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# Restaurant hygiene attributes and consumers' fear of COVID-19: Does psychological distress matter?

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## ABSTRACT

Restaurant unhygienic affairs have concerned consumers and policy makers alike since the onset of COVID-19 pandemic. The current study incorporates restaurant hygiene attributes—consumers-use spaces, personal hygiene of staff, workplace hygiene—and their association with consumers' fear of COVID-19 (CFC). Moreover, how CFC educes consumers' psychological distress (CSD) and the consequent behavioral reactions—preventive behavior (PB) and revisit intention (RI)—has been examined. Furthermore, perceived vulnerability (PV) employed as a moderator between hygiene attributes and CFC. Data collected from 407 respondents via Chinese online platform was analyzed in SPSS 25.0 and AMOS 24.0. Results showed significant association between hygiene attributes and CFC. Similarly, CFC significantly engenders CSD, which consequently effects PB. Contrarily to our hypothesis, CSD positively developed RI. Lastly, PV moderated the relationships between antecedents and CFC. Findings add to the literature of health management, consumer psychology, and service management with practical relevance, followed by limitations and potential future avenues.

## 1. Introduction

The world has experienced myriads of natural outbreaks, in retrospect, such as Spanish flu (1918), SARS (2004), H1N1 (2009), and Ebola (2016) (Hung et al., 2018). However, the rippling effects of the current pandemic (coronavirus) across the globe are unprecedented. The World Health Organization (WHO) proclaimed Coronavirus (COVID-19) a pandemic soon after its eruption in December 2019, Wuhan, China (WHO, 2020a). In this vein, the susceptibility of this contagious disease is attributed, among others, to the exponential population growth, advancements in transportation, massive commutation, unhygienic issues, and dynamics of livings across the globe (Li et al., 2021; Park et al., 2019). The world community suffered, *en bloc*, due to the COVID-19 pandemic in terms of peoples' health and business havoc, particularly the restaurant industry whose (un)hygienic status was closely associated with risk of the current pandemic. For example, the Restaurant Dive Survey (2020), in current context, unveiled the perception of consumers' fear associated with restaurant unhygienic attributes namely, touching door handles (i.e. 78 % reported risky), using restaurant spaces (i.e. 77% asserted vulnerable), and service encounter (i.e. 74% showed proclivity to catch disease) (Beckett, 2020). Within this purview, over

110,000 restaurants (17%) in the United States closed permanently, and more than 500,000 were financially choked due to the COVID-19 pandemic (National Restaurant Association, 2020). Hence, in the light of the foregoing reports and discussion, there is a dire need to identify and investigate the unhygienic attributes (*vis-à-vis* COVID-19 pandemic) of traditional restaurants and food chains to provide scientific rationale to ease business challenges (Yu et al., 2021a, 2021b, 2021a).

Recently, consumers' sensitivity to restaurants' hygienic affairs has inflated owing to mass awareness by the media and government restrictions (Song et al., 2021). As the COVID-19 pandemic transmits, directly and indirectly, through coughing and sneezing, the probability of virus infection increases exponentially in congested place (Boyras et al., 2020). Thus, the restaurant industry bears more risk in the current pandemic in that the direct and indirect contact (e.g. shaking hands, crowded spaces, and touched places by others) may pose imminent threats in consumer's mind. Moreover, it is common for restaurant consumers to interact with service providers and other customers to utilize various spaces, dining hall, elevators, washrooms, and lobbies (Park et al., 2019). Scholars have asserted that the fear of COVID-19 transmission is likely to engender suspicion regarding shared facilities

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and places in consumers' mind and consequent avoidance behavior (Akhtar et al., 2020; Duong, 2021; Laato et al., 2020; Yin and Ni, 2021). Hence, it is fair to infer that consumers' interaction with unhygienic attributes—tangible or intangible—at the food and beverage restaurant increases consumers' fear of COVID-19, which, in turn, causes their cognitive distress.

The prevailing academic literature mostly concentrated on the food preparation services and hygiene of hotel workers (Awan et al., 2020; Gu and Ryan, 2008; Hung et al., 2018; Shin and Kang, 2020; Sifuentes et al., 2014) and articulated little about hygiene attributes in context of novel infectious disorders. This gap has mushroomed unpleasant events like COVID-19, despite its immediate significance to be realized for consumers' restaurant choices (Dedeoğlu et al., 2021). Therefore, based on the academic and industrial reports above, it is zeitgeist to assess: (1) reasons that contribute to consumers' fear of COVID-19 at restaurants, (2) how fear affects consumers psychologically, and (3) how to encourage customers to visit the restaurants. Despite its pertinence, the extant literature has largely glossed over the role of restaurants' hygiene attributes—customer space, worker hygiene, and workspace—in developing fear of COVID-19.

To address this gap, we responded to Yu et al.'s (2021) call by developing and testing a theoretical model for restaurant hygiene attributes. We investigate the role of hygiene attributes—customer use spaces, personal hygiene of staff, and workspace hygiene—, intriguing to engender fear of COVID-19 and consequent consumers' psychological distress. Moreover, this study examines the behavioral outcomes—preventative behavior and revisit intentions—in response to consumers' psychological distress. We also applied the perceived vulnerability as a moderator between the relationship of hygiene attributes and fear of COVID-19. By doing so, we address the research questions and contribute to the body of knowledge in the following areas: health management, consumer psychology, consumer behavior, and service management. Lastly, the findings put forth the prolific implications for the food and beverage restaurant businesses in context of the COVID-19 pandemic.

The remainder of the article entails following parts: section 2 elaborates theory and hypotheses development; section 3 substantiates methodology and data analysis; section 4 draws findings, discussion and implications ensued by the limitation and future directions.

## 1.1. Theoretical groundings

### 1.1.1. Stimulus-organism-response (S-O-R) theory

The stimulus-organism-response (S-O-R) theory by Mehrabian and Russell (1974) interprets the environmental factors intriguing to the peoples' thoughts, feelings, and resultant behavioral reactions. In the S-O-R paradigm, the stimuli (S) signify a set of sensory factors in a specific situation. Organism (O) covers the emotional reactions to the environmental stimuli divided into three categories: degrees of pleasure (pleasure-displeasure), levels of mental attentiveness (arousal-no arousal), and feelings of control over actions (dominance-submissiveness). Arousal and pleasantness are the most affective states among the organism conditions, whereas dominance is linked with cognitive perception (Mehrabian and Russell, 1977). Lastly, avoidance or approach responses are represented by responses (R). Scholars in information science have used the S-O-R paradigm to explore both avoidance and approach behaviors (Islam et al., 2020). During the COVID-19 pandemic, scholars have aptly employed this model in assessing customer attitude and reactions (Song et al., 2021; Sultan et al., 2021). In this vein, the S-O-R framework illuminates the prominent emotion-inducing components present in the peripheral environment vis-à-vis consumers' behavioral responses during the COVID-19.

Contextually, the COVID-19's human-to-human transmission raised death rates exponentially, which proclaimed it a worldwide pandemic. Resultantly, this pandemic has influenced the economic, social, and geographical spheres worldwide. Scholars ascribe this global stagnancy

to ignoring standard operating procedure (SOPs), which also include unhygienic conditions (Huang et al., 2020; Sung et al., 2021). Moreover, to contain the pandemic's effects on masses, most of the governments have enacted astute preventative measures, such as social distancing, lockdowns, wearing mask, and travel bans (Akhtar et al., 2020). However, unhygienic practices and information overload on electronic platforms implicated the consumers in terms of vulnerability (Boyraz et al., 2020). Hence, under the S-O-R theory, these unhygienic threats vis-à-vis COVID-19 represent external environmental stimuli—a lynchpin leading to the consumers' fear of COVID-19.

