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The effects of crowdedness and safety measures on restaurant patronage choices and perceptions in the COVID-19 pandemic

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ABSTRACT

This paper investigates the effects of crowdedness and in-restaurant safety measures on consumers' restaurant patronage choices (eat-in vs. order takeaway vs. not patronize) and their perceptions during the COVID-19 pandemic. In an online experiment with 593 US consumers and 591 Australian consumers, we assess the effects of three levels of crowdedness (low vs. medium vs. high crowdedness) and four types of in-restaurant safety measures (none vs. partition vs. increasing distances between tables vs. not using in-between tables) by showing participants an image of the restaurant setting. Results show that US consumers are more sensitive to crowdedness, whereas Australian consumers are more sensitive to different types of safety measures, which greatly influence their patronage choices. In general, safety measures featuring social distancing are preferred over partitions, and there is no preferential difference between the measure of increasing distances between tables and the measure of not using in-between tables.

1. Introduction

The COVID-19 pandemic has had a huge impact on the hospitality industry due to canceled events, hotel and restaurant closures, and tourist attractions being shut down (Baum and Hai, 2020; Song et al., 2021). A weekly comparison between March 21, 2019, and March 21, 2020 (i.e., year over year), identifies that the number of guests substantially declined by more than 50%, which corroborates the crisis in the accommodation sector owing to the pandemic (Gössling et al., 2020). Hotel occupancy in China decreased 89% by January 2020, while in the United States (US), revenue per available rooms in the hotel industry declined by 11.6% at the end of March 2020 alone (Nicola et al., 2020). Although social distancing is a key strategy to effectively manage COVID-19 in several countries, in addition to the hotel industry, restaurants and cafes (which have a small return on investment) are the worst-hit areas (Gössling et al., 2020).

Although COVID-19 is having a devasting impact, research suggests some feasible and actionable solutions to help hospitality practitioners to survive the impact of the pandemic. These solutions can be divided into four general categories. The first solution is related to adopting new technology (e.g., Shin and Kang, 2020; Hao et al., 2020). The main reason travelers and restaurant customers are reluctant to make purchases during the COVID-19 period is because of the high perception of there being a health risk. As such, an effective way to attract customers is to reduce the perceived health risk. For example, hotels can adopt technology innovations (e.g., mobile check-in systems, kiosk check-in machines, and robot cleaning systems) to minimize guest interactions with hotel staff and to improve hotel cleanliness (Shin and Kang, 2020). Further, the digital transformation of the hotel industry (e.g., food delivery robots, kiosks, face recognition, voice appliance, mobile payment, video conferencing, cloud collaboration, and teleworking) presents several advantages for digital customer relationship management (Hao et al., 2020). The second solution relates to changing service delivery processes (e.g., Hao et al., 2020; Kim and Lee, 2020). The pandemic has presented a huge threat to restaurants because of the need to minimize seating capacities to maintain social distancing policies. Restaurant owners are forced to make a strategic move to keep customers. A way to do this is to provide private dining rooms. Research has found that the salience of the virus has created a preference for private dining tables and for restaurants with private rooms (Kim and Lee, 2020). The third solution is related to following hygiene-related standards (e.g., Alonso et al., 2020; Seale et al., 2020). As recommended by Seale et al. (2020), restaurants and hotels can encourage consumers to wash their hands with soap and water and use hand sanitizer more often.

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Fourth is related to coping with and adjusting to the COVID-19 pandemic (e.g., Alonso et al., 2020). Small and medium-sized enterprises in the hospitality industry can either adopt coping strategies or make adjustments to day-to-day activities in response to COVID-19 (Alonso et al., 2020). For example, restaurant owners should make changes in revenue-generation in terms of strengthening their food delivery and takeaway options, reducing working hours, mothballing (deactivating, storing, or preserving equipment), and rotating staff (Alonso et al., 2020). Restaurant owners should also introduce new product lines (e.g., different sizes and prices to facilitate consumers to consume more at home).

Crowdedness is an important factor for consumers to evaluate the popularity of a restaurant as it can create a favorable impression of high food quality, low food prices, and a good reputation (Tse et al., 2002), and there is a wealth of research providing recommendations on how to create a safe restaurant environment during the COVID-19 pandemic (e.g., Taylor, 2020). However, there is a lack of research looking into the crowdedness–safety relationship in the pandemic and the differences between various safety measures regarding their effects on restaurant patronage choices. In addition, there is a lack of research comparing the behaviors and perceptions of consumers from countries in different stages of COVID-19. This paper aims to fill these research gaps by undertaking a thorough investigation of how crowdedness and safety measures influence restaurant patronage choices across two countries: the US and Australia. Theoretically, we contribute to the literature on crowdedness and social distancing by gaining a systematic and insightful understanding of the impact of the COVID-19 pandemic on consumer patronage decisions for restaurants. Further, we provide relevant and effective suggestions on how to determine the optimal density and how restaurants can better set up their layout to help them survive the COVID-19 crisis and, importantly, recover from its devastating effects in the long run.

2. Theoretical framework

This study draws on the DAST (design-ambient-social-trialability) framework (Roggeveen et al., 2019), which proposes that design factors (e.g., layout, comfort, presentations), ambient elements as background conditions (e.g., lighting, music, smells), social people present in the environment (e.g., number of others, behavior of others, physical presence of others), and trialability of the products (e.g., sampling, virtual reality) all influence consumer decision-making. The DAST framework builds on environmental psychology, which argues that environmental stimuli affect people's behaviors (Mehrabian and Russell, 1974). The DAST framework was originally proposed and discussed in the retail context; there is no research to date that assesses this framework in the restaurant or service context.

Past studies show that the physical environment is one of the key determining factors in consumers' decision-making regarding restaurant selection. A restaurant's atmosphere drives positive experiences among customers, particularly young dining customers (Harrington et al., 2011). Services have intangible characteristics and often require customers' interaction with service providers; thus, physical cues or surroundings can be used as cues to effectively communicate a restaurant's services (Bitner, 1990; Ryu and Han, 2010). The physical surroundings or environment of a service organization is referred to as its "servicescape" (Bitner, 1992). There are three key dimensions of a servicescape: (a) ambient conditions (e.g., temperature, air quality, noise, music, etc.); (b) space/function (e.g., layout, equipment, furnishing, etc.); and (c) signs, symbols, and artifacts (e.g., signage, personal artifacts, style of décor, etc.). These servicescape dimensions have been found to have a direct impact on patrons' perceptions (Wakefield and Blodgett, 1994; Taylor and DiPietro, 2018). Also, a restaurant's ambience (i.e., a servicescape dimension) is a significant factor in a customer's motivation to choose a restaurant (Soriano, 2002; Yi et al., 2018). Cullen (2004) and Barta (2008) also suggest that décor and atmosphere influence a patron's restaurant choice.

Applying the DAST framework to this study, we go beyond the current discussion on servicescape and consider two important and relevant factors to restaurants in the pandemic: social, which is the number of people present in the environment (i.e., crowdedness), and design, which refers to the table layout in the restaurant context (i.e., social distancing).

3. Literature review

3.1. Crowdedness

Patrons may evaluate a store's attractiveness by observing the number of people in a service environment (i.e., store traffic). The density of consumers within a store or service atmosphere can restrict or interfere with activities, and a feeling of crowding can be experienced (Machleit et al., 1994, 2000). In fact, consumers use crowdedness as a cue to draw inferences about missing information, such as quality, reputation, and price (Tse et al., 2002). Past studies have shown that consumers' perceptions of crowdedness can create either a positive or negative impact on their decision-making in both retailing and hospitality contexts (e.g., Harrell et al., 1980; Tse et al., 2002; Pan and Siemens, 2011).

