Received: 12 January 2021 | Revised: 7 April 2021 | Accepted: 29 September 2021

DOI: 10.1002/cb.1998

ACADEMIC PAPER

WILEY

Impact of COVID-19 on consumers' impulse buying behavior of fitness products: A moderated mediation model

Weisheng Chiu[1] | Ga-Eun (Grace) Oh[2] | Heetae Cho[3]

[1]Lee Shau Kee School of Business and Administration, Hong Kong Metropolitan University, Ho Man Tin, Hong Kong

[2]Department of Marketing and International Business, Faculty of Business, Lingnan University, Tuen Mun, Hong Kong

[3]Department of Physical Education and Sports Science, Nanyang Technological University, Singapore, Singapore

Correspondence
Heetae Cho, Department of Physical Education and Sports Science, Nanyang Technological University, Singapore, Singapore.
Email: heetae.cho@nie.edu.sg

Abstract

During the COVID-19 pandemic, consumers are found to be more impulsive to purchase fitness products online. Accordingly, the purpose of this study was to investigate a moderated mediation model of consumers' perception of COVID-19 and impulse buying behavior through fear moderated by income. A total of 608 responses were collected from consumers in the United States, and this study employed partial least squares structural equation modeling (PLS-SEM) to examine the hypothesized relationships in the research model. The results showed that the perception of COVID-19 had a positive influence on fear, which in turn led to impulse buying behavior of fitness products. Moreover, consumers' income levels negatively moderated the positive relationship between fear and impulse buying behavior. The findings contribute to a better understanding of consumers' behavior and offer practical implications that enable marketers and retailers to predict consumers' behavior during the COVID-19 pandemic.

1 | INTRODUCTION

Since the World Health Organization (WHO) announced the 2019 novel coronavirus (COVID-19) outbreak a pandemic (World Health Organization, 2020), many countries have rolled out lockdown and/or different social distancing measures to slow down the spread of COVID-19; people are encouraged to stay at home and minimalize outdoor activities. Therefore, it is not surprising that consumers' spending habits have changed during the COVID-19 pandemic due to the changed lifestyle (Pantano et al., 2020; Sheth, 2020). Specifically, it was found that the COVID-19 pandemic has consumers purchasing more impulsively than prior to the pandemic. According to a survey by Slickdeals, American consumers' impulse spending increased by 18% during the COVID-19 pandemic (Cain, 2020). Another survey also found a trend that the more time individuals spend staying at home, the more frequently they purchase impulsively (Klaviyo, 2020b). It indicates that "in-home everything" lifestyle has impacted consumers' impulse buying habits (Donthu & Gustafsson, 2020; Sheth, 2020).

During the COVID-19 pandemic, it should be noted that impulse buying habits lead to a drastic increase in e-commerce sales across different categories, such as food & beverage, health & beauty, and fitness products (Klaviyo, 2020a). Due to the closure of gyms and fitness centers for preventing the spread of COVID-19, many people have turned to home fitness products during the COVID-19 pandemic. This has resulted in a huge surge in demand for home fitness products and a significant increase in sales of more than 170% for home fitness products in the United States (Research and Markets, 2020). For example, Decathlon, a French sporting goods retailer, has reported a 220% increase in fitness products across categories, such as cycling, fitness cardio, yoga, and running, by consumers seeking to bolster home equipment for self-exercise and workout (Balram, 2020). The increasing sales of fitness products may be attributed to the importance of exercise and fitness to individuals, especially amid the COVID-19 pandemic. Research shows that regular exercise is one of the crucial ways to combat the COVID-19 as it can boost the immune system, prevent weight gain, reduce stress and anxiety, and improve sleep, which together help fight against (Rahmati-Ahmadabad & Hosseini, 2020; Ranasinghe et al., 2020). Therefore, the benefits of exercise have inspired consumers to purchase indoor fitness equipment and start home fitness to stay healthy (De Sutter et al., 2020). Although the COVID-19 pandemic has caused

a significant disruption in people's lives, the surge in demand for fitness products indicates that most individuals generally understand and value the importance of exercise and fitness amid the COVID-19 pandemic.

Despite the importance of exercise and fitness in individuals' life, the influential factors and mechanisms for sport consumers' impulse buying behavior of fitness products are limited in the extant literature (Chen et al., 2013; Kwon & Armstrong, 2002, 2006; Lam & Bae, 2014). Therefore, especially during the COVID-19 pandemic, it is imperative to explore the trend and impacts of the COVID-19 pandemic on the impulse buying behavior of fitness products. Therefore, this study intends to investigate how the COVID-19 pandemic leads to an increase in demand and overconsumption for immediate enjoyment during this time. The existing literature on impulse buying has identified the role of emotion in affecting individuals' impulsive consumption behavior (Amos et al., 2014; Chan et al., 2017; Iyer et al., 2020; Xiao & Nicholson, 2013). As such, this study employed negative emotions (i.e., fear) as a mediator in the research model. Specifically, the stimulus-organism-response (S-O-R) model (Mehrabian & Russell, 1974) was used as the theoretical framework to examine individuals' impulsive consumption behavior, as it addressed the influence of the environmental stimulus and emotional response on individuals' behavior.

Moreover, previous studies have identified that individuals' income level plays a critical role in times of sufferings and stress (i.e., COVID-19 pandemic; Kesebir & Hong, 2008; Lachman & Weaver, 1998; Ross & Mirowsky, 1992). As people in different income levels perceive different levels of sense of control, they may adopt different coping strategies in difficult times (i.e., COVID-19 pandemic; Lachman & Weaver, 1998; Ross & Mirowsky, 1992). Previous studies evidence that individuals' responses to the COVID-19 situation and coping strategies were strongly differentiated by the income level (Asmundson et al., 2020; Fu et al., 2020; Weill et al., 2020). Therefore, we presumed that the income level would have an impact on the relationships between COVID-19 perception, fear, and impulse buying. This study therefore proposed a moderated mediated relationship in which perception of COVID-19 directly and indirectly (through fear) affects impulse buying, contingent on income level. This study is the initiative to explore the impact of the COVID-19 pandemic on the impulse buying behavior of fitness products. The findings of this study fill the research gap and gain the knowledge of impulse buying behavior during the COVID-19 pandemic in the extant literature. Practically, the findings of this study help marketers better understand sport consumer behavior during the COVID-19 pandemic and propose tailored marketing strategies to increase sales.

2 | THEORETICAL BACKGROUND AND LITERATURE REVIEW

2.1 | Stimulus-organism-response model

The existing literature has identified the S-O-R model as a framework to comprehensively understand which factors contribute to impulse buying (Mummalaneni, 2005). Specifically relevant to the online shopping setting, the S-O-R model has been extensively used as the theoretical approach to impulse buying behavior (Chan et al., 2017). While the S-O-R model has been examined in the recent investigations of consumer behaviors related to the COVID-19 pandemic, such as unusual purchases of hygiene products and stock-piling (Laato et al., 2020), panic buying of essential items (Pandita et al., 2021), intention to order food online (Brewer & Sebby, 2021), and impulsive buying at grocery stores (Islam et al., 2021), none of them has examined impulse purchase of fitness products as a response to the COVID-19 pandemic. According to the three elements of the S-O-R model (Mehrabian & Russell, 1974), in the online environment for the impulse purchase, *stimulus* corresponds to a trigger in the perceived online environment that influences consumers' affective experiences; *organism* corresponds to consumers' internal evaluation of the stimulus; *response* corresponds to consumers' impulsive shopping behavior as reactions toward to the stimulus and their internal evaluations (Chan et al., 2017).

According to the classification of Chan et al. (2017), stimulus in the online shopping environment, which is an antecedent of impulsive buying behavior, usually is divided into two types: external stimulus and internal stimulus. External stimulus refers to stimuli related to features of the shopping environment, whereas internal stimulus means consumer characteristics related to impulsivity. Although external stimulus usually includes the direct physical environment related to the online shopping setting, such as the website characteristics and the product-related characteristics (e.g., price; product attributes), there has been a lack of investigation of a global physical environment as an external stimulus beyond the direct physical setting. However, the surrounding situation of the COVID-19 as an external stimulus would trigger emotional responses among consumers (Kumar & Nayar, 2020). Among various emotional responses that this pandemic situation evokes, fear is studied as a major emotional outcome of the current pandemic situation (Mertens et al., 2020; Schimmenti et al., 2020) or for its role in preventive health behaviors (Harper et al., 2020; Pakpour & Griffiths, 2020). However, it has not been investigated how fear can drive one's impulse buying behavior in the online setting. While increasing sales of home fitness products are witnessed in the midst of the COVID-19 pandemic (Research and Markets, 2020), the underlying mechanism regarding how demand for such products is attributed to the present pandemic situation has not been much known. Grounded by the S-O-R framework, the present research conceptualizes consumers' affective reactions to the COVID-19 as a result of the perception of the external environment and provides a deeper understanding of how their affective reactions toward the surrounding environment guide their impulse buying behaviors of fitness products.

