



ORIGINAL ARTICLE

Predicting individuals' behaviors during a pandemic: why we might have acted as we did during the COVID-19 pandemic

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BACKGROUND

This study examined individual differences in how people behave in response to a pandemic – more specifically, the current coronavirus pandemic.

PARTICIPANTS AND PROCEDURE

A sample of 420 participants was recruited through the online data collection platform MTurk. Participants were directed via an online link to a Qualtrics survey. This survey was composed of several demographic questions and self-report personality and belief scales, followed by a set of outcome measures designed to measure specific behaviors relating to avoidant behavior, protective behavior, and impulsive buying which the participants might, or might not, have engaged in during the COVID-19 pandemic.

RESULTS

The results showed that locus of control was the best personality-related predictor of peoples' pandemic-relevant behavior, such that externally oriented people were more

likely to report both protective behavior and impulsive buying behavior. In addition, perceived threat was significantly associated with all three types of pandemic-relevant behaviors (avoidant, protective, and impulsive buying).

CONCLUSIONS

Individuals' personality traits and beliefs clearly play a major role in determining their behavior during health crises. In the case of the current COVID-19 crisis, some people adopt behaviors that ensure their safety and the safety of others, whereas other people display careless behaviors that contribute to spreading the infection. Because individual differences in this situation matter, it is important to determine which variables accurately predict which behaviors.

KEY WORDS

pandemic; prevention behavior; protective behavior; impulsive buying; locus of control; state of anxiety; trust; perceived threat; self-efficacy

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BACKGROUND

During a pandemic, the health and lives of individuals are seriously threatened. According to the Centers for Disease Control and Prevention (CDC), nearly 40 million US citizens have been infected by COVID-19 at the time of writing, with neither vaccines nor therapies widely available until late 2020. As the virus circumnavigated the globe, presidents announced a national emergency, after which many people began adopting a variety of behaviors to ensure both their own safety and that of others. Such differences matter, because a virus's spread depends on how people react based on their personality traits and beliefs.

While the World Health Organization has proclaimed the pandemic at a "transition point" and governments have scaled back their efforts to contain it, there is much yet to be learned from our collective experience.

Consider, for example, how the populace behaved. News reports suggest that although most US citizens were sufficiently convinced by CDC recommendations to adopt prevention and protection behaviors, others chose to reject these recommendations by refusing to wear masks (Fogel & Azrak, 2023) or maintain social distance. As shown by Jørgensen et al. (2021) and Ungüren et al. (2023), fear is a particularly potent motivator of health-related behaviors.

As noted by Bandura and Walters (1963/1977), predicting individuals' behaviors must consider the effects of both personality and beliefs. In terms of the COVID-19 pandemic, this would entail identifying specific relevant personality traits and beliefs, then using appropriate measures to predict the extent to which an individual's behavior is likely to be avoidant, protective, or selfish/impulsive.

Avoidant behavior during a pandemic includes shunning crowded places and obeying quarantine restrictions. *Protective behavior* includes washing one's hands frequently, wearing masks, and using sanitizers, and various household items in order to minimize the chances of becoming infected in the first place.

A third type of behavior is *impulsive buying*. Impulsive buyers are the ones who empty store shelves to stockpile, even hoard, supplies that others need as well. Such panic purchasing, according to Taylor et al. (2020), allows the shopper to feel more in control, and temporarily alleviates panicky feelings.

The relationship of avoidant and protective behaviors to a variety of predictors has been previously documented in studies such as the one by Gaygısız et al. (2012), which investigated individual reactions to H1N1 during a later stage of the epidemic. The inclusion of impulsive buying behavior is based on a study by Addo et al. (2020), which found an association between purchasing behavior and fear during the early days of the COVID-19 pandemic.

To identify the personality traits and beliefs that might predict these behaviors, four theories were applied in the present investigation. According to Rogers' (1975) protection motivation theory (PMT), people respond to fear through threat appraisal and coping appraisal. Fear both for one's own safety and for that of others should lead individuals to cope in particular ways. For example, an individual's perception of a disease's severity and ease of transmission can be expected to play a major role in determining their subsequent coping behavior.

