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The panic buying behavior of consumers during the COVID-19 pandemic: Examining the influences of uncertainty, perceptions of severity, perceptions of scarcity, and anxiety

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ABSTRACT

The lack of a vaccine for COVID-19 and the limited amount of reliable data on the cessation of the disease have made people feel more vulnerable to the disease. As a result, people in many countries have been found to engage in panic purchasing, which has adversely affected the supply system for the retail market. Applying behavioral inhibition system theory, reactance theory, and expectancy theory, this research examines how psychological factors such as uncertainty, perceptions of severity, perceptions of scarcity, and anxiety affected the panic purchasing behavior of consumers. This study was conducted in Malaysia in light of the 2020 outbreak of the COVID-19 pandemic. The results from structural equation modeling indicate that uncertainty, and perceptions of scarcity are positively associated with anxiety but not with the panic purchasing behavior of consumers. In addition, anxiety fully mediates the relationship among these variables and the panic purchasing behavior of consumers. Taken together, these findings provide support for doing more empirical research in order to develop a more resilient retail strategy and to improve consumer service.

1. Introduction

The COVID-19 coronavirus pandemic has become a global crisis. The virulence of the disease has shaken the world. Until now, neither medications nor vaccines have been identified for this disease, which has left people feeling helpless all over the globe. The leaders of countries most hit by the disease such as those in the European Union and in the United Nations have expressed their impotence in the face of this natural catastrophe, saying that they do not know when this horror will end. There has thus been an urgent call by leading journals and publishers for more research and relevant data for those facing the outbreak of COVID-19. Social science researchers have been asked to produce rich and detailed studies related to the social, behavioral, and contextual aspects involving the communities, societies, and populations that have been affected by the COVID-19 epidemic (WHO, 2020).

Previous studies have found that a fear of an unknown deadly infectious virus can have a severe psychological effect on persons, leading

to an increase in the anxiety and stress of individuals (Arumugam, 2020; Hyams et al., 2002). This is because an individual's perception of the risk associated with a new virus tends to be very high during the early stages of a pandemic, particularly when there is neither a vaccine nor an antivirus available (Leppin and Aro, 2009). Therefore, despite the fact that it is older people and those with underlying medical conditions who are the most likely to become seriously ill or die from COVID-19 (Canady, 2020; WHO Report, 2020), it is no wonder that the majority of the population feels they are at a high risk of being affected by the pandemic.

There is no doubt that the fear and uncertainty that have emerged from the COVID-19 outbreak have brought about psychological changes in terms of consumer behavior (Duan and Zhu, 2020; Meyer, 2020). Many countries, such as United States, Australia, the nations of the European Union, and Singapore have experienced panic buying, which occurs when customers are found to be stocking up on goods to avoid the effects of a possible future shortage (New Straits Times, 2020). As a

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result, the shelves of supermarkets were often emptied after the sudden spike of COVID-19 positive cases in the later winter and spring of 2020 (New Straits Times, 2020). According to Sheth (2020), when there are changes in the contextual factors, such as social, government rules and regulations, technologies, and in terms of there being a less predictable situation (i.e., those which occur from natural disasters and a global pandemic, including COVID 19), then there will be disruptions both to consumption as well as the production and supply chains. Big Commerce reported that the COVID-19 pandemic drastically changed what, how, and when people buy (Meyer, 2020), which could cause their habits to be replaced by more efficient and alternative ways of shopping and consuming certain products (Sheth, 2020).

Scholars and reporters noted the behavior of consumer stockpiling during the COVID-19 as a form of panic purchasing, and they argued that this panic buying can adversely affect the economy by disrupting the supply system of the market, causing emerging stock-out situations, increasing the inflation rate (Liren et al., 2012; Yuen et al., 2020), and affecting the profit margin of organizations (Wright, 2020). Therefore, to address this issue and ensure a greater amount of social and economic stability, performing systematic research on panic purchasing behavior is essential (Liren et al., 2012; Prentice et al., 2020).

Previous researchers have considered panic buying by individuals from different perspectives for instance policy and legal actions (Kobayashi and Anbumozhi, 2016), retailers and suppliers (Shou et al., 2011; Zheng et al., 2020), panic buying of vaccines (Godlee, 2010), and natural disasters (Thomas and Mora, 2014). Some studies have emphasized the need to identify how social media influences consumers' intentions to buy and behavior (Aragoncillo and Orus, 2018) as well as their urgency to make purchases impulsively (Chung et al., 2017). The extant stockpiling and hoarding studies have mostly considered the safety stock management or warehouse location issues for ensuring the optimal distribution of stock (Yuen et al., 2020). In addition, it has been found that compulsive buying results from stress (Roberts and Jones, 2001), anxiety (Koran et al., 2006), as well as pleasure and excitement (Trotzke et al., 2015). Although these studies have offered valuable insights into the behavior of consumer stockpiling, the systematic research that has emphasized how consumer psychology influences panic purchasing during a pandemic is still lacking (Liren et al., 2012; Sheth, 2020; Yuen et al., 2020).

The extant literature has shown the importance of considering panic buying from economic, social, and psychological perspectives. Nevertheless, the field of empirical studies that have discussed those factors that can significantly influence consumer panic purchasing is still nascent (Wijaya, 2020). Although some recent studies have proposed that perception, scarcity, coping strategies, uncertainty, and many other psychological and social factors are antecedents to consumer panic purchasing, they suggested that further empirical research is required to understand the interrelationships among the antecedents of panic buying and to understand how the different factors mediate or moderate the relationships among the predictor variables and consumer panic buying (Yuen et al., 2020). Furthermore, the adverse impact of COVID-19 pandemic on grocery purchases has been documented but the actual psychological factors of consumers that have affected their grocery panic purchases and hoarding behavior during the pandemic have yet to be understood (Sheth, 2020). In fact, Covid-19 has disrupted the whole range of consumer behavior process ranging from problem recognition to purchase and consumption which has shown a great deal of research opportunities.

Therefore, while considering the limitations in the existing literature, this study attempts to investigate the role of consumer psychology, namely the factors of uncertainty, perceived severity, perceived scarcity, and anxiety, on their panic buying behavior after the outbreak of the COVID-19 pandemic. Our study argues that by examining the relationship among the variables for the grocery purchasing context, we should be able to shed light on the antecedents that influence consumer panic purchases so that governments and retailers can take the necessary steps

to avoid losses if and when such situations arise in the future. Also, the results of this study can be compared with the findings of other scholars who are also examining the psychological and social factors that influence consumer panic purchasing in different contexts, which should allow us to generalize these findings. To conduct this research, this study will collect data from Malaysia, since the country experienced panic purchasing in its grocery markets during the initial outbreak of the COVID-19 pandemic.

2. Literature review and hypotheses development

2.1. Panic purchases

Over the last two decades, researchers have documented the different psychological responses people have, such as fear, anxiety, depression, loss, guilt, irritability, having a sense of isolation, and stigmatization, when there is an infectious disease outbreak (Leung et al., 2004; Maunder et al., 2003; Sim et al., 2020). Researches can now look at the psychological responses related to panic buying seen in multiple countries during the COVID-19 outbreak (Sim et al., 2020). Panic is a subjective, emotional state of the human being that significantly influences their behavior (Ngunjiri, 2020). Panic purchasing is socially undesirable (Steven et al., 2014), irrational (Duoyong, 2006), and is an insensible (Honggang, 2011) behavior that takes place when a large group of customers stockpiles the daily necessities in times of uncertainty and panic in order to avoid an anticipated future threat (Liren et al., 2012; Yuen et al., 2020).

