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The Pandemic Consumer Response: A Stockpiling Perspective and Shopping Channel Preferences

Savvas Papagiannidis [1], Eleftherios Alamanos [1], Michael Bourlakis [2] and Charles Dennis [3]

[1]Newcastle University Business School, Newcastle University, Newcastle-upon-Tyne, NE1 4SE, UK, [2]Cranfield School of Management, Bedford, MK43 0AL, UK, and [3]The Business School, Middlesex University, London, NW4 4BT, UK

Corresponding author email: savvas.papagiannidis@ncl.ac.uk

Covid-19 has changed consumer behaviour, probably forever. Initial consumer stockpiling led to stockouts, threat and uncertainty for consumers. To overcome shortages, consumers expanded their use of channels and many consumers started buying online for the first time. In this paper, we aim to address important research gaps related to consumer behaviour during the pandemic and especially stockpiling. Our paper starts by presenting the findings of our pre-study, which used social media to elicit or confirm potential constructs for our quantitative models. These constructs complemented the protection motivations theory to explain stockpiling behaviour, forming the basis for study 1, the stockpiling preparation stage and study 2, the effects of the Covid-19 pandemic disruptor on customer service logistics and lockdown shopping channel preferences. For studies 1 and 2 we gathered data via a UK online panel-structured questionnaire survey (n = 603). Results confirm that consumer-driven changes to supply chains emanate largely from consumer uncertainty. Lockdown restrictions led to consumers feeling socially excluded, but enhanced consumers' positive attitudes towards shopping online and increased consumers' altruism. In response, consumers stockpiled by visiting physical stores and/or ordering online. Lockdown restrictions led to feelings of social exclusion but, importantly, stockpiling helped to minimize consumer anxiety and fear and even increase wellbeing.

Introduction

Covid-19 has affected the resilience of global supply chains (Verbeke, 2020), creating many disruptions, such as product shortages. Shortages were to a great extent due to consumers buying products in bulk to create stockpiles as they were feeling insecure and threatened (Pantano *et al.*, 2020). Stockpiling can be a rational or emotional consumer response related to product scarcity (Micalizzi, Zambrotta and Bernstein, 2021), involving large purchases that consumers undertake (Dahlén and Lange, 2002). Stockpiling was only the start of this consumer behaviour reaction due to Covid-19. Panic buying was relatively brief, and things started to transition to the new Covid-19 consumer status quo within a few weeks (Laato *et al.*, 2020). Soon afterwards, the imposition of social distancing and lockdowns accelerated this insecurity, threat and uncertainty for consumers. Many consumers started buying products online primarily to minimize health risks and uncertainty about product availability. Retailers quickly shifted priorities from developing instore consumer experiences to building and improving online service and delivery, although this change is frequently associated with negative effects on consumers' wellbeing (Pantano *et al.*, 2020).

Consumers could have started suffering from social exclusion (Dennis *et al*., 2016; Papagiannidis *et al*., 2017), due to social distancing and lockdown, which led to lower wellbeing. Customers have found it difficult or sometimes impossible to book delivery slots and some online supermarkets have marshalled shoppers with an online queueing system (Pantano *et al*., 2020). Real queues outside physical stores, difficulties in booking deliveries online and stockouts, as well as compliance with health and safety guidelines in shopping outlets led to inconvenience and the unavailability of even basic essentials.

Prior research had little to offer when it came to understanding consumer behaviour changes in such extreme circumstances on a global scale. With a few exceptions (e.g. Teasdale *et al*., 2012; Wen, Gu and Kavanaugh, 2005), the impact of a pandemic on consumer behaviour had not been analysed in detail and, therefore, Covid-19 presented an opportunity to fill this gap by offering researchers a unique backdrop (Laato *et al*., 2020). Consumer response issues presented a unique consumer 'journey', creating a plethora of research gaps that require urgent attention. In the first instance, research aimed to make sense of the emerging landscape. Then, empirical work started offering insights from different contexts. As different countries experienced and dealt with the pandemic in diverse ways, such pieces of work offered valuable findings that helped make sense of consumer behaviour.

This work has two overarching objectives. First, it examines two important behaviours that were key to consumers' strategies with regard to tackling the pandemic challenges from a shopping perspective. Stockpiling and channel preferences exemplify the efforts that consumers put into maximizing their wellbeing, safety and security. Still, at the same time there were instances when consumers put the safety and security of others first. Hence, our second overarching research objective was to infuse our study with the factors that captured the key aspects of these conflicting priorities and study how behaviours and wellbeing were shaped by consumers' social inclusion and altruism. To address the above we have undertaken a pre-study using social media text mining to inform our models on stockpiling and channel preferences. In turn, we empirically tested two models that revolved around protection motivations theory (PMT) (Rogers, 1983; Rogers and Prentice-Dunn, 1997), an adapted version of the theory of planned behaviour (TPB) (Ajzen, 1991) developed by Dennis *et al*. (2016) and the framework of pro-social behaviour (Rapert, Thyroff and Grace, 2021). By meeting our research objectives, we aimed to make a tangible contribution to our understanding of how consumers behave in such extreme circumstances and how practitioners can adapt their strategies to alleviate the pressure that such dramatic changes in consumer behaviour could impose.