These external stimuli are linked with individuals' inner feelings (un) consciously. For instance, Chinese customers, in present context, have experienced a variety of unwholesome issues which triggered their psychological—including loneliness, melancholy, anxiety, and fear (Huang et al., 2020; Li et al., 2021; Song et al., 2021). Previously, Russell and Pratt (1980) articulated that the external stimuli such as vulnerable situation and unpleasant emotions develop sleepy states and psychological distress. Song et al. (2021) and Laato et al. (2020) refer that the fear and psychological distress are linked with COVID-19, and produce adverse behavioral response, which reflect the response elements of the S-O-R model. Consequently, this research, led by the S-O-R paradigm, tries to look into unhygienic attributes and vulnerability (i.e. stimuli) at the restaurants, the related fear and distress (i.e. organisms) among the individuals, and their downstream behavioral reactions (i.e. responses) in context of COVID-19. In the current context, the S-O-R model affirms that an individuals' avoidance or approach behavior is the function of their organism state. Likewise, adverse or positive behavioral responses stem from the desire to avoid or approach a specific (un)hygienic environment (Islam et al., 2020). Thus, the aforementioned arguments lend support to our conceptualization of S-O-R paradigm in examining restaurants' hygiene attributes and vulnerability related to the COVID-19 that causes consumers' fear and adverse behavioral responses.

## 1.2. Perceived hygiene attributes

Hygiene connotes the acts that safeguard one's own life and well-being against vulnerability (Choi et al., 2010; Gu and Ryan, 2008; Sifuentes et al., 2014). Simply put, it implies preparing and securing favorable conditions for health. Improved hygiene conditions can considerably minimize the risk of diseases infection that can be life threatening (Shin and Kang, 2020). A camp of previous literature has emphasized on the hygiene practices in order to spill their positive ramifications for the consumers (Leach et al., 2001; Ungku Fatimah et al., 2011). A recent study by Delea et al. (2020) affirmed that the unwholesome management erodes the peoples' well-being. Similarly, scholars have also contended that the poor hygiene conditions are more likely to spur respiratory infections, such as influenza, pneumonia, gastrointestinal, worm, and trachoma (Akhtar et al., 2020; Dedeoğlu et al., 2021).

The related work on service management significantly links the customers' first impression with a company's hygiene outlook (Omar et al., 2021; Yu et al., 2021b). For instance, customers' service encounters in the restaurants immediately elicit their reactions regarding products and services. Therefore, the hygiene conditions of the restaurants assume centrality in predicting customers' behavioral responses, e.g. intention to return, perceived service quality, and customer happiness (Choi et al., 2010). In context of hospitality, Yu et al. (2021a, 2021b) illuminated the hygiene attributes—customer-use spaces, personal hygiene of staff, and workspace hygiene—, which customers evaluate during their visits or stays in hotels. They advocate that customers overall impression bases on hygienic conditions of the spaces they frequently use (e.g. dining tables, washrooms, and smoking corner), the spaces used by service providers (e.g. front desk, chairs, and computers), and the personal hygiene of the service providers (e.g. uniforms, hands, and heads). These hygiene attributes are critical in service provisions to

the customers, and deemed instrumental in their decision-making (Leach et al., 2001; Sifuentes et al., 2014). In the present context of COVID-19 pandemic, it is critical to incorporate and examine the restaurants' hygiene attributes, which the extant literature has overlooked. By doing so, it would be expedient for the restaurant industry, affected by the COVID-19, to orchestrate strategic rational to overcome the consumers' fear of the pandemic (Sung et al., 2021).

## 2. Hypotheses development

### 2.1. Customer-use spaces and consumers' fear of COVID-19

Traditionally, consumers considered consumption of food, interaction with the staff, and uses of spaces in restaurants as safe and free of risk (Choi et al., 2010). However, recent scholarships (Delea et al., 2020; Yu et al., 2021b) posit that customers' interaction, direct (e.g. service encounters, handshakes) and indirect (e.g. frequently use of space), in restaurants tends to trigger risk of infection and consumers' intrinsic fear. The questions on restaurant disinfection practices, unhygienic issues, and inflexibility to COVID-19 related SOPs have further aggravated the situation (Peng and Chen, 2021). For instance, Food and Drug Administration (FDA) defined the sanitization code for cleaning in a restaurant (FDA, 2017) as.

*“Sanitization means the application of cumulative heat or chemicals on cleaned food-contact surfaces that, when evaluated for efficacy, is sufficient to yield a reduction of 5 logs, which is equal to a 99.999% reduction, of representative disease microorganisms of public health importance.”* These arguments allude that the restaurants workplace attributes may put customers at risk of contracting viruses such as the COVID-19. Customers' perceptions regarding hygiene management is associated with their psychological states and decision-making process (Omar et al., 2021; Sifuentes et al., 2014). Opposing, unhygienic, and untidy spaces at hotels might increase consumer fear and threats of COVID-19 infection (Yu et al., 2021b). According to Choi et al. (2010), lack of space hygiene (e.g. dishes, equipment, infrastructure, and cutlery) in restaurants is considered as fear of disease infection. Similarly, dining space contamination or incorrect handling can occur when the surroundings is dirty, resulting in spread of infectious disease (Aksoydan, 2007). We contend that uncleanliness of space hygiene attributes at restaurants is more likely to develop fear of infectious disease in customers.

During COVID-19, cleanliness at dining surfaces, food preparation, kitchen, restrooms, and cutlery alleviate fear of infection and help determine customers' restaurant choice (Awan et al., 2020; Dedeoğlu et al., 2021). Likewise, Barber and Scarcelli (2010) argued that cleanliness is a critical indicator of the physical environment at restaurants. The studies predict that a customers consider the unhygienic state of physical environment as a key precursor of their fear regarding infectious disease (Chen and Eyoum, 2021; Duong, 2021; Sandín et al., 2021). We assume that consumers are more concerned about the space hygiene conditions when they dine at indoor or outdoor space, and feel fear if they experience unclean spaces. In the current scenario, consumers' interaction with unhygienic spaces at the restaurants causes their fear of COVID-19 infection. Hence, this study proposes the following hypothesis:

**H1.** Customers use spaces hygiene in restaurants is positively associated with their fear of COVID-19.

### 2.2. Personal hygiene of staff and consumers' fear of COVID-19

Employees' interaction, direct or indirect, with customers is inevitable in closed spaces in a service industry (e.g. hotels, airlines, and restaurants) (Yu et al., 2021a). The nature of the interaction—talking with customers and handling customers' belongings—increases the likelihood of catching and spreading infectious disease (Zhang et al., 2020). Moreover, food safety problems in the foodservice business are

attributed to five arch factors, including insufficient cooking, contaminated equipment, unsafe food sources, unsuitable holding temperatures, and poor personal hygiene (FDA, 2017). It implies that the employees working in the restaurants with poor personal hygiene are more likely to instill fear of COVID-19 in customers.