The underlying assumption behind panic buying is that the general public acts irrational, un-coordinately, and uncooperatively during emergencies, which leads them to panic (Glass and Schoch-Spana, 2002). Uncertainty, panic, abnormal buying, and a sharp concentration for where things are bought are some of the significant features of panic buying (Liren et al., 2012). Indeed, one needs to determine if a buying behavior is a panic or rather a preparation for a disaster during a pandemic based on the rationality of the stockpiling behavior (Glass and Schoch-Spana, 2002). During the COVID-19 pandemic, consumers were found to purchase certain products in bulk, such as toilet paper, hand sanitizer, thermometers, and face masks. As a result, these essentials were flying off store shelves in many countries (Ngunjiri, 2020). In light of this, several researchers have emphasized the need to understand the factors that play a crucial role in influencing consumer panic purchases during a pandemic.

Based on the existing literature concerning stockpiling and hoarding, researchers have suggested that perceptions of a threat, perceptions of scarcity, fear of unknown or of uncertainty, coping behavior, social influences, and social trust are among the most important antecedents to panic buying (Yuen et al., 2020). Ngunjiri (2020) has argued that anxiety, fear, and perceived scarcity are some of the most important antecedents to panic purchasing. However, all of this research has suggested that there is a need for further empirical research to understand the interrelationships among the antecedents of panic buying and the different factors that mediate or moderate the relationships between the predictor variables and the behavior of consumer panic buying (Liren et al., 2012; Wijaya, 2020; Yuen et al., 2020).

2.2. Theories in the context of panic purchase

The research model is developed based on three psychological theories; behavioral inhibition system theory (Gray, 1975), reactance theory (Brchm and Brehm, 1981), and expectancy theory (Reiss and McNally, 1985). The behavioral inhibition system (BIS) theory exerts that people brain has three distinct interrelated emotion systems namely behavioral inhibition system (BIS), behavioral activation system (BAS), and fight-flight system which evoke by primary reinforces and stimuli (secondary reinforces) and control their emotional behavior (Gray, 1975). The theory argues that individuals' anxiety is the result of

aversive stimulation that restricts them to behave in a relaxed and natural way (Hagopian and Ollendick, 1994). It further argues that when BIS emotion encounters negative stimuli, it induces peoples' anxiety and lead them to organize their life in a way so that they can avoid an anxiety-provoking situation (MacAndrew and Steele, 1991).

The expectancy theory indicates that an individual's expectancy of danger and the sensitivity to this danger object motivate them to take necessary actions to avoid the fear stimulus (Reiss, 1991). The theory even argues that individuals' fear may vary based on their expected negative outcomes and the sensitivity of the aversive outcomes that are related to anxiety or panic (Reiss, 1991). Thus, it is important to consider the role of response expectancy to prevent an individual's anxiety disorder (Kirsch, 1997). The reactance theory is another psychological theory that aims to explain individuals' responses after experiencing the threat of freedom (Bruchm and Brehm, 1981). According to the theory, "perceived threat to an individual's freedom generates a motivational state aimed at recapturing the affected freedom and preventing the loss of others" (Gogarty, 1997). From the perspective of objective, there are differences between these three psychological theories. For instance, the expectancy theory considers that the sensitivity of expected fear objects influences individuals' anxiety, while the reactance theory explains how individuals' perceived threat of freedom influences their motivation to restore freedom. Moreover, behavioral inhibition system theory explains why people respond differently under a specific situation. Although all these psychological theories are normally applied in health contexts, we have used these theories to explain consumers panic purchase behavior because psychological factors are assumed to play a crucial role to influence consumers anxiety and panic purchase behavior after the outbreak of COVID-19 pandemic context (Sim et al., 2020; Yuen et al., 2020).

There is still a debatable topic whether or not consumers' purchase behavior during a pandemic is disaster preparation or panic purchase behavior. Based on the theories we argue that consumers who have a dominant BIS emotion system might get anxious easily by the negative stimuli such as uncertainty, perceived scarcity of food, and perceived severity of the disease. As a result, their severe consequences expectation makes them panic to buy bulk products so that they can avoid the anxiety-provoking situation. Besides, we posit that the threat of limited supply, uncertainty associated with the pandemics, and severity of getting infected by the COVID-19 virus might induce consumers' perceived lack of control over a situation to restore consumers' engagement in panic purchase behavior.

2.3. Uncertainty, anxiety, and panic purchases

Uncertainty is one of the most important features behind panic purchasing (Liren et al., 2012). These kinds of purchases emerge when there is a skepticism that predictions about the future will hold out (Taylor, 1974). Anderson, Carleton, Diefenbach, and Han (2019) defined uncertainty as a mental state that emerges from the conscious awareness of an individual that s/he is ignorant about something. An awareness of ignorance influences people's thoughts, feelings, and actions (Anderson et al., 2019). Several researchers have argued that uncertainty influences how people anticipate various fearful consequences that make them anxious (Kemp et al., 2014) when they exacerbate the perceived threat (Dugas et al., 2005). Inhibitory uncertainty and doubt can increase social anxiety, panic, agoraphobia, and depression (Carleton, 2012). Moreover, a sudden situation such as a disaster or pandemic can create uncertainty since too little is known about the incident, its duration, any potential solution, and how it will end, which in turn influences how people perceive their levels of fear and engage in panic purchasing (Liren et al., 2012). Since people dislike uncertainty (Carleton, 2016), they tend to avoid it at any cost (Anderson et al., 2019; Lovallo and Kahneman, 2000).

During the COVID-19 pandemic, the implementation of a chaotic self-quarantine and the lockdown in several countries in Asia, Europe,

and North America created great levels of uncertainty, which adversely affected the anxiety and stress levels of individuals who were not able to go outdoors or meet friends (Arumugam, 2020). History testifies that extreme measures such as a quarantine can make people feel more vulnerable than the disease itself (Glass and Schoch-Spana, 2002). According to behavioral inhibition system theory (Gray, 1977), unexpected events can influence behavioral inhibition and neurological systems, which are strongly related to anxiety and change in which can influence the individuals' subsequent behaviors in an unexpected situation. There is no doubt that the sudden outbreak of the COVID-19 pandemic, the inability to create a vaccine for the disease, and the decision to lockdown many countries have adversely affected peoples' mental states and has created some chaos and uncertainty, which has also led to panic buying in the consumer markets (Yuen et al., 2020).

The relationship between uncertainty, anxiety, and panic behavior has already been documented in the health context (Carleton et al., 2014; Talkovsky and Norton, 2016). A recent study also found empirical evidence that the greater uncertainty will cause more people to be panic during the COVID-19 pandemic crisis (Xu and Sattar, 2020). Moreover, several researchers postulated a direct positive relationship between uncertainty and panic buying behavior of individuals (Arafat et al., 2020; Dickins and Schalz, 2020) where the individuals' perceived inability to tolerate uncertainty and distress may influence behavior like hoarding, stockpiling, or panic purchase during a pandemic (Ketchell, 2020). Besides, extant studies have shown that uncertainty triggers anxiety during a pandemic or disaster (Arumugam, 2020; Bakioglu et al., 2020; Kouchaki and Desai, 2015). Therefore, based on the above arguments, the following two hypotheses have been developed:

H1a. Uncertainty has a positive relationship with consumers' perceived level of anxiety.