2.2 | Perception of COVID-19

Previous research has utilized that perception of the epidemic (e.g., 2009 H1N1 influenza) as what people cognitively know about

the epidemic (Lee et al., 2012). According to the survey targeting people across 10 different countries across America, Europe, and Asia, people are highly concerned about the COVID-19 issue (Dryhurst et al., 2020). Due to the concern of the COVID-19 situation and the situational constraints (e.g., stay-at-home orders), a person would generate negative affective reactions to the COVID-19 pandemic (Kumar & Nayar, 2020; Mertens et al., 2020; Tull et al., 2020). Moreover, the perception of COVID-19 is not the same across individuals. The worry about the COVID-19 varies across regions (Fitzpatrick et al., 2020) as well as individuals (Tull et al., 2020). In other words, some consumers would have a more concerning perception of COVID-19 than other consumers. Such individual differences in COVID-19 perception would lead to different responses. The greater impact people perceive COVID-19 has on their lives, the more negative emotions and thoughts they experience, such as anxiety and worry (Tull et al., 2020). Prior investigation has already shown that people have changed their consumption behavior in a more impulsive manner during the COVID-19 pandemic (Cain, 2020), which suggests the link between the perception of COVID-19 and the change in consumption behavior patterns. Prior research together suggests that depending on the perception of the COVID-19, their reactions to the COVID-19 situation and the downstream effects of reactions on consumption behaviors would be different. As the perception of the COVID-19 is the precursor of affective reactions and impulsive behaviors, we investigated how the perception of the COVID-19 is related to evaluative reactions to the external environment with the COVID-19 pandemic as well as responses to the environment, manifested in their online impulse buying tendency.

2.3 | Fear

Among various emotional experiences during the COVID-19 pandemic, fear has been extensively studied (Mertens et al., 2020; Pakpour & Griffiths, 2020; Schimmenti et al., 2020). While fear itself is negative in relation to psychological outcomes and well-being, the fear regarding the COVID-19 can be functional in that fear is positively related to the compliance of public health recommendations for preventive behaviors (e.g., social distancing; personal hygiene; Harper et al., 2020; Pakpour & Griffiths, 2020). However, there has been a lack of investigation of how fear about the COVID-19 may drive people's behaviors as consumers. Particularly, according to the appraisal-tendency framework, fear occurs when people perceive the unpredictability of negative events, but people think they cannot control the situation (Lerner & Keltner, 2000). Also, fear motivates people to exert effort to get out of threatening situations or remove negative feelings (Lerner & Keltner, 2001). Impulsive buying behavior can be distractions from such negative feelings or ways to cope with the threatening environment. Also, as fear is arousing to mobilize people to respond to the immediate danger (Lazarus & Lazarus, 1991), arousal from fear to the COVID-19 would facilitate impulsive purchase behavior online (Sun & Wu, 2011). In the following, we investigated how fear about the COVID-19 is further related to the impulsive buying of fitness products.

2.4 | Impulse buying behavior

When people engage in impulse buying, the behavior is explained by their sudden urge to acquire the products rather than their planned considerations of product purchase (Rook, 1987). Hence, the main drivers of impulse purchase are affect-based factors (e.g., hedonic motivation) rather than cognition-based factors (Hausman, 2000). In the online shopping environment, many elements of the web environment and the products, as well as consumer's own internal characteristics, can instigate a desire for impulse purchases (Chan et al., 2017; Moe, 2003). For instance, visual features, media format, and content of the website and product-related attributes (e.g., product type, price, and discount/promotion) contribute to online impulse buying (Chan et al., 2017). Also, consumer-related factors such as consumers' shopping motives, hedonic consumption needs, and social influence instigate the impulse purchase online (Chan et al., 2017; Moe, 2003).

Beyond these well-known factors of online impulse purchases, the global external environment of the COVID-19 would also serve as a factor that can contribute to the impulse buying tendency. Under physical constraints on daily activities due to the COVID-19 pandemic, people's consumption has dramatically changed, such as their reliance on online retailers (Hall et al., 2021; Pantano et al., 2020). Various research studies have revealed that impulse buying tendency has increased in general due to the increase in online shopping behaviors during the COVID-19 pandemic (Cain, 2020; Donthu & Gustafsson, 2020; Klaviyo, 2020b; Sheth, 2020). Specifically related to the sport industry, the COVID-19 has led people to change how to spend their fitness and sport-related leisure time and consume fitness-related products and services online (e.g., online fitness training; solo sports such as walking and running; outdoor activities; Ratten, 2020). This suggests that people are likely to come across fitness products that are appealing for their online impulse purchases. Thus, this research examined how the perception of the COVID-19 and emotional responses to the COVID-19 are associated with impulse buying behavior of fitness products.

2.5 | Hypotheses development and research model

2.5.1 | Effect of perception of COVID-19 on impulse buying behavior

Online buying behavior becomes a norm during the COVID-19 pandemic (Hall et al., 2021; Pantano et al., 2020). As the perception of COVID-19 reflects people's worry of catching the disease, the perception would lead to an increase in online buying behavior, which may increase cases of impulse buying behavior (Jeffrey & Hodge, 2007). Moreover, due to the physical constraints to avoid contractions of the COVID-19, consumers' consumption behaviors have changed to doing alternative consumption behaviors in the online context (Sheth, 2020). Specifically, under the measures to reduce physical social interactions (e.g., closure of non-essential facilities), many people have to reduce their usual fitness activities (e.g., going to a gym) and then change how to spend their leisure time by resorting to the in-home fitness activities

or other alternative activities (Dwyer et al., 2020; Mutz & Gerke, 2021; Ratten, 2020). While public health experts have recommended keeping physical activities at home during the pandemic (Hammami et al., 2020), many sport and fitness businesses and practitioners have provided online contents and services for home-based fitness activities, which can serve as a useful guide for those who change their exercise regime (Dwyer et al., 2020). This would lead people to look for in-home fitness equipment or products from online retailers and to encounter opportunities to impulsively buy products for fitness and sport activities. This is indeed shown in an increase in the impulsive purchase of products, including the fitness and health category during the COVID-19 pandemic (Klaviyo, 2020b). Furthermore, when people experience distress about the negative external event that is not controllable (e.g., natural disaster), they tend to cope with their negative situations by engaging more in impulsive buying behavior (Li et al., 2020; Sneath et al., 2009). This suggests that the perception of COVID-19 might increase impulsive buying of fitness products as a coping strategy with the stressful situation. Hence, we presumed that the perception of COVID-19 would be positively related to online impulse buying of fitness products .

H1: Perception of COVID-19 positively affects impulse buying behavior.

2.5.2 | Effect of perception of COVID-19 on fear

People across many countries have a serious concern about the issue of COVID-19 and worry about contracting the virus (Dryhurst et al., 2020). Given the external environment posing the threat of the COVID-19, people feel fear from the worry of themselves and their loved ones being affected (Mertens et al., 2020). The actual spread of the COVID-19 rather remains unknown (Brown & Walensky, 2020). The spread of the virus has not been seen as under control in many countries, while the remedies or vaccines are not developed yet (Schnirring, 2020). The current conditions of the COVID-19 pandemic situation closely match the appraisals of fear, such as the uncertainty about the situation and perceived low control over the situation (Lerner & Keltner, 2000). Hence, for the current pandemic situation that has been highly uncertain and threatening, the perception of COVID-19 would contribute to fear (Asmundson & Taylor, 2020). Indeed, in the region where more confirmed cases are reported, which is more threatening and associated with low control over the situation, residents show higher fear and worry about the COVID-19 (Fitzpatrick et al., 2020). Hence, we predicted that the perception of the COVID-19 has a positive influence on fear toward the COVID-19.

H2: Perception of COVID-19 positively affects fear.

2.5.3 | Effect of fear on impulse buying behavior

Negative mood is positively related to impulsive behaviors in general (Rook & Gardner, 1993). Because negative emotions are basically aversive, people are more likely to find distractions or ways to reduce or get rid of their negative feelings. One way of seeking distractions and a positive mood is engaging in impulsive buying (Atalay & Meloy, 2011; Gardner, 1985). Hence, consumers would find the impulsive purchase as a means to alleviate their fear about the COVID-19 situation. Further considering the appraisals of fear, the link between fear and impulsive purchase behavior becomes apparent. When people perceive the negative situation as highly uncertain, which is stressful, they feel fear about the situation (Lerner & Keltner, 2000). Under such stressful conditions, consumers often employ impulse buying as a means to relieve their stress by escaping from the negative mood (Hausman, 2000). Likewise, COVID-19-induced fear would facilitate impulsive buying behavior. Also, fear is highly arousing as it prompts responses to the eminent external danger (Lazarus & Lazarus, 1991). Previous research has shown that arousal is positively related to an online impulse buying tendency (Sun & Wu, 2011). Given that fear is arousing for immediate actions and is associated with a lack of control over the situation, fear about the COVID-19 would increase impulsive buying (Naeem, 2020). Particularly, buying fitness products may help people to cope with fear as they can expect to enhance their health by using fitness products, while fear about COVID-19 is related to the salience of health issues. Thus, the impulsive purchase of fitness products would be facilitated by the degree of fear that individuals experience (Naeem, 2020). Together, under the COVID-19 pandemic, as people generate their fear as an emotional response to the threatening external environment, their fear, in turn, will serve as a driver for impulse purchase behavior. Hence, we hypothesized that the more people feel fear about the COVID-19, the more they would be likely to purchase fitness products out of impulse.