More recently, scholars have aptly asserted the employees' personal by referring to their uniforms, hands, and heads (Yu et al., 2021b). Personal hygiene has always been stated in terms of employees' hand and dress cleanliness as it warrants protection against ailments and contagious diseases (Awan et al., 2020; Laato et al., 2020). In current context, improper hygiene of staff—hand wash without soap and alcohol-based hand sanitizer—increases the susceptibility of COVID-19 infection (Montgomery et al., 2021). Employees' lack of understanding regarding food allergens, food temperatures, and hand and dress cleanliness increases the risk of contamination, which trigger consumers' fear and psychological stress (Barber and Scarcelli, 2010). Consumers weigh dish cleanliness, worker personal hygiene, and serving temperature as major factors while calculating their fear of food-borne infection (Leach et al., 2001). According to Duong (2021), cleanliness at the restaurants significantly contributes to customer satisfaction versus unhygienic conditions which build consumers' fear and anxiety. Therefore, in COVID-19 context, it is reasonable to conclude that improper personal hygiene of staff in the restaurants activates consumers' fear of disease transmission. Hence, we hypothesized:

**H2.** Personal hygiene of staff in restaurants is positively associated with consumers' fear of COVID-19.

### 2.3. Workspace hygiene and consumers' fear of COVID-19

Researchers have rarely addressed the sanitation and unhygienic conditions at restaurant spaces during epidemics or pandemics (Sifuentes et al., 2014). Recently, the restaurant hygiene and cleanliness has gained more prominence with the COVID-19's potency to transmit through virus-infected surfaces (WHO, 2020b). To this node, scholars identified that the restaurants are likely to be unhygienic, comprise a large number of microorganisms, and ultimately may serve as a source of spreading infection (Park et al., 2019). Similarly, aerosol spread via air conditioning may be a source of infection for COVID-19 (Zhang et al., 2020). The foregoing studies articulate that consumers prefer restaurants that offer both indoor and outdoor eating services with practicing protocols (i.e. sanitation and cleanliness). However, irregular hygiene inspections (i.e. human or robot based) tend to induce fear of COVID-19 pandemic.

A plethora of studies have contended that unhygienic and lack of safety and sanitary protocols at restaurant workspace develop consumer concerns of pathological and viral diseases. For instance, Hung et al. (2018) confirmed this assumption in context of SARS and H1N1 swine flu. Moreover, they discovered that lack of cleanliness at restaurant workspace could increase the spread of infectious diseases and fear in consumers. Likewise, Gu and Ryan (2008) assert that tidy dining area is critical to a restaurant's reputation. In this regard, scholars have looked at general sanitation and cleanliness as a major factor in customers restaurant selection (Ungku Fatimah et al., 2011), customers satisfaction (Choi et al., 2010), and customer loyalty. Restaurant surfaces that frequent receive human contacts are more likely to be contaminated by touch and become carriers of infectious diseases, which induce fear of COVID-19 among consumers (Addo et al., 2020). Therefore, it can be inferred that insufficient hygiene condition and sanitization at restaurant spaces are tend to develop the consumers' fear of transmission of disease.

Predicating on the aforementioned arguments, we posit that consumers at food and beverage restaurants feel fear of COVID-19 when they observe the unhygienic conditions at restaurant workspace—the cause of infection disease. Thus, we propose the following hypothesis:

**H3.** Workspace hygiene in restaurants is positively associated with consumers' fear of COVID-19.

### 3. Consumers' fear of COVID-19 and psychological distress

Fear, an emotional state, occurs in response to a real or perceived threat, and escalates an autonomic arousal, escape action, and thought of immediate danger (Chen and Eyoun, 2021). When individuals fail to deal with the threats, they experience emotional and psychological distress (Duong, 2021; Lee and Crunk, 2020; Sandín et al., 2021). According to Lee and Crunk (2020), people often experience distress through situational anxiety and panic. Fear and anxiety not only cause psychological distress but also engender a variety of pathological symptoms associated with the infectious disease (Addo et al., 2020). In this conduit, fear and anxiety are correlated with contagious disease (i.e. COVID-19) that causes consumers' psychological distress.

Recent studies have elaborated the connection between fear of COVID-19 and mental health issues (Boyratz et al., 2020; Faisal et al., 2021; Lee and Crunk, 2020). Moreover, scholars have assessed psychological distress vis-à-vis fear and anxiety from the COVID-19 perspective (Duong, 2021; Keum and Ahn, 2021), investigated the downstream psychological consequences (Akhtar et al., 2020; Finsterwalder, 2021), and derived prolific implications for practitioners (Shin and Kang, 2020). We infer from these arguments that establishing the connections between fear of COVID-19 and psychological distress can thereby improve our understanding of the pandemic's effects on consumers' behavioral responses.

Akhtar et al. (2020), based on fear and anxiety, conceptualized coronaphobia as an emotional state that represents negative psychological distress and adverse behaviors. COVID-19 related dread and anxiety can lead to psychological distress and other negative emotional disorders in consumers (Dedeoğlu et al., 2021; Leach et al., 2001). Scholar argued that fear and anxiety of COVID-19 can lead to mental health problems such as psychological distress and depression (Lee and Crunk, 2020). The contemporary researchers affirmed that the psychological consequences of various infectious diseases are associated with fear, anxiety, and stress (Chen and Eyoun, 2021). The current pandemic exhibited increased level of distress and discomfort (Omar et al., 2021; Yin and Ni, 2021). Therefore, based on foregoing arguments, fear of COVID-19, anxiety, and sadness positively develop the restaurants consumers' psychological distress. Hence, this study postulated the following hypothesis:

**H2.** Consumers' fear of COVID-19 positively develops their psychological distress.

#### 3.1. Psychological distress and behavioral intentions

Psychological distress is a term that describes bad or unpleasant sensations triggered by a variety of life events (Kessler et al., 2003). Anxiety, despair, stress, low motivation, bewilderment, withdrawal, hopelessness, and distraction states were all used under the aegis of psychological distress (Andrews and Slade, 2001; Duong, 2021). Scholars have argued that consumers' psychological distress educates two types—negative and positive—of behavioral responses (Siddiqi et al., 2020). Akhtar et al. (2019) mentioned that anxiety, distress, and discomfort positively develop consumers' negative evaluation and adverse purchase behavior. It can be argued that psychological distress, worry, or sadness is linked to cognition, which cause consumers' complex thinking and elicit contradictory behavioral intentions. Distracted and disorganized mental state develops preventative and avoidance purchase decision (Islam et al., 2020; Sung et al., 2021). Consumers' preventative behavior (i.e. poor interest, diversion, low focus) as a result of their distressed psychological states, and less motivation engenders less revisit intentions (Huang et al., 2020). Under the S-O-R paradigm, it infers that restaurants consumers are more likely engage in preventative

behavior when they have experience of distress and fear of COVID-19, and avoid repeat visit. The existing literature on service management vis-à-vis COVID-19 supports present conceptualization. For instance (Dedeoğlu et al., 2021), showed that consumers exhibit avoidance behavior when their cognition is constraint by a specific event (e.g. COVID-19 pandemic). Similarly, due to fear and psychological distress, consumers may feel uneasy and have a negative emotional state, which restrict their continuous purchase intentions (Andrews and Slade, 2001). Consumers who suffer, cognitively and emotionally, demonstrate less repurchase experience (Sultan et al., 2021). Therefore, result of stress, emotional instability, aggravation, and psychological distress tend to decline positive behaviors and spark preventative behaviors. In the current context, consumers' psychological distress due to COVID-19 fear and hygiene attributes are more likely to engage them in preventative behavior and abandonment of repeat visits at restaurant.