H1b. Uncertainty has a positive relationship with consumers' panic purchasing behavior.

2.4. Perceived severity, anxiety, and panic purchasing

The words "perceived severity" refer to a situation in which individuals perceive a risk of negative consequences for engaging in or avoiding a particular behavior (Yuen et al., 2020). Individual perceptions of severity can increase anxiety levels, and it is one of the strongest predictors of behavioral change (Qian et al., 2020). This is because people tend to focus more on the severity of a risk when they are exposed to risk or uncertainty (Yeung and Morris, 2001). In the medical context, it has been documented that the severity of a perceived threat may cause individuals to take unnecessary safety measures so that they can escape from or prevent negative emotions (Telch and Lancaster, 2012). In consumer behavior research, scholars have found that perceptions of fear may increase the levels of individual purchase decisions to get rid of negative emotion such as a lower feeling of security, discomfort, stress, and feeling the need to escape from fear (Kennett-Hensel et al., 2012; Sneath et al., 2009).

According to Reiss's (1991) expectancy theory, people avoid a feared object by expecting a negative consequence of the feared object/situation (e.g., an expectation) and anticipating an event to be severe. In fact, the fear of queuing for long hours or the likelihood of regretting not buying a product can make people anxious and cause panic purchases (Ngunjiri, 2020). The threats to life or property associated with a pandemic may also increase an individual's perception of fear. Consequently, this can increase their levels of anxiety and panic purchases (Liren et al., 2012). Yuen et al. (2020) found that in a pandemic situation when a disease breaks out, individuals perceive a threat of contracting the disease and that this might trigger them to engage in the panic buying of safety products so that they can protect themselves from potential danger and take precautions. During the COVID-19 outbreak, observers noticed changes in consumer behavior such as panic buying among grocery shoppers (Laato et al., 2020). For example, countries in

North America, Australia, and Europe, and Malaysia and Singapore have experienced panic buying during which customers were found stocking up on goods after the sudden spike in COVID-19 cases (New Straits Times; March 17, 2020). Several past studies have suggested that unplanned buying or compulsive buying and major spending are often associated with moods, anxiety, other personality disorders (Black et al., 2007; Gallagher et al., 2017), and environmental factors (Black et al., 1998). People have associated the coronavirus pandemic with the deadly Spanish flu outbreak of 1918, which killed almost 50 million people worldwide (Taylor, 2020), and this has triggered a great amount of fear in people's minds. People respond to these feelings by engaging in unreasonable behavior like stockpiling household products. Based on the above analysis, the following hypotheses have been developed:

H2a. The perceived severity of a pandemic outbreak has a positive relationship with consumer anxiety.

H2b. The perceived severity of a pandemic outbreak has a positive relationship with consumer panic purchasing.

H2c. Anxiety has a positive relationship with consumer panic purchasing.

2.5. Perceived scarcity, anxiety, and panic purchasing

Perceived scarcity refers to an individual's expectation that a product might not be accessible after incidents such as health crises (Sheu and Kuo, 2020). Researchers have found that perceived scarcity has a significant influence on an individual's purchase intentions in the retail context (Parker and Lehmann, 2011). It can also make people anxious and, consequently, it can influence them to engage in hoarding or panic purchasing (Serman and Dogan, 2015). Several researchers have argued that an individual's perception that future supplies will be scarce may influence him/her to engage in panic buying (Shou et al., 2013; Sim et al., 2020; Wei et al., 2011). Ngunjiri (2020) has noted that when a person perceives that the stores might be running out of goods during a pandemic, this can motivate him/her to try to take control of the situation by stocking up on products. Yuen et al. (2020) also noted that the consumers' perceptions that products might not be accessible due to a health crisis may influence their perceptions of a threat to their freedom. This supports reactance theory, which argues that individuals who perceive a threat to their freedom may direct themselves toward the reestablishment of their freedom by instigating a psychological reaction (Brock, 1968). Therefore, our study argues that during the COVID-19 pandemic consumers' perceived scarcity of grocery products may lead them to engage in panic purchasing to reestablish their perceptions of freedom. Based on the above arguments and theory, the following two hypotheses have been developed:

H3a. The perceived scarcity of needed products has a positive relationship with consumer anxiety.

H3b. The perceived scarcity of needed products has a positive relationship with the consumer behavior of panic purchasing.

2.6. Anxiety as a mediator

Anxiety is a generalized or unspecified sense of disequilibrium (Turner, 1988) that emerges from the feelings of being uneasy, tense, worried, or apprehensive about what might happen (Stephan and Stephan, 1985). It is an emotional state that emerges from internal (cognitive) or external (environmental) stimuli (Craighead et al., 1976). Anxiety results from the combined effect of stress and a perception of a threat from a negative outcome, even though the threat might not be real (Stephan et al., 1999). It can lead people to act awkwardly or it may increase their effectiveness by influencing proactive behaviors (Stephan et al., 1999). In an anxious state, consumers are more prone to act in a way that is risk-averse and to assess ambiguous stimuli as risky (Lerner

and Keltner, 2001). Scholars have discussed how the perceived risk and the threat of negative outcomes may have motivated people to take drastic measures such as panic buying to protect themselves from a negative situation after the outbreak of the COVID-19 pandemic (Yuen et al., 2020). Researchers have argued that panic buying might help consumers to seek relief from the anxiety that emerged from uncertainty and other negative feelings in a pandemic context (Bacon and Corr, 2020; Sim et al., 2020; Yuen et al., 2020).

According to the American Psychiatric Association (2013), a panic attack arises from the anxiety that some unexpected attack will be repeated. Consequently, a panic attack inclines a person to flee from the conditions they are afraid of (Aafjes-van Doorn et al., 2019). According to behavioral inhibition system theory, the unexpected events influence behavioral inhibition and neurological systems, which are strongly related to anxiety and can influence the individuals' subsequent behaviors in an unexpected situation (Gray, 1977). Researchers found evidence that anxiety can increase consumers' intention of bulk purchases (Black et al., 2007; Gallagher et al., 2017). During the outbreak of the COVID-19 pandemic, consumers were panic and stockpiling products world-wide (Laato et al., 2020; Ngunjiri, 2020; Yuen et al., 2020). Several scholars postulated that an individual's intolerance of uncertainty (Arumugam, 2020; Bakioglu et al., 2020), perceived severity (Arumugam, 2020; Liren et al., 2013; Ngunjiri, 2020; Qian et al., 2020) and perceived scarcity (Sim et al., 2020; Serman and Dogan, 2015) might influence consumer's anxiety that leads towards the panic purchase behavior.

Moreover, it is also documented that anxiety partially mediates the relationship between stress and depression (Nima et al., 2013). Lee et al. (2011) discovered in their experimental study that anxiety mediates the relationship of stereotype threat and purchase intention of individuals in an automotive repair service context. Other study revealed how anxiety mediates the relationship between fear of Covid-19 infection, intolerance of uncertainty, and an individual's positive emotion (Bakioglu et al., 2020). Even, Otero-López and Villardefrancos (2013) found that anxiety is a mediator of the materialism influence (e.g. importance, and success) on consumers' addictive buying. As stated by scholars that the uncertainty of the span of the pandemic, the likelihood of having limited access to daily necessities, and a fear that there will be a disruption to the supply system may make people anxious and, consequently, induce panic buying so that they can get rid of their emotional turmoil (Sim et al., 2020; Yuen et al., 2020). This study thus posits that consumers' perceptions of uncertainty, perceptions of severity, and perceptions of scarcity that emerged from the sudden outbreak of the COVID-19 pandemic might influence their anxiety level; consequently, panic purchase behavior. Therefore, based on the above analysis, the following hypotheses are developed:

H4a. Anxiety mediates the relationship between uncertainty and panic purchasing.

