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# The Effects of Public Health Emergencies on Altruistic Behaviors: A Dilemma Arises between Safeguarding Personal Safety and Helping Others

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**Abstract**

During public health emergencies, people need to help each other while also assisting in addressing societal-level challenges. However, the nature of the infection itself puts everyone at risk, which may prevent altruistic behaviors. In other words, the pandemic has created a dilemma in which individuals may need to choose between their personal safety and continuing to help others. As such, this study explored how public health emergencies affect altruistic behaviors. Questionnaire surveys were distributed to 1508 residents from 31 provinces across China in February 2020 during the outbreak of COVID-19. Structural equation models were then implemented to test multiple research hypotheses using the obtained data. Findings showed that the severity of the pandemic had both positive and negative effects on altruistic behaviors. Empathy mediated the positive relationship between the severity of the pandemic and altruistic behaviors, while the sense of control mediated the negative effect between the severity of the pandemic and altruistic behaviors. These findings are useful for a government's altruistic behaviors promotion and disaster risk management.

**Keywords**: Altruistic behaviors; Empathy; Public health emergencies; Sense of control; Severity of the pandemic

## 1.Introduction

Public health emergencies not only cause loss of life and property in various parts of the world, but also affect a range of psychological states and behaviors. One such behavior is altruism. This is important due to the profound benefits achieved when individuals are willing to help others with both the viral and social aspects of the pandemic. For example, over 100,000 individuals in Guangdong province volunteered to serve urban and rural communities affected by COVID-19. Due to the selfless nature of this assistance, they were referred to as heroes in harm's way (Nan & Zoey, 2020). In Israel,

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many recovered COVID-19 patients also volunteered to help others who were hospitalized due to the virus (Setton, 2020). The evidence shows that many individuals are willing to engage in altruistic behaviors during the pandemic. However, in public health emergencies, exposure to viruses can be deadly, thus putting everyone at risk. In this context, terror management theory posits that individuals will protect themselves from such threats by obtaining resources and avoiding risks (Li et al., 2020). Because altruistic behaviors occur when individuals provide their own resources to help others (Fehr & Fischbacher., 2003), volunteers may bear the risks of contracting the virus. These concerns may create dilemmas between personal safety and the desire to provide assistance, thus preventing many instances of altruism over the course of the pandemic. This study explored the propensity for individuals to engage in altruistic behaviors during public health emergencies in the context of the pandemic.

At present, there are limits to the body of research outlining the relationship between emergencies and altruistic behaviors. The biggest limitation is that most previous studies have explored altruistic behaviors during public health emergencies from a positive perspective. In the context of the Wenchuan earthquake in 2008, for example, Rao et al. (2011) found that the degree of altruistic behaviors increased with greater levels of residential devastation. Anthropogenic disasters can also increase altruistic behaviors. For example, after the September 11th attacks on the United States, many individuals donated blood and participated in voluntary organizations, especially those related to the crisis (Piferi et al., 2006). People often engage in altruistic behaviors during public health emergencies in order to cope with negative effects while helping others out of dilemmas (Staub & Vollhardt, 2008). As with all public health emergencies, the pandemic can cause serious harm at both the individual and societal levels, thus prompting altruistic behaviors targeted at the alleviation of suffering (Rao et al., 2011; Piferi et al., 2006; Staub & Vollhardt, 2008). However, the pandemic is associated with a variety of features that may not be present during other emergencies, including uncertainty, infection, and death. In this environment, people may avoid risks by limiting their contact with others. Indeed, Xu et al. (2020) found that many people prioritize themselves over helping others. Because helping others may require interpersonal contact, this increases the risk of contracting the virus, thereby limiting the opportunity for altruism during the pandemic. Because previous studies have not examined the negative effects of public health emergencies on altruistic behaviors, this study focused on this issue in the context of the pandemic, thus addressing a current theoretical gap.