The health belief model (HBM), which originated at the U. S. Public Health Service (Rosenstock, 1974), holds that individuals will not change existing behaviors until they believe they are at risk. For example, during the COVID-19 pandemic, many young people declined to wear masks or practice social distancing because they did not believe that people in their age range could die from the virus. However, once the belief of one's personal risk has been established, several other factors come into play to determine relevant behaviors. These factors include belief in the effectiveness of the recommended health behaviors, general self-efficacy beliefs, and perceived barriers to taking certain actions (Yenew et al., 2023).

Bandura and Walters' (1963/1977) social learning theory (SLT) also emphasizes the importance of beliefs, positing that avoidant, protective, and impulsive buying behaviors are more likely determined by them than by life events.

Finally, according to Witte's (1994) the extended parallel processing model (EPPM) was applied, the anticipatory nature of a *perceived threat* usually motivates people to adopt precautionary actions that would reduce their risk of infection.

LOCUS OF CONTROL

A cognitive-personality dimension which these theoretical approaches suggest should be important in this regard is perceived locus of control.

Rotter (1954) proposed that individuals with a strong internal locus of control feel they can control environmental events, whereas individuals with a strong external locus of control feel relatively powerless to do so. Accordingly, people with an internal locus of control should be more likely to believe that their ability to avoid COVID-19 infection is a direct consequence of their actions and choices – wearing masks and maintaining social distance – whereas people with an external locus of control should be more likely to believe that avoiding infection is beyond their control.

In a study conducted to predict individuals' behavior in the workplace, Itani and Hollebeek (2021) found that higher levels of a consumer's internal locus of control could be seen to raise that individual's

health consciousness and social distance behavior. Conversely, as noted by Taylor et al. (2020), externally oriented individuals, who are more likely to feel ineffectual, may try for a more indirect sense of control through panic or impulsive buying.

In addition to locus of control, the present study examined four other personality- and belief-related variables that are potentially relevant to the actions that people take during a pandemic – specifically, state anxiety, trust in authority, perceived threat, and self-efficacy.

STATE OF ANXIETY

According to Mathews (1990), the state of anxiety reflects the individual's reaction to a threatening situation in a specific moment, motivating that individual to find a self-protective way of coping. For example, the threat of a contagious disease, especially in the absence of effective vaccines, might trigger a state of anxiety as a response. A recent study by Shanahan et al. (2022) found that students with high levels of anxiety were more likely to adopt prevention behaviors during a pandemic. More broadly, Bish and Michie (2010) integrated the findings of 26 studies examining individuals' pandemic behavior, concluding that higher levels not only of state anxiety but also of trust in authority were associated with avoidant behavior.

TRUST IN AUTHORITY

During a pandemic, trust in authority has mostly to do with one's willingness to follow the recommendations of medical and governmental authorities. Such recommendations as maintaining social distance, obeying recommended quarantine restrictions, wearing masks, and using sanitizers help to ensure that the community as a whole is not only prepared for the pandemic but will respond to it appropriately and in timely fashion. Concurrently, the validity and transparency of the information underlying these recommendations influence the community's overall level of trust and degree of readiness in obeying them. Another factor, according to Ihlen et al. (2022), is the perceived openness of government representatives, which they found predictive of trust in authority. Similarly, Pagliaro et al. (2021) found such trust to be a better predictor of compliance with prescribed COVID-19 behaviors than information related to the threat itself.

PERCEIVED THREAT

The EPPM was applied by Manika and Golden (2011), who found that fear appeals do indeed pro-

mote healthy behaviors. In the COVID-19 pandemic, the CDC made it clear that COVID-19 contagion spread more efficiently than influenza. As a result, many people felt personally threatened and so began to adopt various avoidant and protective behaviors to ensure both their own safety and that of others (Oniszczenko, 2021). Sadique et al.'s (2007) study, conducted across five European and three Asian regions, examined precautionary actions in response to the 2003 SARS outbreak and found evidence that here too people adopted avoidant and protective behaviors in order to reduce their feelings of perceived threat; similarly, Manika and Golden (2011) predicted and found that a greater sense of perceived threat was positively correlated with a greater likelihood of adopting preventative behaviors during a pandemic. Conversely, Phillips et al. (2022) found that low levels of perceived threat during the COVID-19 pandemic affected people's decision to be vaccinated against it. More specifically, such people preferred natural immunity to medical intervention.