H4b. Anxiety mediates the relationship between perceived severity and panic purchasing.

H4c. Anxiety mediates the relationship between perceived scarcity and panic purchasing.

Fig. 1 displays the research model and includes all the proposed relationships in this study.

3. Methodology

3.1. Research design and sampling

This study examines the relationship between consumers' perceived uncertainty, perceived severity, perceived scarcity, anxiety, and panic purchasing behaviors in the Malaysian grocery store context after the outbreak of COVID-19 pandemic and the news that there would be a lockdown. Our study targeted as a potential sample the consumers who

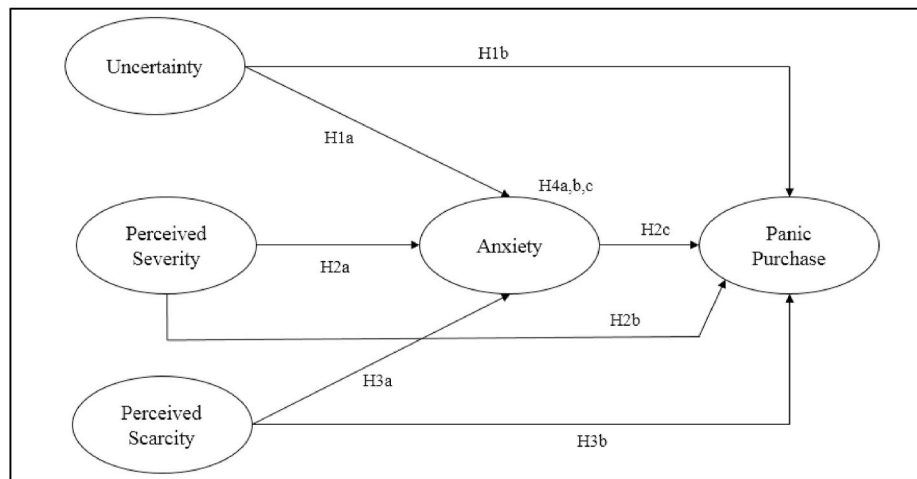


Fig. 1. The model showing the proposed relationship between the variables.

purchased more products than in their usual purchases after the lockdown decision was declared. The data were collected from consumers in three major cities in Malaysia, Kuala Lumpur, Wilayah Persekutuan Putrajaya, and Selangor state. These three cities were chosen because many Malaysian reporters focused on these major cities when reporting on the panic purchasing behavior of consumers that was due to the high rate of COVID-19 cases. In order to ensure the representativeness of the participants, the questionnaire was properly designed, including the choice of words, the appearance and the sequence of the questions (Babin et al., 2019). Some screening questions were also developed where participants were asked if they stockpiled products during COVID-19 pandemic outbreak or when they heard the news about a lockdown. We applied the snowball sampling online method to collect data from the respondents. During the data collection period, Malaysia was ranked 34th in the world based on the number of positive cases in April 2020 (Worldometer, 2020). Initially, the country was not well prepared to fight the outbreak due to the political crisis that was happening at the same time (Shah et al., 2020). The threat of COVID-19 became worse in March 2020 after more than 10,000 participants from Malaysia and other countries attended a religious gathering in Selangor, Malaysia. In order to curb the spread of the virus, drastic actions were taken by the government. The first Movement Control Order or lockdown was imposed from March 18–31, 2020 and then it extended till May 3, 2020. The data collection began by contacting a small number of known individuals who were qualified participants lived in Selangor, having experienced the first lockdown and involved in unusual groceries purchase. Then, the qualified participants shared invitations with other subjects who have similar experiences that could provide accurate information regarding the psychological factors that influenced their purchasing behaviors during the outbreak of COVID-19 (Dusek et al., 2015). Due to the restriction order imposed by the government during that time, online snowball sampling was adopted to reach the targeted population through a network of social interaction with the initial subject on the network (Atkinson and Flint, 2001).

The online data collection method helped us to reach a large number of respondents. Several media platforms such as Messenger, WhatsApp, Viber, and other applications were used to reach potential respondents. A link to the questionnaire was sent to potential respondents by using these social networks so that we could avoid direct contact with the respondents, which was mandatory while the movement control order (MCO) was in effect. Two filtering questions were included in the questionnaire (e.g. those have experienced the first lockdown and made an unusual purchase during the first wave of the crisis) to confirm the qualification of respondents before they could participate in the research. Moreover, questions about other attributes of the participants

such as email address and amount of spending on groceries before and after the lockdown were also included. The clear targeted sampling process allowed the researchers to have some control over the initial participants that accept the invitation to participate in the study. The researchers could also maintain some controls via the recruitment methods and instruments to ensure the samples truly represent the targeted population. A total of 250 participants were invited to participate in the study with only 157 participants agreed to participate in this research representing a satisfactory response rate of 62.8 percent.

A structured close-ended questionnaire method was applied to collect the data. Moreover, the questionnaire was developed to be simple and straightforward so that respondents could easily read and then quickly answer the questionnaire while not getting demotivated to participate in the study (Frazer and Lawley, 2001). In addition, we mentioned that the participants would be kept anonymous and that their participation would be voluntary in the questionnaire to increase the response rate.

3.2. Measurement instrument

The measurement items of the scales were designed as reflective and were adapted from previous studies while using a slight modification for this research context (Table 1). After we designed the questionnaire, we tested eight respondents by asking them to go through the questions and provide comments on the wording of the questions. Based on their comments, we made some minor modifications. A five-point Likert scale ranging from “strongly disagree” to “strongly agree” was adopted to measure all the constructs except for perceived uncertainty where “extremely uncertain” to “extremely certain” was used. All constructs in the study were operationalized as a reflective construct and adapted from past studies. The construct “uncertainty” was measured by adapting six items from Han et al. (2019) and Quintal et al. (2010). The “perceived severity” was measured by adapting three items from Ling et al. (2019); and Weun et al. (2004). The five measurement items for “perceived scarcity” was from Byun and Sternquist (2011). The consumer “anxiety” items were also adapted from previous scholars (Chlan et al., 2003; Marteau and Bekker, 1992; Zsido et al., 2020). As for the dependent variable “panic purchasing”, three items were adapted from Locke et al. (2015); Frost et al. (2004) and Van et al. (2010). The demographic information of the participants was collected for further analysis. The descriptive statistics on the consumers’ demographic variables were conducted by using the frequency analysis in SPSS version 26. In addition, the PLS-SEM was used to analyze the validity and reliability of the measurement model as well as to analyze the structural model of this research.