More specifically, this study conducted an online questionnaire survey among 1,508 residents in 31 provinces of China during the COVID-19 pandemic outbreak (i.e., from February 10th to 15). The obtained data were used to answer the following two research questions: 1) Are people willing to engage in altruistic behaviors during the pandemic outbreak? 2) What psychological mechanism underlies the effects of the pandemic on altruistic behaviors?

## 2.Theoretical Background and Hypotheses

### *2.1 Altruistic Behaviors During Public Health Emergencies*

Altruistic behaviors refer to actions that help others at the cost of the helper (Fehr & Fischbacher., 2003). Such behaviors have the following characteristics: (1) they benefit others, (2) they are voluntary, (3) the behavior has a certain awareness and clear purpose, and (4) the helper does not expect a return (Piliavin & Charng, 1990). According to the theory of social information processing, the social environment may also affect altruistic behaviors (Salancik & Pfeffer, 1978), including the level of social support (Cropanzano & Mitchell, 2005), social exclusion (Twenge et al., 2007), and the nature of the social emergency to which one must respond (Rao et al., 2011; Piferi et al., 2006). Regarding this

latter element, an ancient proverb states that "much disaster makes a country prosperous," meaning that people tend to give generously and selflessly when disaster strikes (Li et al., 2013). Public health emergencies thus constitute the most important factor related to altruistic behaviors. As such, this study focused on how public health emergencies motivate altruistic behaviors in the context of the pandemic.

The outbreak of the pandemic has had various psychological impacts on the individual level, which in turn affect altruistic behaviors. This paper argues that the impact of the severity of the pandemic on individual altruistic behaviors are not unidirectional. On the one hand, previous studies have shown that unfortunate events tend to evoke empathy for the suffering, thereby increasing altruistic behaviors (Piferi et al., 2006; Staub & Vollhardt, 2008; Batson, 2012). This indicates that the severity of the pandemic has a positive impact on these behaviors. On the other hand, high infection and mortality rates can trigger fear. In this context, Terror Management Theory posits that individuals will protect themselves from the threat of the pandemic by acquiring resources and avoiding risks (Li et al., 2020). Altruistic behaviors may thus be inhibited, as helpers face various risks, even when attempting to donate resources (Fehr & Fischbacher, 2003). This suggests that the severity of the pandemic has a negative impact on altruistic behaviors. In summary, the severity of the pandemic may, in the context of this study, have both positive and negative impacts on individual altruistic behaviors through different psychological mechanisms.

### *2.2 The Role of Empathy*

Empathy refers to the emotional response an individual has based on the emotional states of others, which instills feelings that individual has been directly affected by the experience themselves (Bernhardt & Singer, 2012). Previous studies have shown that individual empathy can result from unfortunate events. For example, Batson (2012) stated that empathy is elicited when witnessing someone in an unfortunate situation, while Singer et al. (2006) found that it was easy to trigger empathy among individuals who were aware that others were suffering from misfortune. As a public health emergency, the pandemic poses several threats to life. This includes the soaring number of deaths and confirmed cases, which create widespread misfortune. Ebuenyi et al. (2020) had confirmed that unfortunate events can arouse empathy during the pandemic. In this context, more severe aspects of the pandemic should create more empathy for those who are suffering. We therefore established the following hypothesis:

H1: The severity of the pandemic is positively associated with empathy.

According to the empathy-altruistic hypothesis, higher levels of empathy are associated with higher levels of altruism (Batson, 2012). Previous research has also confirmed this relationship in regard to altruistic behaviors. For example, Ding & Lu (2016) found that empathy was the source of altruistic behaviors. Findlay et al. (2006) found that the same was true among children; that is, empathy is positively correlated with altruistic behaviors. We therefore established Hypothesis 2, as follows:

H2: Empathy is positively associated with altruistic behaviors.