There are two dimensions of crowding: spatial density and social crowding (Blut and Iyer, 2020). Spatial density refers to the number of nonhuman components in the atmosphere, for instance, tables in restaurants. The associations of these nonhuman components can create a perception of crowding (Rompay et al., 2008). Harrell et al. (1980) found that crowding in retail environments has a positive influence on shopping behavior and consumer attitude about retail outlets and shopping trips. Also, their results revealed that the impact of crowding on patrons' attitudes or feelings about a retail outlet is mediated by consumers' adoption strategies (e.g., planned shopping time and fulfillment of purchase plans). As such, consumers develop more favorable attitudes and want to pay more for services when the level of crowding is increased in hair salons (Pan and Siemens, 2011).

Social crowding is another dimension of perceived retail crowding, which is defined as the number of humans and the extent of social interaction among individuals in a given atmosphere (Machleit et al., 1994). Huang et al. (2018) found that even though the perception of social crowding promotes consumers to avoid interaction with others, it directs them to show more brand attachment (i.e., strengthens the consumer–brand relationship) to maintain their basic need for belongingness. Consumers who experience crowding buy more hedonic products and more national brands because crowding discourages deliberation (i.e., motivation distraction limits cognitive capacity) and increases the relative influence of affective responses on the buying decision (Aydinli et al., 2020).

In addition to the retailing context, it has been demonstrated that social crowding positively affects consumer decision-making in a dining environment. When patrons perceive a restaurant as very crowded, they attribute the high level of crowding to high food quality, low food price, and a good restaurant image (Tse et al., 2002). Further, higher crowding in restaurant waiting areas creates more feelings of arousal than lower crowding and thus persuades patrons to enter the service atmosphere (Hwang et al., 2012). In contrast to high crowding, patrons have a more positive perception of moderate-density seating than high-density seating; this perception in turn influences customers' choices and use of a particular café/restaurant (Yildirim and Baskaya, 2007).

However, too many or too few consumers in a restaurant context may also create undesirable effects. A high level of crowding in a waiting area can create a feeling of dominance among consumers, owing to a loss of control over their atmosphere (Hwang et al., 2012), whereas patrons attribute a low level of crowding in a restaurant to low food quality, high prices, and a poor restaurant reputation. More importantly, people in a highly crowded environment are at higher risk of contracting the

COVID-19 virus such that the fear of contracting the virus should activate and highlight safety concerns associated with crowdedness in a closed space (e.g., a restaurant) (Li et al., 2021); people should, therefore, avoid crowded restaurants. All these notions are mixed in predicting the role of crowdedness in this period. Therefore, in the present research, we firstly investigate the behavioral and perceptual effects of social crowding in the restaurant context during the COVID-19 pandemic.

3.2. Safe restaurant environment

Creating a safe environment is one of the basic factors for restaurants. A safe environment may include but is not limited to food safety and environmental safety. Consumers are highly concerned about food safety at restaurants. To improve diners' perceptions of food safety, restaurants use foodservice hygiene factors, such as food and location (e.g., clean and tidy rubbish areas, staff do not touch food when serving, kitchen looks clean, food cooked properly, cleanliness of cups and glasses, etc.), staff and handling (e.g., staff wear appropriate aprons, gloves, and other attire; staff appearance and uniforms are neat and clean; staff demonstrate a high standard of personal hygiene; the floors are clean, etc.), premise and practices (e.g., food on display looks fresh, food served looks fresh, suitable location, etc.), and an ambient scene (e.g., clean tables and tablecloths, sinks for handwashing are clean) (Fatimaha et al., 2011). Likewise, Liu and Lee (2018) suggest that staff keeping their fingernails clean, wearing clean uniforms or protective clothing, and wearing gloves when handling ready-to-eat meals are very important safety measures to diners.

A safe environment is equally important. Traditionally, a safe environment in a restaurant is more related to environmental cleanliness. For example, Henson et al. (2006) suggest that cleanliness of the dining atmosphere, restroom, and appearance of staff are key considerations for patrons while visiting a dining place. However, in the current COVID-19 period, consumers place more emphasis on safety measures taken by the restaurant to prevent patrons from contracting the virus. These measures include enhanced cleaning protocols (Chang et al., 2021), the contact tracing approach (Chen et al., 2021), menu redesign to decrease the number of foods served raw, cold, or uncooked (Byrd et al., 2021), changing table setups to have more balcony tables and using more private rooms (Kim and Lee, 2020), as well as placing glass partition screens between tables as a temporary separation (Taylor, 2020), which seems to be an effective measure when there are no private rooms available. Safety measures also include modifying the layout to limit the seating capacity to allow for social distancing (Center for Disease Control and Prevention, 2020). As described by Taylor (2020), a creative way to maintain social distancing is by using mannequins to fill up the empty seats. Another common measure featuring social distancing is where a restaurant keeps half of its tables spare by displaying a "not-in-use" sign on in-between tables.

Taylor (2020) was the first to find that partitions are preferred to mannequins. This is because partitioned dining rooms are visually attractive, clean looking, more welcoming, safer looking, more entertaining, more sanitary, and more comfortable than rooms with mannequins. However, there are some limitations to Taylor's (2020) study. First is that using mannequins may lead to higher spatial density, which may generate a negative effect on consumer attitudes. Second, although putting mannequins at tables can be considered to maintain social distancing, it is not a direct manipulation of social distancing, which is to increase the distance between tables. So, there is still a lack of direct comparison between social distancing and partition screens. Third, Taylor (2020) only assessed US customers' attitudes and perceptions toward safety measures; there is a lack of comparison between countries experiencing different severities of COVID-19. Building upon Taylor (2020), in the present research, we secondly investigate the effects of different safety measures on consumers' choices and perceptions. Thirdly, we compare the effects of crowdedness and various safety measures between countries: the US and Australia.

4. Method

To test the effects of crowdedness and various safety measures on consumers' patronage choices and perceptions of restaurant service, we designed an online experiment to simulate a restaurant scenario with different densities and layouts.

4.1. Sample and participants

Since choosing restaurants is a very common decision that people make in daily life, the target population for this study is all adults. We recruited 1,184 adults via Prolific (an online participant recruitment platform), who registered to participate in this computer-based study in exchange for monetary payment between September and October 2020. The sample selection criteria were that (1) participants must be 18 years old or above and (2) their current country of residence must be the US or Australia. By applying a quota for each country, 50% of the sample were recruited from US residents (n = 593) and 50% of the sample were recruited from Australian residents (n = 591). We intended to compare the effects of crowdedness and safety measures on consumer responses between countries differing in severity of the COVID-19 pandemic. At the end of October 2020, the US had the highest number of confirmed cases (8.6 million cases) – of which the reproduction rate (R_0, which reflects how infectious a disease is) was 1.24 – and the highest number of COVID-19 deaths (225,000 deaths). Conversely, Australia is one of the countries recognized as having effectively prevented and controlled the spread of the COVID-19 virus (0.28 million cases, 0.77 reproduction rate, and 905 deaths as at the end of October 2020) (Appel et al., 2021). This country-wise comparison allows us to: a) test the generalizability of the observed effects internationally, b) examine the dependence of observed effects on the severity of the COVID-19 pandemic, and c) foresee the possible changes in consumer reactions after the pandemic.

Table 1
Profile of participants.

Characteristic	Level	%	
		US sample (n = 593)	AU sample (n = 591)
Gender	Male	47.7	51.4
	Female	50.4	46.9
	Other	1.9	1.7
Age	18–24	20.4	28.9
	25–34	42.5	36.2
	35–44	20.4	20.1
	45–54	9.8	9.1
	55–64	5.6	4.2
	65+	1.3	1.4
	Mean (years)	33.5	32.3
Ethnicity	Aboriginal or Torres Strait Islander	0	0.3
	Asian	8.4	21.7
	Black	9.1	0.3
	Caucasian (White)	73.5	72.8
	Hispanic	5.7	0.2
	Native American	0.3	0
	Pacific Islander	0	0.2
	Other	2.9	4.6
Educational level	Elementary/primary school	0	0.2
	Some high school	0.8	1.0
	Completed high school	21.8	20.1
	Associate Degree or Certificate	15.7	15.4
	Bachelor's Degree	39.1	40.6
	Postgraduate degree	17.7	17.6
	Ph.D. or Advanced Professional Degree	4.9	5.1

Note: US = United States, AU = Australia.

