronger the individuals' IAM, the more positive emotions they will produce. And individuals in positive emotional state will have higher positive evaluation of their self-competence and self-worth (Benetti & Kambouropoulos, 2006). Therefore, the stronger the IAM, the higher the individual's positive evaluation. Researchers believe that individuals with high empathy are more likely to feel close to others and have a better ability to recognize and experience others' emotions, thus they are more likely to feel others' positive evaluations (Deci & Ryan, 2000). Therefore, under the condition of high empathy, individuals with high IAM will not only receive a lot of positive evaluations, but also feel these positive evaluations well, thus improving their self-esteem. By contrast, under the condition of low empathy, individuals with high IAM can obtain many positive evaluations, but cannot experience these positive evaluations well, which to some extent offsets the effect of IAM on self-esteem, thus making the predictive effect of IAM on self-esteem insignificant.

Implications

This study has several important implications. First, the current study focuses on the effect of IAM on IAB, which is the first attempt to explore the relationship between IAM and IAB. We found that IAM significantly affected IAB, which was consistent with the relationship between altruistic motivation and altruistic behavior in real situations, indicating that motivation-induced behavior is universal in different contexts, therefore theoretically enriching the research of IAM and IAB. Second, we test a moderated mediation model by self-esteem and empathy to investigate the underlying mediating and moderating mechanisms of the link between IAM and IAB, which contributes to deeper understanding of how and when IAM affects IAB. Third, the present study also provide useful suggestions for the potential interventions aimed at improving college students' IAB. For instance, it is appropriate that stimulating college students' IAM and improving their self-esteem can effectively promote their IAB.

Limitations and future directions

There are several limitations of the present study. First, all variables in this study were measured by self-report. Although the results showed that the common method deviation in this study was not significant, the future research should change the measurement methods of variables, such as the combination of questionnaire method and experimental method to obtain data, to reduce the impact of common method deviation on the research results. Second, the participants in this study were only from one university in China, thus affecting the representativeness of the sample. Therefore, caution should be exercised in generalizing findings to other populations and cultures. Third, the results showed that self-esteem had a significant mediating effect on the relationship between IAM and IAB, but the mediating effect was small (mediating effect only accounted for 12.16% of the total effect). Future research should explore the mediating and moderating effects of other important variables (such as cognitive variables) of such relationship.

Conclusion

In short, the present study offers a first glimpse into the relationship between IAM and IAB, and verifies that altruistic motivation has the function of activating altruistic behavior in the Internet environment. Our research advances the current understanding of how and when IAM promotes IAB by unraveling self-esteem as a mediator, as well as empathy as a moderator. According to the findings of this study, stimulating college students' IAM is the key to improving their IAB. In addition, the improvement of college students' self-esteem and empathy also contributes to the promotion of their IAB.

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical approval All research procedures involving human participants are in accordance with the ethical standards of the agency and / or the National Research Council, as well as the 1964 Helsinki Declaration and its subsequent amendments or similar ethical standards.

Informed consent was obtained from all individual participants involved in the study.

Conflict of interest The authors declare that they have no conflicts of interest.

References

Afolabi, O. A. (2014). Do self-esteem and family relations predict prosocial behaviour and social adjustment of fresh students? *Higher Education of Social Science, 7*(1), 26–34. https://doi.org/10.3968/5127

Albert, K. L., Angeline, K., & Peng, H. A. (2005). Factors influencing adolescents engagement in risky internet behavior. *Cyberpsychology & Behavior, 8*(6), 513–520. https://doi.org/10.1089/cpb.2005.8.513

Balconi, M., & Canavesio, Y. (2013). Prosocial attitudes and empathic behavior in emotional positive versus negative situations: Brain response (ERPs) and source localization (LORETA) analysis. *Cognitive Processing, 14*(1), 63–72. https://doi.org/10.1007/s10339-012-0525-1

Batson, C. D., & Shaw, L. L. (1991). Evidence for altruism: Toward a pluralism of prosocial motives. *Psychological Inquiry, 2*(2), 107–122. https://doi.org/10.1207/s15327965pli0202_1