Based on the above rationale, we propose that the severity of the pandemic can positively influence altruistic behaviors. First, issues related to the severity of the pandemic can threaten life and create unfortunate situations, thus eliciting empathy for affected individuals (Batson, 2012; Ebuenyi et al., 2020; Singer et al., 2006). When individuals feel empathy for those in distress, they often hope that their actions can help the other person escape from the current predicament, thereby exhibiting altruistic behaviors (Ding & Lu, 2016). Moreover, the empathy-altruistic hypothesis posits that higher levels of empathy are associated with higher altruism at the individual level (Batson, 2012; Findlay et

al., 2006). We therefore established Hypothesis 3, as follows:

H3: Empathy mediates the positive relationship between the severity of the pandemic and altruistic behaviors.

*2.3 Role of Sense of Control*

In the pandemic context, individuals are not only concerned about the safety of others, but must also worry about their own safety. In this regard, sense of control is an important individual safety requirement (Daniels, 1982). Sense of control refers to the extent to which an individual perceives their ability to predict, explain, and affect the occurrence and development of external events, thus obtaining desired results (Burger, 1989). Previous studies have found that sense of control has positive effects at the individual level. For example, a high level of sense of control can reduce the occurrence of mental illnesses such as depression and anxiety, which results in better mental and physical health (Infurna et al., 2011). However, sense of control is often affected by external threats. For example, Fritsche et al. (2008) found that death-related information was difficult for people to receive, thereby reducing sense of control (Liu et al., 2016). The soaring death tolls related to the pandemic may trigger an individual's fear of death, thus diminishing sense of control in a variety of contexts. In this regard, more severe the pandemic may substantially reduce sense of control. We therefore established Hypothesis 4, as follows:

H4: The severity of the pandemic is negatively associated with sense of control at the individual level.

Previous studies have shown that the lack of control can lead to negative psychological outcomes, including anxiety and restlessness (Li et al., 2020). This may induce a series of negative behaviors. For example, Warburton et al. (2006) found that the lack of control increased anti-social behavioral tendencies (Guo et al., 2016). As such, individuals who perceive a lack of control may not only avoid altruistic behaviors, but are also more likely to engage in antisocial behaviors. Previous research has also shown that individuals with a high level of sense of control may also have more psychological resources, thus increasing the tendency for altruistic behaviors (Rudolph et al., 2004). We therefore established Hypothesis 5, as follows:

H5: The sense of control is positively associated with altruistic behaviors.

Based on the above discussion, we propose that the severity of the pandemic can negatively influence altruistic behaviors in several ways. For example, soaring death tolls stemming from the pandemic may increase the fear of death, thereby reducing sense of control (Fritsche et al., 2008; Liu et al., 2016). Individuals who perceive a lack of control will therefore engage in less altruistic behaviors, which is mainly based on the following reasons. Firstly, when individuals lack a sense of control, they tend to prioritize regaining their own sense of control over helping others (Xu et al., 2020). During the pandemic, individuals may need to first consider how to regain a sense of control before they can think about helping others. Secondly, those who engage in altruistic behaviors may also consume their own resources, including time, money, and other valuables (Fehr & Fischbacher, 2003). In turn, altruistic behaviors during public health emergencies can significantly increase the risk of infection, which further reduces individuals' sense of control (Li et al., 2020). Therefore, during public health emergencies, in order to regain a sense of control and avoid further loss of control, individuals may reduce their altruistic behaviors. Based on this, we propose the following Hypothesis 6, as follows:

H6: The sense of control mediates the negative relationship between the severity of the pandemic and altruistic behaviors.

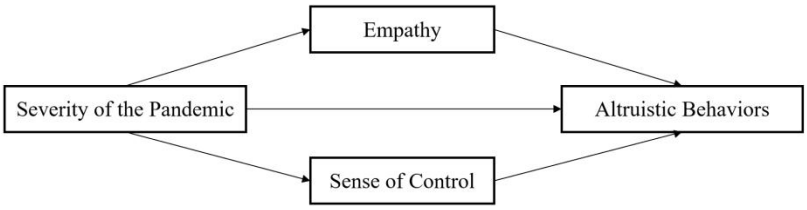


**Figure 1.** Research Model

## 3. Methods

### *3.1 Survey Sample*

A total of 1,508 residents were surveyed in 31 provinces across China (excluding Hong Kong, Macau, and Taiwan). More specifically, online questionnaires were distributed via Credamo during February 2020 in order to obtain information about their actions and perceptions during the COVID-19 pandemic. Each respondent who completed a valid questionnaire received 10 yuan. See Table 1 for respondent characteristics.