Table 1 depicts the overall profile of participants.

4.2. Experimental design, procedure, and measures

The experiment was designed and implemented using an online survey in Qualtrics, where participants recruited from Prolific completed the survey in exchange for a small payment. The experiment employed a two-factor, 3 (degree of crowding: high vs. medium vs. low) × 4 (safety measure: no vs. protective partition screens vs. increased distance between tables vs. not using in-between tables) between-subjects design. In the not using in-between tables condition, the restaurant displays a "not-in-use" sign on half of its tables and operates at half of its full capacity (half of the tables are deliberately left unoccupied for social distancing purposes); thus, there is no condition of high crowdedness – instead, there is only medium and low crowdedness. As a result, a total of 11 experimental conditions were used, and participants were randomly allocated to one of the conditions.

The experiment incorporated a hypothetical scenario in which participants were instructed as follows: "Imagine it is midday today and you are looking for a place to go for lunch. You happen to pass by a restaurant which serves your favorite food. At the entrance, you see the inside of the restaurant, as shown in the image below." Participants were then presented with an image (as the experimental stimulus) showing a restaurant layout having one of the crowdedness levels × one of the safety measures; that is, holding everything else constant (including the restaurant layout and the number of tables), each image varied in the number of consumers and type of safety measure used in the restaurant. For the conditions at the same level of crowdedness, the number of consumers and tables occupied were kept constant for consistency. At least one table was spare across all conditions. The condition of no safety measure served as the control condition where restaurant tables were placed with regular distances between them. In the partition condition, as the safety measure, transparent glass partition screens were installed between tables; however, these were still arranged with regular distances between them. Implementation of this safety measure requires an initial investment in installation. Both the increased distance between tables and the not using in-between tables conditions feature social distancing as the safety measure and do not require an initial investment. The implication is that in the condition of not using in-between tables, a restaurant operates at only half of its full capacity and, thus, its sales and revenue are more adversely impacted. An example of the experimental stimuli is illustrated in Fig. 1.

Participants indicated their patronage choice decisions from three options provided: eat in this restaurant, order takeaway from this restaurant, or leave and look for something else (not patronize). To understand participants' motivations behind their choice decisions, we also measured a series of their perceptions on 7-point scales. The Appendix shows details of the measures used. These included perceived safety associated with eating in and ordering takeaway, perceived comfort of the restaurant's setting, perceived popularity of the restaurant, perceived price level, perceived reputation of the restaurant, and perceived food quality.

Fig. 1. An example of the experimental stimuli.
Crowdedness: medium; safety measure: not using in-between tables.

To elicit participants' perceptions of the safety measures used by the restaurant, we further measured their perceptions of the restaurant's effort to protect dinners against the spread of COVID-19, perceptions of the effectiveness of the restaurant's safety measures, and perceptions of whether the restaurant takes social responsibility seriously. As manipulation checks of the experimental stimuli, participants were asked to rate the crowdedness and the distance between tables in the restaurant. Finally, participants indicated the severity of the COVID-19 pandemic in the place where they live and provided their demographic information. Internal reliability tests also exhibited adequate scale consistency for all multi-item scales (r or Cronbach's α ranged from 0.73 to 0.96, see Appendix for details) across both the US and Australian samples; these scale items were averaged to generate the specific constructs measured.

5. Results

5.1. Manipulation checks

An analysis of variance (ANOVA) was conducted on the perceived crowdedness for the combined data of the US and Australian samples. The ANOVA showed a significant effect of the level of crowdedness ($F(2, 1181) = 225.89$, $p < .01$). Contrast analyses revealed that participants' perceived it was more crowded in the high crowdedness condition ($M_{high\ crowdedness} = 4.32$, $SD = 1.66$) than in the medium crowdedness condition ($M_{medium\ crowdedness} = 3.18$, $SD = 1.48$; $t(1181) = 10.30$, $p < .01$) and it was perceived more crowded in the medium crowdedness condition than in the low crowdedness condition ($M_{low\ crowdedness} = 2.00$, $SD = 1.36$; $t(1181) = 11.67$, $p < .01$). Another ANOVA on the perceived distance showed a significant effect of the safety measure type ($F(3, 1180) = 206.81$, $p < .01$). Contrast analyses revealed a narrower distance perceived in the no safety measure condition ($M_{no\ safety\ measure} = 2.93$, $SD = 1.63$) than in the partition condition ($M_{partition} = 3.70$, $SD = 1.63$; $t(1180) = 4.48$, $p < .01$) and a narrower distance perceived in the partition condition than in either the increased distance between tables condition ($M_{increased\ distance} = 5.33$, $SD = 1.48$; $t(1180) = 13.79$, $p < .01$) or in the not using in-between tables condition ($M_{not\ in\ use} = 5.55$, $SD = 1.10$; $t(1180) = 14.03$, $p < .01$). The distance was perceived to be similar between the increased distance between tables condition and the not using in-between tables condition ($t(1180) = 1.64$, $p > .10$). These results held constant across both the US and Australian samples, except that US participants perceived a narrower distance in the increased distance between tables condition than in the not using in-between tables condition ($p < .05$). Together, these results confirmed the manipulations of degrees of crowdedness and types of safety measures implementing social distancing differently. Also, in line with the numbers of confirmed cases and reproduction rates in the two countries, US participants perceived the COVID-19 pandemic as more severe than the Australian participants ($M_{us} = 4.74$, $SD = 1.55$ vs. $M_{Australia} = 3.33$. $SD = 1.63$; $t(1182) = 15.28$, $p < .01$). Country-wise means are displayed in Table 2.

5.2. Patronage choices

The choice shares in different experimental conditions are presented in Fig. 2. Multi-nominal logistic regressions were performed to analyze participants' patronage choice decisions where the option of *leave* and *look for something else* served as the comparison base. We firstly analyzed the effects of country and perceived severity of COVID-19 on choices with a multi-nominal logistic regression, where the participant's country of residence was dummy coded (US = 1, Australia = 0). Results showed that US participants were less likely to select eating in the restaurant than Australian participants ($\beta = -0.67$, Wald χ^2 (1) = 10.55, $p < .01$) and participants who perceived the COVID-19 pandemic as more severe

Table 2
Means of manipulation checks.

Variable	Condition	US sample	AU sample
Perception of crowdedness	High crowdedness	4.55 (1.77)*	4.08 (1.52)
	Medium crowdedness	3.40 (1.63)	2.97 (1.29)
	Low crowdedness	2.10 (1.36)	1.89 (1.31)
	No safety measure	2.74 (1.68)	3.13 (1.55)
Perception of distance	Partition screen	3.51 (1.60)	3.89 (1.64)
	Increased distance between tables	5.13 (1.58)	5.55 (1.33)
	Not using in-between tables	5.51 (1.18)	5.59 (1.01)
Perception of severity of COVID-19	–	4.74 (1.55)	3.33 (1.63)

* Standard deviations in parentheses.

were less likely to select eating in the restaurant (β = -0.15, Wald χ^2 (1) = 6.46, $p < .05$). There was a marginally significant interaction between country and perceived severity (β = -0.22, Wald χ^2 (1) = 3.07, $p = .08$) such that the negative effect of perceived severity on selecting eating in was only significant for US participants (β = -0.26, Wald χ^2 (1) = 8.91, $p < .01$) but not for Australian participants (β = -0.04, Wald χ^2 (1) = 0.21, $p > .6$). This is probably because a generally low perceived severity of the pandemic in Australia does not cause differential effects on patron eating-in choice decisions. In other words, Australians are not as alert to the pandemic and not as sensitive to eating in restaurants as Americans are. In addition, participants' choice decisions of ordering takeaway from the restaurant were not affected by country or perceived severity (*p*s > .2).