SELF-EFFICACY

According to Bandura (1994), self-efficacy plays a major role in enacting avoidant or protective behaviors. During pandemics, it shapes people's confidence in their ability to stay safe from infection; and, following the work of Manika and Golden (2011), the self-efficacy variable was added to the HBM. Their results helped explain why most people choose to change their behaviors during pandemics. In a related study, Al-Raddadi et al. (2023) discovered that, among 4423 adults in Saudi Arabia, those with high levels of self-efficacy were more adherent to preventative behavior during the COVID-19 pandemic.

HYPOTHESES

The goal of this study is to determine whether, and to what extent, certain personality traits and beliefs relate to each of three types of pandemic-related behaviors: avoidant, protective, and impulsive buying. According to PMT and the EPPM, a higher level of perceived threat and state anxiety will predict a higher level of avoidant, protective and/or impulsive buying behavior.

Furthermore, according to the HBM, a higher level of self-efficacy and trust in authority will predict a higher level of avoidant, protective and/or impulsive buying behavior.

Finally, according to the SLT, individuals who report a higher level of external locus of control should also display a higher level of avoidant, protective and/or impulsive buying behavior.

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

A sample of 420 participants was recruited through the online data collection platform MTurk. Participants identified themselves as American Indian = 11, Asian = 96, African American = 35, White = 223, Hispanic = 42, Middle Eastern = 3, and other = 10. The mean age was 35.70 ($SD = 11.11$), with ages ranging from 18 to 70. In terms of gender, there were 263 males and 157 females.

PROCEDURE

The study methodology was approved by the Institutional Review Board (IRB). Participants were directed via an online link to a Qualtrics survey composed of several demographic questions and self-report personality and belief scales, followed by a set of outcome measures designed to measure avoidant behavior, protective behavior, and impulsive buying behavior.

MEASURES

Two personality and three belief measures were used as predictor variables, with an additional three self-reported outcome measures.

Locus of control ($\alpha = .61$) was measured with Valcha and Ostrom's (1974) abbreviated version of Rotter's (1966) Locus of Control Scale. Each of 10 forced-choice items aimed at measuring general beliefs about the locus of a particular factor over which an individual may or may not believe they have control. Participants were asked to choose between pairs of statements, one expressed from an external perspective (e.g. "Many of the unhappy things in people's lives are partly due to bad luck"), the other from an internal one (e.g. "People's misfortunes result from the mistakes they make").

State anxiety ($\alpha = .75$) was measured with Marteau and Bekker's (1992) State Anxiety Scale, consisting of six items (such as "I feel upset"), all related to the pandemic. Response alternatives ranged from 1 (*not at all*) to 4 (*very much so*).

Trust in authority ($\alpha = .91$) was measured with Quinn et al.'s (2009) Trust in Authority Scale, consisting of seven items (such as "How open do you think the government is with information regarding COVID-19?"), all related to the pandemic. Response alternatives ranged from 1 (*not at all*) to 4 (*very*).

Perceived threat ($\alpha = .79$) was measured with Conway et al.'s (2020) Perceived Threats Scale, consisting of six items (such as "I have tried hard to avoid other people because I don't want to get sick") related to

the pandemic. Response alternatives ranged from 1 (*strongly agree*) to 5 (*strongly disagree*).

Self-efficacy ($\alpha = .81$) was measured with Manika and Golden's (2011) Self-Efficacy Scale, consisting of three items (such as "How confident do you feel about your ability to make coronavirus prevention choices?") related to the pandemic. Response alternatives ranged from 1 (*not at all confident*) to 5 (*highly confident*).

Avoidant Behavior Scale (ABS; $\alpha = .87$). The first self-reported outcome measure was composed of four items pertaining to avoidant behavior during the pandemic, derived from then-current CDC recommendations (such as "I avoid crowded places") concerning the pandemic. Response alternatives ranged from 1 (*not accurate at all*) to 5 (*extremely accurate*). Exploratory factor analysis (EFA) was conducted to ensure that, despite their apparent similarity, the ABS measured a different construct from the Perceived Threat Scale, as suggested by previous research by Cochrane et al. (2008) and Fernandes et al. (2013), among others.

