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COVID-19: fear appeal favoring purchase behavior towards personal protective equipment

COVID-19 (新冠肺炎): 恐惧诉求促进消费者个人防护用品的购买

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ABSTRACT

The 2019 novel coronavirus is a non-segmented positive-sense RNA virus belonging to the Coronaviridae-Nidovirales family. We examined the swings in purchase behavior following the outbreak of the COVID-19 in Wuhan, China, and across the world based on the theory of fear appeal. We gathered published statistics (suspected, confirmed, and fatality) on the COVID-19 alongside the purchase of personal protective equipment to examine the swings in online purchase behavior. With a serial mediated analysis, we established that fear appeal is associated with the sharp dynamics in the online purchase as related to the COVID-19. The results confirmed that fear appeal promotes social presence in anticipation of seeking affection, acceptance, and social information. This feeling is a precondition for developing e-loyalty, which promotes purchase behavior. Even though our variables might not be conclusive enough, we believe the findings are fundamental to understanding the swings in the purchase trend in this and any similar situations.

摘要

2019年的新型冠状病毒是一种非分节段阳性RNA病毒，属于冠状病毒—nidovirales家族。基于恐惧感理论，我们研究了中国武汉和世界各地COVID-19爆发后的购买行为的波动。我们收集了有关COVID-19的已发布统计数据（可疑，已确认和死亡）和个人防护用品的购买数据，以检查其在线购买行为的变化。经过一系列的中介分析，我们发现恐惧感与COVID-19有关的在线购买中的剧烈变化有关。研究结果证实，恐惧吸引力在寻求情感、接受和社会信息的预期中促进了社会存在感。这种感觉是发展电子忠诚度的先决条件，从而促进了购买行为。即使我们的变量可能无法得出足够的结论，我们相信研究结果对于了解这种情况和任何类似情况下的购买趋势波动至关重要。

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Introduction

Purchase behavior is an extensively recognized phenomenon in marketing research. Significant academic investigation has been directed to identify the fostering antecedents. Many of these research works pointed to the fact that planned (conscious) or impulse (subconscious) buying behavior is greatly influenced by emotional or hedonic and utilitarian motivations (Leverin & Liljander, 2004; Yu & Bastin, 2010). Many other previous studies investigating customers' behavior also identified perceptions, attitudes, and motivation as significant influencers on customers' values (Güler, 2014; Haq & Abbasi, 2016).

Existing studies explored the impact of hedonic and utilitarian shopping motives mainly as mediators (Haq & Abbasi, 2016) or moderators (Koparal & Çalik, 2015). Others studied these factors as direct and independent influencers on purchase behavior (Pöyry et al., 2013; Yu & Bastin, 2010). Other studies are examining the role of hedonic encounters as a single and 'double' (Haq & Abbasi, 2016) mediator explaining impulsive behavior evidenced in the importance of these antecedents in purchasing. However, most of the works mentioned focused on product-related and the positive aspects of hedonic and utilitarian motives and not as external factors.

The product-related definition of these antecedents motivated hedonic consumption to be considered as that which is related to 'the multi-sensory, fantasy, and emotive aspects of one's experience with products' (Hirschman, 1980). Here pleasure and peace of mind in making purchase decisions, shopping enjoyment from positive emotions (Foroughi et al., 2013; Mogilner et al., 2012) were the key influencers. One study attempted the 'negative' hedonic impact on purchases. Unfortunately, it focused on assumptions and perceptions of economic crises (Boutsouki, 2019) but not on the actual events that could cause a negative hedonic motive.

The current study, however, presents the opposite of what dominated contemporary literature and focuses on life-saving purchase decision 'buying out of fear (hedonic) and necessity (utilitarian). We studied the dynamics in consumer/purchase behavior in the wake of the deadly 2019 novel coronavirus in Wuhan, China, known as the COVID-19.

Product supply is susceptible to oscillatory behavior when faced with abrupt changes in demand, such as panic buying and stockpiling (Upton & Nuttall, 2014). Consumers' panic buying has the potentials to exaggerates the consequences of supply disruption (Peels et al., 2009). Abnormally high demand leads to substantial stock-outs, increasing-price, and the possible quota buying imposition. The rapid escalation of the COVID-19 epidemic has caused the affected population and the world at large to raid shops. Countries like Singapore (INSEAD, 2020) and Australia (BBC, 2020), among others, have been hit with panic buying and stockpiling of PPEs, food items and general household supplies, despite there being no indication of the impending shortage. Panic buying, in general, increases consumer anxiety about supply shortage and make panic buying even worse (Allon & Bassamboo, 2011). Frontline health workers, critical care nurses, and the vulnerable are particularly at risk of the scarcity of essential items and everyday consumables (BBC, 2020).

It is imperative to understand the trend and impacts of the COVID-19 pandemic on panic buying. It is even more crucial to understand this trend from an online and social commerce dimension due to the lockdown of offline shops and restrictions on human-human contacts and social interaction. The current paper, besides being among the very first studies to focus on both hedonic and utilitarian motives of buying in times of

crisis (COVID-19), it highlights the important association between the antecedents (fear appeal, social presence, e-loyalty, and purchase behavior) in live streaming product experience platforms. We specifically brought back an almost-forgotten theory (fear appeal) to explain panic buying in social commerce: a subclass of e-commerce that encompasses social and online media that supports social interaction, and stakeholders' contributions to aid online buying and selling (marketing) of products and services. This study will serve as a template and a frontier in marketing and e-commerce research across the globe following the continuous global spread and threats posed by the COVID-19 and any similar crisis.