**Table 1.** The Sample Characteristics

| Items | Options | Sample | Percentage | Items | Options | Sample | Percentage |
|---|---|---|---|---|---|---|---|
| Gender | Male | 838 | 55.6% | Personal expenses per month | <1000RMB | 525 | 34.8% |
| | Female | 670 | 44.4% | | 1000-2000RMB | 534 | 35.4% |
| Education level | High school or below | 347 | 23.0% | | 2000-3000RMB | 229 | 15.2% |
| | Bachelor degree | 1024 | 67.9% | | >3000RMB | 220 | 14.6% |
| | Master degree or above | 137 | 9.1% | Personal income per month | <3000RMB | 568 | 37.7% |
| Age | <25 | 703 | 46.6% | | 3000-6000RMB | 551 | 36.5% |
| | 25-40 | 705 | 46.8% | | 6000-9000RMB | 243 | 16.1% |
| | >40 | 100 | 6.6% | | >9000RMB | 146 | 9.7% |

### *3.2 Measures*

The independent variable was the severity of the pandemic (SP). This study selected pandemic-related data released by the Health Commission of the People's Republic of China on the day the subjects answered the question designed to measure SP. Data were divided into four categories, including the number of newly confirmed cases, cumulative number of confirmed cases, death toll, and number of cured cases. However, the death toll and the number of cured cases were zero in many cities where the pandemic was not considered serious. We therefore used the number of newly confirmed cases per province (NNP), cumulative number of confirmed cases per province (CNP), number of newly confirmed cases per city (NNC), and cumulative number of confirmed cases per city (CNC) to create an index for SP to reflect the severity of the local epidemic situation. A higher SP index indicates a more severe local epidemic. Subsequently, the SP index was matched with each participant based on

the date, city, and province recorded by Credamo.

The independent variable was altruistic behaviors (AB). As existing scales designed to measure AB are based on regular daily life (Wrightsman, 1974), they cannot be used in special situations such as a public health emergency. This study compiled three items to measure AB based on both its definition and specific issues related to the COVID-19 pandemic. AB was then measured on a 7-point Likert scale: "In order to fight the pandemic, how many days are you willing to volunteer?" "In order to fight the pandemic, are you willing to sacrifice your own interests to help others?" and "In order to fight the pandemic, are you willing to take risks to help others?"

The mediating variables were set as empathy (EM) and sense of control (SC). To measure EM, we used the five-item situational empathy scale developed by Toi and Batson, which was adapted to fit the COVID-19 context (Toi & Batson, 1982). To measure SC, we used the three-item situational control scale developed by Fritsche et al.: "At this moment, I feel helpless." "At this moment, I feel powerless," and "At this moment, I feel a lack of control" (Fritsche et al., 2008). Both EM and SC were rated using a 5-point Likert scale.

## 4. Results

### *4.1 Reliability, Validity, and Measurement Model*

This study conducted confirmatory factor and reliability analyses to test the measurement model (Table 2). The Cronbach'sα coefficients for SP, EM, SC, and AB were all greater than 0.8, while the AVE was greater than 0.5, and the CR was greater than 0.8. This indicates that the measurement tool was sufficiently reliable (Fornell & Larcker, 1981; McAllister & Bigley, 2002). This study also used a structural equation model to test the discriminant validity of each variable. Because the large sample size may have led to chi-square expansion, we adopted the Bollen-Stine method to calibrate the model (Bollen & Stine, 1992). The calibrated model indices are shown in Table 3. The model fitting index of the measurement model met the minimum requirements ($\chi 2/df < 4$, RMSEA < 0.1, CFI > 0.9, IFI > 0.9, TLI > 0.9 (Hu & Bentler, 1998)).