H3: Fear is positively associated with impulse buying behavior.

2.5.4 | A mediating role of fear in the relationship between the perception of COVID-19 and impulse buying behavior

As aforementioned, we predicted that both perception of COVID-19 and fear would be positively related to impulse buying behavior. Under the negative and stressful situation that is out of one's control, people engage in impulsive buying behavior more as a coping strategy (Sneath et al., 2009). Fear is produced within consumers as an affective response to the external stimulus based on their perception of the COVID-19 pandemic. In the S-O-R framework, consumers' evaluation of the situation leads to behavioral responses to the external buying situation (Chan et al., 2017). Consistent with the general mechanism of the S-O-R, fear about COVID-19 would, in turn, enhance impulsive buying behavior. In particular, Iyer et al.'s (2020) meta-analysis also identified that both positive and negative mood states play mediating roles in explaining the affective and cognitive psychological processes associated with impulse buying. Hence, we predicted that fear would mediate the relationship between

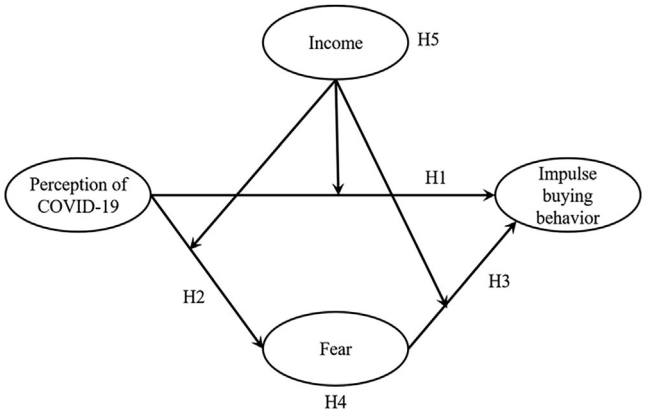

FIGURE 1 A research model and hypotheses

perception of COVID-19 and impulse buying behavior of fitness products (Figure 1).

> **H4:** Fear mediates the relationship between perception of COVID-19 and impulse buying behavior.

2.5.5 | Income as a moderator

In the S-O-R framework applied to consumer behavior, it has been suggested that the S-O-R system can interact with individuals' other psychological systems, such as their income (Jacoby, 2002). Hence, various personal traits and demographic characteristics, including income levels, have been explored as moderators in the relationships between stimulus and response (Chang et al., 2011; Fiore & Kim, 2007). Consistent with the buffering role of income against harmful reactions toward the threatening situation (Pitesa & Thau, 2014), we introduce income as the moderating factor to the proposed S-O-R framework in the COVID-19 pandemic context. Money has the power to buffer against physical and psychological pain because money provides a sense of control over one's environment by enabling people to access various means for protection (Kesebir & Hong, 2008). As a result, people with higher earnings from their jobs tend to feel a higher sense of control (Ross & Mirowsky, 1992), whereas people with low income tend to have a lower level of control in their life (Lachman & Weaver, 1998). Particularly under highly stressful situations, people with more financial resources would be able to cope better with their negative feelings like fear and worry. Indeed, people with high income tend to feel less negative thought or affect, such as worry than their counterparts with low income (Li et al., 2016). People who experience either physical or psychological pain tend to be less stressed if they possess the money to resort to (Kesebir & Hong, 2008). Similarly, financial wealth helps people to protect their life satisfaction from environmental influences (Johnson & Krueger, 2006). As such, individuals with low income would perceive a higher threat from others' harmful behaviors than their counterparts with high income (Pitesa & Thau, 2014). Considering the buffering power of money against stressful and threatening situations, the relationship between the perception of COVID-19 and fear would be moderated by income. Indeed, during the lockdown due to the COVID-19 pandemic in Austria, individuals with low income reported higher levels of anxiety and stress and other negative mental health outcomes (Pieh et al., 2020). In a similar vein, the link between the COVID-19 perception and fear about the COVID-19 would be weaker for those with high income as they would have more resources to cope with the threat of the COVID-19. Therefore, under the COVID-19, which is a highly uncertain and threatening event, people from low-income households are indeed at higher risk to catch the COVID-19 (Raifman & Raifman, 2020). This may amplify the impact of the perception of COVID-19 on fear among those with low-income while lessening the impact among those with high income. In other words, income will moderate the relationship between COVID-19 perception and fear.

Furthermore, since income can serve as a psychological buffer in times of sufferings and stress, depending on one's income level, a person can adopt different coping strategies in response to the same COVID-19 situation. While both cognition and emotion (affect) of organisms are involved in generating responses to the stimulus (Kim & Lennon, 2013), among those with relatively low income who lack a sense of control over the situation, the coping strategies might be more affect-based than cognition-based. This is because the lack of a sense of control dampens self-regulation (Cannon et al., 2019). For example, when individuals experience seasonal deprivation of financial resources (e.g., farmers before the harvest), they exhibit impaired cognitive performance compared to their capabilities observed after the temporary deprivation is relieved (e.g., after the harvest; Mani et al., 2013). Since individuals with low income feel higher fear about the COVID-19, they would rely less on their cognitive processes, but rather be prone to making affect-based purchase decisions, such as impulse buying. Also, in response to the lack of control and stress from an adverse event, people tend to engage in impulse buying in order to restore their sense of control and cope with negative feelings (Sneath et al., 2009). In addition, previous research has shown that people with low income (e.g., unemployed) showed higher levels of impatience and risk-seeking tendency than others with higher income (e.g., employed; Gneezy & Imas, 2015). This suggests that low-income individuals would be more impatient and vulnerable to make impulse purchase decisions as a result of worry about the COVID-19 perception and fear. Thus, we hypothesized that those who have high income would exhibit less fear due to the COVID-19 perception and less reliance on impulsive consumption as a coping strategy against the perception and fear regarding COVID-19, compared to those who have relatively low income. In sum, income will moderate the relationship between the perception of COVID-19, fear, and impulse buying behavior.

> **H5.** Income moderates the relationships (a) between the perception of COVID-19 and impulse buying behavior, (b) between the perception of COVID-19 and fear, and between (b) fear and impulse buying behavior.

3 | METHODS

3.1 | Survey instrument

The survey instrument was developed based on the review of relevant literature and comprised of four measures (perception of COVID-19, fear, impulse buying tendency, and impulse buying behavior). First, perception of COVID-19 was operationalized with four items that measure individuals' cognition of the COVID-19 pandemic (Lee et al., 2012). Second, individuals' fear of COVID-19 was assessed by a scale developed by Ahorsu et al. (2020). Finally, impulse buying behavior was assessed by a two-item scale from Mattila Anna and Wirtz (2008). These scales revealed adequate validity and reliability in previous studies. These items were slightly amended to fit the context of this study and were measured by using a 7-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). The survey instrument also included respondents' demographic information, such as gender, age, education, and income.

3.2 | Participants and data collection

Data collection was conducted using an online survey method via Amazon Mechanical Turk (Mturk). Mturk is a crowd-sourcing platform that has been widely applied by researchers for collecting empirical data (Buhrmester et al., 2011). Although the non-probability sampling approach of Mturk may limit the sample's representativeness of the general population (Sue & Ritter, 2012), the sample collected from Mturk is known for its diverse population pool and reliability as compared with other convenience sampling methods (Buhrmester et al., 2011; Mason & Suri, 2012). As a next step, the survey link was posted on the Mturk website only for individuals who were 18 years or older living in the United States. Participants read an informed consent before starting the questions, and those who successfully completed the survey were given a monetary reward ($.75). In particular, data were collected during the peak of the second wave (July 16 to July 19, 2020), in which there were averagely more than 65,000 confirmed COVID-19 cases in the United States daily (Centers for Disease Control and Prevention, 2020).

As a result, a total of 608 individuals participated in this study with 61.5% females ($n = 377$) and 38.5% males ($n = 236$). The average age of participants is 37.19 ($SD = 10.55$) years old, and most of them hold a college or university degree ($n = 448$, 73.1%). In addition, with regard to the combined annual household income, most respondents fell in the category of US40,000–US$59,999 (39.4%, $n = 241$).