Table 1
Constructs and items.

| Constructs | Item | Source |
|--|--|--|
| Perceived scarcity | My favorite products almost out of stock when I want to purchase them. | Byun and Sternquist (2011) |
| | There was only a limited number of my favorite product on the rack. | |
| Perceived uncertainty | I found my favorite product was often scarce. | Han et al. (2019) and Quintal et al. (2010) |
| | There was only a limited number of products on the shelf. | |
| | While shopping, I found that there were a limited number of product choices. | |
| | The certainty that Covid 19 pandemic will not cause physical risk to you is (extremely uncertain-extremely certain) | |
| | The certainty that Covid 19 pandemic will not cause emotional risk to you is (extremely uncertain-extremely certain) | |
| | The certainty that Covid 19 pandemic will not cause financial risk to you is (extremely uncertain-extremely certain) | |
| | The certainty that Covid 19 pandemic will not cause social risk to you is (extremely uncertain-extremely certain) | |
| | The certainty that Covid 19 will not harm you is (extremely uncertain-extremely certain) | |
| | The certainty that Covid 19 pandemic will not affect your family is (extremely uncertain-extremely certain) | |
| | Covid-19 pandemic is a serious threat | |
| Covid-19 pandemic is critical Covid-19 pandemic can be life-threatening. | | |
| Anxiety | When shopping for groceries, I feel that difficulties are piling up so that I cannot overcome them. | Chlan et al. (2003), Marteau and Bekker (1992) and Zsido et al. (2020) |
| | When shopping for groceries, I worry too much over something that really doesn't matter. | |
| | When shopping for groceries, I take disappointments so keenly that I can't put them out of my mind. | |
| | When shopping for groceries, I get in a state of tension or turmoil as I think over my recent concerns and interest. | |
| | When shopping for groceries, some unimportant thoughts run through my mind and bothers me | |
| Panic purchasing | While shopping for groceries, I have bought more products than what I intended to buy. | Frost et al. (2004) and Van et al. (2010) |
| | Stock up groceries and/or other necessities | |
| | Unusual purchase of groceries | |

4. Data analysis and results

Out of the 250 sample, a total of 157 consumers successfully submitted the questionnaire, which is 62.8% of the total population. Table 2 shows the descriptive statistics findings where 54.8% of the respondents in this study were female and 45.2% of the respondents were male. Among the respondents, 54.8% of the respondents were single, followed by those who were married, which was 40.1%. Most of the respondents were 23–38 years old (46.5%), which was followed by those 18–22 years old (27.4%) and those 39–54 years old (24.2%). The number of

Table 2
Demographic profile of respondent.

| Variables | Frequency | Percentage (%) |
|---------------------|-----------|----------------|
| Gender | 71 | 45.2 |
| Male | 86 | 54.8 |
| Female | | |
| Age | 43 | 27.4 |
| 18-22 years | 73 | 46.5 |
| 23-38 years | 38 | 24.2 |
| 39-54 years | 3 | 1.9 |
| 55-73 years | | |
| Ethnicity | 81 | 51.6 |
| Malay | 47 | 29.9 |
| Chinese | 15 | 9.5 |
| Indian | 14 | 9.0 |
| Others | | |
| Marital status | 86 | 54.8 |
| Single | 63 | 40.1 |
| Married | 8 | 5.1 |
| Others | | |
| Education | 32 | 20.4 |
| High School | 39 | 24.8 |
| Certificate/Diploma | 58 | 36.9 |
| Bachelor Degree | 28 | 17.9 |
| Postgraduate | | |
| Income | 21 | 13.4 |
| Less than RM1,000 | 28 | 17.8 |
| RM1,000-RM1,999 | 43 | 27.4 |
| RM2,000-RM3,999 | 21 | 13.4 |
| RM4,000-RM5,999 | 15 | 9.6 |
| RM6000-RM7,999 | 9 | 5.7 |
| RM8,000-RM9,999 | 20 | 12.7 |
| Above RM10,000 | | |

consumers who participated in this study who possessed a bachelor's degree was 36.9%, which was followed by those who had earned a certificate/diploma (24.8%) and those who had a high school certificate (20.4%).

4.1. Common method bias

This study adopted both procedural and statistical remedies to detect any possibility of common method bias (CMB) (Podsakoff et al., 2012). First, all measurement scales in the study were adopted from previous studies. This reduces vague terms and item ambiguity in the questionnaire. Second, a clear initial criterion for the sample frame was applied during the online survey data collection process to meet the sample criteria and participation in the study. With the use of online snowball sampling, we assured the respondents of the privacy and confidentiality of their responses. Furthermore, this study requested several personal information such as email address and telephone number of participants for further data validation (Baltar and Brunet, 2012). The filtering questions were also included in the online survey which enables to control the representativeness of the sample (Tehseen et al., 2017). Therefore, the possibility of common method bias was minimized during the stage of the survey questions design (ff_2012" title = "bib69">MacKenzie and Podsakoff, 2012). As for statistical remedy, the study conducted Harman's single-factor test to check common method variance (CMV) in the data. The study showed a single factor has a value of variance less than 50% (Podsakoff et al., 2012). The small method variance specified that CMV was not a main concern in the data. Furthermore, the correlations matrix procedure was also used to evaluate the impact of CMV among the latent variable correlations. The correlation among all the constructs is less than 0.9. Thus, the results confirm that common method bias is not an issue in this research (Pavlou and El Sawy, 2006).

4.2. Measurement model evaluation

To evaluate the results of the measurement model, this study tested

the Cronbach's alpha, factor loadings, composite reliability (CR), and average variance extracted for all the constructs. The results revealed that the outer loading of the indicators of this study ranged from 0.568 to 0.956. Hair Jr et al. (2017) suggest that the indicators' outer loading for a measurement scale should be at least 0.708. However, by considering the content validity of the variables as an indicator with a value, more than 0.40 should have remained. Thus, this study decided to keep all of the indicators with a value of more than 0.50 for further research. We also examined Cronbach's alpha and composite reliability values (Table 3) for all of the variables in favor of determining the internal consistency of the variables. The results showed that the Cronbach's alpha and composite reliable values of all the variables were greater than 0.830 and 0.880 respectively, which are above the threshold value of 0.7 as proposed by Hair et al. (2017). Moreover, this study examined the AVE values of all of the constructs and found that the AVE value of all of the variables was in a range from 0.553 to 0.873, which exceeds the cut-off level of 0.5. Hence, the findings ensure the consistency, reliability, and convergent validity of the study's constructs.

In addition, we observed the latent variable covariance for the five factors in this study. Table 4 shows there was a strong covariance between the latent exogenous and the latent endogenous construct. In addition, this table also show the extent of covariance between the exogenous latent variables. The covariance value in the table show that uncertainty is tied to anxiety at a higher absolute level than is perceived scarcity, and anxiety has a strong relationship with panic purchase.

Finally, our study examined the discriminant validity of the scale by using the heterotrait-monotrait (HTMT) ratio approach. This study used the HTMT approach because earlier scholars suggested that if the outer loadings of the measurement model vary widely then implementing the HTMT approach would be more accurate (Hair et al., 2017). The result of the HTMT approach presented in Table 5 shows that the HTMT values of all of the constructs were less than the threshold value of 0.85 as recommended by Hair et al. (2017). Therefore, the findings ensure the discriminant validity of the scale.