**Table 2.** Reliability and Validity

| Variable | Items | Standardized Factor Loading | C.R. | AVE | Cronbach's α |
|---|---|---|---|---|---|
| SP | NNP | 0.942 | 0.905 | 0.708 | 0.911 |
| | CNP | 0.967 | | | |
| | NNC | 0.709 | | | |
| | CNC | 0.711 | | | |
| EM | EM1 | 0.668 | 0.855 | 0.542 | 0.854 |
| | EM2 | 0.698 | | | |
| | EM3 | 0.749 | | | |
| | EM4 | 0.796 | | | |
| | EM5 | 0.764 | | | |
| SC | SC1 | 0.844 | 0.856 | 0.666 | 0.851 |
| | SC2 | 0.882 | | | |
| | SC3 | 0.712 | | | |
| AB | AB1 | 0.526 | 0.826 | 0.624 | 0.810 |
| | AB2 | 0.896 | | | |
| | AB3 | 0.893 | | | |

We also applied the diagonal matrix analysis method to test the discriminant validity (Table 3). As shown, the value on the diagonal represented the square root of the AVE, while the value under the diagonal represented the correlation coefficient between variables. This shows that the variables are better explained by the variable to which they belong than other variables when the value on the diagonal is greater than the value under the diagonal (Fornell & Larcker, 1981). As presented in Table 3, this study was shown to have good discriminant validity.

**Table 3.** Correlation and Discriminant Validity

| | SP | EM | SC | AB |
|---|---|---|---|---|
| SP | 0.841 | | | |
| EM | 0.138** | 0.736 | | |
| SC | -0.131** | 0.024 | 0.816 | |
| AB | -0.035 | 0.168** | 0.126** | 0.790 |

**Note:** **$p$<0.01 (two-tailed)

*4.2 Structural Equation Model Analysis*

This study used AMOS 24.0 software to build a structural equation model. As mentioned above, the large sample size may have led to chi-square expansion. We thus adopted the Bollen-Stine method to calibrate the model (Bollen & Stine, 1992). The results are shown in Table 4. As presented, SP had a significant positive effect on EM ($\beta = 0.060$, $p < 0.001$), thus confirming H1. On the other hand, SP had a significant negative effect on SC ($\beta = -0.093$, $p < 0.001$), thus confirming H4. Further, EM had a significant positive effect on AB ($\beta = 0.248$, $p < 0.001$), thus confirming H2. SC also had a significant positive effect on AB ($\beta = 0.072$, $p < 0.01$), thus confirming H5. However, SP had no significant effects on AB ($\beta = -0.020$, $p > 0.05$), thus indicating the existence of both negative and positive effects.

**Table 4.** Path Analysis

| Path | Standardized Estimate | S.E. | T-Value | p |
|---|---|---|---|---|
| SP → EM | 0.060 | 0.011 | 5.190 | 0.000 |
| SP → SC | -0.093 | 0.016 | -5.725 | 0.000 |
| EM → AB | 0.248 | 0.035 | 6.995 | 0.000 |
| SC → AB | 0.072 | 0.023 | 3.103 | 0.002 |
| SP → AB | -0.020 | 0.013 | -1.579 | 0.114 |

**Model Fit:** $\chi 2/df = 1.150$, RMSEA = 0.010, CFI = 0.999, IFI = 0.999, TLI = 0.999

*4.3 Analyzing the Mediating Effects*

The bootstrap method with bias correction was used to test the mediating effects of EM and SC between SP and AB (Preacher et al., 2007). This method included procedures that computed 95% confidence intervals (CIs) for the total, indirect, and direct effects. If the 95% confidence interval does not contain 0, then the mediation effect is significant (Preacher et al., 2007). After controlling for age, sex, education, personal expenses per month, and personal income per month, EM had a significant

mediating effect between SP and AB (β = 0.018, 95% CI: 0.010 to 0.031), thus confirming H3. Next, SC had a significant mediating effect between SP and AB (β = -0.016, 95% CI: -0.026 to -0.009), thus confirming H6. However, the total effect of SP on AB was not significant (β = 0.003, 95% CI: -0.011 to 0.017), thus indicating that the relationship between SP and AB was obscured by the mediating effects of EM and SC.