3.3 | Data analysis

First, because the data were collected from self-report questionnaires at a one-time point, common method bias needs to be considered and examined (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003). Harman's one-factor test was conducted, and results showed that the common factor explains less than 50% in the exploratory factor analysis. Also, the confirmatory factor analysis (CFA) results show that the one-factor model does not fit the data very well ($\chi^2 = 1091.622$, $df = 65$, $p = .000$, CFI = 0.761; RMSEA = 0.161). These results indicate that the common method bias is not an issue in this study.

Next, data analysis was employed by partial least squares-structural equation modeling (PLS-SEM) using SmartPLS 3.0 (Ringle et al., 2015). Aligning with the guidelines of Hair et al. (2017), the PLS-SEM analysis was employed in two stages. First, the measurement model was evaluated by its reliability and validity. Second, the structural model was examined for hypothesized relationships in the research model. In particular, the PLS algorithm followed by bootstrapping sampling (2000 resample) was employed to determine factor loadings, path coefficients, and their respective significance levels.

In addition, moderated-mediation analysis for the indirect effect of COVID-19 perception on impulse buying behavior through fear was examined by using the SPSS PROCESS macro (Model 59; Hayes, 2017). Applying the SPSS PROCESS macro can provide statistical evidence on the conditional indirect effect in the research model. The statistical significance of the moderated-mediation effects, were estimated by using the 95% bias-corrected confidence interval (5000 samples). The significant moderated-mediation effect was established if the confidence interval did not contain zero (Hayes, 2017).

4 | RESULTS

4.1 | Measurement model assessment

Following the guideline of Hair et al. (2017), the measurement model was evaluated by (1) internal consistency reliability, (2) convergent validity [factor loading and average variance extracted (AVE)], and (3) discriminant validity [Heterotrait-Monotrait-Ratio (HTMT)]. First, internal consistency reliability was evaluated by Cronbach's alpha coefficients and composite reliability (CR). As reported in Table 1, Cronbach's alpha coefficients ranged from .810 to .901, and CR values ranged from .874 to .922, indicating adequate internal consistency reliability (Hair et al., 2017). Second, convergent validity was supported as all items revealed high and significant factor loadings, ranging from .727 to .907, and AVE values for all measures surpassed the recommended value of 0.5 (Hair et al., 2017). Third, discriminant validity was established as the HTMT values were lower than the conservative threshold value (0.85; Henseler et al., 2015; Table 2).

4.2 | Structural model assessment

Prior to testing the hypotheses, the multicollinearity of the structural model was examined by the variance inflation factor (VIF). It showed that all VIF values were lower than the suggested value (3.3), indicating no critical levels of collinearity and absence of common method bias (Kock, 2017). The structural model assessment showed that the model indicated moderate to substantial explanatory capacity as it explained

TABLE 1 Psychometric properties of the measures

Constructs/items	Factor loadings
Perception of COVID-19 ($M = 5.640$, $SD = 1.032$, $\alpha = .810$, $CR = 0.874$, $AVE = 0.635$)	
It is dangerous to go out because of COVID-19.	0.790
COVID-19 is a very frightening disease.	0.801
Compared to SARS and Influenza A (H1N1), COVID-19 is more dangerous.	0.770
I am afraid of COVID-19.	0.826
Fear ($M = 5.006$, $SD = 1.306$, $\alpha = .901$, $CR = 0.922$, $AVE = 0.628$)	
I am most afraid of COVID-19.	0.711
It makes me uncomfortable to think about COVID-19.	0.727
My hands become clammy when I think about COVID-19.	0.833
I am afraid of losing my life because of COVID-19.	0.805
When watching news and stories about COVID-19 on social media, I become nervous or anxious.	0.806
I cannot sleep because I'm worrying about getting COVID-19.	0.798
My heart races or palpitates when I think about getting COVID-19.	0.857
Impulse buying behavior ($M = 5.016$, $SD = 1.409$, $\alpha = .736$, $CR = 0.883$, $AVE = 0.790$)	
I ended up spending more money than I originally set out to spend.	0.871
I bought more than I had planned to buy.	0.907

TABLE 2 Discriminant validity (HTMT)

Constructs	1	2	3
1. Perception			
2. Fear	0.665		
3. Impulse buying behavior	0.745	0.419	

34.0% of the variance of fear and 37.6% of impulse buying behavior (Chin, 1998). Moreover, the results of path coefficients, standard deviations (*SD*), and *t*-values for each path were reported in Table 3. First, perception had no significant influence on impulse buying behavior ($\beta_{\text{Perception} \rightarrow \text{IBB}} = -.045$, $t = 0.823$, $p = .411$), and therefore H1 was not supported. Moreover, perception had a positive influence on fear ($\beta_{\text{Perception} \rightarrow \text{Fear}} = .583$, $t = 16.746$, $p < .001$), supporting H1. Finally, fear was positively associated with impulse buying behavior ($\beta_{\text{Fear} \rightarrow \text{IBB}} = .639$, $t = 12.032$, $p < .001$), supporting H3. In addition, the effect of gender as a control variable was tested on endogenous variables (i.e., fear and impulse buying behavior). The results showed that gender had no impact on fear ($\beta = -.015$, $t = 0.459$, $p = .646$) and impulse buying behavior ($\beta = -.044$, $t = 1.343$, $p = .646$), indicating the relationships between variables were not affected by gender.

4.3 | Mediating effect of fear

In order to investigate the mediating effect of fear, mediation analysis was conducted following the guideline of Nitzl et al. (2016). The first step is to examine the significance of the indirect effect ($a \times b$). If the indirect effect is significant, the second step was to assess the significance of the direct effect (c') to determine the type of mediation (Nitzl et al., 2016; Zhao et al., 2010). As reported in Table 3, it was found that the indirect effect ($a \times b$) between the perception of COVID-19 and impulse buying behavior was significant ($p <$. 001), indicating the existence of mediation (Nitzl et al., 2016; Zhao et al., 2010). As the direct effect (c') was not significant, it indicated the indirect-only mediation (i.e., full mediation) in the research model (Nitzl et al., 2016; Zhao et al., 2010).

4.4 | Moderating effect of income

In order to test of moderating effect of fear in the research model, the product indicator approach was employed by multiplying the predictor and moderator to create interaction constructs (Ramayah et al., 2018). More specifically, two interaction constructs (perception of COVID-19 $\times$ Income and fear $\times$ Income) were created and used to examine the impacts of fear and impulse buying behavior. As presented in Table 3, it was found that the estimated path coefficient for the moderating effect of income on the relationship between fear and impulse buying behavior ($\beta_{\text{Fear} \times \text{Income} \rightarrow \text{IBB}} = -.149$, $t = 3.433$, $p < .01$), therefore H5c was supported (Figure 2).

4.5 | Moderated-mediation effect

Further above moderation analysis, moderated-mediation analysis was conducted to examine the indirect effect of perception of COVID-19 on impulse buying behavior (through fear). In particular, it examined the indirect effect at representative values of the moderator (i.e., conditional direct effect) for further investigating the conditions (i.e., low, medium, and high) under which mediation does (not) exist (Hayes, 2017; Preacher et al., 2007). As shown in Table 4, the conditional indirect effect of perception of COVID-19 is significant and stronger at the lower level of income ($\beta = .698$, SE = .082 [.534, .859]) and significant and weaker at the higher level of income ($\beta = .453$, SE = 0.075 [0.325, 0.618]). It indicates that the indirect effect of perception of COVID-19 on impulse buying behavior was stronger in the condition of a lower level of income.

5 | DISCUSSION

The outbreak of COVID-19 has significantly changed consumers' consumption habits. This study attempted to address the trend of the increasing impulsive consumption of fitness products and to explore the factors influencing individuals' impulse buying behavior. Grounded

TABLE 3 Results of hypotheses testing

	Standardized coefficient (β)	Standard deviation	*t*-Value	Conclusion
Direct effect				
Perception of COVID-19 → Impulse buying behavior	−.045	0.055	0.832	H1; not supported
Perception of COVID-19 → Fear	.583	0.035	16.746***	H2; supported
Fear → Impulse buying behavior	.639	0.053	12.032**	H3; supported.
Indirect effect				
Perception of COVID-19→ Fear → Impulse buying behavior	.372	0.044	8.534***	H4; supported.
Moderating effect				
Perception of COVID-19 × Income → Impulse buying behavior	.044	0.045	0.979	H5a; not supported.
Perception of COVID-19 × Income → Fear	−.051	0.038	1.336	H5b; not supported.
Fear×Income → Impulse buying behavior	−.149	0.043	3.433**	H5c; supported.