Due to the country differences in severity perceptions and patronage decisions, the US and Australian samples were separately analyzed regarding the effects of experimental factors. Predicator variables included crowdedness levels and types of safety measures. Specifically, three crowdedness levels were dummy coded as two variables: medium crowdedness (medium crowdedness = 1, medium crowdedness = 0) and high crowdedness (high crowdedness = 1, high crowdedness = 0), with low crowdedness as the base group. Types of safety measures were effect coded into three nested variables: a) whether the restaurant implements a safety measure (with safety measure = 1, without safety measure = 0); b) whether the safety measure features social distancing (with social distancing = 1, without social distancing = -1); c) two types of social distancing (not using in-between tables = 2, increased distance between tables = -2). Table 3 presents the details of the codes for the different experimental conditions.

Table 4 shows the estimation results for the US and Australian samples separately. For the US sample, the model parameters revealed that both high crowdedness (β = -1.78, $p < .01$) and medium crowdedness (β = -1.21, $p < .01$) significantly and negatively affected choice shares of eating in the restaurant. However, having safety measures in the restaurant significantly and positively affected choice shares of eating in the restaurant (β = 2.45, $p < .01$). In particular, safety measures featuring social distancing (i.e., increased distances and not using in-between tables) led to more choices of eating in (β = 1.41, $p < .05$) than the safety measure using partition screens. There was no significant difference between the two social distancing measures; thus, not using in-between tables did not further increase the choice shares of eating in. Similarly, both high crowdedness (β = -1.18, $p < .01$) and medium crowdedness (β = -0.95, $p < .01$) significantly and negatively affected choice shares of ordering takeaway from the restaurant. Restaurants with safety measures also attracted more choice shares of ordering takeaway than those without safety measures (β = 1.56, $p < .01$). However, there were no effects of different safety measures on choice shares of ordering takeaway. Another logistic regression examining the choice shares between eating in and ordering takeaway (i.e., the latter served as the comparison base) showed that high crowdedness shifted choices from eating in to ordering takeaway (β = -0.60, $p < .05$), but having a safety measure shifted choices from ordering takeaway to eating in (β = 0.89, $p < .01$); safety measures featuring social distancing

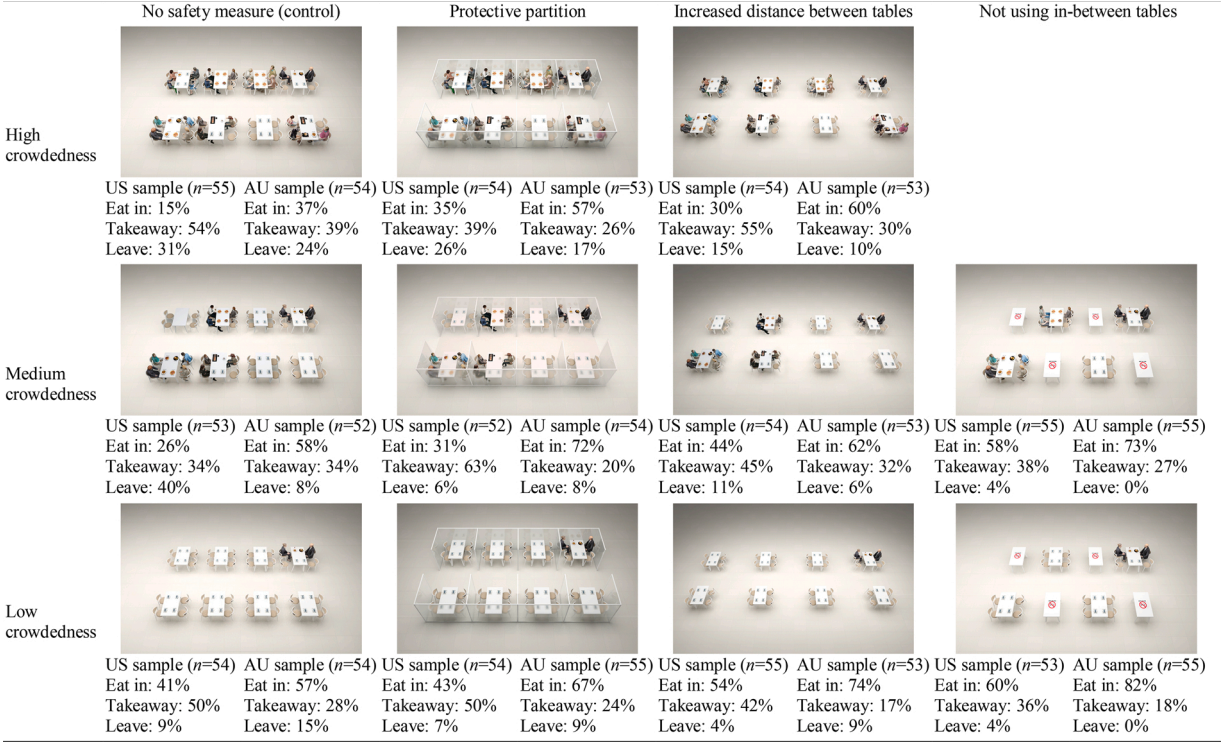

Fig. 2. Choice shares across conditions.

Table 3
Coding table for experimental conditions.

	Predictor				
Condition	High crowdedness	Medium crowdedness	Safety measure	Social distancing	Not-in-use for in-between tables
High crowdedness	1	0			
Medium crowdedness	0	1			
Low crowdedness	0	0			
No safety measure			0	0	0
Partition screen			1	−1	−1
Increased distance between tables			1	1	−2
Not using in-between tables			1	1	2

(vs. using partition screens) further shifted choices from ordering takeaway to eating in ($\beta = .67$, $p < .05$).

For the Australian sample, participants demonstrated a weaker sensitivity to the crowdedness such that only high crowdedness (but not medium crowdedness) had a significant and negative effect on their choices of eating in the restaurant ($\beta = -0.70$, $p < .05$). Their choices of ordering takeaway were not affected by high crowdedness, but the effect of medium crowdedness was marginally significant and positive ($\beta = 0.75$, $p < .1$), indicating a moderately crowded restaurant led to more choices of ordering takeaway from it. Interestingly, Australian participants appeared to be overly sensitive to restaurant safety measures. Having safety measures in the restaurant resulted in more choices of both eating in ($\beta = 18.66$, $p < .01$) and ordering takeaway ($\beta = 17.99$, $p < .01$); further, safety measures featuring social distancing led to more choice shares of both eating in ($\beta = 18.05$, $p < .01$) and ordering takeaway ($\beta = 18.01$, $p < .01$) than did the safety measure of using partition screens; even further, not using in-between tables led to more choice shares of both eating in ($\beta = 17.74$, $p < .01$) and ordering takeaway ($\beta = 17.58$, $p < .01$) than did increased distances between tables. Another logistic regression examining the choices between eating in and ordering takeaway (i.e., the latter served as the comparison base) showed that high crowdedness shifted choices from eating in to ordering takeaway ($\beta = -0.63$, $p < .05$), but having safety measures shifted choices from ordering takeaway to eating in ($\beta = 0.67$, $p < .05$). No other changes in choices between different crowdedness and safety measures conditions were found. We also tested the interaction effects of crowdedness and type of safety measures on patronage choices – none of them achieved significance; thus, they are not reported or discussed.

5.3. Perceptions

We ran a series of linear regressions of various perceptions on the

Table 4
Parameter estimates of multi-nominal regression on patronage choices and linear regressions on perceptions.