Psychological distress is a prevalent health condition among several individuals in today's culture. Consumers' usually experience some of the negative emotions such as anger, sadness, worry, and stress with psychological distress, which frequently linked to bad outcomes (Kang et al., 2021). Likewise, perplexed customers are often distressed, frustrated, and anxious and these psychological states frequently lead to negative behavior such as postponement or abandonment of purchasing activity, or switching to another brand (Aka and Buyukdag, 2021). In addition, Akhtar et al. (2019) discovered that users' ability to limit their behavioral responses is positively connected to their distress. Users who are experiencing psychological distress are more inclined to cope with uncomfortable and unpleasant feelings, which cause their switching or preventive behavior (Sung et al., 2021). Consumers that are psychologically distressed are more likely to engage in decline behavior without continuous purchases (Shin and Kang, 2020).

Based on aforementioned discussion, it can be concluded that the state of psychological distress linked with individuals' degree of stress, fear, and vulnerable situation that cause their adverse behavior and defer repeat decision-making. In the COVID-19 context, restaurants consumers' psychological distress, due to the fear of COVID-19 and hygiene conditions, at the restaurant develops their preventative behavior and restricts them for revisit. Thus, the following hypotheses have been formulated.

**H4.** Consumers' psychological distress is positively associated with their preventative behavior.

**H5.** Consumers' psychological distress is negatively associated with their revisit intentions.

#### 3.2. The moderating role of perceived vulnerability

In general, individuals underestimate their vulnerability to contagious diseases (Joseph et al., 2021; Weinstein, 1987). However, COVID-19 quick spread, deadly nature, and other factors such as social media intrusiveness, insufficient hygiene condition, lack of trust in vaccination, and lack of approved vaccines regressed this perception. It can be assumed that the COVID-19 pandemic has developed a sense of vulnerability due to unhygienic environment and lack of vaccination awareness. Individuals, who believe they are vulnerable to COVID-19, may be motivated to pursue self-protective actions through adaptive roles (Boyratz et al., 2020; Yin and Ni, 2021). Vulnerability to hygiene attributes may disrupt people's sense of safety or control by increasing COVID-19-related anxieties (e.g. loss of control, fear of infection, and feelings of insecurity) and activating adverse responses. In response, this study incorporated perceived vulnerability as a determiner between restaurant hygiene attributes and fear of COVID-19 as hypothesized (i.e. H1, H2 and H3).

Recent results reveal that greater vulnerability is linked with hotel cleanliness attributes in increasing risk and concern for COVID-19 (Kang et al., 2021). Studies in context of SARS (Hung et al., 2018) and COVID-19 (Akhtar et al., 2020) have elaborated consumers experience

of unhygienic factors and situational vulnerability germane to fear of infection. Moreover, a greater sense of disease vulnerability has been reported to lead to an increased level of fear due to unhygienic signs, particularly when such signs are interpreted in text of potential threat of an infection (Aka and Buyukdag, 2021; Duong, 2021). Individuals with high fear of COVID-19 comprehend the physical vulnerability with hygiene attributes such as tangible and intangible (Peng and Chen, 2021). Likewise, the effect of the cleanliness was significant amongst those who felt more vulnerable to infectious diseases that cause fear of disease (Chen and Eyoum, 2021; Duong, 2021; Sung et al., 2021). We therefore postulate that perceived vulnerability may enhance concerns associated with hygiene attributes, which, in turn, brings more fear during this pandemic. Therefore, we contend that the greater perception of vulnerability consequents in more fear of COVID-19 when the hygiene attributes are inadequately followed at the restaurants. Hence, we hypothesized the following:

**H5.** Perceived vulnerability positively moderates the effect of hygiene attributes (a) hygiene of customer-use spaces, (b) personal hygiene of staff, (c) and hygiene of workspace on fear of COVID-19 such that the association is strong (vs. weak) when perceived vulnerability is high (vs. low).

## 4. Methodology

### 4.1. Survey design

We administered a survey instrument from the established literature. We changed certain expressions of measurement items to fit the COVID-19 context. The original questionnaire was written in English, therefore, we hired two professional bilingual translators who translated it into Chinese and back-translated into English. We also approached a university professor to confirm the content wording of the translated version. Later, a pilot study with 53 participants revealed adequate constructs' reliability (i.e. Cronbach Alpha >0.70): Hygiene of customer-use spaces ( $\alpha = 0.78$ ), personal hygiene of staff ( $\alpha = 0.81$ ), hygiene of workspace ( $\alpha = 0.74$ ), perceived vulnerability ( $\alpha = 0.77$ ), fear of COVID-19 ( $\alpha = 0.87$ ), psychological distress ( $\alpha = 0.80$ ), preventative behavior ( $\alpha = 0.79$ ), and revisit intentions ( $\alpha = 0.85$ ). The first section of the survey contained the research description and screening question. The second section comprised of items anchoring the focal constructs of the study. All items were anchored on different Likert scale, and this section had 34 questions. Age, gender, profession, income, education, and frequency of restaurant visits were all included in the third section of the survey. We also tested the control effects of age, gender, income, and frequency of restaurant visits.

We used 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) anchoring respondents' perceived hygiene experiences from the work of Yu, Seo, et al. (2021a, 2021b): seven items of hygiene of customer-use spaces (e.g. space cleanliness, antibacterial products, hygiene of tangible facilities, sterilization and disinfection), six items of personal hygiene of staff (e.g. staff health care, body temperature, hand wash), and four items of hygiene of workspace (e.g. cleanliness of work area of staff, equipment, and workspace and lounge disinfection). We adopted seven items of fear of COVID-19 from Chen and Eyoum (2021) based on 7-point Likert scale (1 = always to 7 = never) to measure the consumers' afraid, uncomfortableness, calmness, life loss, nervousness, worry, and palpitates due to COVID-19. Similarly, perceived vulnerability was adopted from the five items measurement scale of Boyraz et al. (2020) anchored on 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). We used a 5-point Likert scale from (1 = strongly disagree to 5 = strongly agree) to measure the perceived distress by using the six items from Kessler et al. (2003). It covered sadness, restless, hopeless, depress, and worthless to gauge consumers' fear of COVID-19. Further, we adapted the eight items to measure the preventative behavior from Sung et al. (2021) 5-point Likert-type (1 = strongly

disagree to 5 = strongly agree). We slightly modified the context to capture consumers' protectiveness, preventative behavior, and discomfort level. Finally, this research applied three items measurement scale from Ahmad and Sun (2018) to measure revisit intentions. Table II included all of the measurement items.

### 4.2. Data collection and sampling

To reduce face-to-face interaction and comply with existing social distancing rules, online questionnaire was administered to record responses. Accordingly, we collected data using Chinese online platform ([www.sojump.com](http://www.sojump.com)), a reliable survey tool for online data gathering in social sciences. A brief statement regarding the research description, data collection procedure, and legally required data protection information was given to respondents (on a page prior to the start of the survey) Thus, 426 responses were obtained during the 20-days spanning September 1, 2021 to September 20, 2021. We excluded 19 responses due to their unsuitability for data analysis, an overall sample size of 407 was employed for the further analysis. The sample size was adequate for data analysis by following the suggestions of Hair et al. (2011).