Background to coronavirus and the COVID-19

Coronaviruses (Coronaviridae) are non-segmented positive-sense RNA viruses belonging to the Coronaviridae family under the order Nidovirales (Drosten et al., 2003; Ksiazek et al., 2003). Earlier versions of the Coronaviridae virus include but not limited to severe acute respiratory syndrome coronavirus (SARS-CoV) (Drosten et al., 2003) and what was known as the Middle East respiratory syndrome coronavirus (MERS-CoV) (Zaki et al., 2012). Even though these viruses are known to have existed among animals, most human coronavirus infections are relatively mild. The previous versions claimed more than 1000 lives out of the 10000 cases recorded, and the highest fatality was recorded in China. China, thus, seems to be a preferred holiday destination for the nCoV family (WHO, 2004). Even though the SARS-CoV and the MERS-CoV were finally contained, recent developments are an indication that what was seen and previously known as just the smokes has enormous fire underneath.

A recent outbreak of the case of chronic pneumonia cases in the Chinese Wuhan city of the Hubei province has been a center of attention globally. The unknown virus was first detected in December 2019 and subsequently identified as the 2019 novel coronavirus (COVID-19), based on the symptoms and the laboratory test results (Huang et al., 2020).

As of March 22, 2020, the global COVID-19 statistics stood at 32542 new diagnosed cases, 253253 cumulative cases, 89408 cured, and 10431 deaths. Out of this, there are 5566 active cases in China with 136 new suspected, 3276 deaths, 2622 existing severe cases, 81694 cumulative cases, and 72852 cured cases. Europe recorded 16412 new diagnoses, 193237 cumulative cases, 13427 cured, and 10295 death cases, with Italy been the hardest hit. Other Asian countries besides China recorded 1222, 44970, 12651, and 2154; North America had 653, 44895, 196, 541, South America with 0, 4186, 24, 53, of new diagnosis, cumulative, cured and death cases respectively. Others include Africa with 276, 1772, 163, 56; Oceania with 0, 1898, 88, 7, and cruise ships with 0, 712, 551, and 10 cases of a new diagnosis, cumulative, healed and death cases respectively (Baidu, 2020).

Currently, besides the very few known studies in areas of epidemiological, clinical characteristics, treatment, and clinical outcomes of confirmed cases infected with COVID-19 (Cortegiani et al., 2020; Huang et al., 2020; Li et al., 2020), there are no known studies on the implication for marketing, and the socio-economic impact of the human infection of the 2019 novel coronavirus (COVID-19). In this study, we present how 'fear appeal'; a negative hedonic feeling has impacted sales and purchase of selected items. Based on published symptoms and the prevention measures, thus, we expected a drastic swing in online consumer behavior from the known high purchasing of apparels

(clothes) and baby products (Kim & Forsythe, 2010) often seen in online sales to COVID-19 personal protective equipment (PPE).

We sampled PPEs, such as masks, hand sanitizers, thermometers, disposable gloves, and alcohol-based cleaning wipes based on the preventive measures announced by the National Health Commission of the People's Republic of China (PRC) (NHC, 2020). Two primary sources of data were used. We sampled purchase data from live-streaming consumer experience platforms and the daily statistics of suspected, confirmed, and fatal cases to investigate how social presence characteristics of live-streaming mediates user needs and purchase behavior.

Fear appeal and purchase behavior

Beyond the reality of the deadly COVID-19, is the 'fear' factor powered by hedonic and utilitarian motives. The theory of fear appeal has dominated marketing research in the past but appears to be neglected in recent times (Witte & Allen, 2000). Fear appeals are persuasive messages designed to communicate facts or to scare individuals by resenting or exaggerating terrible outcomes of neglecting a specific caution (Witte, 1992). Marketers often use this technique intelligently to persuade customers to buy their products (Mcdaniel & Zeithaml, 1984). A fear appeal may be segmented into danger control and fear control. Danger control guides adaptive behavior to deal with or avoid danger whiles fear control guides emotional responses resulting from risk. In the current study and for the fact that there are no apparent signs of controlling or curing the deadly COVID-19, individuals will have to avoid, deal with, and or respond to it.

An increase in fear is known to be associated with increases in coaxing and compliant behavior if the causal factor forewarned the receiver to danger. Subsequently, the parallel response paradigm base on the theory of fear appeal predicts that the higher the perceived level of risk, the greater the intent to take action to relieve it (Laros & Steenkamp, 2005). Fear appeals have been employed in advertising of products and services. It dominated areas such as life insurance, road accident campaigns, promoting political causes, drug-prevention commercials, and in the development of social awareness of serious concerns (Latour & Zahra, 1988), such as the COVID-19 and other public health-related issues. Some studies also associated impulse buying with fear (Lin & Chen, 2012).