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

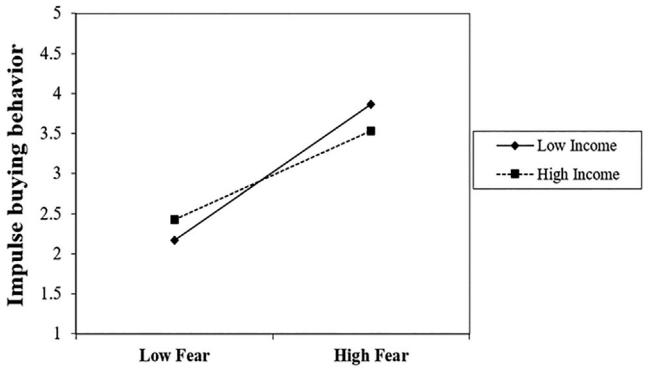

FIGURE 2 A moderating effect of income on the relationship between fear and impulse buying behavior

by the S-O-R model (Mehrabian & Russell, 1974), this study developed a moderated mediation model to examine the relationships between the perception of COVID-19, fear, and impulse buying behavior of fitness products, and moderating effect in the above relationships. First, this study found that perception of COVID-19 had a positive influence on fear. It is not surprising that individuals' perception of COVID-19 positively leads to their fear. Due to the uncertainty of the COVID-19 pandemic situation, individuals may be scared of themselves and their loved ones getting COVID-19, as there are no available remedies or vaccines for curing or preventing the disease (Mertens et al., 2020). Also, individuals may feel a lower level of controllability and a strong sense of hopelessness under the COVID-19 pandemic, which instill negative emotions, such as anxiety, fear, and stress (Asmundson & Taylor, 2020; Fitzpatrick et al., 2020; Lerner & Keltner, 2000). Therefore, when individuals perceive the severity of the COVID-19 pandemic, such as the increasing confirmed cases, they reveal higher levels of fear and worry.

Moreover, it was found that fear positively affects individuals' impulse buying behavior of fitness products. The positive association between fear and impulse buying behavior is consistent with previous empirical studies (Lin & Chen, 2012; Liu et al., 2019; Silvera et al., 2008; Verplanken et al., 2005). The extant literature primarily emphasized the role of positive emotions (e.g., excitement, happiness, and joy) in triggering impulsive consumption (Kalla & Arora, 2010). However, two meta-analyses of impulse buying found that individuals' negative moods are positively associated with impulse buying behavior (Amos et al., 2014; Iyer et al., 2020). Verplanken et al. (2005) also argued that negative emotions are "darker motives" (p. 430), which reinforce consumers' intention to purchase impulsively. Further, when an individual is in a negative mood state, impulse buying behavior acts as a self-regulatory mechanism to seek distractions and reduce the negative feelings (Atalay & Meloy, 2011; Gardner, 1985; Verplanken et al., 2005). In this study, consumers' impulse buying of fitness products functions to alleviate their fear of the COVID-19 pandemic. That is, the degree of fear that consumers experience during the COVID-19 pandemic may facilitate their impulsive consumption of fitness products, which helps them cope with their fear due to the anticipated benefits of using fitness products.

However, it should be noted that the direct effect of the perception of COVID-19 on consumers' impulse buying behavior was not found. It may be attributed to the mediating effect of fear on this relationship. In other words, the impact of the perception of COVID-19 on impulse buying behavior of fitness products is not merely an input–output relationship. Instead, this causal relationship is mediated by the degree of fear about COVID-19, indicating the importance of mediating effect of fear. More specifically, consumers' impulse buying behavior is determined by the degree of fear, which is instilled by the perception of COVID-19. This finding is consistent with the results of a meta-analysis, which confirm that negative mood states mediate and explain the affective and cognitive psychological processes

TABLE 4 Result of conditional indirect effect (perception of COVID-19 → fear → impulse buying behavior)

Moderator value	Conditional indirect effect	Bootstrap SE	Bootstrap LLCI	Bootstrap ULCI
2.0728 (−1 *SD*)	0.698	0.082	0.534	0.859
4.2833 (Mean)	0.569	0.060	0.458	0.690
6.5035 (+1 *SD*)	0.453	0.075	0.325	0.618

Abbreviations: LLCI, lower level confidence interval; *SD*, standard deviation; *SE*, standard error; ULCI, upper level confidence interval.

associated with impulse buying behavior (Iyer et al., 2020). Therefore, not only the perception of COVID-19 but also the negative affect (i.e., fear) about the COVID-19 are critical for triggering consumers' impulsive purchase decisions of fitness products.

An additional purpose of this study was to explore the moderating effect of income in the research model. The results showed that the income level significantly and negatively moderated the relationship between fear and impulse buying behavior. Moreover, the moderated mediation analysis showed that the income level also negatively moderated the indirect effect of perception of COVID-19 on impulse buying behavior. It indicates that the income level will weaken the influence of COVID-19 perception on individuals' fear, which leads to their impulse buying behavior. This finding may be due to the buffering power of money against stressful and threatening situations (Kesebir & Hong, 2008). During threatening situations, individuals with a higher income level may be more capable of coping with negative emotions, such as fear, anxiety, stress, and worry (Li et al., 2016; Ross & Mirowsky, 1992). Therefore, individuals with higher income levels would rely more on their cognitive processes and are less likely to make an impulse buying decision (Gneezy & Imas, 2015). On the other hand, individuals with lower income levels may lack a sense of control and feel scared of the COVID-19 pandemic, and therefore, they would be more vulnerable to make impulse purchase decisions (Gneezy & Imas, 2015).

5.1 | Theoretical implications

The findings of this study contribute to important theoretical advancements. Past research has applied the S-O-R model (Mehrabian & Russell, 1974) to explain consumer behavior in various contexts (e.g., Kaur et al., 2017). However, to the best of our knowledge, this study is one of the first few studies that adopt the S-O-R model in the context of pandemics (Brewer & Sebby, 2021; Islam et al., 2021; Laato et al., 2020; Pandita et al., 2021). In this study, we employed the perception of COVID-19 as stimuli, fear as the organism, impulse buying behavior as behavioral responses. The findings of this study conclude that the S-O-R model is a useful and robust framework explaining consumer behavior in the context of the COVID-19 pandemic.

Second, it addressed an under-researched topic (i.e., impulse buying behavior) amid the COVID-19 pandemic. So far, there is limited understanding of why individuals engage in impulse buying during the COVID-19 (Naeem, 2020). The findings of this study highlight the critical role of fearful emotions in impulse buying behavior. Past research has identified that fearful emotions are regarded as a determinant of behavioral change in health-related issues (Kok et al., 2018). Therefore, the fear emotions evoked by the COVID-19 pandemic can trigger impulsive buying. Moreover, because home fitness products are critical for the consumer to stay active and healthy during the COVID-19 pandemic, consumers are more likely to be influenced by the perception of COVI-19 and engage in impulse buying behavior (Naeem, 2020). The findings gain a better understanding of consumers' impulse buying behavior of fitness products amid the COVID-19 pandemic.

Third, this study identified the moderating role of income in the relationship between fear and impulse buying behavior by extending the S-O-R framework. It has been proposed and examined that the S-O-R framework can work together with another psychological system of individuals in tandem (Fiore & Kim, 2007; Jacoby, 2002). While various individual differences can afford or limit the operation of the S-O-R (Chang et al., 2011), we specifically propose income to be a moderating factor as a critical resource for the COVID-19 situation. Under the threatening situation (e.g., inflation), a lack of material resources, such as income, can make people more vulnerable, leading to extreme responses (Pitesa & Thau, 2014). Previous studies have found that individuals' responses to the COVID-19 situation would be varied by the income level (Asmundson et al., 2020; Fu et al., 2020; Weill et al., 2020). However, how income level moderates consumers' impulse buying is still unclear. While both cognition and affect play roles in the relationship between the stimulus and the response (Kim & Lennon, 2013), the dominant role of affect in the impulsive purchase response is likely to be pronounced among those who lack resources to fight against the threat of the COVID-19. By identifying the impacts of the stimulus (i.e., perception of COVID-19) on the emotion of organisms (i.e., fear) and further on impulse buying within the S-O-R framework, this finding further underscores how resources in terms of income level drive the dominance of emotion in driving response of impulsive purchase. Adding to extant research that has integrated the individual factors to the S-O-R framework (Chang et al., 2011; Fiore & Kim, 2007), the present research sheds light on a critical role of income that constrains response of organisms.

5.2 | Practical implications

The findings of this study also offer several practical implications for marketers during the COVID-19 pandemic. First, due to the surge of impulse buying behavior of fitness products during the COVID-19

pandemic, sport retailers need to promote and emphasize the healthy benefits of fitness products. Doing so can trigger consumers' impulse buying intention of fitness products, which can help them maintain healthily and be active during the COVID-19 pandemic. Also, individuals' fear plays a critical role in the decision-making of impulse purchases. As such, marketing strategies need to be customized according to the recent situations of COVID-19, such as confirmed cases, measures, and policies.

Second, as sport consumers spend more time staying at home and shop more online, e-commerce retailers need to create more opportunities for social interactions online. For example, e-commerce retailers can launch live-streaming workout lessons for consumers to engage in physical activities at home. Consumers may understand the importance of regular exercise during the COVID-19 pandemic and, therefore, purchase more fitness products for home workouts. According to Naeem (2020), social media interactions among consumers enhance fear and uncertainty, which facilitate their impulse buying behavior. Therefore, sport retailers need to pay attention to inventory management, especially when home fitness products are highly demanded during the COVID-19 pandemic.