### 4.3. Data analysis

We used IBM SPSS 25.0 and AMOS 24.0 to analyze the data in order to confirm the relationships in the provided hypotheses. We employed the following quantitative analysis techniques (e.g. assessment of measurement model, assessment of structural model, estimation of common method variance, common method variance, and variance inflation factor (VIF). Additionally, we calculated the variance of endogenous variables and their effect sizes. Finally, we examined the effects of moderation using Hayes (2013) PROCESS macro.

### 4.4. Respondents' profile

To check the sample characteristics, demographic analysis was carried out using the SPSS 24.0. Of those surveyed, 52.6% were men and 47.4% were women. In terms of age, 16.9 percent were in their twenties, 47.4 percent in their thirties, 21.8 percent in their quarters, and 9.3 percent in their fifties, suggesting that the 18 and 45 participants represent the greatest population of the survey. Based on education, 25.1% of respondents had finished their studies in high schools, 41% had undergraduate from college, and 33.9% were graduate. Lastly, the income level showed the following: 32.1 percent had revenue below 5000 RMB, 25.3 percent between 5001 and 10,000 RMB, 17.9 percent between 10,001 and 15,000 RMB, and 14.5% beyond 15,001–20,000 RMB (Table I).

### 4.5. Measurement model assessment

Anderson and Gerbing's (1988) two-step approach was employed for checking measurement and structural models through AMOS 24.0. The fit indices showed the stipulated adequacy for the measurement mode as follows: ( $\chi^2/df$ ; 2760.166/981 = 2.814, RMSEA = 0.067) (Hu and Bentler, 1999), AGFI = 0.908 (MacCallum and Hong, 1997), NFI = 0.954, RFI = 0.939, CFI = 0.967; TLI = 0.960 (Hu and Bentler, 1999). Table II represents the result of confirmatory factor analysis (CFA) of the constructs. All standardized factor loadings (SFLs) of the indicators surpassed the cut-off score of 0.70 except CFC3 (i.e. 0.611) and PB8 (i.e. 0.651), thus excluded from the rest of analysis. The composite reliabilities (CRs) for the eight constructs ranged between 0.89 and 0.95—higher than the 0.70 threshold score (Fornell and Larcker, 1981). The internal consistency of measurement items was determined using Cronbach alpha ( $\alpha$ ) with a suggested value of 0.70. Further, the average variance extracted (AVE) for all variables was above the 0.50 cut-off value; thereby, achieving convergent validity (Fornell and Larcker, 1981). Moreover, we also confirmed the discriminant validity by

**Table 1**  
Consumers' demographics (n = 407).

Consumers' demographic	n	(%)
<b>Gender</b>		
Male	214	52.6
Female	193	47.4
<b>Marital Status</b>		
Single	310	76.2
Married	97	23.8
<b>Category of age (years)</b>		
18-25	69	16.9
26-35	193	47.4
36-45	89	21.8
46-55	38	9.3
Over 56	18	4.4
<b>Education level</b>		
High school	102	25.1
Undergraduate	167	41.0
Graduate	138	33.9
<b>Income (RMB/Month)</b>		
< 5000	131	32.1
5001-10,000	103	25.3
10,001-15,000	73	17.9
15,001-20,000	59	14.5
> 20,000	41	10.0
<b>Profession of inbound tourists</b>		
Students	148	36.4
Govt. official	98	24.0
Business persons	115	28.3
Scholars	46	11.3

calculating the square root of the AVE for each construct, which should be higher than the correlations between all the constructs (Fornell and Larcker, 1981). The square roots of AVE for all constructs ranged from 0.75 to 0.84, above the correlations of focal variables, as indicated in Table III. Thus, discriminant validity was established.

4.6. Common method variance

The current study employed a self-administrated questionnaire, which is likely to pose the issue of common method variance (CMV). For initial detection of CMV, the Harman's single-factor approach Podsakoff and Lee (2003) was employed. The exploratory factor analysis revealed the variance of 21.29% for the first factor, indicating that no single factor explained the majority of the variance; hence, CMV was not a concern. Additionally, for robustness, we used common latent factor approach as suggested Podsakoff and Lee (2003). The results demonstrated that the predicted parameters and fit indices for the current research model had insignificant variances. Thus, CMV did not appear to be a significant concern in our sample data.

4.7. Structural model assessment

The hypothesized relationships were tested using structural equation modelling. To test the proposed structural relationships, we used the bootstrapping method (Preacher and Hayes (2004)) and employed a 95% bootstrap confidence interval (CI) with 10,000 samples. The structural model results indicated satisfactory model fit indices adequate fit:  $\chi^2/df$ ; 2025.030/709 = 2.856, p = 0.000,; RMSEA = 0.068 (Hu and Bentler, 1999); AGFI = 0.843 (MacCallum and Hong, 1997); CFI = 0.911; RFI = 0.911; NFI = 0.907; TLI = 0.903 (Hu and Bentler, 1999). The model achieved goodness of fit criteria to proceed with the hypotheses testing.

4.8. Hypotheses tests

We used structural equation modelling (SEM) to test the postulated hypotheses (Fig. 1 and Table IV). Initially, we looked for the multicollinearity issue and found variance inflation factor (VIF) between

**Table 2**  
Results of construct validity and reliability of latent constructs.

Constructs	Items	Statements	SFL
<b>Customer-use spaces (CUS)</b> (CR = 0.95, AVE = 0.73, $\alpha$ = 0.85)	CUS1	This restaurant cleans areas where water is congested (i.e., sinks, toilets, and washroom floors) using disinfectants.	0.863
	CUS2	This restaurant washes its lobby using antibacterial products and practices.	0.874
	CUS3	The restaurant is regularly fumigated to prevent pests and cockroaches.	0.834
	CUS4	This restaurant cleans in-dining facilities (i.e., desks, chairs, sofas, mirrors, and closets) using disinfectants.	0.869
	CUS5	The dining areas in this restaurant are equipped with special air cleaners to prevent aerosol infections.	0.863
	CUS6	This restaurant conducts hot water sterilization (heating for more than 30 s in boiling water) of utensils used in its (i.e., cutlery, crockery, and cutting boards).	0.840
<b>Personal hygiene of staff (PHS)</b> (CR = 0.92, AVE = 0.68, $\alpha$ = 0.82)	PHS1	The restaurant staff each receive at least one health check-up per year.	0.816
	PHS2	The restaurant staff are meticulous in their hand-washing and disinfecting.	0.825
	PHS3	The restaurant staff refrain from visiting crowded areas.	0.839
	PHS4	The restaurant staff wear masks at all times while on duty.	0.866
	PHS5	The restaurant staff cover their mouths and noses with bent elbows when coughing or sneezing.	0.817
	PHS6	The restaurant staff always check their body temperature upon arrival at work.	0.806
<b>Workspace hygiene (WH)</b> (CR = 0.89, AVE = 0.68, $\alpha$ = 0.82)	WH1	This restaurant cleans the surfaces of the work areas of staff (i.e., desks and tables) using disinfectants.	0.900
	WH2	This restaurant cleans the work equipment of staff (i.e., phones, keyboards, and printers) using disinfectants.	0.849
	WH3	The restaurant staff maintain a distance of more than 1 m from their fellow staff members while at work.	0.803
	WH4	The workspaces and lounges used by staff in this restaurant are subject to regular management by professional hygiene companies.	0.761
<b>Consumers' fear of COVID-19 (CFC)</b> (CR = 0.89, AVE = 0.57, $\alpha$ = 0.75)	CFC1	I am most afraid of COVID-19.	0.751
	CFC2	It makes me uncomfortable to think about COVID-19.	0.724
	CFC4	I am afraid of losing my life because of COVID-19.	0.774
	CFC5	When watching news and stories about COVID-19 on social media, I become nervous or anxious.	0.734
	CFC6	I cannot sleep because I'm worrying about getting COVID-19.	0.796
	CFC7		0.775