Recent works point out that purchase decisions and choices are a result of the scrutiny of the pros and cons and affective and sensitive aspects of products (Consoli, 2009). Products that are perceived to overcome a specific risk or dangers, fomenting fear, and more successful in reducing perceptions of danger, attract higher purchases (Mcdaniel & Zeithaml, 1984). We based on this to predict that, in the wake of the continuous spread of the deadly COVID-19;

> H1: Fear appeal will have a positive relationship with the purchase behavior of selected personal protective equipment.

Social presence

Social presence is an essential element in both offline and online social contexts and has featured widely in studies in the area of technology or computer-mediated interactions to ascertain the existence of personal and socio-emotional attachments (Short et al., 1976). Over the

years, several definitions of social presence have emerged and rapidly changing with the birth of virtual reality and augmented reality. However, social presence has commonly been referred to as the degree to which two people interacting through a technologically mediated environment feel as if they are physically together. Face-to-face communication has a higher social presence than that of SMS, email, or voice calls (Biocca et al., 2003).

In many computer-mediated interactions, viewers have the feeling of being together while they are interacting with other people on a second screen or, in many cases, the host. As a result, users turn to get very involved in such a mediated environment as though the other person is physically present. Social presence is two dimensional – as a sense and as a means, also known as the absent availability and present availability, respectively. Absent availability requires physical colocation in space and time, while the latter refers to a person's perceptions and feelings of being with others (Nowak & Biocca, 2013; Zhao, 2002). This study adopted the former (the sense of being together in a mediated perception of an environment).

Fear appeal and social presence

My people perish for lack of knowledge (Hosea 4:6). Fear is a negatively-valance sentiment, along with a high level of provocations, and provoked by a threat that is seemingly significant and personally relevant (Witte, 1992). Consumer needs information to control, avoid, deal with, or respond to fear and its perceived risks. The fear that accompanies the COVID-19 will lead consumers to seek answers, and this will lead to a high level of interactivity and social presence in e-commerce platforms (Arnold & Reynolds, 2012). Consumers characterized by (negative) hedonic motives (fear) are known to engage more in social-interactive aspects of shopping as a way to seek affection, acceptance, and social information (Arnold & Reynolds, 2003; Joo Park et al., 2006). We predict that with the uncontrollable infectious state of the COVID-19;

> H2: Fear appeal will have a positive relationship with the level of social presence in consumer experience live-streaming platforms

The fear appeal comes with audience reactions. The typical outcome in fear appeal besides intention or behavior change is message acceptance and a strong connection to a source of relief (Khasawneh et al., 2010). It is known that the decision to accept a fear appeal recommendation is a function of seeming utility of the threat, the possibility that the risk will occur, and the probability that the threat will not happen or can be avoided if the recommended changes are made (Stauss et al., 2005). A strong connection with the source of PPEs against the COVID-19 (Online retail shops) is highly possible.

Confidence, trust, and loyalty are three social emotions necessary, respectively, for the social processes of agency, cooperation, and organization. Having confidence in a system, brand, or a vendor leads to trust. Trust, when built over time, leads to (electronic) loyalty (e-loyalty). Confidence is associated with the willingness to act (Demoulin & Zidda, 2009). Whiles confidence is the emotional basis of action and agency, trust is the emotional basis of cooperation. Trust, therefore, includes the feeling that one can somehow rely upon others. When this reliability is established, loyalty becomes obvious. While trust is generally acknowledged as a sufficient condition for cooperation to occur, it is widely not held to be a necessary condition until it develops into loyalty. Individuals may feel

loyal to a person, a relationship, or an institution that provides satisfactory solutions even in the absence of self-confidence (Demoulin & Zidda, 2009; Latour & Rotfeld, 1997).

Confidence, trust, and loyalty bring the future into the present by providing a sense of security and certainty to what is inherently mysterious, feared, and unknowable so that specific action concerning it may be engaged (Laros & Steenkamp, 2005; Passyn & Sujan, 2006). Similarly, the fear of and for the unknown (the COVID-19) is a sufficient premise to build customer-seller, customer-product confidence. This confidence leads to the building of trust in PPEs and, causing consumers who find solace in the product and brand to become loyal and eventually propagating positive word-of-mouth (eWOM). It is important to note that live-streaming provides a social platform for consumers and streamers to interact, share ideas, learn, and comfort or provide counseling in times of distress.

The high social presence characteristics embedded in a live-streaming strategy can enhance customers' online purchase behavior with a reduction in psychological distance and perceived uncertainty (Zhang et al., 2019). We based on this and predicted that;

H3: Fear appeal will have a positive association with consumers' e-loyalty in live-streaming services.

H4: e-loyalty will partially mediate the relationship between fear appeal and purchase behavior.