4.3. Hypothesis testing results and discussion

This study examines the direct relationship between consumers' perceptions of uncertainty, perceptions of severity, perceptions of scarcity, anxiety, and panic purchasing behavior in the food purchase

Table 3
Result of measurement model.

| Latent Variable | Std. Loading | CA | CR | AVE |
|--------------------------|--------------|-------|-------|-------|
| Perceived Severity (PS) | | 0.923 | 0.949 | 0.862 |
| PS-1 | 0.925 | | | |
| PS-2 | 0.956 | | | |
| PS-3 | 0.904 | | | |
| Perceived Scarcity (PSC) | | 0.896 | 0.919 | 0.695 |
| PSc-1 | 0.843 | | | |
| PSc-2 | 0.897 | | | |
| PSc-3 | 0.865 | | | |
| PSc-4 | 0.854 | | | |
| PSc-5 | 0.694 | | | |
| Panic Purchase (PP) | | 0.855 | 0.932 | 0.873 |
| PP-1 | 0.935 | | | |
| PP-2 | 0.935 | | | |
| Anxiety (A) | | 0.830 | 0.893 | 0.682 |
| A-1 | 0.568 | | | |
| A-2 | 0.841 | | | |
| A-3 | 0.919 | | | |
| A-4 | 0.924 | | | |
| Uncertainty (U) | | 0.835 | 0.880 | 0.553 |
| U-1 | 0.641 | | | |
| U-2 | 0.609 | | | |
| U-3 | 0.768 | | | |
| U-4 | 0.832 | | | |
| U-5 | 0.760 | | | |
| U-6 | 0.825 | | | |

Table 4
Latent variable covariances.

| Variables | A | PSC | PP | PS | U |
|-----------|--------|--------|--------|--------|-------|
| A | 1.000 | 0.264 | 0.663 | -0.134 | 0.369 |
| PSC | 0.264 | 1.000 | 0.234 | -0.083 | 0.160 |
| PP | 0.663 | 0.234 | 1.000 | -0.107 | 0.327 |
| PS | -0.134 | -0.083 | -0.107 | 1.000 | 0.033 |
| U | 0.369 | 0.160 | 0.327 | 0.033 | 1.000 |

Table 5
Discriminant validity assessment (Heterotrait- Monotrait Approach).

| Variables | A | PSC | PP | PS | U |
|-----------|-------|-------|-------|-------|---|
| A | | | | | |
| PSC | 0.284 | | | | |
| PP | 0.786 | 0.248 | | | |
| PS | 0.156 | 0.078 | 0.111 | | |
| U | 0.441 | 0.209 | 0.383 | 0.081 | |

context after the outbreak of COVID-19 pandemic cases in Malaysia. We also examined whether individual anxiety levels mediated the relationship among the examined psychological factors: uncertainty, perceptions of severity, perceptions of scarcity, and panic purchasing behavior. To assess the structural model and the hypotheses, this study used the significance of the path coefficient, the variance explained (R^2), and the effect size (f^2) of the variables. We also checked the multicollinearity issues of the model by using the variance inflation factor (VIF) presented in Table 6. The results reveal that the VIF value of all of the variables ranged from 1.168 to 4.923, which is less than the suggested threshold value of 5 (Venkatesh et al., 2012). A bootstrapping procedure (n = 157, sample = 5000) was applied to measure the path coefficient, standard error, and t-statistics. The critical value for the one-tail test was 1.645 at a 5% level of significance. The result reveals that the R^2 value for panic purchasing is 0.451 and, for anxiety, is 0.195, which is considered to be substantial (Hair et al., 2017).

The direct and indirect relationships among the variables also provided in Table 6. The results reveal that uncertainty ($\beta = 0.341, t = 3.970$) plays the most crucial role in influencing consumer anxiety, followed by the perception of scarcity ($\beta = 0.199, t = 2.300$). However, it was revealed that perceived severity ($\beta = -0.128, t = 2.341$) influences consumer anxiety levels negatively. These findings further support hypotheses H1a and H3a and allow us to reject the hypothesis H2a suggesting a positive relationship between perceived severity and anxiety. Results in Fig. 2 also show that anxiety ($\beta = 0.611, t = 9.506$) exhibits strong and positive effects on panic purchasing behavior, supporting H2c. However, the study found no direct relationship between uncertainty ($\beta = 0.094, t = 1.467$), perceived severity ($\beta = -0.024, t = 0.386$), perceived scarcity ($\beta = 0.056, t = 0.806$), and the panic purchasing behavior of consumers. Consequently, hypotheses 1b, 2b, and 3b are not supported.

The final three hypotheses of this study predicted that the individual anxiety levels might mediate the relationship between the psychological factors and panic purchasing. The mediation result in Table 6 shows that anxiety fully mediates the relationship between the psychological factors and consumer panic purchasing behavior. Interestingly, this study confirms that there is only an indirect relationship between the variables for uncertainty ($\beta = 0.208, t = 3.518$), perceived severity ($\beta = -0.078, t = 2.426$), perceived scarcity ($\beta = 0.121, t = 2.251$), and consumer panic purchasing. The findings further support hypotheses H4a, H4b, and H4c, respectively, that consumer anxiety levels mediate the relationship between uncertainty, perceived severity, perceived scarcity, and panic purchasing.

Overall, our study suggests that consumers' perceptions of uncertainty regarding the COVID-19 pandemic, their perceptions of the severity of the COVID-19 pandemic outbreak, and their perceptions of

Table 6
Results of the structural model analysis.

| Hypothesis | Relationship | Std Beta | Std Error | t-values | p-values | Decision | R ² | f ² |
|------------|------------------|----------|-----------|----------|----------|---------------|----------------|----------------|
| H1a | U - > A | 0.341 | 0.086 | 3.970 | 0.000 | Supported | 0.195 | 0.140 |
| H1b | U - > PP | 0.094 | 0.064 | 1.467 | 0.071 | Not Supported | 0.451 | 0.014 |
| H2a | PS - > A | -0.128 | 0.075 | 2.341 | 0.010 | Not Supported | | 0.020 |
| H2b | PS - > PP | -0.024 | 0.061 | 0.386 | 0.350 | Not Supported | | 0.001 |
| H2c | A - > PP | 0.611 | 0.064 | 9.506 | 0.000 | Supported | | 0.547 |
| H3a | PSC - > A | 0.199 | 0.087 | 2.300 | 0.011 | Supported | | 0.048 |
| H3b | PSC - > PP | 0.056 | 0.069 | 0.806 | 0.210 | Not Supported | | 0.005 |
| H4a | U - > A - > PP | 0.208 | 0.059 | 3.518 | 0.000 | Supported | | |
| H4b | PS - > A - > PP | -0.078 | 0.032 | 2.426 | 0.015 | Supported | | |
| H4c | PSC - > A - > PP | 0.121 | 0.054 | 2.251 | 0.024 | Supported | | |