(continued on next page)

Table 2 (continued)

Constructs	Items	Statements	SFL
<b>Perceived vulnerability (PV)</b> (CR = 0.92, AVE = 0.72, α = 0.84)	PV1	My heart races or palpitates when I think about getting COVID -19.	0.871
	PV2	In general, I am very susceptible to infectious diseases.	0.857
	PV3	I am more likely than the people around me to become infected with Coronavirus.	0.852
	PV4	I have a history of susceptibility to infectious disease.	0.856
	PV5	I am more likely than the people around my age to become infected with Coronavirus.	0.805
<b>Psychological distress (PD)</b> (CR = 0.89, AVE = 0.59, α = 0.76)	PV5	I have pre-existing health conditions that increase my susceptibility to Coronavirus.	0.805
	PD1	When using restaurant to eat, due to fear of COVID-19, I often feel:	0.753
	PD2	So sad	0.833
	PD3	Nervous	0.761
	PD4	Restless	0.763
	PD5	Hopeless	0.741
<b>Preventative behavior (PB)</b> (CR = 0.90, AVE = 0.57, α = 0.75)	PD6	Worthless	0.781
	PB1	Depressed	0.781
	PB1	While dining out in a restaurant, I have worn a mask to reduce the risk of COVID-19 infection.	0.778
	PB2	While dining out in a restaurant, I have tried to wash my hands or used hand sanitizer more often to prevent the risk of COVID-19 infection.	0.735
	PB3	While dining out in a restaurant, I have tried to avoid crowds by selecting restaurants restricting their capacity to half or less.	0.805
	PB4	I would be willing to choose restaurants that follow preventative measures.	0.776
	PB5	I often urge my friends to choose restaurants that use preventative measures.	0.723
<b>Revisit intentions (RI)</b> (CR = 0.91, AVE = 0.72, α = 0.84)	PB6	I would be willing to obey preventative measures in order to keep the safe environment for dining.	0.707
	PB7	I make every attempt to keep personal hygiene in order to maintain diner environmental sanitation and restaurant safety.	0.765
	RI1	I anticipate continuing to visit the restaurants in the near future.	0.835
	RI2	It is likely that I will continue to go to the restaurants.	0.868
	RI3	I expect to continue to visit the restaurants in the near future.	0.850
	RI4	I am satisfied with my decision to go to the restaurants and will go again in the future.	0.847

1.097 and 1.810— significantly below the threshold 3.0 criterion. Regarding hypotheses results, H1 revealed that customer use spaces had significant positive effects on consumers’ fear of COVID-19 (CUS→CFC = 0.557\*\*\*, t = 4.251, [0.300, 0.813]). The results for H2 showed that personal hygiene of staff had significant positive influence on consumers’ fear of COVID-19 (PHS → CFC = 0.537\*\*\*, t = 3.781, [0.258, 0.815]). Similarly, H3 results indicated a significant positive association between workspace hygiene and consumers’ fear of COVID-19 (WH → CFC = 0.564\*\*\*, t = 3.312, [0.151, 0.590]). Hence, the results of H1-H3 were supported. We found a significant positive effect of consumers’ fear of COVID-19 on psychological distress (CFC → PD = 0.645\*\*\*, t =

3.981, [0.327, 0.962]), which supported H4. Finally, the relationship between psychological distress and preventative behavior was significant and positive (PD → PB = 0.669\*\*\*, t = 4.372, [0.369, 0.968]), showing that H5 was supported. Although, we found a significant relationship between psychological distress and revisit intentions (PD → RI = 0.297\*\*\*, t = 2.911, [0.097, 0.496]), it was refuted being contrary to our hypothesis H6.

In addition, we provided the predictive power (R<sup>2</sup>) of exogenous variables towards endogenous constructs. The R<sup>2</sup> = 32.6% in consumers’ fear of COVID-19 is explained by hygiene of customer use, personal hygiene of staff, and hygiene of workspace. Likewise, psychological distress is explained 41.6% by consumers’ fear of COVID-19. Lastly, preventative behavior (R<sup>2</sup> = 44.7%) and revisit intentions (R<sup>2</sup> = 9%) is enunciated by psychological distress. The cumulative variance respresented by all independent variables was greater than 60% as suggested by Hair et al. (2011). Moreover, we followed the recommendations of Cohen (1988) to calculate effect size (f<sup>2</sup>) of the focal constructs (i.e. large = 0.35, medium = 0.15, and small = 0.02). The results indicated the followings effect sizes: f<sup>2</sup><sub>CFC</sub> = 0.483, f<sup>2</sup><sub>PD</sub> = 0.712, f<sup>2</sup><sub>PB</sub> = 0.808 have large effect sizes, and f<sup>2</sup><sub>RI</sub> = 0.098 has small effect size.

#### 4.9. Moderating results of perceived vulnerability

We applied the Hayes (2013) PROCESS macro in examining the moderating effects of perceived vulnerability. In SPSS 25.0, we used model 1 based on 10,000 samples at a 95% CI level to check the moderation effects. The results in Table V showed that perceived vulnerability significantly moderated the association between customer use spaces and consumers’ fear of COVID-19 (PV × CUS→CFC = 0.607\*\*\*, t = 7.091, [0.439, 0.774]), showing H7(a) was supported. Likewise, the results of H7 (b) indicated that perceived vulnerability significantly moderate the influence of personal hygiene of staff on consumers’ fear of COVID-19 (PV × PHS→CFC = 0.598\*\*\*, t = 8.925, [0.466, 0.729]), thus supported H7 (b). Lastly, perceived vulnerability had a significant moderation effect on the relationship between workspace hygiene and consumers’ fear of COVID-19 (PV × WH→CFC = 0.487, t = 11.398, [0.388, 0.595]), which supported H7(c).

Moreover, to check the boundary condition of the moderating effects, we split the perceived vulnerability data into low and high groups by applying centric mean, as suggested by Aiken et al. (1991). With all predictors, we investigated the effects of low and high levels of the moderating function on consumers’ fear of COVID-19. When perceived vulnerability was high, customer use spaces had a significant positive effect on customers’ fear of COVID-19 (PV(H) × CUS→CFC = 0.664\*\*\*, t = 8.524, [0.511, 0.817]). In comparison, when perceived vulnerability was low, customer use spaces had a low significant effect on consumers’ fear of COVID-19 (PV(L) × CUS→CFC = 0.332\*\*, t = 6.916, [0.237, 0.426]). Similarly, when perceived vulnerability was high, personal hygiene of staff had a high significant positive impact on consumers’ fear of COVID-19 (PV(H) × PHS→CFC = 0.528\*\*\*, t = 6.830, [0.376, 0.680]) compared with low perceived vulnerability (PV(L) × PHS→CFC = 0.264\*\*, t = 7.333, [0.193, 0.334]). Lastly, perceived vulnerability had a greater influence on the association between workspace hygiene and consumers’ fear of COVID-19 at a high level (PV(H) × WH→CFC = 0.489\*\*\*, t = 6.776, [0.347, 0.631]) in comparison to perceived vulnerability at low level (PV(L) × WH→CFC = 0.244\*\*, t = 4.135, [0.128, 0.359]). Thus, moderating hypotheses were completely supported.