Social presence and follower

Social presence is a quality inherent in a communication medium (Short et al., 1976). From an emotional point of view, social presence is characterized as the 'warmth feeling' of the media, thus, its ability to transmit the feeling of human warmth and sensitivity through non-verbal cues (Cyr et al., 2007; Yoo & Alavi, 2001). These characteristics are found to increase customer e-loyalty and positive purchase behavior (Cyr et al., 2007; Gefen et al., 2003; Mäntymäki & Salo, 2010). Social presence reinforces e-trust and e-loyalty through e-communications, to increase social presence in computer-mediated environments (Hassanein & Head, 2005). Visual cues are also known as a good measure of social presence because they focus on the consumer's actual, functional, and emotional needs by emphasizing the characteristics of the product and, importantly, the benefits that are associated with the product (Kahn, 2017). When consumers experience an online inspiring, involving, and co-creative experience, such as the Taobao live-streaming video interaction, they participate more intensely. A higher level of website interactivity is argued to increases website visitors' online flow experience and social presence. This experience subsequently leads to positive outcomes of concern to marketers, such as favorable attitudes toward the website and the brand, an increased number of product-relevant thoughts, and desirable behavioral intention including eWOM, and purchasing (Köhler et al., 2011).

Trust and loyalty are developed through positive interactions with other people. The interaction with a trusted party, in face-to-face or mediated means, is a precondition of loyalty (Gefen & Straub, 2004). This implies that any form of human interaction increases the social presence and underwrite the building of loyalty. In online commerce, a consumer may be vulnerable and needs to rely on the seller. Since trust is built from social

environment and interaction, social presence is a prerequisite for trust, and trust is a prerequisite for loyalty. Seller-buyer interactions produce more social information meant to reveal vital information to buyers to form their naive beliefs based on which they developed their loyalty (Lu et al., 2016). With the increasing infection rate of the COVID-19, we predict that;

H5: The experience of social presence will have a positive association with customer e-loyalty.

H6: Social presence will partially mediate the relationship between fear appeal and e-loyalty

Social presence and purchase behavior

Social Presence is one of the essential concepts in computer-mediated communications. Social presence is a widely recognized factor that influences consumer behavior in marketing and shopping. Consumers are mostly influenced by the level of their social interactions with others when making purchase decisions (Godes et al., 2005; Zhang et al., 2019). Platforms that dominate marketplace-based e-commerce like Amazon and Taobao have successfully added social applications with contents to help people to connect with whom and where they usually buy (Marsden, 2010).

The evolution of technology brought along the capacity of direct and interactive communication. It has provided consumers with a strong feeling of 'being together' or 'being connected' with the online streamers (Stever, 2011). Through this interaction, fans might feel as if those streamers are socially present in their life. The 'presence' of these streamers in customers' lives influence their buying decisions (Bergel & Brock, 2019; Marsden, 2010). Previous studies argue brand trust and loyalty have played significant intermediary roles in the impact advertising appeals (perceptual and rational) have on purchase intention (He & Qu, 2018; Yang et al., 2015). In a social context, it was argued that rational advertising appeal could propel consumers to a more positive brand attitude toward crisis brands (Yuan et al., 2010). Thus, we predict that;

H7: Social presence will have a positive association with consumers' purchase behavior.

H8: Social presence will have a partial mediation influence on the relationship of fear appeal and purchase behavior.

Followers, e-loyalty and purchase behavior

An essential component of commerce, similar to social media, is followership. Customer engagement, as a critical catalyst of loyalty, has become a catchphrase of marketing research in recent years (Bergel & Brock, 2019). The number of followers, which indicates the network size and an indication for popularity, is a crucial indicator for the social impact the product or an institution has (Badashian & Stroulia, 2016; De Veirman et al., 2017). Consequently, a higher number of followers is a good judge of broader coverage of a commercial, market, loyal customers, and the extent to which a social message can go to promote electronic eWOM. Businesses today leverage the power of this specific type of eWOM at scale to intensify their presence and influence (De Veirman et al., 2017). Regarding their commercial potential, technologies have been developed to identify and track relevant influencers for brands and connect with them. Thus, followers are brand loyalists.

Several studies are available on the importance and the role of followers (Badashian & Stroulia, 2016; Cha et al., 2010; De Veirman et al., 2017). However, these studies are predominantly centered on social media such as Facebook, Twitter, YouTube, Instagram, Google +, Foursquare, and Pinterest but not on product experience platforms like live-streaming for business to customer and customer to customer. Live-streaming, as social commerce, includes this functionality and mostly explored for marketing advantages. Most successful firms are likely to use this and other social media characteristics to have superior consumer engagement (Barnes, 2014). This generates a fertile environment for the growth of social commerce and SMEs. The loyalty, elicitation of appropriate responses behavioral reactions from followers, are shaping product design and service quality. Followers' use of likes suggests that a satisfactory interaction has occurred and their demands are met. It is a definite matrix for eWOM, purchase, referrers, and repeated purchase (Leek et al., 2019; Sashi, 2012).

The mediating effects of loyalty and trust in e-commerce, especially between social presence and purchase behavior is reported in many previous studies. Trust, loyalty, and 'stickiness' were the central focuses mediating social presence (Web, and interaction) and purchase intention (Gao et al., 2018; Lu et al., 2016). Loyalty remains a key determinant of relationship development in every social environment (Winnie et al., 2019). In the virtual domain, loyalty is a significant factor in harnessing business success and long-term profits, especially in a virtual domain. Social presence activation in e-commerce is necessary but nor sufficient with the needed loyalty, and the ability to retain loyal customers increases profits within the range of 25% to 95% (Gallo, 2014). We predict that;

H9: Customer e-loyalty will have a positive association with purchase behavior.