In addition, the moderating effect of income on the relationships between fear and impulse buying suggests the market segmentation of sport consumers during the COVID-19 pandemic. Sport retailers must customize marketing strategies to fulfill different needs and wants from targeted customers under the threatening situation. Our findings reveal that consumers with different income levels have different tendencies of impulse purchases of fitness products under the COVID-19 pandemic. Therefore, marketers have to target specific segments with different pricing strategies. In a fearful environment, price discounts may play a useful tool to attract consumers' attention. While consumers with different income levels may respond differently, and they also differ in terms of levels of disposable income, pricing strategies need to vary for high-end and/or low-end fitness products based on targeting different segments. Also, while consumers with high income are less likely to exhibit impulsive purchase of fitness products due to their pandemic perception and low susceptibility to the impact of emotions such as fear, marketers of fitness products may pursue opportunities to attract their non-impulsive purchase of fitness items by adopting cognitive appeals. Also, even high-income consumers group might be prompted to make an impulsive purchase by persuasive messages that highlight the infrequency of their impulsive purchase, which is known to increase indulgent consumption among non-impulsive consumers (May & Irmak, 2018).

5.3 | Limitations and future research

Despite the valuable and timely implications during the COVID-19 pandemic, this study is not without limitations. First, it should be noted that individuals' perceptions of COVID-19 and fear are not stable states and may change over time due to the trend of confirmed cases and the number of deaths caused by COVID-19. Therefore, future studies should include the information of confirmed cases when respondents participated in the survey and consider the longitudinal research design in order to better understand the influences of perception and fear on impulse buying behavior. Second, the perception of COVID-19 has significantly affected consumers' psychological and emotional states. Therefore, future studies may consider more variables that can influence consumers' consumption patterns, such as nostalgia (Cho, 2021; Cho et al., 2020; Cho, Chiu, et al., 2021; Cho, Joo, et al., 2019; Cho, Khoo, et al., 2019; Cho, Lee, et al., 2021), anxiety (Lee, 2020), and stress (Taylor et al., 2020), to explore their impacts on purchase behavior. Third, as the income level was found to be the moderator in this study, other factors, such as age, online/offline consumption, and knowledge levels about vaccinations may be taken into consideration for future research. Last but not least, it should be noted that the data were collected from the United States, which is one of the countries seriously affected by COVID-19. Therefore, future studies should take more countries into consideration to understand how the pandemic of COVID-19 affects sport consumer behavior globally.

6 | CONCLUSION

With the aim to understand consumers' impulse buying behavior of home fitness products in a time of abnormality and uncertainty (i.e., COVID-19 pandemic), this study explores the relationship between consumers' perception of COVID-19 and impulse buying behavior through fear. Moreover, the moderating effect of income level was examined. The findings of this study provide timely and insightful contributions to the extant literature on the impact of COVID-19 on sport consumer behavior. Aligning with the S-O-R model (Mehrabian & Russell, 1974), the situation of the COVID-19 pandemic serves as the external stimuli, which trigger individuals' negative emotional responses (e.g., fear; Kumar & Nayar, 2020). Further, consumers' fear about the COVID-19 leads to the impulse buying behavior of fitness products. Specifically, this study identified the mediating role of fear in the relationship between perception of COVID-19 and impulse buying behavior. Further, the moderating effect of income was found to undermine the positive relationship between fear and impulse buying behavior, highlighting the condition under which the role of organisms' emotion, rather than their cognition, is dominant in generating responses in the S-O-R framework. The findings of this study contribute to a better comprehension of how COVID-19 triggers consumer impulse buying behavior through fearful emotion and how income level moderates the influence of fear on impulse buying behavior. In addition, this study provides insights for sport retailers to promote fitness products and design customized marketing strategies for different segments.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Weisheng Chiu https://orcid.org/0000-0002-8090-5082

Heetae Cho https://orcid.org/0000-0002-8927-9743

REFERENCES

Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction*. , https://doi.org/10.1007/s11469-020-00270-8

Amos, C., Holmes, G. R., & Keneson, W. C. (2014). A meta-analysis of consumer impulse buying. *Journal of Retailing and Consumer Services*, *21*(2), 86–97. https://doi.org/10.1016/j.jretconser.2013.11.004

Asmundson, G. J., Paluszek, M. M., Landry, C. A., Rachor, G. S., McKay, D., & Taylor, S. (2020). Do pre-existing anxiety-related and mood disorders differentially impact COVID-19 stress responses and coping? *Journal of Anxiety Disorders*, *74*, 102271. https://doi.org/10.1016/j.janxdis.2020.102271

Asmundson, G. J., & Taylor, S. (2020). Coronaphobia: Fear and the 2019-nCoV outbreak. *Journal of Anxiety Disorders*, *70*, 102196.

Atalay, A. S., & Meloy, M. G. (2011). Retail therapy: A strategic effort to improve mood. *Psychology & Marketing*, *28*(6), 638–659.

Balram, S. (2020). Covid-19 impact: E-commerce gives a big boost to home fitness accessories as gyms remain shuttered. *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/industry/services/retail/covid-19-impact-e-commerce-gives-a-big-boost-to-home-fitness-accessories-as-gyms-remain-shuttered/articleshow/76574746.cms?from=mdr

Brewer, P., & Sebby, A. G. (2021). The effect of online restaurant menus on consumers' purchase intentions during the COVID-19 pandemic. *International Journal of Hospitality Management*, *94*, 102777. https://doi.org/10.1016/j.ijhm.2020.102777

Brown, T. S., & Walensky, R. P. (2020). Serosurveillance and the COVID-19 epidemic in the US: Undetected, uncertain, and out of control. *JAMA*, *324*(8), 749–751. https://doi.org/10.1001/jama.2020.14017

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's mechanical Turk: A new source of inexpensive, yet high-quality data? *Perspectives on Psychological Science*, *6*(1), 3–5. https://doi.org/10.1177/1745691610393980

Cain, S. L. (2020). *Slickdeals survey: Americans are spending more during the coronavirus pandemic*. Retrieved from https://slickdeals.net/article/news/pandemic-impulse-spending-survey-2020/

Cannon, C., Goldsmith, K., & Roux, C. (2019). A self-regulatory model of resource scarcity. *Journal of Consumer Psychology*, *29*(1), 104–127.

Centers for Disease Control and Prevention. (2020). *Coronavirus disease 2019 (COVID-19)*. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html

Chan, T. K. H., Cheung, C. M. K., & Lee, Z. W. Y. (2017). The state of online impulse-buying research: A literature analysis. *Information & Management*, *54*(2), 204–217. https://doi.org/10.1016/j.im.2016.06.001

Chang, H.-J., Eckman, M., & Yan, R.-N. (2011). Application of the stimulus-organism-response model to the retail environment: The role of hedonic motivation in impulse buying behavior. *The International Review of Retail, Distribution and Consumer Research*, *21*(3), 233–249. https://doi.org/10.1080/09593969.2011.578798

Chen, C.-Y., Lin, Y.-H., & Chang, W.-M. (2013). Impulsive purchasing behavior for professional sports team-licensed merchandise—From the perspective of group effects [article]. *Sport Marketing Quarterly*, *22*(2), 83–91 Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=88992066&site=ehost-live

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, *295*(2), 295–336.

Cho, H. (2021). How nostalgia forges place attachment and revisit intention: A moderated mediation model. *Marketing Intelligence & Planning*, *39*(6), 856–870.

Cho, H., Chiu, W., & Tan, X. D. (2021). Travel overseas for a game: The effect of nostalgia on satellite fans' psychological commitment, subjective well-being, and travel intention. *Current Issues in Tourism*, *24*(10), 1418–1434.

Cho, H., Joo, D., Moore, D., & Norman, W. C. (2019). Sport tourists' nostalgia and its effect on attitude and intentions: A multilevel approach. *Tourism Management Perspectives*, *32*, 100563.

Cho, H., Joo, D., & Woosnam, K. M. (2020). Sport tourists' team identification and revisit intention: Looking at the relationship through a nostalgic lens. *Journal of Hospitality & Tourism Research*, *44*(6), 1002–1025.

Cho, H., Khoo, E. C., & Lee, H. W. (2019). Nostalgia, motivation, and intention for international football stadium tourism. *Asia Pacific Journal of Tourism Research*, *24*(9), 912–923.

Cho, H., Lee, H. W., & Chiu, W. (2021). Satellite fans: Does sport nostalgia influence purchase intention toward sponsors' products? *Journal of Retailing and Consumer Services*, *62*, 102653.