### 5. Discussion and implications

The purpose of this study was to assess perceived hygiene attributes—customer use space, personal hygiene of staff, and workspace hygiene— with respect to consumers’ fear of COVID-19 and associated psychological distress. We also examined the behavioral



**Table 3**  
Discriminant validity.

	CUS	PHS	WH	CFC	PV	PD	PB	RI
1	0.858							
2	0.521	<b>0.829</b>						
3	0.599	0.589	<b>0.830</b>					
4	0.494	0.386	0.484	<b>0.759</b>				
5	0.505	0.486	0.543	0.469	<b>0.848</b>			
6	0.453	0.338	0.427	0.568	0.414	<b>0.773</b>		
7	0.490	0.404	0.474	0.537	0.443	0.368	<b>0.756</b>	
8	0.528	0.508	0.565	0.427	0.577	0.415	0.445	<b>0.849</b>

Note: 1 = CUS, 2 = PHS, 3 = WH, 4 = CFC, 5 = PV, 6 = PD, 7 = PB, 8 = RI.

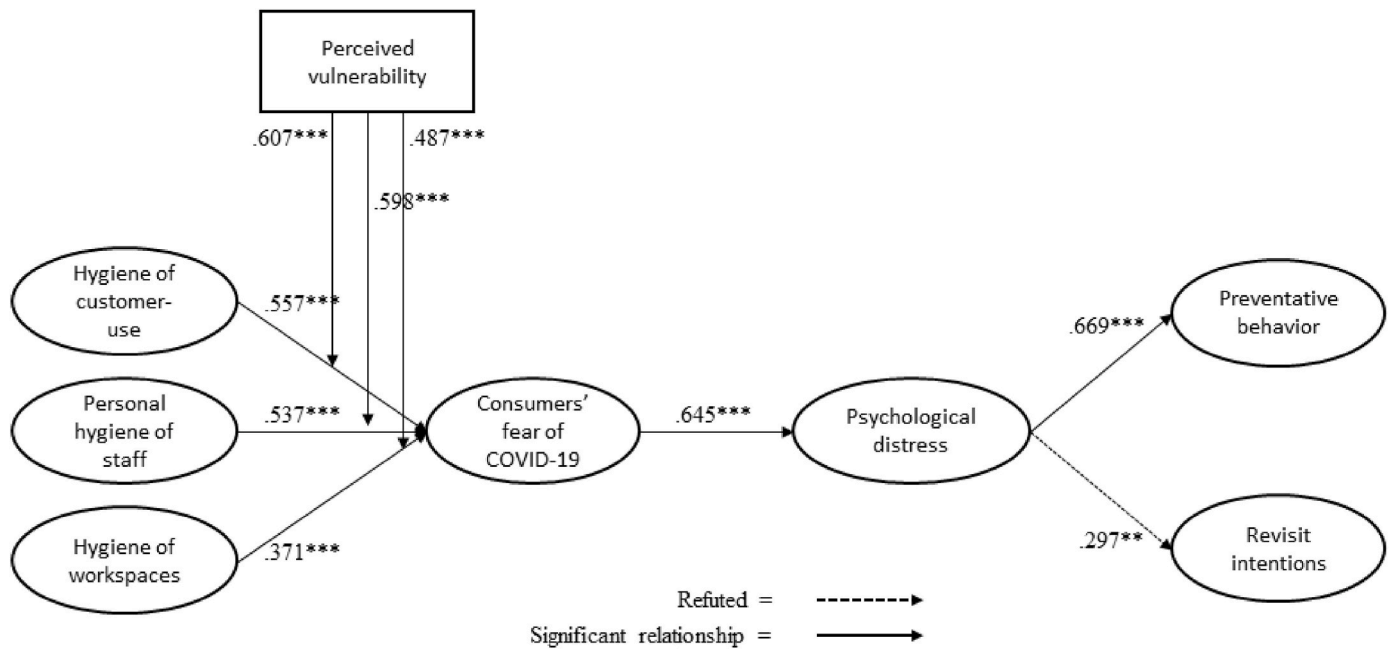


Fig. I. Confirmation of proposed relationships.

**Table 4**  
Hypotheses tests.

Structural paths	Coefficient estimates	t-value	Confidence interval. 95%	Path results
CUS→CFC	0.557***	4.251	[0.300, 0.813]	H1: supported
PHS→CFC	0.537***	3.781	[0.258, 0.815]	H2: supported
WH→CFC	0.371***	3.312	[0.151, 0.590]	H3: supported
CFC→PD	0.645***	3.981	[0.327, 0.962]	H4: supported
PD→PB	0.669***	4.372	[0.369, 0.968]	H5: Supported
PD→RI	0.297**	2.911	[0.097, 0.496]	H6: Refuted

Notes: level of significant \*\*\**p* < 0.001.

outcomes—preventative behavior and revisit intentions—the effects of consumers’ psychological distress. This study investigates the moderating role of perceived vulnerability on the effects of hygiene attributes on consumers’ fear of COVID-19. To attain the research objectives, we applied the survey technique by employing adapted scales from well-establish literature in COVID-19 context. The findings affirmed that restaurant hygiene attributes impact on consumers’ fear of COVID-19 and their psychological distress. Psychological distress positively causes consumers preventative behavior (supported) and revisits intentions (refuted). The boundary condition of perceived vulnerability positively

**Table 5**  
Moderation effects of perceived vulnerability.

Structural paths	Coefficient estimates	Standard error	t-value	Confidence interval 95%	Path results
PV × CUS→CFC	0.607***	0.0856	7.091	[0.439, 0.774]	H7(a): Supported
PV × PHS→CFC	0.598***	0.0670	8.925	[0.466, 0.729]	H7(b): Supported
PV × WH→CFC	0.487***	0.0554	8.790	[0.378, 0.595]	H7(c): Supported

Notes: \*\*\**p* < 0.001.

strengthens the associations between perceived hygiene attributes and consumers’ fear of COVID-19. Hence, the ensuing theoretical implications were derived with discussion.

5.1. Theoretical implications

First, findings demonstrated that perceived hygiene attributes—customer-use spaces, personal hygiene of staff, and workspace hygiene— develop consumers’ fear of COVID-19. Previous research has proven the significance of customers’ perceptions of hygiene attributes in determining their purchase behavior and decision-making (Barber and Scarcelli, 2010; Choi et al., 2010; Yu et al., 2021a). During the COVID-19, consumers’ fear of the pandemic has inflated with respect to customer spaces, staff personal hygiene, and workplace hygiene. The

contemporary research focused on the hotel hygiene, food storage, and cooking processes; however, limited scholars elaborated restaurant hygiene attributes in the COVID-19 context. Recently, Yu, Seo, et al. (2021a, 2021b) examined the aspects of hotel hygiene based on guests' perception. In line, the current research accentuated the critical nature of restaurant hygienic attributes in retaining and encouraging customers' revisit during the COVID-19 pandemic. It is noteworthy that this research asserted that consumers significantly focused on hygienic attributes during the COVID-19. Thus, we contribute to the body of knowledge on health and service management by demonstrating that perceived hygiene attributes significantly predict consumers' fear of COVID-19.