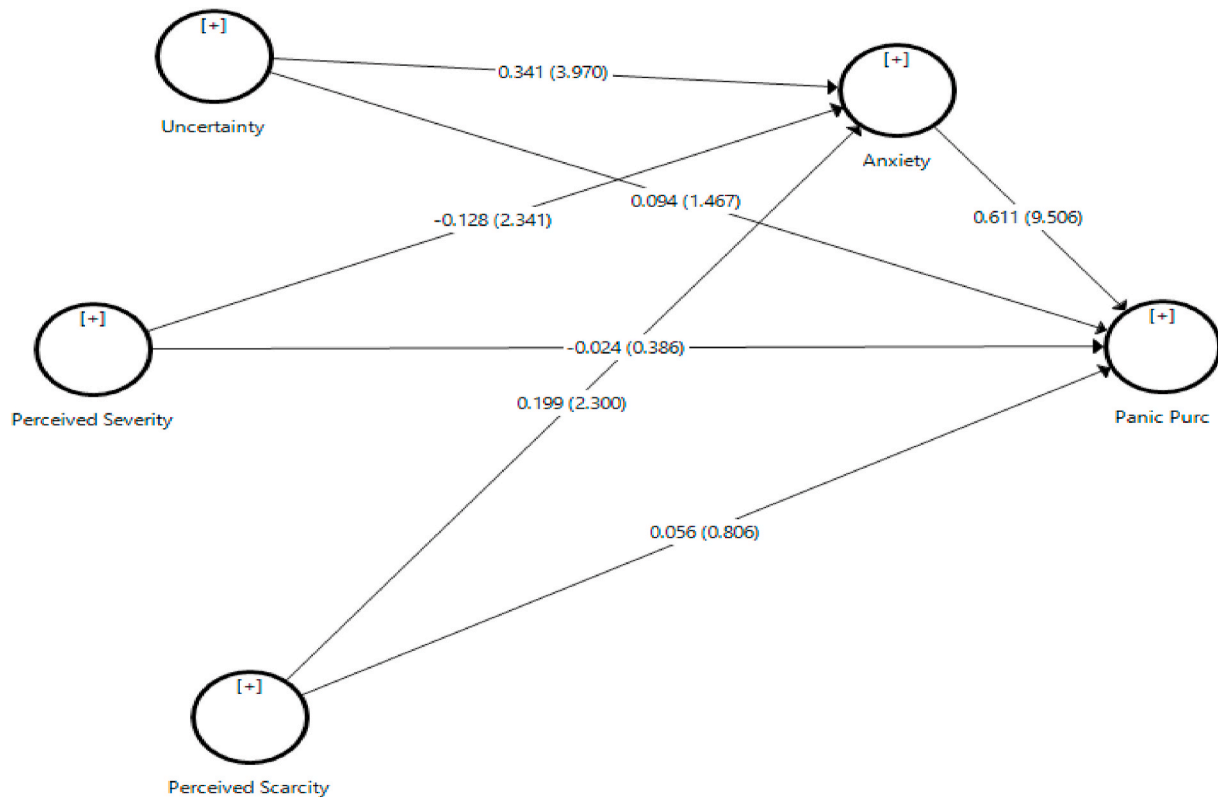


Fig. 2. Results of the mediation model.

scarcity that the stores would run out of food could positively influence their anxiety levels and, thus, their panic purchasing behavior. This study confirms that anxiety is an important antecedent to panic purchasing, which further mediates the relationship between other psychological factors: uncertainty, perceptions of severity, perceptions of scarcity, and consumer panic purchasing behavior. These findings are in line with the health researchers' argument that anxiety is an important antecedent of panic behavior (Locke et al., 2015). The significant direct and indirect relationships among the examined variables further support previous scholars' claims that uncertainty, perceptions of severity, perceptions of scarcity, and anxiety are important antecedents to panic purchasing (Kemp et al., 2014; Liren et al., 2012; Sim et al., 2020; Yuen et al., 2020).

Our study also confirms that the uncertainty, perceptions of severity, and perceptions of scarcity that emerged from the COVID-19 pandemic outbreak did not cause panic purchasing behavior directly. Rather, they had an indirect effect on consumer panic purchasing behavior. It has been documented that anxiety plays a crucial mediating role between these variables. The revealed positive relationship between uncertainty, perceived scarcity, and consumer anxiety levels supports earlier studies

that argued that these two variables significantly influence consumers' levels of anxiety (Ngunjiri, 2020; Yuen et al., 2020).

Interestingly, the study found that consumer perceptions of severity can help to reduce their anxiety level consequently influence consumer panic purchasing behavior after the outbreak of the COVID-19. The negative relationship between perceived severity and anxiety in this study opposes earlier studies that argued the perceptions of severity can increase anxiety levels (Liren et al., 2012; Ngunjiri, 2020; Yuen et al., 2020). However, the findings support other study by Li et al. (2020) arguing that if people perceive that they have a high level of control over a situation, this might mitigate the impact of their perceptions of severity on their mental health. This is in line with the report by the Department of Statistics Malaysia (2020) indicating that there was a significant change in daily spending before and during COVID-19 outbreak where the amount of grocery spending showed a reduction at the early stage of the outbreak and more people shift towards online platform (The Borneo Post, 2020).

Besides that, researchers postulated that social media has a significant influence on creating panic during the COVID-19 pandemic (Ahmad and Murad, 2020). It has been widely reported in the media that

although COVID-19 is a highly transmissible disease, but it is not as deadly as SARS and MERS (Barati et al., 2020). The infection and death rate of people with COVID-19 in Malaysia were much lower than many other countries at an early stage of pandemic. Moreover, during the initial health crisis, the country was in ongoing political turmoil at the same time (Shah et al., 2020) and without a health minister in the transition between governments (Varagur, 2020). Furthermore, it has also been documented that “consumers tend to retain a feeling of immunity thinking that they and people in their close proximity will have a lower risk of experiencing a certain event, compared to others” (Hutjens, 2014). Therefore, we posit that since social media, newspapers, and the Malaysian government, have provided proper information regarding the way people should take precautionary measures to prevent the spread of COVID-19, the respondents might not have considered the disease to be severe, consequently reduced their levels of anxiety.

Besides that, this study measured anxiety in the context of grocery purchase where the perceived severity here refers to an individual's perception towards the severity of the disease. The perceived severity of the COVID-19 pandemic might possibly increase people fear of getting an infection that reduces their anxiousness to purchase grocery products. However, further research is recommended in this aspect to understand the relationship between perceived severity and panic purchase in the COVID-19 pandemic context.

5. Implications

5.1. Theoretical implications

The findings of our study have several implications. First, our study examines if consumer psychological factors such as uncertainty, perceptions of severity, perceptions of scarcity, and anxiety cause panic purchases during a pandemic. The mediating effect of anxiety between uncertainty, perceived severity, perceived scarcity, and panic purchase behavior provides empirical support for previous research that showed these factors might influence consumer panic purchasing behavior (Liren et al., 2012; Yuen et al., 2020). Based on the stockpiling and hoarding behavior literature, some researchers have proposed that these psychological factors act as antecedents to consumer panic purchases. However, there is still a lack of empirical research in this area (Yuen et al., 2020), especially in the grocery store context. Therefore, the empirical evidence regarding the indirect effect of these variables on the panic purchase becomes a major contribution of the study to the consumer behavior literature.

Second, this study found that consumers' inability to predict the outcome of the COVID-19 pandemic might influence their levels of anxiety. When consumers experience uncertainty, this adversely affects their normal activities. Consequently, this leads them to act in a way so that they try to overcome the situation. In fact, in the case of uncertainty, people may imagine multiple negative consequences, which may arouse fear (Kemp et al., 2014). This study also found that consumers' perceptions of the limited supply of daily necessities or their favorite products influence their anxiety levels. This is because when consumers experience a market supply shortage for their daily necessities, this causes a psychological reaction by threatening or restricting their personal freedom (Maghsoudi et al., 2018). Thus by examining the relationship among the variables, our study extends the panic purchasing behavior literature in the grocery product context.