De Sutter, A., Llor, C., Maier, M., Mallen, C., Tatsioni, A., van Weert, H., Windak, A., & Stoffers, J. (2020). Family medicine in times of 'COVID-19': A generalists' voice. *European Journal of General Practice*, *26*(1), 58–60. https://doi.org/10.1080/13814788.2020.1757312

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, 284–289. https://doi.org/10.1016/j.jbusres.2020.06.008

Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L., Recchia, G., Van Der Bles, A. M., Spiegelhalter, D., & van der Linden, S. (2020). Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, *23*, 1–13.

Dwyer, M. J., Pasini, M., De Dominicis, S., & Righi, E. (2020). Physical activity: Benefits and challenges during the COVID-19 pandemic. *Scandinavian Journal of Medicine & Science in Sports*, *30*(7), 1291–1294.

Fiore, A. M., & Kim, J. (2007). An integrative framework capturing experiential and utilitarian shopping experience. *International Journal of Retail & Distribution Management*, *35*(6), 421–442. https://doi.org/10.1108/09590550710750313

Fitzpatrick, K. M., Drawve, G., & Harris, C. (2020). Facing new fears during the COVID-19 pandemic: The state of America's mental health. *Journal of Anxiety Disorders*, *75*, 102291.

Fu, W., Wang, C., Zou, L., Guo, Y., Lu, Z., Yan, S., & Mao, J. (2020). Psychological health, sleep quality, and coping styles to stress facing the COVID-19 in Wuhan, China. *Translational Psychiatry*, *10*(1), 1–9. https://doi.org/10.1038/s41398-020-00913-3

Gardner, M. P. (1985). Mood states and consumer behavior: A critical review. *Journal of Consumer Research*, *12*(3), 281–300.

Gneezy, A., & Imas, A. (2015). *Poverty as helplessness: How loss of control affects impulsivity and risk-taking*. ACR North American Advances.

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.

Hall, M. C., Prayag, G., Fieger, P., & Dyason, D. (2021). Beyond panic buying: Consumption displacement and COVID-19. *Journal of Service Management*, *32*(1), 113–128.

Hammami, A., Harrabi, B., Mohr, M., & Krustrup, P. (2020). Physical activity and coronavirus disease 2019 (COVID-19): Specific recommendations for home-based physical training. *Managing Sport and Leisure*, 1–6. https://doi.org/10.1080/23750472.2020.1757494

Harper, C. A., Satchell, L. P., Fido, D., & Latzman, R. D. (2020). Functional fear predicts public health compliance in the COVID-19 pandemic. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-020-00281-5

Hausman, A. (2000). A multi-method investigation of consumer motivations in impulse buying behavior. *Journal of Consumer Marketing*, *17*(5), 403–426. https://doi.org/10.1108/07363760010341045

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

Henseler, J., Ringle, C., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Islam, T., Pitafi, A. H., Arya, V., Wang, Y., Akhtar, N., Mubarik, S., & Xiaobei, L. (2021). Panic buying in the COVID-19 pandemic: A multi-country examination. *Journal of Retailing and Consumer Services*, *59*, 102357. https://doi.org/10.1016/j.jretconser.2020.102357

Iyer, G. R., Blut, M., Xiao, S. H., & Grewal, D. (2020). Impulse buying: A meta-analytic review. *Journal of the Academy of Marketing Science*, *48*(3), 384–404. https://doi.org/10.1007/s11747-019-00670-w

Jacoby, J. (2002). Stimulus-organism-response reconsidered: An evolutionary step in modeling (consumer) behavior. *Journal of Consumer Psychology*, *12*(1), 51–57. https://doi.org/10.1207/S15327663JCP1201_05

Jeffrey, S. A., & Hodge, R. (2007). Factors influencing impulse buying during an online purchase. *Electronic Commerce Research*, *7*(3–4), 367–379. https://doi.org/10.1007/s10660-007-9011-8

Johnson, W., & Krueger, R. F. (2006). How money buys happiness: Genetic and environmental processes linking finances and life satisfaction. *Journal of Personality and Social Psychology*, *90*(4), 680–691.

Kalla, S. M., & Arora, A. P. (2010). Impulse buying: A literature review. *Global Business Review*, *12*(1), 145–157. https://doi.org/10.1177/097215091001200109

Kaur, S., Lal, A. K., & Bedi, S. S. (2017). Do vendor cues influence purchase intention of online shoppers? An empirical study using SOR framework. *Journal of Internet Commerce*, *16*(4), 343–363. https://doi.org/10.1080/15332861.2017.1347861

Kesebir, P., & Hong, Y.-Y. (2008). The pain-buffering functions of money and social support: A motivational account. *Psychological Inquiry*, *19*(3–4), 196–198.

Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention. *Journal of Research in Interactive Marketing*, *7*(1), 33–56. https://doi.org/10.1108/17505931311316734

Klaviyo. (2020a). *COVID-19 ecommerce market pulse*. Retrieved from https://www.klaviyo.com/covid-19-daily-ecommerce-insights

Klaviyo. (2020b). *Covid-19 poll daily insights*. Retrieved from https://www.klaviyo.com/covid-19-daily-ecommerce-insights/marketing-consumer-insights-04092020

Kock, N. (2017). Common method bias: A full collinearity assessment method for PLS-SEM. In H. Latan & R. Noonan (Eds.), *Partial least squares path modeling: Basic concepts, methodological issues and applications* (pp. 245–257). Springer International Publishing.

Kok, G., Peters, G.-J. Y., Kessels, L. T., Ten Hoor, G. A., & Ruiter, R. A. (2018). Ignoring theory and misinterpreting evidence: The false belief in fear appeals. *Health Psychology Review*, *12*(2), 111–125. https://doi.org/10.1080/17437199.2017.1415767

Kumar, A., & Nayar, K. R. (2020). COVID 19 and its mental health consequences. *Journal of Mental Health*, *49*(4), 382–384. https://doi.org/10.1080/09638237.2020.1757052

Kwon, H. H., & Armstrong, K. L. (2002). Factors influencing impulse buying of sport team licensed merchandise. *Sport Marketing Quarterly*, *11*(3), 151–163.

Kwon, H. H., & Armstrong, K. L. (2006). Impulse purchases of sport team licensed merchandise: What matters? *Journal of Sport Management*, *20*(1), 101–119. https://doi.org/10.1123/jsm.20.1.101

Laato, S., Islam, A. N., Farooq, A., & Dhir, A. (2020). Unusual purchasing behavior during the early stages of the COVID-19 pandemic: The stimulus-organism-response approach. *Journal of Retailing and Consumer Services*, *57*, 102224. https://doi.org/10.1016/j.jretconser.2020.102224

Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, *74*(3), 763–773.

Lam, E. T. C., & Bae, J. (2014). Confirmatory factor analysis of the purchaser style inventory for sport products (PSISP). *Sport Management Review*, *17*(3), 254–264. https://doi.org/10.1016/j.smr.2013.08.003

Lazarus, R. S., & Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press on Demand.

Lee, C.-K., Song, H.-J., Bendle, L. J., Kim, M.-J., & Han, H. (2012). The impact of non-pharmaceutical interventions for 2009 H1N1 influenza on travel intentions: A model of goal-directed behavior. *Tourism Management*, *33*(1), 89–99. https://doi.org/10.1016/j.tourman.2011.02.006

Lee, S. A. (2020). Coronavirus anxiety scale: A brief mental health screener for COVID-19 related anxiety. *Death Studies*, *44*(7), 393–401.

Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition & Emotion*, *14*(4), 473–493.

Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146–159.

Li, B., Li, A., Wang, X., & Hou, Y. (2016). The money buffer effect in China: A higher income cannot make you much happier but might allow you to worry less. *Frontiers in Psychology*, *7*, 234.

Li, M., Zhao, T., Huang, E., & Li, J. (2020). How does a public health emergency motivate people's impulsive consumption? An empirical study during the COVID-19 outbreak in China. *International Journal of Environmental Research and Public Health*, *17*(14), 5019. https://doi.org/10.3390/ijerph17145019

Lin, Y.-H., & Chen, C.-Y. (2012). Adolescents' impulse buying: Susceptibility to interpersonal influence and fear on negative evaluation. *Social Behavior & Personality: An International Journal*, *40*(3), 353–358. https://doi.org/10.2224/sbp.2012.40.3.353

Liu, P., He, J., & Li, A. (2019). Upward social comparison on social network sites and impulse buying: A moderated mediation model of negative affect and rumination. *Computers in Human Behavior*, *96*, 133–140. https://doi.org/10.1016/j.chb.2019.02.003

MacKenzie, S. B., & Podsakoff, P. M. (2012). Common method bias in marketing: Causes, mechanisms, and procedural remedies. *Journal of Retailing*, *88*(4), 542–555. https://doi.org/10.1016/j.jretai.2012.08.001

Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty impedes cognitive function. *Science*, *341*(6149), 976–980.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's mechanical Turk. *Behavior Research Methods*, *44*(1), 1–23. https://doi.org/10.3758/s13428-011-0124-6

Mattila Anna, S., & Wirtz, J. (2008). The role of store environmental stimulation and social factors on impulse purchasing. *Journal of Services Marketing*, *22*(7), 562–567. https://doi.org/10.1108/08876040810909686

May, F., & Irmak, C. (2018). The effects of rarity on indulgent consumption: Non-impulsives indulge when low frequency is salient. *Journal of Consumer Research*, *45*(2), 383–402. https://doi.org/10.1093/jcr/ucy001

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. MIT Press.

Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in march 2020. *Journal of Anxiety Disorders*, *74*, 102258. https://doi.org/10.1016/j.janxdis.2020.102258

Moe, W. W. (2003). Buying, searching, or browsing: Differentiating between online shoppers using in-store navigational clickstream. *Journal of Consumer Psychology*, *13*(1–2), 29–39. https://doi.org/10.1207/S15327663JCP13-1&2_03

Mummalaneni, V. (2005). An empirical investigation of web site characteristics, consumer emotional states and on-line shopping behaviors. *Journal of Business Research*, *58*(4), 526–532.

Mutz, M., & Gerke, M. (2021). Sport and exercise in times of self-quarantine: How Germans changed their behaviour at the beginning of the Covid-19 pandemic. *International Review for the Sociology of Sport*, *56*(3), 305–316.

Naeem, M. (2020). Understanding the customer psychology of impulse buying during COVID-19 pandemic: Implications for retailers.

International Journal of Retail & Distribution Management., *49*, 377–393. https://doi.org/10.1108/IJRDM-08-2020-0317

Nitzl, C., Roldan Jose, L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. *Industrial Management & Data Systems*, *116*(9), 1849–1864. https://doi.org/10.1108/IMDS-07-2015-0302

Pakpour, A. H., & Griffiths, M. D. (2020). The fear of COVID-19 and its role in preventive behaviors. *Journal of Concurrent Disorders*, *2*(1), 58–63.

Pandita, S., Mishra, H. G., & Chib, S. (2021). Psychological impact of covid-19 crises on students through the lens of stimulus-organism-response (SOR) model. *Children and Youth Services Review*, *120*, 105783.

Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C. (2020). Competing during a pandemic? Retailers' ups and downs during the COVID-19 outbreak. *Journal of Business Research*., *116*, 209–213.

Pieh, C., Budimir, S., & Probst, T. (2020). The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *Journal of Psychosomatic Research*, *136*, 110186.

Pitesa, M., & Thau, S. (2014). A lack of material resources causes harsher moral judgments. *Psychological Science*, *25*(3), 702–710. https://doi.org/10.1177/0956797613514092

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*(1), 185–227. https://doi.org/10.1080/00273170701341316

Rahmati-Ahmadabad, S., & Hosseini, F. (2020). Exercise against SARS-CoV-2 (COVID-19): Does workout intensity matter? (a mini review of some indirect evidence related to obesity). *Obesity medicine*, *19*, 100245. https://doi.org/10.1016/j.obmed.2020.100245

Raifman, M. A., & Raifman, J. R. (2020). Disparities in the population at risk of severe illness from covid-19 by race/ethnicity and income. *American Journal of Preventive Medicine*., *59*, 137–139.

Ramayah, T., Hwa, C., Chuah, F., Ting, H., & Memon, M. (2018). PLS-SEM using SmartPLS 3.0: Chapter 13: Assessment of moderation analysis. In T. Ramayah, J. Cheah, F. Chuah, H. Ting, & M. A. Memon (Eds.), *Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: An updated guide and practical guide to statistical analysis*. Pearson.

Ranasinghe, C., Ozemek, C., & Arena, R. (2020). Exercise and well-being during COVID 19–time to boost your immunity. *Expert Review of Anti-Infective Therapy*, *18*(12), 1195–1200. https://doi.org/10.1080/14787210.2020.1794818

Ratten, V. (2020). Coronavirus disease (COVID-19) and sport entrepreneurship. *International Journal of Entrepreneurial Behavior & Research*, *26*(6), 1379–1388.

Research and Markets. (2020). Fitness equipment: COVID-19. Retrieved from https://www.researchandmarkets.com/issues/fitness-equipment-grows-170pct?utm_source=dynamic&utm_medium=BW&utm_code=m6djfc&utm_campaign=1386770+-+Fitness+Equipment+Sales+Grow+by+170%25+During+Coronavirus+Lockdown&utm_exec=joca220bwd

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). SmartPLS 3 Retrieved from http://www.smartpls.com

Rook, D. W. (1987). The buying impulse. *Journal of Consumer Research*, *14*(2), 189–199.

Rook, D. W., & Gardner, M. P. (1993). In the mood: Impulse buying's affective antecedents. *Research in consumer behavior*, *6*(7), 1–28.

Ross, C. E., & Mirowsky, J. (1992). Households, employment, and the sense of control. *Social Psychology Quarterly*, *55*, 217–235.

Schimmenti, A., Billieux, J., & Starcevic, V. (2020). The four horsemen of fear: An integrated model of understanding fear experiences during the COVID-19 pandemic. *Clinical Neuropsychiatry*, *17*(2), 41–45. https://doi.org/10.36131/CN20200202

Schnirring, L. (2020). *Pandemic total passes 21 million cases*. Retrieved from https://www.cidrap.umn.edu/news-perspective/2020/08/pandemic-total-passes-21-million-cases

Sheth, J. (2020). Impact of Covid-19 on consumer behavior: Will the old habits return or die? *Journal of Business Research*, *117*, 280–283. https://doi.org/10.1016/j.jbusres.2020.05.059

Silvera, D. H., Lavack, A. M., & Kropp, F. (2008). Impulse buying: The role of affect, social influence, and subjective wellbeing. *Journal of Consumer Marketing*, *25*(1), 23–33. https://doi.org/10.1108/07363760810845381

Sneath, J. Z., Lacey, R., & Kennett-Hensel, P. A. (2009). Coping with a natural disaster: Losses, emotions, and impulsive and compulsive buying. *Marketing Letters*, *20*(1), 45–60.

Sue, V. M., & Ritter, L. A. (2012). *Conducting online surveys* (2nd ed.). Sage Publication.

Sun, T., & Wu, G. (2011). Trait predictors of online impulsive buying tendency: A hierarchical approach. *Journal of Marketing Theory and Practice*, *19*(3), 337–346.

Taylor, S., Landry, C., Paluszek, M., Fergus, T. A., McKay, D., & Asmundson, G. J. (2020). Development and initial validation of the COVID stress scales. *Journal of Anxiety Disorders*, *72*, 102232. https://doi.org/10.1016/j.janxdis.2020.102232

Tull, M. T., Edmonds, K. A., Scamaldo, K., Richmond, J. R., Rose, J. P., & Gratz, K. L. (2020). Psychological outcomes associated with stay-at-home orders and the perceived impact of COVID-19 on daily life. *Psychiatry research*, *289*, 113098. https://doi.org/10.1016/j.psychres.2020.113098

Verplanken, B., Herabadi, A., Perry, J., & Silvera, D. (2005). Consumer style and health: The role of impulsive buying in unhealthy eating. *Psychology & Health - PSYCHOL HEALTH*, *20*, 429–441. https://doi.org/10.1080/08870440412331337084

Weill, J. A., Stigler, M., Deschenes, O., & Springborn, M. R. (2020). Social distancing responses to COVID-19 emergency declarations strongly differentiated by income. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(33), 19658–19660. https://doi.org/10.1073/pnas.2009412117

World Health Organization. (2020). *WHO announces COVID-19 outbreak a pandemic*. Author Retrieved from https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic

Xiao, S. H., & Nicholson, M. (2013). A multidisciplinary cognitive behavioural framework of impulse buying: A systematic review of the literature. *International Journal of Management Reviews*, *15*(3), 333–356. https://doi.org/10.1111/j.1468-2370.2012.00345.x

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197–206. https://doi.org/10.1086/651257

AUTHOR BIOGRAPHIES

Weisheng Chiu is an associate professor of Sport Management in the Lee Shau Kee School of Business and Administration at the Hong Kong Metropolitan University. His research interests primarily focus on sport tourists' behavior and marketing issues in the sport and tourism industry.

Ga-Eun (Grace) Oh is a research assistant professor at Lingnan University in Hong Kong. Her main research interests concern consumer self-control, nutrition labeling, food consumption, social influence, age perceptions, creativity, innovation, and sustainable consumption. Grace's work has appeared in journals such as *Journal of Business Research*, *International Journal of Hospitality Management*, and *Psychology and Health*.

Heetae Cho is an assistant professor in the Department of Physical Education and Sports Science at Nanyang Technological University. The primary focus of his research is to understand sport fan behavior, and a large part of his research is related to the concept of nostalgia in the contexts of sport, leisure, and tourism.

How to cite this article: Chiu, W., (Grace) Oh, G.-E., & Cho, H. (2022). Impact of COVID-19 on consumers' impulse buying behavior of fitness products: A moderated mediation model. *Journal of Consumer Behaviour*, *21*(2), 245–258. https://doi.org/10.1002/cb.1998