	Choice				Perception of safety: eat in		Perception of safety: takeaway		Perception of comfort		Perception of popularity	
	US sample		AU sample		US sample	AU sample	US sample	AU sample	US sample	AU sample	US sample	AU sample
	Eat in	Takeaway	Eat in	Takeaway								
Predictor variable	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Constant	0.54 (0.69)	0.79 (0.68)	19.70 (0.60)**	19.27 (0.56)**	2.89 (0.31)**	4.88 (0.15)**	5.64 (0.14)**	5.63 (0.12)**	4.45 (0.16)**	4.47 (0.14)**	3.73 (0.13)**	3.52 (0.11)**
High crowdedness	−1.78 (0.38)**	−1.18 (0.36)**	−0.70 (0.34)*	−0.07 (0.37)	−1.35 (0.20)**	−0.80 (0.16)**	−0.80 (0.15)**	−0.28 (0.13)*	−0.97 (0.17)**	−0.45 (0.15)**	1.58 (0.14)**	2.01 (0.13)**
Medium crowdedness	−1.21 (0.37)**	−0.95 (0.36)**	0.42 (0.41)	0.75 (0.43)	−0.83 (0.18)**	−0.42 (0.15)**	−0.61 (0.14)**	−0.05 (0.11)	−0.35 (0.15)*	−0.08 (0.14)	0.88 (0.13)**	1.13 (0.11)**
Safety measure	2.45 (0.58)**	1.56 (0.57) **	18.66 (0.46)**	17.99 (0.40)**	1.11 (0.24)**	0.39 (0.17)*	0.42 (0.16)**	0.31 (0.13)*	0.30 (0.18)	0.48 (0.16)**	0.29 (0.14)*	0.26 (0.13)*
Social distancing measure	1.41 (0.59)*	0.74 (0.60)	18.05 (0.48)**	18.01 (0.43)**	0.41 (0.24)	0.16 (0.17)	0.18 (0.16)	0.14 (0.13)	0.34 (0.18)	0.2 (0.16)	−0.10 (0.14)	−0.21 (0.13)
Not using in-between tables	0.93 (0.60)	0.50 (0.61)	17.74 (0.30)**	17.58 (0.00)**	0.31 (0.24)	−0.04 (0.19)	0.08 (0.18)	0.08 (0.15)	0.39 (0.21)	0.2 (0.18)	0.53 (0.17)**	0.58 (0.15)**

	Perception of price		Perception of reputation		Perception of food quality		Perception of effort		Perception of effectiveness		Perception of social responsibility	
	US sample	AU sample	US sample	AU sample	US sample	AU sample	US sample	AU sample	US sample	AU sample	US sample	AU sample
Predictor variable	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Constant	4.21 (0.10)**	3.97 (0.09)**	3.75 (0.12)**	3.51 (0.11)**	4.66 (0.10)**	4.40 (0.09)**	3.53 (0.15)**	3.70 (0.13)**	3.61 (0.16)**	3.68 (0.13)**	3.62 (0.17)**	3.78 (0.14)**
High crowdedness	−0.14 (0.11)	−0.11 (0.10)	0.54 (0.13)**	1.05 (0.12)**	0.28 (0.11)**	0.56 (0.1)**	−0.99 (0.16)**	−0.71 (0.15)**	−1.18 (0.17)**	−0.69 (0.14)**	−1.03 (0.18)**	−0.87 (0.15)**
Medium crowdedness	−0.13 (0.10)	0.03 (0.09)	0.30 (0.12)*	0.5 (0.11)**	0.14 (0.10)	0.34 (0.09)**	−0.74 (0.15)**	−0.58 (0.13)**	−0.65 (0.15)**	−0.35 (0.13)**	−0.79 (0.16)**	−0.40 (0.13)**
Safety measure	0.22 (0.12)	0.36 (0.10)**	0.48 (0.14)**	0.28 (0.13)*	0.31 (0.11)**	0.13 (0.1)	1.85 (0.17)**	1.86 (0.15)**	1.25 (0.18)**	1.61 (0.15)**	1.53 (0.19)**	1.74 (0.16)**
Social distancing measure	−0.14 (0.12)	−0.26 (0.10)**	−0.12 (0.14)	−0.11 (0.13)	−0.07 (0.11)	0.04 (0.1)	0.05 (0.17)	−0.11 (0.15)	0.46 (0.18)*	0.07 (0.15)	0.23 (0.19)	0.01 (0.16)
Not using in-between tables	0.23 (0.13)	0.15 (0.11)	0.58 (0.16)**	0.45 (0.15)**	0.16 (0.13)	0.18 (0.11)	0.55 (0.19)**	0.55 (0.17)**	0.21 (0.21)	0.39 (0.17)*	0.78 (0.22)**	0.58 (0.18)**

* $p < .05$.
** $p < .01$, AU = Australia, US = United States.

Table 5
Indirect effects of crowdedness and safety measures on choices via perceptions.

Independent variable	High crowdedness		Medium crowdedness		Safety measure		Social distancing measure		Not using in-between tables	
Dependent variable	Eat in	Takeaway	Eat in	Takeaway	Eat in	Takeaway	Eat in	Takeaway	Eat in	Takeaway
Mediator	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)	β (Boot SE)
Perception of safety[1]	−1.05 (0.26)*	−0.3 (0.09)*	−0.61 (0.17)*	−0.22 (0.08)*	0.63 (0.18)*	0.25 (0.09)*	0.08 (0.07)	0.05 (0.04)	0.01 (0.04)	0.00 (0.02)
Perception of comfort	−0.43 (0.15)*	−0.09 (0.06)*	−0.12 (0.08)	−0.02 (0.02)	0.38 (0.13)*	0.08 (0.05)*	0.11 (0.05)*	0.03 (0.02)*	0.35 (0.02)*	0.01 (0.01)
Perception of popularity	0.78 (0.36)*	0.48 (0.26)	0.44 (0.20)*	0.27 (0.15)	0.18 (0.09)*	0.09 (0.05)*	0.00 (0.02)	0.00 (0.01)	0.06 (0.03)	0.03 (0.02)
Perception of price	0.01 (0.04)	0.00 (0.02)	0.00 (0.02)	0.00 (0.01)	−0.01 (0.07)	0.00 (0.04)	0.00 (0.02)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Perception of reputation	−0.09 (0.17)	−0.09 (0.14)	−0.05 (0.08)	−0.04 (0.07)	−0.06 (0.1)	−0.05 (0.07)	0.00 (0.01)	0.00 (0.01)	−0.02 (0.03)	−0.01 (0.02)
Perception of food quality	0.15 (0.12)	0.19 (0.10)*	0.09 (0.08)	0.10 (0.06)*	0.09 (0.08)	0.08 (0.05)	0.00 (0.02)	0.00 (0.02)	0.01 (0.02)	0.01 (0.01)
Perception of effort	0.23 (0.25)	0.17 (0.10)	0.18 (0.19)	0.15 (0.09)	−0.57 (0.59)	−0.47 (0.28)	−0.01 (0.03)	−0.01 (0.02)	−0.04 (0.04)	−0.03 (0.02)
Perception of effectiveness	−0.21 (0.32)	−0.11 (0.14)	−0.11 (0.17)	−0.06 (0.08)	0.38 (0.56)	0.21 (0.27)	0.04 (0.06)	0.02 (0.03)	0.01 (0.02)	0.01 (0.01)
Perception of social responsibility	−0.24 (0.26)	−0.07 (0.12)	−0.15 (0.17)	0.05 (0.08)	0.52 (0.54)	0.16 (0.29)	0.04 (0.05)	0.01 (0.02)	0.04 (0.05)	0.01 (0.02)

* 95% confidence interval excludes zero for an indirect effect.
1 Perceived safety associated with eating in was included for the eat-in choice, perceived safety associated with takeaway was included for the takeaway choice.

same predictor variables that were used in the multi-nominal logistic regressions. The results showed that, for the US sample, in line with choice patterns of eating in, both high crowdedness (β = -1.35, $p < .01$) and medium crowdedness (β = -0.83, $p < .01$) had significant and negative effects on perceived safety associated with eating in. Having safety measures (vs. no safety measures) in the restaurant had a significant and positive effect (β = 1.11, $p < .01$), and safety measures featuring social distancing (vs. partition screens) had a marginally significant and positive effect on perceived safety associated with eating in (β = 0.41, $p < .1$). Also, in line with the choice of ordering takeaway, both high crowdedness (β = -0.80, $p < .01$) and medium crowdedness (β = -0.61, $p < .01$) had significant and negative effects, while having safety measures (vs. no safety measures) had a significant and positive effect (β = 0.42, $p < .01$) on perceived safety associated with ordering takeaway.