Protection Behavior Scale ($\alpha = .84$). The second self-reported outcome measure was composed of five items based on Cui et al.'s (2017) Protection Behavior Scale and used to assess individuals' protective behaviors during the pandemic (e.g. "Do you wear a face mask in your activities away from home?"). Response alternatives ranged from 1 (*definitely yes*) to 5 (*definitely no*).

Impulsive Buying Scale ($\alpha = .91$). The third self-reported outcome measure was composed of 10 items based on Merdin-Uygur's (2018) Impulsive Buying Scale, and used to assess individuals' unplanned buying behavior during the pandemic (e.g. "I purchased more products/services on spot than I previously planned") Response alternatives ranged from 1 (*completely disagree*) to 5 (*completely agree*).

RESULTS

The zero-order correlations revealed some, but not all, of the personality- and belief-related variables to be significantly correlated with the three behavioral variables in the predicted direction. Table 1 reports descriptive statistics and correlations for all study variables.

Two-stage hierarchical multiple regression analyses were conducted for each behavioral variable so as to determine whether certain personality- and belief-related variables would significantly predict the three pandemic-relevant behaviors, after first controlling for the effects of age and gender. Such analyses would reveal which personality- and belief-related variables were predictive of which behaviors. Also of interest was how much variance in each behavior might be explained by a given personality or belief-related variable. Table 2 reports the significant findings of the multiple regression analyses for all the study hypotheses.

Table 1

Descriptive statistics (pre-normalization) and correlations between all variables measured

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Avoidant	4.00	0.89									
2. Protective	3.62	1.00	.15**								
3. Impulsive buying	3.22	0.92	-.07	.47**							
4. State anxiety	2.70	0.66	.19*	-.02	-.12*						
5. Self-efficacy	3.71	0.87	.51**	.06	-.04	.36**					
6. Trust in authority	2.65	0.72	.13*	.25**	.34**	.15**	.25**				
7. Locus of control	1.49	0.23	-.12*	.05	.12*	-.47**	-.23**	-.20**			
8. Perceived threat	3.40	0.89	.28**	.27**	.14*	-.24*	-.01*	-.10*	.02		
9. Gender	-	-	.08	-.11*	-.11*	.04	-.07	-.15**	-.50	.10	
10. Age	35.71	11.11	.25*	-.10*	-.22**	.09	-.16*	-.16*	-.04	.16**	.16**

Note. * $p < .05$, ** $p < .01$; gender: 1 – male, 2 – female.

Table 2

Results of the hierarchical regression analysis of the three types of behavior (avoidant, protective, and impulsive buying)

Variable	β	<i>t</i>	<i>R</i>	<i>R</i> ²	ΔR^2
Avoidant behavior					
Step 1			.26	.07	.07
Age	.26	5.15**			
Gender	.02	0.44			
Step 2			.63	.40	.33
Self-efficacy	.50	11.28**			
Perceived threat	.33	7.95**			
Protective behavior					
Step1			.10	.01	.01
Age	-.10	-1.97*			
Gender	-.01	-1.97			
Step2			.41	.17	.15
Trust in authority	.27	5.24**			
Perceived threat	.31	6.26**			
Impulsive buying					
Step1			.23	.05	.05
Age	-.21	-4.10**			
Gender	-.07	-1.39			
Step2			.46	.21	.16
Locus of control	.13	2.43*			
Trust in authority	.38	7.68**			
Perceived threat	.17	3.49**			

Note. β – standardized coefficient; gender: 1 – male, 2 – female. * $p < .01$, ** $p < .001$.

AVOIDANT BEHAVIOR ANALYSIS

The first hierarchical multiple regression was run to determine whether the addition of locus of control, state anxiety, trust in authority, perceived threat, and self-efficacy improved the predictability of avoidant behavior over and above the effects of age and gender (which accounted for 7% of the variance in such behavior, $F(2, 389) = 14.13, p < .001$). Specifically, age ($\beta = .26, t = 5.15, p < .001, sr^2 = .06$) was a significant predictor.