H10: E-loyalty will partially mediate the association between social presence and purchase behavior

Based on the interconnectivity among fear appeal, social presence, e-loyalty, and purchase behavior, we predict a parallel mediation that;

H11: There will be a partial serial mediation between fear and purchase behavior via social presence and e-loyalty.

We summarized the hypotheses in Figure 1.

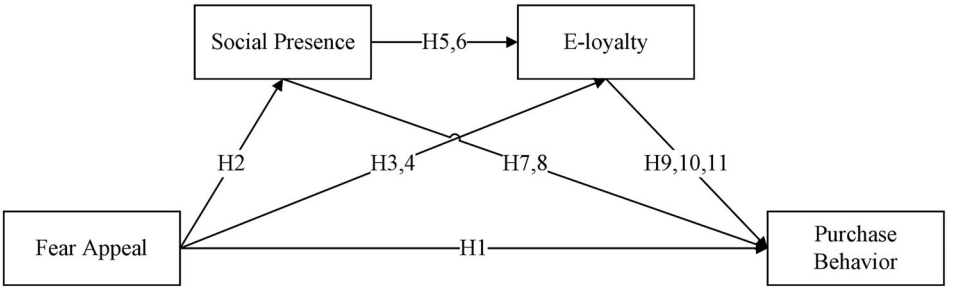

Figure 1. Summary of hypotheses.

Controlled variable

Price is a well-known, influential factor in individuals' willingness to purchase. Price remains one of the complex stimuli and unquestionable market cues that can attract or repel consumers (Cho & Sagynov, 2015). Existing studies argued that perceived cost is sternly associated with consumers' attitudes toward purchase. The perception of price fairness as a significant indicator of consumers' reactions toward sellers has been well documented in the literature. Studies noted that price, directly and indirectly, influences the purchase willingness of consumers even when other indicators such as trust and quality of products are favorable (Bergel & Brock, 2019; Cho & Sagynov, 2015; Lu et al., 2016). Price changes in any market are mostly the outcome of shifts in supply relative to demand. In a global market, several simultaneous supply and demand shifts may affect prices to different levels (Tomek, 2000). In times of crisis such as the with the current COVID-19, panic buying and stockpiling of PPEs is expected to cause changes in price. Singapore (INSEAD, 2020) and Australia (BBC, 2020), among other countries, have reported price escalations not only for PPEs but also for everyday consumables. The Wall Street Journal has reported a 5.2% or more rise in consumer price in China (The Wall Street Journal, 2020). China's food prices, in particular, are reported by the ABC News to have shot to 21.4% over a year earlier in February 2020 as efforts to contain a virus outbreak disrupted supplies (ABC News, 2020). We, therefore, deemed it necessary to control the price of the products corrected. A higher price is generally considered as an indication of good quality, even though this perception may vary across product categories (Pan et al., 2013).

Experiential evidence thrives on supporting gender differences in decision-making processes. While some studies found women to be more inclined to business-oriented fields, others report that 'objective' and 'logical' are more male-valued traits (Powell & Ansic, 1997). Females were ascribed with having more communal attitudes than males by stressing the need for a personal relationship, oneness with others, and the development of harmonious relations (El Dief & Font, 2010). Relational skills such as selling are argued to be more appropriate with the personality qualities associated with women than men, pointing to the emphasis on women's socialization, empathy, and sensitivity towards others (Ndubisi, 2006). In sales management literature, it was documented that saleswomen place a higher value on relational and social (interpersonal) aspects of their job, while men place a high value on career-oriented factors (Oakley, 2000). Some other studies explicitly stated the need to control gender in marking, sales, and customer-related studies (Ndubisi, 2006). Therefore, we deemed it necessary to control gender in this study.

Method

To study the trend of purchase behavior effectively, we collected a total of 834 daily data from 40 live-streaming shops alongside the daily nCoV cases from the China Center for Disease Control and Prevention (CDC) published on Baidu (Baidu, 2020). To have a realistic and clear understanding of the market swings, we followed 20 shops each on Taobao and JingDong live-streaming platforms. Ten shops from each platform deal in PPEs and the other in apparels. The decision to compare the purchase trend of apparel is for the fact

that this category of products is known to receive increased online sales (Kim & Forsythe, 2010). It will present a better perspective of the current dynamics. We collected daily purchases to measure Purchase behavior (Ajzen & Madden, 1986; Ling et al., 2010). The number of followers was collected to measure e-loyalty (De Veirman et al., 2017). The number of chats, visits, and likes was collected to measure social presence (Kahn, 2017). Fear appeal was measured by the COVID-19 statistics following a similar study that used public health concerns to measure fear appeal (Lin & Chen, 2012).