Third, the revealed mediating effect of anxiety between the consumers' psychological factors and panic purchase indicates that when the negative stimuli influence consumers' perceived anxiety, it can lead towards their panic purchase behavior to overcome the anxiety-provoking situation. The findings support the behavioral inhibition system (BIS) theory which suggests that people's anxiety is the result of aversive stimulation that restricts their normal behavior (Gray, 1977; Hagopian and Ollendick, 1994). This study also suggests that consumers who are prone to be anxious and panic by the negative psychological

factors might have a dominant BIS emotion system. The implementation of the behavioral inhibition system theory in the panic purchase context in this study will bring to an end the long-term controversy of whether consumers' bulk purchase behavior during a pandemic is disaster preparation or panic purchase behavior (Glass and Schoch-Spana, 2002). Therefore, it extends the behavioral inhibition system theory in consumer behavior literature.

Fourth, this study confirms that the relationships among uncertainty, perceived severity, perceived scarcity, and consumer panic purchase behavior is not direct. Rather, anxiety plays a crucial role in mediating among these variables. These findings are in line with health researcher findings that anxiety is an important antecedent or prerequisite for panic behavior (Locke et al., 2015; Spiaci et al., 2012). While the earlier studies proposed that there is a positive relationship between the examined psychological factors and panic purchasing behavior, our study pointed out that all of these factors influence consumer purchasing only if they heighten the consumers' levels of anxiety. Thus, by revealing the mediating effects of anxiety, this study enriches our collective understanding regarding the relationship and the examined variables while answering the call from earlier research (Yuen et al., 2020) to focus on identifying the mediating factors that play a crucial role in influencing consumer panic purchases. Overall, by revealing the role of psychological factors on consumer's anxiety level particularly in the context of panic purchase behavior, this study attempts to provide a holistic understanding of the way panic purchase occurs during a pandemic.

Fifthly, the insignificant direct relationship between the psychological factors and consumers' panic purchase behavior further rejects the reactance theory (Brock, 1968) that argued people's perceived threat of freedom motivates them to recapture their freedom. Although previous scholars found the support of reactance theory in different contexts (Quick et al., 2013), but it is contrary in the case of consumers' panic purchase behavior. Moreover, our study found that consumers' perception of the severity of the COVID-19 pandemic has a negative relationship with their levels of anxiety and this effect is minimal when compared to other psychological factors examined in this study. The findings indicate that consumers' perceived fear of getting infected by COVID-19 negatively influences their anxiety level to purchase grocery products; consequently, causes panic purchase behavior. This finding can be explained by previous scholars' argument that an individual's fear may vary based on expected negative outcomes that are related to anxiety or panic (Kirsch, 1997; Reiss, 1991). The results support Reiss's (1991) expectancy theory that an individual's expectancy of danger and the sensitivity towards the dangerous object motivate them to take necessary actions to avoid the fear stimulus. Thus, the application of the theory in a panic purchase context extends Reiss (1991) expectancy theory in consumer behavior literature.

Finally, this study adopted three psychological factors only as antecedents of anxiety and consumers' panic purchase behavior. We argue that future research should examine if other psychological factors can influence consumers' panic purchase behavior during a pandemic crisis. The future study can also emphasize if there are any other mediating or moderating variables that can significantly influence the relationship between these variables.

Therefore, the model of this study can be used to identify further variables that successfully influence panic purchases. By widening the opportunity for further research in this area, this study thus contributes to the psychological and consumer behavior literature for the developing country of Malaysia.

5.2. Practical implications

Our study argues that both policymakers and retailers can reap benefits from this study. First, the study establishes that panic purchase is a reality during the pandemic crisis. When uncertainty and perceived scarcity influence consumers' anxiety levels, it can induce their panic

purchase behavior. By revealing the mediating role of anxiety, this study sheds light on how psychological factors indirectly affect consumers' panic purchase behavior. Our study posits that marketers and policymakers can address the problem of panic purchase by providing constructive information during a pandemic crisis and ensuring the adequacy of the supply of products in the markets. This study also suggests that policymakers and merchants should focus on developing policies and strategies that can effectively reduce consumers' perceived anxiety during a pandemic situation.

Second, this study reveals that there is no direct relationship between consumers' psychological factors such as uncertainty, perceptions of severity, perceptions of scarcity and consumers' panic purchase behavior. The findings show that all these psychological factors do not have any effect on consumers' bulk purchase or disaster preparation behavior indicating that to be panic, the psychological factors have to influence consumers' anxiety; otherwise, there will be no panic purchase. The findings suggest that to ensure business continuity and future risk management, the policymaker should make timely and effective decisions and plans in order to reduce the anxiety of customers who are prone to panic. The effective communication strategies and substantial planning are required early in the outbreak of a pandemic to avoid negative individual emotions (Glass and Schoch-Spana, 2002).

Thirdly, our study reveals that uncertainty plays a major role to induce consumers' anxiety on procuring grocery products, compared to the perceived scarcity. Therefore, it is crucial for policymakers to take the necessary steps to reduce consumers' negative emotions such as uncertainty and perceived scarcity. We recommend the government and retailers should provide sensible, constructive, and effective information to consumers in order to gain their trust in the market supply system as well as reduce their negative emotions and behavior like anxiety, and panic buying. The government and marketers should implement multiple strategies such as the usage of bulletins, broadcasting news in electronic media, sharing sensible and timely information in social media, ensuring online delivery of products, and many others which will provide signs to the consumers that the government, market, and economy are ready to face the challenges during the pandemic.

5.3. Conclusions and future research

This study delivers a vital contribution to the literature by presenting and testing a model that suggests the direct and indirect influence of uncertainty, severity, and scarcity on anxiety and panic purchase. Results confirm the positive relationship between uncertainty, scarcity and anxiety and also the mediating roles of anxiety in the relationship. The mediating role of anxiety sheds light on how psychological factors indirectly affect consumers' panic purchase behavior. It also extends knowledge about consumers' psychological factors, such as uncertainty, perceptions of severity, perceptions of scarcity, and consumers' panic purchase behavior in the context of emerging markets as well as persuading government and marketers to employ multiple strategies that can appropriately reduce consumers' perceived anxiety during a pandemic situation.

While our study contributes to theory and practices, there are some limitations, too. Firstly, this study collected data from consumers after a few days of panic purchasing incidents in Malaysia. Although it provides valuable insights into the antecedents for panic buying behavior, it would be better if the data could be collected from the location (mall-intercept) of panic purchases. However, due to social distancing strategies, it wasn't possible to collect data from the respondents while they were making purchases. The results of the study should be interpreted with caution. We believe that the generalization of the findings and replication of the study in other contexts such as different cultures and product categories are important. Since the panic purchase is experienced globally after the COVID-19 outbreak, therefore, future research should focus on examining the relationship between these variables in a different context.

Second, this study used a cross-sectional self-reported data collection method, which may cause some biases in the findings. Therefore, future researchers should focus on experimental studies to further investigate the relationship between the variables. A replication of the study in another country is also essential for generalizing the findings. Third, this study examined only a few psychological factors as antecedents to panic purchasing. Likewise, other psychological factors such as stress, distress, fear, mood congruency, emotional intensity, and many others may also play a crucial role in causing the consumer to engage in panic purchasing behavior. Therefore, future research should focus on this area.

Finally, it is possible that uncertainty and perceived scarcity were stimulated by the sudden lockdown news rather than by the COVID-19 pandemic. Thus, future studies should identify the social factors that can influence consumer behavior and panic purchase during a pandemic outbreak. For this, a mixed-method approach could be applied.

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