Furthermore, crowdedness decreased perceptions of the restaurant's comfort, the restaurant's effort to take preventative safety measures to protect diners against the spread of COVID-19, the effectiveness of the safety measures, and the restaurant being socially responsible, while crowdedness increased perceptions of the restaurant's popularity, reputation, and food quality (only for the high crowdedness condition). Having safety measures (vs. no safety measures) increased perceptions of the restaurant's popularity, reputation, food quality, effort in preventing the spread of COVID-19, the effectiveness of the safety measure, as well as the restaurant's social responsibility, but did not affect perceptions of comfort. Safety measures featuring social distancing (vs. partition screens) only increased perceptions of the effectiveness of the safety measure, while not using in-between tables (vs. increased distances between tables) increased perceptions of the restaurant's popularity, reputation, effort, and social responsibility. Various crowdedness levels and safety measure types had no significant effects on price perceptions.

For the Australian sample, the linear regression results showed that both high crowdedness (β = -0.80, $p < .01$) and medium crowdedness (β = -0.42, $p < .01$) significantly and negatively affected perceptions of safety of eating in the restaurant. Having safety measures (vs. no safety measures) in the restaurant had a significant and positive effect (β = 1.11, $p < .01$) on perceived safety of eating in, regardless of the types of safety measures. On the other hand, only high crowdedness (but not medium crowdedness) negatively affected the perceived safety of ordering takeaway from the restaurant (β = -0.28, $p < .01$), and having safety measures (vs. no safety measures) in the restaurant positively affected perceived safety of ordering takeaway (β = 0.31, $p < .05$) regardless of the type of safety measure.

Furthermore, crowdedness also decreased perceptions of comfort (only for the high crowdedness condition), the restaurant's effort in preventing the spread of COVID-19, the effectiveness of the safety measure, and the restaurant being socially responsible. Conversely, crowdedness increased perceptions of the restaurant's popularity, reputation, and food quality. Having safety measures (vs. no safety measures) increased perceptions of the restaurant's comfort, price level, popularity, reputation, effort in preventing the spread of COVID-19, the effectiveness of the safety measure, as well as the restaurant's social responsibility. Safety measures featuring social distancing (vs. partition screens) only decreased perceptions of price levels such that the restaurant featuring partition screens was perceived to offer more expensive food. Not using in-between tables (vs. increased distances between tables) increased perceptions of the restaurant's popularity, reputation, effort, effectiveness, and social responsibility. Safety measures had no significant effect on perceptions of food quality.

5.4. Mediation analyses

To investigate the perceptual factors that drive consumers' patronage responses to crowdedness and safety measures, we conducted mediation tests with the bootstrapping method using Hayes' (2018)

PROCESS macro (model 4). The US data and the Australian data were combined in the analysis for simplicity and generalizability of the mediation test results, in which country dummy was included as a covariate. The results of the indirect effects are displayed in Table 5. Specifically, safety negatively mediated the effects of both crowdedness levels and safety measures (regardless of the types) on both eat-in and takeaway choices. Comfort also negatively mediated the effect of high crowdedness (but not medium crowdedness) on both choices but positively mediated the effects of safety measures (vs. no safety measures), social distancing measures (vs. partition), and not using in-between tables (vs. increased distance between tables) on both choices (except the effect of not using in-between tables on takeaway choice). Interestingly, popularity mediated the effects of both high and medium crowdedness levels on eat-in choice, whereas quality mediated the effects of both high and medium crowdedness levels on takeaway choice. Finally, popularity mediated the effect of safety measures (regardless of the type) on both eat-in and takeaway choices, such that featuring safety measures in the restaurant indeed increased consumers' perceptions of the restaurant's popularity and subsequently increased both the eat-in and takeaway choice probabilities. Overall, it can be concluded that safety, comfort, quality, and popularity underlie the effects of crowdedness and safety measures on restaurant patronage choices.

6. Conclusion

This study applies the DAST framework to understand how two environmental factors – crowdedness and in-restaurant safety measures – influence consumers' restaurant patronage choices in terms of eating in, ordering takeaway, and not patronizing. In addition, it assesses consumers' perceptions toward the restaurant by comparing these two factors during the COVID-19 pandemic in two countries differing in the severity of COVID-19. It shows that US consumers are more sensitive to crowdedness and that even a moderately crowded dining environment decreases their patronage intentions; conversely, Australian consumers are more sensitive to different types of safety measures, which greatly influence their patronage choices. In general, safety measures featuring social distancing are preferred over a partition, but there is no preferential difference between two social distancing measures: increasing distances between tables and not using in-between tables. Furthermore, different levels of crowdedness and types of safety measures are found to significantly influence consumer perceptions of the restaurant in terms of safety, comfort, popularity, price, reputation, quality, effort to protect diners against the spread of COVID-19, the effectiveness of the safety measure, and social responsibility. Finally, mediation tests show that perceived safety, comfort, popularity, and quality underlie the effects of crowdedness levels, while perceived safety, comfort, and popularity underlie the effects of safety measures on consumer patronage choices.

6.1. Theoretical contribution

The present research makes two theoretical contributions. First, this study is the first to apply the retailing DAST framework to the restaurant context. Past research has applied this framework to the context of human enhancement technology (Grewal et al., 2020), product display (González et al., 2021), and retail crowding (Aydinli et al., 2020). However, there is no research to date that applies this framework in the service or hospitality context. The present study systematically examines how two DAST factors – social people present in the environment (crowdedness) and design (table layout) – influence patrons' restaurant choices and perceptions. The findings support that both design and social factors influence consumers' choices of restaurant and their perceptions. This research highlights that in the COVID-19 pandemic, the determining factors of consumer decision-making regarding restaurant choices go beyond the traditional ones, such as food quality, price, and brand reputation. Consumers place more emphasis on and have become more cautious toward the safety of the environment by considering both crowdedness in the restaurant and the safety measures taken by the restaurant as a prevention against contracting COVID-19.

Second, the present research builds on and extends Taylor's (2020) work to a direct comparison across various safety measures in a cross-country context. Further, we also consider both the effects of different levels of crowdedness and different types of safety measures on not only patrons' eat-in decisions but also their takeaway decisions (which help buffer the financial impact on restaurants). In general, we found that both Australian and US consumers are more likely to patronize restaurants that use safety measures than restaurants without safety measures, and consumers prefer eating in than ordering takeaway from restaurants that use safety measures. Safety measures increase restaurants' positive perceptions of its effort in preventing the spread of COVID-19, the effectiveness of its safety measure, as well as its social responsibility. We also found social distancing is preferred more than partition screens, as safety measures featuring social distancing are perceived as more comfortable and effective than partition screens.

6.2. Implications

Our findings have clear and important implications for restaurants and other hospitality businesses. Firstly, a crowded dining environment greatly decreases consumers' patronage intentions for both eating in and ordering takeaway, directly and adversely impacting the restaurant's revenue and profitability. On the other hand, the number of patrons directly influences the sales revenue, and, thus, an uncrowded environment is economically undesirable for restaurants, particularly when most restaurants are currently suffering devasting economic effects of the COVID-19 pandemic. Restaurant owners and managers are thus required to carefully balance these two opposing forces to determine the density that optimizes revenue. Despite the negative effects of crowdedness on both eat-in and takeaway decisions in the US, where the COVID-19 situation is very severe, a silver lining is that in Australia, where the COVID-19 situation is much milder, only a highly crowded restaurant reduces consumers' eat-in decisions, but a moderately crowded restaurant does not change consumers' eat-in decisions. Further, Australian consumers' takeaway decisions do not seem to be negatively affected by crowdedness, with moderate crowdedness even slightly boosting the takeaway choice. Their more tolerant behavioral patterns may potentially signal consumers' post-pandemic responses to crowdedness – the adverse effects of it may fade away along with the attenuation of pandemic severity.

Secondly, the key determinant of restaurant patronage decisions is safety concern. Featuring safety measures in a restaurant makes consumers feel safer and more comfortable and more likely to both eat in and order takeaway, regardless of the country and pandemic severity. This highlights the importance of safety measures for restaurants, even in the post-pandemic stages. The three types of safety measures – partitions, increasing table distance, and not using in-between tables – have their own pros and cons.