We made use of the day-lag approach between the independent and dependent variables to be able to collect the actual figures where the data of day-2 for an instant is collected at the start of day-3. This is because the actual daily COVID-2019 statistics are officially updated only at the end of the day. We assume that consumers will make purchase decisions based on the most current reports. In this case, the purchase decision of day *n* will be influenced by the statistics of day *n-1*. We expect this effect to follow a lag of a day as the purchase is online and can have almost an immediate effect. In that case, we believe the results of COVID-19 statistics will be associated with the next days' customer behavior. Such that day-1's COVID-19 statistics are paired with day-2 live-streaming data. Even though the COVID-19 cases dated as far back as December 8th, 2019, the data for this work was collected from January 16th. This date was when 2019 nCoV was officially reported by disease in the Infectious Disease Law and Health and Quarantine Law in China (Li et al., 2020).

A visual trend of the data is presented in Figure 2. Next, we performed a serial-mediated analysis based on 10000 bootstrap samples at 95% CI (Demming et al., 2017; Hayes & Rockwood, 2017) on the PPEs data sets collected from the live-streaming platforms to address the study hypotheses defined in Figure 1.

To appreciate the trend of the COVID-19 and based on the mode of presentation of the CDC (Baidu, 2020), we presented a cumulative statistics with the data collected from the

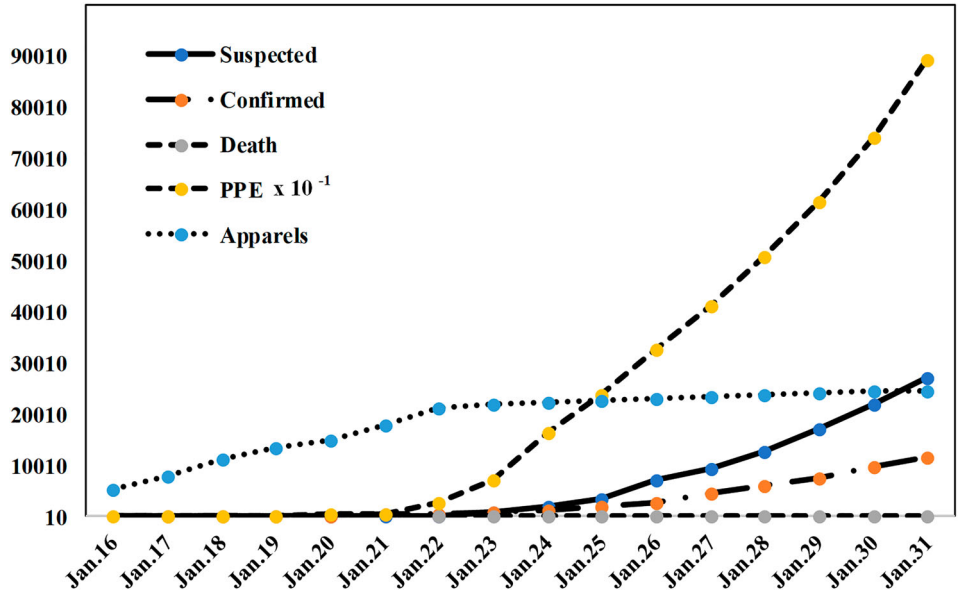

Figure 2. Cumulative COVID-19 description statistics and purchase behavior.

live-streaming platforms. To fit the huge purchase figures of PPEs and have a more unobstructed view of all the results presented, the PPEs are scaled by a factor of 0.1. To avoid decimals from average calculations of the consumer behavior datasets, we rounded each value to the nearest integer.

In summary, the purchase of PPEs appreciated along with the COVID-19 statistics (suspected cases, confirmed cases, and the number death recorded). However, the rise was seen in apparels between the January 16 and January 21, halted with only a marginal increase. The rise of PPEs also started around January 21. It is important to note that January 21 was a day after the COVID-19 was officially incorporated as a notifiable disease in the Infectious Disease Law and Health and Quarantine Law in China (Li et al., 2020). The controlled variables (price and gender) are included in the regression model, and their results presented accordingly.

Results

We performed a serial mediated regression to establish the association between fear appear and purchase behavior in customer experiences live-streaming via social presence and e-loyalty, as shown in Figure 3. We stated the continuous variables in terms of logarithmic functions to avoid data misrepresentations, typical about continuous and community behavior datasets (Bründl & Thomas, 2006; Feng et al., 2014), and also to smooth-edge high values (Feng et al., 2014).

After controlling for price and gender (by including them in the regression model), fear appeal explained about 64% of the variance in social presence enjoyed seller-buyer in customer experiences, live-streaming withing the study period ($\beta = .783$, $p = 0.000$). The result is an indication that the higher the fear appeal, the higher the possibilities of people engaging to come out with a plausible solution. Price and gender even though has a positive effects on the model ($\beta = 113$, $p =$ n.s.; $\beta = 010$, $p =$ n.s.), their effects are not statistically significant. This result provided support for H2. Fear appeal ($\beta = .422$, $p = 0.01$), and social presence ($\beta = .025$, $p = 0.05$) contributed to a 45% change in e-loyalty. The results here provided enough support for H3 and H5. Price has an insignificantly negative effect on the