Batson, G. J., Mattew, T. R., & Brannect, B. H. (1995). Empathy and the collective good: Caring for the others in a social dilemmas. *Journal of Personality and Social Psychology, 68*(4), 619–631. https://doi.org/10.1037/0022-3514.68.4.619

Bear, S. E., & Hwang, A. (2015). Who mentors? Contextual prosocial motivation and willingness to be a mentor. *Human Resource Development International, 18*, 58–75. https://doi.org/10.1080/13678868.2014.979005

Benetti, C., & Kambouropoulos, N. (2006). Affect-regulated indirect effects of trait anxiety and trait resilience on self-esteem. *Personality and Individual Differences, 41*(2), 341–352. https://doi.org/10.1016/j.paid.2006.01.015

Berkowitz, L. (1972). Social norms, feelings, and other factors affecting helping and altruism. *Advances in Experimental Social Psychology, 6*, 63–108. https://doi.org/10.1016/S0065-2601(08)60025-8

Cohen, D., & Strayer, J. (1996). Empathy in conduct-disordered and comparison youth. *Developmental Psychology, 32*(6), 988–998. https://doi.org/10.1037/0012-1649.32.6.988

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Decety, J., & Grèzes, J. (2006). The power of simulation: imagining one's own and other's behavior. *Brain Research, 1079*(1), 4–14. https://doi.org/10.11016/j.brainres 2005.12.115.

Eisenberg, N. (1986). *Altruistic emotion, cognition, and behavior*. Lawrence Erlbaum Associates.

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26*, 399–419. https://doi.org/10.1146/annurev.publhealth.26.021304.144357

Fu, X., Padilla-Walker, L. M., & Brown, M. N. (2017). Longitudinal relations between adolescents' self-esteem and prosocial behavior toward strangers, friends and family. *Journal of Adolescence, 57*, 90–98. https://doi.org/10.1016/j.adolescence.2017.04.002

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*(3), 199–223. https://doi.org/10.1023/A:1025007614869

Gecas, V., & Schwalbe, M. L. (1983). Beyond the looking-glass self: Social structure and efficacy-based self-esteem. *Social Psychology Quarterly, 46*, 77–88. https://doi.org/10.2307/3033844

Han, L. (2005). *Effects of trait empathy and state empathy on helping behavior* [Unpublished master's dissertation]. Northeast Normal University, China.

Hayes, A. F. (2017). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. Guilford Publications.

Hoffman, M. L. (1994). Discipline and internalization. *Developmental Psychology, 30*(1), 26–28. https://doi.org/10.1037/0012-1649.30.1.26

Ikriki, Z. (2019). An exploration of the associations among positivity, general distress and internet addiction: The mediating effect of general distress. *Psychiatry Research, 272*, 628–637. https://doi.org/10.1016/j.psychres.2018.12.147

Jiang, H., Chen, G., & Wang, T. (2017). Relationship between belief in a just world and Internet altruistic behavior in a sample of Chinese undergraduates: Multiple mediating roles of gratitude and self-esteem. *Personality and Individual Differences, 104*(1), 493–498. https://doi.org/10.1016/j.paid.2016.09.005

Joyce, F., Joanna, P., & Nicola, R. (2007). Children's altruistic behavior in the dictator game. *Evolution and Human Behavior, 28*(3), 168–175. https://doi.org/10.1016/j.evolhumbehav.2006.10.003

Lardi, B. C., Leone, D., Kasser, T., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology, 23*(21), 1789–1805. https://doi.org/10.1111/j.1559-1816.1993.tb01066.x

Leng, J., Guo, Q., Ma, B., Zhang, S., & Sun, P. (2020). Bridging personality and online prosocial behavior: The roles of empathy, moral identity, and social self-efficacy. *Frontiers in Psychology, 11*, Article 575053. https://doi.org/10.3389/fpsyg.2020.575053.