Based on our findings, the first safety measure, partitions, is the least-preferred measure since it is perceived by US consumers as less effective in preventing the spread of COVID-19 than social distancing measures. This safety measure may also require a considerable initial investment in the installation of protective screens; thus, the restaurant is perceived as more expensive. In addition, this measure also lacks the flexibility to change the setting of tables and restaurant layout. However, the restaurant will remain at full operating capacity without compromising the space and tables.

The second safety measure, increasing table distance, is a moderately preferred measure. However, its implementation completely depends on the space available. If this space is not available, the restaurant will need to reduce the number of tables to achieve social distancing. This safety measure is perceived by Australian consumers as not being as effective as not using in-between tables to prevent the spread of COVID-19. However, it does not involve additional costs and allows the store to

easily change the table settings.

The third safety measure is not using in-between tables. This safety measure is the most preferred and is perceived to help improve the restaurant's image overall (i.e., popularity, reputation, effort, and social responsibility). It is also flexible, allowing the restaurant to move tables and change the layout; however, it suffers the most negative impact on its revenue due to the loss of half of its operating capacity – only 50% of the tables can be used – such that consumers may easily turn to other restaurants when it is full. Caution should be exercised when restaurant owners determine the safety measure to use, depending on whether the restaurant's objective is to pursue a higher cash flow or a better image.

Thirdly, the over-sensitivity to safety measures in Australia implies that keeping social distancing and safety measures may be a long-lasting consumer expectancy in the restaurant servicescape – even after the pandemic. In a severe situation of COVID-19, such as that being experienced in the US, the perceived risks and consequences of exposure to crowdedness are too substantial to be mitigated by in-restaurant safety measures. In contrast, in a mild situation of COVID-19, such as is the case in Australia, consumers are more tolerant and less susceptible to crowdedness. As such, to increase patron numbers, restaurants are likely to be subjected to the existence of safety measures. Safety measures may essentially entail a strong psychological feeling of safety – more than the physical benefits in preventing the spread of the virus. Of note is that our findings show that featuring safety measures also positively influences patrons' decisions to order takeaway – a decision context that is seemingly not strongly relevant to in-restaurant safety measures – due to the increased perceptions of safety, comfort, and popularity associated with safety measures. Such effects can be attributed to the "spillover" effects of the psychological desire for safety in the pandemic and can be understood as a norm established by consumers to expect safety measures in the restaurant (as evidence by the increase in perceived popularity) regardless of the patronage type. Restaurant operators should be alerted to this and continue the safety measures post-pandemic and in the long run for the sake of consumer safety and wellbeing, as well as business development and social resilience.

6.3. Limitations and future research directions

There are several limitations to this study. First, in the current study we only consider two DAST factors. However, one may argue that the third factor –the ambient element – may also play a role in influencing patrons' perceptions and choices. Future research may examine whether and how ambient elements, such as room temperature and lighting, can moderate the effect of restaurant crowdedness on consumers' perceptions. Specifically, in a dark-lighting context, the crowdedness effect on lower eat-in intention will weaken, and in a high-temperature context, the crowdedness effect will be stronger.

Second, the current research was conducted online. Participants were shown images and read scenarios. As such, one may argue that the external validity of the study is weak, so are the practical implications based on current findings. Our study approximated a real day-to-day restaurant setting as best as possible while retaining high levels of experimental control. To illustrate, in our study, when participants were asked after the main task how the image and scenario reflected the reality of a restaurant (1 = not realistic at all; 7 = very realistic), the mean score was relatively high (M = 5.10, SD = 1.58), reflecting a reasonable level of reality and acceptable validity of the study. Future research may conduct field observations and survey customers in restaurants to see whether our findings hold in a real-life setting and to underpin and improve the implications for restaurant owners and managers for better operations in the pandemic.

Third, the present research only focuses on table layout as a safety measure. There are many other safety measures used by restaurants, such as using digital menus to minimize touch, providing scanning codes to record customer information, and using disposable plates and cutlery. Future research may use conjoint analysis to assess these safety measures together with the table layout to determine the importance of these measures.

Finally, while the present research broadly investigates the overall effects of restaurant crowdedness and safety measures in the pandemic among a convenience sample of the general population in the US and Australia, it does not distinguish the effects for groups that differ in their demographic characteristics (e.g., income and ethnicity) and restaurant patronage habits (e.g., patronage frequency and loyalty to the restaurant). Together with other situational factors such as restaurant size (small restaurants vs. big chains), class (fine dining vs. casual dining), and reputation (famous vs. unknown), these create interesting research avenues for further exploration of the moderating effects of the current findings.

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Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Measures used in the study

Variable	Measures (all 7-point scales)	Reliability coefficients	
		US sample	AU sample
Patronage choice	• Please indicate your decision as to whether you want to have lunch in this restaurant. (eat in this restaurant, order takeaway from this restaurant, leave and look for something else)	–	–
Perception of safety – eat in	• Do you feel safe to eat in this restaurant? (not at all safe–very safe, very risky–not at all risky)	$r = .91$	$r = .87$
Perception of safety – order takeaway	• Do you feel safe to order takeaway from this restaurant? (not at all safe–very safe, very risky–not at all risky)	$r = .90$	$r = .81$
Perception of comfort	• What do you think about the setting of this restaurant? (not at all comfortable–very comfortable, not at all pleasant–very pleasant)	$r = .89$	$r = .86$
Perception of popularity	• How popular do you think this restaurant is? (not at all popular–very popular)	–	–
Perception of price	• How expensive do you think the price of food in this restaurant is? (very cheap–very expensive)	–	–
Perception of reputation	• What do you think about the reputation of this restaurant? (not at all famous–very famous)	–	–
Perception of food quality	• What do you think about the food quality of this restaurant? (poor quality–good quality, not delicious food at all-delicious food, a narrow choice of dishes–a wide choice of dishes)	$\alpha = .91$	$\alpha = .88$

(*continued on next page*)

(*continued*)

Variable	Measures (all 7-point scales)	Reliability coefficients	
		US sample	AU sample
Perception of the restaurant's effort	• How much effort do you think the restaurant has taken in preventative safety measures to protect diners against the spread of COVID-19? (no effort at all–a lot of effort)	–	–
Perception of the effectiveness of the safety measure	• How effective do you think the restaurant's safety measures are in preventing the spread of COVID-19? (not at all effective–very effective, not at all practical–very practical, not at all useful–very useful)	α = .96	α = .96
Perception of the restaurant being socially responsible	• How socially responsible do you think the restaurant is with regards to the COVID-19 pandemic? (not at all socially responsible–very socially responsible, not taking social responsibility at all–taking social responsibility very seriously)	*r* = .96	*r* = .93
Perception of crowdedness	• To what extent do you feel this restaurant is crowded? (crowded being there/there too many people/no room for me there: not at all–very much)	α = .93	α = .90
Perception of distance	• How do you feel about the distance between the dining tables in this restaurant? (cramped–spacious, narrow–wide)	*r* = .92	*r* = .92
Perception of COVID-19 severity	• How severe do you think COVID-19 is in the place you are living? (not at all severe– very severe, not at all serious–very serious)	*r* = .89	*r* = .73

References

Alonso, A.D., Kok, S.K., Bressan, A., O'Shea, M., Sakellarios, N., Koresisf, A., Solis, M.A. B., Santoni, L.J., 2020. COVID-19, aftermath, impacts, and hospitality firms: an international perspective. Int. J. Hosp. Manag. 91, 102654.

Appel, C., Beltekian, D., Gavrilov, D., Giattino, C., Hasell, J., Macdonald, B., Mathieu, E., Ortiz-Ospina, E., Ritchie, H., Roser, M., 2021. Data on COVID-19 (coronavirus) by Our World in Data. https://github.com/owid/covid-19-data/tree/master/public/data.

Aydinli, A., Lamey, L., Millet, K., Braak, A.T., Vuegen, M., 2020. How do customers alter their basket composition when they perceive the retail store to be crowded? An empirical study. J. Retail. in press.