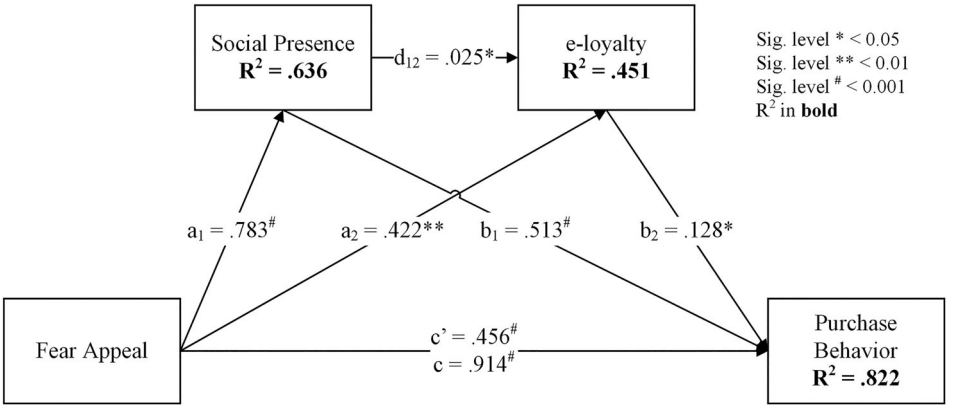

Figure 3. Hypotheses testing.

model ($\beta = -0.16$, p = n.s.), an indication that high prices may affect the consumers' loyalty but not significant in as far as PPE purchase behavior is concerned.

e-loyalty has a significant positive association with purchase behavior ($\beta = .128$, $p = 0.01$) and, in conjunction with the other dependent variables (social presence ($\beta = .513$, $p = 0.001$) and fear appeal ($\beta = .456$, $p = 0.001$)), contributed to an contributed to 82% of variance explained in purchase behavior. within the study period. This outcome supports our claims that customer e-loyalty will have a positive association with purchase behavior (H9), social presence will have a positive association with consumers' purchase behavior (H7), and the fear appeal will have a positive association with purchase behavior favoring selected personal protective equipment (H1) respectively.

We went a step further to test the indirect effects from a fear appeal to purchase behavior via social presence and e-loyalty in Table 1.

The indirect test supported our proposed related hypothesis. First, we tested the partial mediation effects of social presence on the positive relationship between fear appeal and purchase behavior ($\beta = .237$; SE = .071; LL = .099; UL = .372), such that an increase in the fear appeal is positively associated with an increase in social presence which results in a positive increase in purchase behavior to support H8. We proposed and tested the prediction that the relationship between fear appeal and purchase behavior will be mediated by e-loyalty (H4). This test was significant ($\beta = .128$; SE = .0281; LL = .051; UL = .091). an increase in the fear appeal is associated with a positive increase in e-loyalty, which in turn results in a positive increase in purchase behavior. Similarly, H6, H10, and H11 were all supported with a positive increase in the related independent variables, as indicated in Table 1.

Discussion

Key findings

The outbreak of the COVID-19 has sent a wave of fear across the world and, most notably, China, Italy, Spain, the USA, France, Germany, Iran, the UK, among others. This work took inspiration for the theory of fear appeal to study the dynamics in purchase behavior in the wake of the deadly 2019 novel coronavirus in Wuhan, China, known as the COVID-19.

First, we established that the purchase trend of PPEs followed the trend of suspected, confirmed, and death cases related to the COVID-19 whiles the usual trend of high purchase of apparels (Kim & Forsythe, 2010), however, dropped significantly.

Table 1. Indirect paths analysis.

			95% CI		
Path	Beta	SE	LL	UL	Hypothesis support
FA->SP ->PB	.237	.071	.099	.372	Yes
FA->e-L ->PB	.128	.028	.051	.091	Yes
FA ->SP -> e-L	.205	.346	.697	.731	Yes
SP -> e-L->PB	.028	.034	.030	.106	Yes
FA ->SP -> e-L ->PB	.108	.026	.046	.069	Yes

B = Standardized coefficients (Beta); SE = standard errors; CI, bias-corrected and accelerated 95% confidence interval; LL = lower limit; UL = upper limit; FA. = Fear appeal; *SP* = Social Presence; e-L = e-loyalty; PB = Purchase behavior.

Secondly, we confirmed based on the current results that fear appeal (facts or rumors) has a positive association with the level of immersion that occurs between sellers and buyers in live-streaming consumer experience platforms. Our results support similar earlier claims that consumer needs information to control, avoid, deal with, or respond to fear and its perceived risks which lead to a high level of interactivity and social presence in e-commerce platforms (Arnold & Reynolds, 2012). We expected this claim to be relevant, especially when there are no known cures for the ever spreading COVID-19. Several other authors also established that cynical hedonic motives (fear) are known to lead to social-interactive in shopping as a way of seeking affection, acceptance, and social information (Arnold & Reynolds, 2003; Joo Park et al., 2006).

Social presence is known to lead to customer loyalty. This, however, is mostly related to positive feelings. We extended this understanding to a negative direction and confirmed that when consumers experience an online inspiring, involving, and co-creative experience, such as the Taobao live-streaming video interaction, they participate more intensely. The human interaction characters of live-streaming, in particular, increases the social presence and countersign the building of loyalty (Gefen & Straub, 2004; Lu et al., 2016).