Secondly, the findings showed that consumers' fear of COVID-19 engendered psychological distress—consistent with the existing literature (Faisal et al., 2021; Keum and Ahn, 2021; Sandín et al., 2021). For example, the work of Duong (2021) and Lee and Crunk (2020) discovered that fear and anxiety of COVID-19 were strongly and positively linked with psychological distress. Theoretically, this research investigated the grand challenge concerning the effects of fear of COVID-19 in developing consumers' psychological distress in the context of Chinese restaurants. Therefore, we enriched the body of knowledge in consumer psychology by comprehending consumers' fear of COVID-19 with relevance to psychological distress.

Third, psychological distress has a positive impact on consumers preventative behavior is consistent earlier research (Ahmad and Sun, 2018; Boyraz et al., 2020; Sung et al., 2021). Psychological distress is one of the most important states of consumers' emotions. It is of no surprise that in the presence of COVID-19, the preventative behavior is amplified. Our findings have also demonstrated that psychological distress positively effects restaurant preventive behaviors, whereas fear has no such effect. These findings contribute to the body of consumer behavior. It emphasizes that psychological distress can be more critical than fear and causes preventative behavior toward restaurants, especially when the hygienic attributes are associated with COVID-19. On the other hand, research proposed negative influence of psychological distress on consumers' revisit intentions (Akhtar et al., 2019; Laato et al., 2020; Yin and Ni, 2021). Previous research has primarily focused on the psychological effects of social life satisfaction, creativity, and well-being (Duong, 2021; Yu et al., 2021a). However, the findings indicate that psychological distress positively engages consumers in revisit intentions. These findings are contrary with the existing literature (Akhtar et al., 2019; Keum and Ahn, 2021; Sharma and Paço, 2021), and extend the body of psychology by indicating that people under psychological distress uses minimum cognitive resources available to think. Therefore, they prefer to reuse the existing opportunities. During the COVID-19, individuals who have been exposed to specific internal state of psychological distress are more prone to reject new encounters. Scholars have argued that unobservable, unknown, and unpredictable threats, such as COVID-19, are determined by individuals' subjective perceptions and state of psychological distress (Duong, 2021).

Finally, our findings relate to the moderating role of perceived vulnerability on the relationships of hygiene attributes and fear of COVID-19. The findings extend the knowledge on health management and have complete agreement with the extant literature (Aka and Buyukdag, 2021; Duong, 2021; Mortensen et al., 2010). Even though earlier studies have shown people's perceive vulnerability to infection as an adaptive function such as encouraging health-protective activities (Barber and Scarcelli, 2010; Boyraz et al., 2020; Faisal et al., 2021), the present findings revealed that perceived vulnerability during COVID-19 significantly affected the association between hygiene attributes and fear of COVID-19. Individuals who develop symptoms of COVID-19 as a result of vulnerability and infectious disease will increasingly engage in fear of pandemic (Boyraz et al., 2020). Our findings contribute to the disaster management literature by identifying hygiene-related attributes (i.e. customer use space, personal hygiene of staff, and workspace hygiene) in developing fear and anxiety.

## 5.2. Practical implications

The current study educes the following practical implications in current context.

First, to reduce the fear of COVID-19 transmission, food and restaurant owners should adhere to all general hygiene guidelines of the WHO. To prevent transmission from human-to-human, precautionary measures such as personal hygiene, hand sanitization, and contactless practices should be used. For example, in China, many hotels are using Wechat payment, which alleviates the unnecessary interaction between customers and employees. Similarly, artificial intelligence based robots, as used in Netherland, should be employed to acclimatize the restaurant industry to the current context. To this end, taking and delivery of order, collecting, and cleaning through robots tend to allay consumers fear. As the S-O-R theory predicts that individuals are influenced by the restaurant ambience, such pandemic based embeddedness would warrant the consumers of the management commitment to safeguard them.

Second, alternatively, it is essential to develop health and disaster management department to train employees on proper hygiene in areas (e.g. dining and waiting areas) where consumers congregate. Restaurant crockery and cutlery should be disinfected for at least 30 s in boiling water, and restaurant furniture (e.g. tables and chairs) should be sanitized with antibacterial. Disinfectants and antibacterial sprays should be used by the staff to treat possible water-logged areas (e.g. sinks, toilets, and washroom floors).

Third, restaurant management should likewise be vigilant about their staff's personal cleanliness. Staff should be ensured using alcohol-based sanitizers and getting annual medical checks-up. During work hours, employees should be required to wear masks, and they should be encouraged to avoid visiting places with massive crowds after office time. Furthermore, employees' body temperature should be consistently checked and, accordingly, be given complete examinations and time offs if they have a fever. During COVID-19, the restaurant managers must remind their workers of the necessity of cleanliness in order to keep customers and encourage them to revisit in the future. Irrespective of the country, offering hygiene qualities in a restaurant makes customers feel more protective and safer, increases their likelihood to dine in or takeaway.

Finally, the present situation emphasizes on the post-COVID-19 vulnerability, as asserted by our findings. Therefore, this research suggests three hygiene attributes—table distance, partition between tables, and separate room dining to regain consumers' visits. To avoid fear of the pandemic and associated vulnerability, the restaurants should allow only vaccinated customers for dining at their outlets. By doing so, the health and safety measures can be ensured by propagating message of collective responsibility to the customers.

## 6. Limitations, future research directions, and conclusion

The current study identifies its limitations, which offer research directions for future studies. First, our sample confined to the People's Republic of China, where the likelihood of consumers' perception, vis-à-vis COVID-19's preventive measures, as a source of fear is low. Therefore, future scholars can examine the applicability of our research to other countries. Second, we examined the indoor restaurants' hygiene attributes during the COVID-19 pandemic; however, future research could assess these hygiene attributes in outdoor dining context. Third, this research did not include take-out and delivery services in its sampling. We encourage future scholars to incorporate this perspective to enrich the related literature. Fourth, we drew finding and implications based on data collected during the COVID-19. It is quite possible that the post-COVID consumer opinion of restaurant hygiene attributes differ. Thus, further research could examine post-COVID consumers' perceptions of restaurant hygiene.

In sum, the widespread COVID-19 pandemic has greatly constrained customers' ability to dine in restaurants. To prevent infection of

restaurant personnel and customers, it is critical to orchestrate hygiene attributes carefully. A stream of literature has examined various aspects of COVID-19; however, it lacks investigation of restaurant hygiene attribute during COVID-19 pandemic. Hence, it was high time to examine perceived hygiene attributes at the restaurants and their effect on consumer behavior. The effects of hygiene attributes— hygiene of customer-use spaces, personal hygiene of staff, and workspace hygiene—were examined in the current research. Our findings discovered that consumers' perceived hygienic attributes increased their fear of COVID-19, resulting in psychological distress, which prompts them to engage in preventative behavior. Moreover, this study established that perceived vulnerability moderates the association between hygiene attributes and consumers' fear of COVID-19.

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