Barta, A., 2008. Foreign tourists' motivation and information source influencing their preference for eating out at ethnic restaurants in Bangkok. Int. J. Hosp. Tour. Adm. 9 (1), 1–17.

Baum, T., Hai, N.T.T., 2020. Hospitality, tourism, human rights and the impact of COVID-19. Int. J. Contemp. Hosp. Manage. 32 (7), 2397–2407.

Bitner, M.J., 1990. Evaluating service encounters: the effects of physical surroundings and employee responses. J. Mark. 54 (2), 69–82.

Bitner, M.J., 1992. Servicescapes: the impact of physical surroundings on customers and employees. J. Mark. 56 (2), 57–71.

Blut, M., Iyer, G.R., 2020. Consequences of perceived crowding: a meta-analytical perspective. J. Retail. 96 (3), 362–382.

Byrd, K., Her, E., Fan, A., Almanza, B., Liu, Y., Leitch, S., 2021. Restaurants and COVID-19: What are consumers' risk perceptions about restaurant food and its packaging during the pandemic? Int. J. Hosp. Manag. 94, 102821.

Center for Disease Control and Prevention, 2020. Considerations for Restaurants & Bars. https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/business-employers/bars-restaurants.html.

Chang, H.S., Capuozzo, B., Okumus, B., Cho, M., 2021. Why cleaning the invisible in restaurants is important during COVID-19: a case study of indoor air quality of an open-kitchen restaurant. Int. J. Hosp. Manag. 94, 102854.

Chen, S.J., Waseem, D., Xia, Z.R., Tran, K.T., Li, Y., Yao, J., 2021. To disclose or to falsify: the effects of cognitive trust and affective trust on customer cooperation in contact tracing. Int. J. Hosp. Manag. 94, 102867.

Cullen, F., 2004. Factors influencing restaurant selection in Dublin. J. Foodserv. Bus. Res. 7 (2), 53–84.

Fatimaha, U.Z.A.U., Booa, H.C., Sambasivanb, M., Salleh, R., 2011. Foodservice hygiene factors—the consumer perspective. Int. J. Hosp. Manag. 30, 38–45.

González, E.M., Meyer, J.H., Toldos, M.P., 2021. What women want? How contextual product displays influence women's online shopping behavior. J. Bus. Res. 123, 625–641.

Gössling, S., Scott, D., Hall, C.M., 2020. Pandemics, tourism and global change: a rapid assessment of COVID-19. J. Sustain. Tour. 1–20.

Grewal, D., Kroschke, M., Mende, M., Roggeveen, A.L., Scott, M.L., 2020. Frontline cyborgs at your service: how human enhancement technologies affect customer experiences in retail, sales, and service settings. J. Interact. Mark. 51, 9–25.

Hao, F., Xiao, Q., Chon, K., 2020. COVID-19 and China's hotel industry: impacts, a disaster management framework, and post-pandemic agenda. Int. J. Hosp. Manag. 90, 102636.

Harrell, G., Hutt, M., Anderson, J., 1980. Path analysis of buyer behavior under conditions of crowding. J. Mark. Res. 17 (1), 45–51.

Harrington, R.J., Ottenbacher, M.C., Staggs, A., Allen-Powell, F., 2011. Generation Y consumers: key restaurant attributes affecting positive and negative experiences. J. Hosp. Tour. Res. 20 (10), 1–19.

Hayes, A.F., 2018. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. Guilford publications.

Henson, S., Majowicz, S., Masakure, O., Sockett, P., Jones, A., Hart, R., Carr, D., Knowles, L., 2006. Consumer assessment of the safety of restaurants: the role of inspection notices and other information cues. J. Food Saf. 26 (4), 275–301.

Huang, X.I., Huang, Z.T., Wyer Jr., R.S., 2018. The influence of social crowding on brand attachment. J. Consum. Res. 44, 1068–1084.

Hwang, J., Yoon, S., Bendle, L.J., 2012. Desired privacy and the impact of crowding on customer emotions and approach-avoidance responses: waiting in a virtual reality restaurant. Int. J. Contemp. Hosp. Manage. 24 (2), 224–250.

Kim, J., Lee, J.C., 2020. Effects of COVID-19 on preferences for private dining facilities in restaurants. J. Hosp. Tour. Manag. 45, 67–70.

Li, Y., Yao, J., Chen, J., 2021. The negative effect of scarcity cues on consumer purchase decisions in the hospitality industry during the COVID-19 pandemic. Int. J. Hosp. Manag. 94, 102815.

Liu, P., Lee, Y.M., 2018. An investigation of consumers' perception of food safety in the restaurants. Int. J. Hosp. Manag. 73, 29–35.

Machleit, K.A., Kellaris, J.J., Eroglu, S.A., 1994. Human versus spatial dimensions of crowding perceptions in retail environments: a note on their measurement and effect on shopper satisfaction. Mark. Lett. 5, 183–194.

Machleit, K.A., Eroglu, S.A., Mantel, S.P., 2000. Perceived retail crowding and shopping satisfaction: what modifies the relationship. J. Consum. Psychol. 9, 29–42.

Mehrabian, A., Russell, J.A., 1974. An Approach to Environmental Psychology. The MIT Press.

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., Agha, R., 2020. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. Int. J. Surg. 78, 185–193.

Pan, Y., Siemens, J.C., 2011. The differential effects of retail density: an investigation of goods versus service settings. J. Bus. Res. 64, 105–112.

Roggeveen, A.L., Grewal, D., Schweiger, E.B., 2019. The DAST framework for retail atmospherics: the impact of in- and out-of-store retail journey touchpoints on the customer experience. J. Retail. 96, 128–137.

Rompay, T., Van, J.L., Galetzka, M., Pruyn, A., Garcia, J.M., 2008. Human and spatial dimensions of retail density: revisiting the role of perceived control. Psychol. Mark. 25 (4), 319–335.

Ryu, K., Han, H., 2010. Influence of the quality of food, service, and physical environment on customer satisfaction and behavioral intention in quick-casual restaurants: moderating role of perceived price. J. Hosp. Tour. Res. 34 (3), 310–329.

Seale, H., Heywood, A.E., Leask, J., Sheel, M., Thomas, S., Durrheim, D.N., Bolsewicz, K., Kaur, R., 2020. COVID-19 is rapidly changing: examining public perceptions and behaviors in response to this evolving pandemic. PLoS One 15 (6), e0235112.

Shin, H., Kang, J., 2020. Reducing perceived health risk to attract hotel customers in the COVID-19 pandemic era: focused on technology innovation for social distancing and cleanliness. Int. J. Hosp. Manag. 94, 102664.

Song, H.J., Yeon, J., Lee, S., 2021. Impact of the COVID-19 pandemic: evidence from the U.S. restaurant industry. Int. J. Hosp. Manag. 92, 102702.

Soriano, R.D., 2002. Customers' expectations factors in restaurants: the situation in Spain. Int. J. Qual. Reliab. Manag. 19 (8/9), 1055–1067.

Taylor, S.Jr, 2020. The socially distant servicescape: an investigation of consumer preference's during the re-opening phase. Int. J. Hosp. Manag. 91, 102692.

Taylor, S.Jr., DiPietro, R.B., 2018. Generational perception and satisfaction differences related to restaurant service environment. Int. J. Hosp. Tour. Adm. 19 (4), 374–396.

Tse, A.C.B., Sin, L., Yim, F.H.K., 2002. How a crowded restaurant affects consumers' attribution behavior. Int. J. Hosp. Manag. 21, 449–454.

Wakefield, K.L., Blodgett, J.G., 1994. The importance of servicescapes in leisure service settings. J. Serv. Mark. 8 (3), 66–76.

Yi, S., Zhao, J., Joung, H.D., 2018. Influence of price and brand image on restaurant customers' restaurant selection attribute. J. Foodserv. Bus. Res. 21 (2), 200–217.

Yildirim, K., Baskaya, A.A., 2007. Perceived crowding in a café/restaurant with different seating densities. Build. Environ. 42 (9), 3410–3417.