Loinaz, I., Sánchez, L. M., & Vilella, A. (2021). Understanding empathy, self-esteem, and adult attachment in sexual offenders and partner-violent men. *Journal of Interpersonal Violence, 36*(5), 2050–2073. https://doi.org/10.1177/0886260518759977

Macdonald, G., Saltzman, J. L., & Leary, M. R. (2003). Social approval and trait self-esteem. *Journal of Research in Personality, 37*(2), 23–40. https://doi.org/10.1016/S0092-6566(02)00531-7

Martínez, J., Rodríguez-Hidalgo, A. J., & Zych, I. (2020). Bullying and cyberbullying in adolescents from disadvantaged areas: Validation of questionnaires, prevalence rates, and relationship to self-Esteem, empathy and social skills. *International Journal of Environmental Research and Public Health, 17*, 6199–6173. https://doi.org/10.3390/ijerph17176199

Maslow, A. H. (1970). *Motivation and personality* (2nd ed.). Harper & Row.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396. https://doi.org/10.1037/h0054346

Owens, T. J., Mortimer, J. T., & Finch, M. D. (1996). Self-determination as a source of self-esteem in adolescence. *Social Forces, 74*(4), 1377–1404. https://doi.org/10.1093/sf/74.4.1377

Popham, J., Mccluskey, M., Ouellet, M., & Gallupe, O. (2020). Exploring police-reported cybercrime in canada. *Policing: An International Journal, 43*(1), 35–48. https://doi.org/10.1108/PIJPSM-08-2019-0128

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*(3), 546–557. https://doi.org/10.1037//0022-3514.76.3.482

Wallace, P. (2001). *The psychology of the internet*. Cambridge University Press.

Wen, Z., & Ye, B. (2014). Different methods for testing moderated mediation models: Competitors or backups? *Acta Psychologica Sinica, 46*(5), 714–726.

Wendy, C., Meyran, B., Nathan, K., et al. (2020). Social media use and cyber-bullying: A cross-national analysis of young people in 42 countries. *Journal of Adolescent Health, 66*(6), 100–108. https://doi.org/10.1016/j.jadohealth.2020.03.006

Won-Moo, H., Taewon, M., & Jea-Kyoon, J. (2016). The effect of workplace incivility on service employee creativity: The mediating role of emotional exhaustion and intrinsic motivation. *Journal of Services Marketing, 30*(3), 302–315. https://doi.org/10.1108/JSM-10-2014-0342

Wright, M. F., & Li, Y. (2011). The associations between young adults' face-to-face prosocial behaviors and their online prosocial behaviors. *Computers in Human Behavior, 27*(5), 1959–1962. https://doi.org/10.1016/j.chb.2011.04.019

Zhao, W. (2016). *The development of college students' Internet altruistic motivation questionnaire and its relationship with personality traits and empathy* [Unpublished master's dissertation]. Gannan Normal University.

Zheng, X. (2010). *Internet altruistic behavior of undergraduates: Scale development and multilevel analysis*. [Unpublished doctoral dissertation]. Shanghai Normal University.

Zheng, X., Chen, H., Wang, Z., Xie, F., & Bao, Z. (2021a). Links between social class and internet altruistic behavior among undergraduates: Chain mediating role of moral identity and self-control. *Current Psychology*, 1–9. https://doi.org/10.1007/s12144-02210-8

Zheng, X., Wang, Z., Chen, H., & Xie, F. (2021b). The relationship between self-esteem and internet altruistic behavior: The mediating effect of online social support and its gender differences. *Personality and Individual Differences, 172*(1), 110588. https://doi.org/10.1016/j.paid.2020.110588

Zheng, X., Xie, F., & Ding, L. (2018). Mediating role of self-concordance on the relationship between Internet altruistic behavior and subjective well-being. *Journal of Pacific Rim Psychology, 12*(e1), 1–8. https://doi.org/10.1017/prp.2017.14

Zheng, X., Zhang, T., & Yuan, Q. (2012). Self-esteem and Internet altruistic behavior: Mediating role of empathy. *Chinese Journal of Clinical Psychology, 20*(4), 550–555.

Zheng, X., & Zhao, W. (2015). The relationships among empathy, self-efficacy and Internet altruistic behavior. *Chinese Journal of Clinical Psychology, 23*(2), 358–361. https://doi.org/10.16128/j.cnki.1005-3611.2015.02.039