Besides the shreds of evidence in the existing literature on how fear appeal affects purchase behavior (Laros & Steenkamp, 2005; Lin & Chen, 2012; Mcdaniel & Zeithaml, 1984), which are equally supported by the current findings, we found the mediating role of social presence and loyalty in explaining this concept. Overall, the controlled variables (price and gender), even though they have been reported by previous studies to have significant impacts on sales and marketing, their effects in the current study are marginal and insignificant. The effects of price in life-saving emergency and crises such as in the case of COVID-19 and the impact of gender on online live-streaming platforms need to be investigated more extensively.

Implication for literature

E-loyalty is considered a central idea of e-commerce in literature besides trust. Loyalty, in effect, is a higher level of trust, as only customers who trust a seller or product will give their loyalty and allegiance (Keen et al., 2000). Most studies in e-commerce focused on a single website and treated e-loyalty and trust as a bilateral relationship between a seller and a buyer without necessarily associating it to social presence and trust. Online live-streaming continues to thrive, especially during the current partial lockdown of offline shops and carries along with advanced forms of mediated human-human interaction. This study examines the extends to which social presence and e-loyalty provide a benchmark for understanding purchase behavior in the wake of the COVID-19. More specifically, we married fear appeal, with the social presence characteristics of live-streaming to explain the change in purchase behavior. Even though these antecedences are not new in marketing and advertising literature (Cyr et al., 2007; Gefen & Straub, 2003; Mäntymäki & Salo, 2010; Mcdaniel & Zeithaml, 1984; Short et al., 1976; Witte & Allen, 2000), their combination is new and not explored in any similar pandemic and global crises.

Whiles academician continues to tackle the presence of the COVID-19 disaster even as a new direction of academic debate; there are no known works in the area of consumer experience behavior directly connected to this new nCoV. Even though our variables

might not be conclusive enough, we believe the findings are fundamental to understanding the swings in the purchase trend in this and any similar situation.

It should be noted that the findings in this work are based on the actual data collected from the Chinese live-streaming customer experience marketplace along with statistics on the COVID-19. Whiles, this work reveals exciting patterns in the purchase behavior, the epidemic has not yet been controlled, and there are new and increasing suspected confirmed and fatal cases each day. We acknowledge that the trends in the purchase are likely to change along the line. This is because most PPEs are non-consumables and not a one-time-use. The more people buy and own these kits, the less the online traffic will become. We also expected the possibilities of a breakthrough for the cure and treatment of the virus. In this case, the trend of purchase will change. Even in the absence of an immediate cure, more and more people are getting the awareness and educated on the protection and preventive measure, which could reduce the 'mad' rush for PPEs.

Practical implications

Besides the theoretical contributions, this study also has essential practical implications necessary for market players and emerging markets. First, the study brought back the 'forgotten' theory of fear appeal and linked this theory to live-streaming. Online vendors can explore and rediscover this theory to increase sales.

It is evidenced, based on the findings in this work, and previous studies (Hassanein et al., 2009; Lu et al., 2016), that live streamers will need to invest their resource in developing and fostering social presence to overcome the deficiency that is associated with traditional e-commerce (the lack of human and social elements) (Cyr et al., 2007).

Lastly, our findings support the claims that social presence (Marsden, 2010) and loyalty (Badashian & Stroulia, 2016; De Veirman et al., 2017) are necessary for the growth and success of electronic commerce. We extended this knowledge to live-streaming, a subsidiary of social commerce, and established that this could be a result of a negative feeling based on the understanding of the theory of fear appeal. The improvement of social environments, thus, becomes necessary and sufficient for the growth of live-streaming and e-commerce in general.

Limitations and suggestions for future work

It is essential to note that the constructs and variables used in this study, even though they are the only available variables in the platforms investigated, may not be conclusive and comprehensive enough. Even though the outbreak of the COVID-19 is not expected to be everlasting, the duration of the data collection is a possible limitation to the current study. The data used in this study are collected from China. Despite China being the very first country to report the COVID-19 and recorded a huge number of cases, the global spread requires a broader investigation of these variables for generalization purposes. It is recommended that further exploration of the phenomenon is needed after several other months. PPEs are at the center of attention and suffered from panic at the early stages of the spread of COVID-19. However, there are many reports of stockpiling, price spikes, and shortage of general merchandise in anticipation of lockdowns. It is, therefore, vital to extend the current framework to

other products and from different parts of the world. Since the time-series approach was not considered in the current work, there might be possible inflations in the amount of R-squares or betas. Further studies should consider other approaches, including the time-series approach.

Conclusion

Drawing inspiration from the theory of fear appeal, the current study examined the swings in purchase behavior in the wake of the deadly 2019 novel coronavirus in Wuhan, China, and across the world. The study demonstrated the association between fear appeal, social presence, e-loyalty, and online purchase behavior as far as PPEs are concerned. Whiles these might not necessarily be the first work with these characteristics, we are confident it is one of the very few studies with these characteristics focusing on the COVID-19. We specifically focused on live streaming online purchase behavior owing to the human-human interaction restriction, travel bans, and closure of offline shop during the spread of COVID-19. Finally, we introduced a framework that needs further investigation for the adoption and uses in live-streaming and e-commerce in general.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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