Collectively, locus of control, state anxiety, trust in authority, perceived threat, and self-efficacy accounted for 33% of additional variance over and above the effects of age and gender, $\Delta F(5, 384) = 42.23, p < .001$. Specifically, self-efficacy ($\beta = .50, t = 11.28, p < .001, sr^2 = .20$) and perceived threat ($\beta = .33, t = 7.95, p < .001, sr^2 = .10$) were strong and significant predictors; locus of control, state anxiety, and trust in authority were not.

PROTECTIVE BEHAVIOR ANALYSIS

The second hierarchical multiple regression was run to determine whether the addition of locus of control, state anxiety, trust in authority, perceived threat, and self-efficacy improved the predictability of protection behavior over and above the effects of age and gender. At the first stage, neither demographic variable was a significant predictor, $F(2, 389) = 2.10, p = .124$. After controlling for the demographic variables, the second stage model accounted for 15% additional variance, $\Delta F(5, 384) = 14.20, p < .001$. Trust in authority ($\beta = .27, t = 5.24, p < .001, sr^2 = .06$) and perceived threat ($\beta = .31, t = 6.26, p < .001, sr^2 = .09$) were significant predictors; locus of control, state anxiety, and self-efficacy were not.

IMPULSIVE BUYING ANALYSIS

The third hierarchical multiple regression was run to determine whether the addition of locus of control, state anxiety, trust in authority, perceived threat, and self-efficacy improved the prediction of impulsive buying behavior over and above the effects of age and gender (which accounted for 5% of the variance, $F(2, 389) = 10.61, p < .001$). Specifically, age ($\beta = -.21, t = -4.10, p < .001, sr^2 = .04$) was a significant predictor.

After controlling for the demographic variables, the second stage revealed that the personality and belief variables accounted for an additional 16% of the variance, $\Delta F(5, 384) = 15.48, p < .001$. Locus of control ($\beta = .13, t = 2.44, p = .015, sr^2 = .01$), trust in authority ($\beta = .38, t = 7.68, p < .001, sr^2 = .12$) and perceived threat ($\beta = .17, t = 3.49, p < .001, sr^2 = .02$) were significant predictors; state anxiety and self-efficacy were not.

DISCUSSION

Individuals' personality traits and beliefs clearly play a major role in determining their behavior during a health crisis. In the case of the COVID-19 pandemic, some people adopted behaviors that ensured their safety and that of those around them, whereas others contributed to spreading the infection by behaving carelessly. Because individual differences matter in such a situation, it is important to determine which variables accurately predict which behaviors.

Here, we focused on the effects of locus of control, state anxiety, trust in authority, perceived threat, and self-efficacy in predicting whether an individual behaved avoidantly, protectively, or by impulse buying. Of the two demographic variables, age was the only significant predictor of avoidant behavior and impulsive buying. Specifically, older people were more likely to report avoidant behavior, whereas younger people were more likely to report that they were impulse buying and stockpiling supplies. The tendency of older respondents to report more protective behaviors might reflect their greater sense of physical vulnerability, whereas the tendency of younger respondents to report more stockpiling might reflect their greater sense of economic vulnerability.

After controlling for age and gender, the results showed that locus of control and perceived threat were significant predictors of certain pandemic-related behaviors. These findings are discussed below.

RESULTS FOR THE PERSONALITY PREDICTORS

Locus of control was the best personality-related predictor of pandemic-related behaviors. In particular, the results revealed that externally oriented people were more likely to adopt both protective and impulsive buying behaviors, suggesting they are also more likely to trust the pandemic-related recommendations of government and the media. Notably, Berg and Lin (2020) also found a positive relationship between external locus of control and prevention behavior among their study participants.

Unexpectedly, the second personality trait, state anxiety, did not significantly predict any of the three behaviors, in contrast to Bish and Michie (2010). The difference may lie in our decision to use Marteau and Bekker's (1992) State Anxiety Scale, which measured the participants' general state anxiety rather than their state anxiety specific to the pandemic.