## 5. Discussion

### *5.1 Theoretical Contributions*

Most research on issues related to the pandemic has focused on mental health (Auerbach & Miller, 2020; Feng et al., 2020), with only a few studies having explored altruistic behaviors (Maftei, 2020). As such, this study's findings add to the broader literature by describing how people may respond to the pandemic, specifically in regard to the relationships between the severity of the pandemic, altruistic behaviors, empathy, and the sense of control.

Most previous studies on the relationship between emergencies and altruistic behaviors have focused on the positive aspect. However, the pandemic constitutes a unique public emergency due to its associations with infection and death, which have both positive and negative effects on altruistic behaviors. This study constructed a dual mediation model for "the severity of pandemic—empathy/sense of control—altruistic behaviors", which was subjected to theoretical and empirical analyses based on the data related to the COVID-19 pandemic in China. Our conclusions thus complement the single effect of emergencies on altruistic behaviors.

### *5.2 Practical Implications*

The severity of the pandemic has both positive and negative impacts on individual altruistic behaviors. Therefore, when encouraging individuals to engage in altruistic behaviors, the government should focus on amplifying the positive impacts and reducing the negative ones. On the one hand, previous studies have shown that sustained empathy can lead to emotional exhaustion, which in turn can trigger “empathy fatigue” (Hodges & Klein, 2001). Therefore, in future public health emergencies, the government should take measures to reduce empathy fatigue to increase altruistic behaviors. Previous research has also shown that social support can reduce emotional exhaustion (Auerbach & Miller, 2020). Thus, in future public health emergencies, the government should vigorously promote anti-pandemic measures through the media to enhance the public’s perception of social support, reduce empathy fatigue, and thereby increase altruistic behaviors. On the other hand, enhancing a sense of control can help individuals alleviate and cope with the anxiety brought about by the pandemic (Li et al., 2020). It is worth noting that previous studies have shown that an individual’s sense of control can be restored through external support (Boscarino et al., 2004; Li et al., 2020). Therefore, in dealing with future public health emergencies, the government should allocate more resources to areas severely affected by the pandemic to enhance the sense of control, and at the same time, increase altruistic behaviors while ensuring proper self-protection.

### *5.3 Limitations and Future Research Directions*

This study had some limitations. First, this study reveals the relationship between the severity of the pandemic and altruistic behaviors through theoretical construction and empirical testing. However, this relationship may be influenced by boundary conditions. Moreover, while this study has verified the bidirectional impact of the severity of the pandemic on altruistic behaviors, it has not yet explored

under what conditions a particular psychological mechanism will take precedence. Therefore, further exploration is needed in future research. Second, this study only explored altruistic behaviors in the context of pandemic severity. Under the pressures of the pandemic, however, altruistic behaviors may be affected by other factors, including the credibility of charitable organizations and the individual self-concept, which can be studied in the future.

*5.4 Conclusion*

This study surveyed 1,508 residents to explore how the severity of the pandemic affected altruistic behaviors in addition to the dual mediating role of empathy and sense of control in this process. We found that the severity of the pandemic had both negative and positive effects on altruistic behaviors. More specifically, empathy mediated the positive relationship between the severity of the pandemic and altruistic behaviors, while the sense of control mediated the negative effects between the severity of the pandemic and altruistic behaviors.

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## Data Availability Statement

All data is available.

## Conflicts of Interest

The authors declare no conflicts of interest.

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