RESULTS FOR THE BELIEF-RELATED PREDICTORS

Two of the three belief-related predictors, self-efficacy and perceived threat, were significantly associated

with both avoidant and protective behaviors. These findings are in keeping with Lee and Park's (2016) results, as well as both the HBM and the PMT, which state that individuals' perceived threat as well as their self-efficacy predict behaviors that will minimize disease infection.

It is noteworthy that perceived threat was also found to significantly predict impulsive buying behavior, making it the only significant predictor across all three pandemic-related behaviors. As Taylor et al. (2020) have noted, people who feel their lives threatened by a novel disease are more likely to engage in panic purchasing, which both helps them regain a partial sense of control and alleviates some of their fear.

Another belief-rated variable, trust in authority, was found to significantly predict protective and impulsive buying behaviors, though not avoidant behavior. For example, Ortiz-Ospina and Roser (2016) noted that Italian citizens, who reported lower trust in government than either Swedish or Danish respondents in a 2014 survey, experienced an even higher number of infections than did Swedes and Danes during the COVID-19 pandemic. They concluded that Italians' resistance to following government recommendations best explained the discrepancy.

With regard to impulsive buying behavior, it makes sense that greater trust in authority would result in greater use of online shopping and store pick-up services, to the extent that the government and the media recommend such practices. On the other hand, it is not always helpful; according to Wong and Jensen (2020), higher levels of trust in authority can foster the perception that individual action is no longer required.

As previously noted, SLT posits that people seek to be self-determining, which in turn informs how likely they are to adapt to a given situation. Consequently, as shown by Sadique et al. (2007) and Manika and Golden (2011), perceived threats to this ability may increase a person's motivation to engage in whichever coping behavior – protective, avoidant, or impulsive buying – appears most likely to foster a sense of control.

CONCLUSIONS

Understanding why people behave as they do during a pandemic can help us communicate more effectively, set realistic standards of care, improve decision-making, and deal better with the social consequences. The present study examined how certain personality traits and individual beliefs can influence individuals' behavior during a pandemic, which in turn can influence the degree to which a disease is spread or contained.

As noted by Taylor (2019), the importance of psychological factors in pandemics, historically speaking,

has been neglected by scientists and health authorities, despite evidence documenting their predictive value. In the same spirit, the present study brings to the forefront a number of these psychological factors, the results for which can be distilled as follows:

1. All of the pandemic-related behaviors studied had at least one associated predictor. This suggests that, at a minimum, each behavior can be explained at least in part by a psychological factor.
2. Perceived threat influenced all three behaviors. This suggests that as individual behavior becomes more avoidant or protective – a good thing – governments would do well to communicate more honestly and not try to minimize the severity of the situation. The increase in impulsive buying behavior suggests a need for greater transparency and oversight of supply chains to ensure that goods are made available quickly to those most in need.
3. State anxiety had no effect on any of the three behaviors. Assuming that its value as a predictor is limited at best, this outcome suggests a possible limitation in study design, i.e., the need for a state anxiety scale specific to pandemic situations.

The four theoretical models on which this study rests have all been well tested in the literature; the difference here is that it is the first time they have been used in tandem to explain a pandemic-related behavior.

1. PMT: Fear clearly plays a major role in terms of changing pandemic-related behavior, to the point that the more they experience fear, the more people will respond (whether protectively or avoidantly). In other words, without fear there would be a greater chance of risky behavior and, by extension, more widespread contagion.
2. HBM: Pandemic-related behavior has a lot to do with what people choose to believe, especially in the areas of self-efficacy (in terms of avoidant behavior) and trust in authority (in terms of protective and impulsive buying).
3. SLT: In a pandemic situation, people who believe they have little control over the situation are more likely to indulge in impulsive buying, which can be viewed as a substitute behavior for being unable to exert direct control.
4. EPPM: Overwhelmingly, and regardless of the behavior they ultimately choose, people will respond to a perceived threat.

Future iterations of this study would benefit from more specific measures of certain predictor variables. For example, a measure that specifically examined pandemic-related state anxiety might have yielded a greater number of significant results. The current findings might also have been stronger if we had measured health locus of control rather than global locus of control. Subsequent research, therefore, would do well to examine more targeted measures of these constructs.

DISCLOSURE

The authors declare no conflict of interest.

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