Literature review

Background: the pandemic's impact on consumers and their behaviour

The Covid-19 pandemic has changed the way consumers purchase products, probably forever, as customers have moved to a greater preference for online shopping and home delivery (Roggeveen and Sethuraman, 2020). Covid-19 has spread globally at an unprecedented speed and is wreaking chaos on the world economy (Le Roux, 2022; Sharma *et al*., 2020), causing global recession (Amirova *et al*., 2021; Eggers, 2020; Fernandes, 2020). Relaxing restrictions may lead to a bounce-back in consumption, which may have only a short-term effect (Deng, Wang and Chao, 2020). The effects of the pandemic on business will be long-lasting and, indeed, future serious pandemics are almost certain (Carnevale and Hatak, 2020), emphasizing the need for greater preparedness.

In such an environment, consumer behaviour was bound to be impacted, especially as product shortages are known to affect consumer buying behaviour (Hamilton *et al*., 2019). Fear of lockdowns, panic buying, increased peer buying, scarcity of essential items on superstore shelves, disruption of supply chains and individual/household demographics have played a vital role in consumer impulse buying behaviours (Ahmed *et al*., 2020; Gupta, Nair and Radhakrishnan, 2021; Nam *et al*., 2021). National contexts and cultures, as well as local circumstances, may also have affected the relative importance of such factors (Messner and Payson, 2021; Prentice *et al*., 2021). These effects have been demonstrated in the Covid-19 pandemic, where stores quickly sold out of basics. Disruptions to the (old-)normal patterns of consumer demand negatively impacted the performance of the supply chains (Dulam, Furuta

and Kanno, 2021; Ivanov, 2020). Scarcities led to price increases of sometimes 300% (Pantano *et al*., 2020), de-sensitizing consumers to price increases (Hamilton *et al*., 2019), waiting times and long queues to enter stores (Pantano *et al*., 2020; Shah, Shafir and Mullainathan, 2015). Notwithstanding that, historically, long waiting times have been associated with reduced customer satisfaction (Anić, Radas and Miller, 2011). These factors have led to consumers stockpiling essential products (Ahmadi *et al*., 2021; Amaral, Chang and Burns, 2021) and to sky-rocketing demand for online retail supplies and home delivery, often associated with reductions in consumers' wellbeing. Prior to the pandemic, online shopping was growing steadily (Harris *et al*., 2017). It then jumped by 129% in only one week at the start of the pandemic (Skeldon, 2020), causing many retailers' websites to crash. They were unable to offer delivery slots and/or excluded new customers (Mintel, 2020).

The above changes in consumer behaviour have had an impact on both consumer psychology and social relationships. On the one hand, stockpiling aimed to maximize individual/household security. On the other hand, consumers were willing to give priority to others, maximizing their safety. Both consumers and retailers have displayed more altruistic behaviour during the Covid-19 crisis, and this more ethical behaviour is predicted to continue beyond the crisis (He and Harris, 2020). Behaviours such as those noted above created an interesting antithesis, which this work aimed to examine in more detail by constructing two models that examined two consumer response strategies, namely stockpiling and channel preferences. As attempts to identify prior research to model the relationships between the antecedents and consequences of important Covid-19 supply chain disruptors produced sparse results, we used social media to elicit the potential constructs for our models (pre-study). Such use of social media to theoretically inform or empirically confirm models (in the context of the pandemic and panic buying; see Barnes, Diaz and Arnaboldi, 2021) can be valuable when it comes to studying emerging phenomena.

Pre-study: exploring social media themes

Given that past research on consumer stockpiling offers only a limited number of antecedent factors and the unprecedented nature of the crisis, we used social media data to complement and extend the literature review-based development of our model (for a background discussion on how social media affected consumer behaviour/panic buying, see Naeem, 2021). More specifically, we set up an automated Twitter post retrieval system and used the Twitter API to search for tweets that contained terms related to coviduk and supermarket brands. This made it possible to identify the main areas of discussion related to grocery shopping. For the period 11 March to 6 June 2020, a total of 6970 tweets were downloaded. These were first filtered to remove duplications in the form of re-tweets (messages that were re-posted by multiple users). Next, we processed the posts to remove all non-alphanumeric characters. We then applied the mySQL stopwords, removing commonly used terms that do not contribute to the meaning (e.g. 'the', 'about', 'just') and also replaced similar terms with a more common variation (e.g. 'lockdownuk' became 'lockdown'). As we were not interested in any specific brand as such, we also replaced all supermarket brands with the generic term 'supermarket'. We finally filtered the list for any potential duplicates. The total number of tweets analysed was 2566. Quantitative content analysis was used to classify parts of the text and draw inferences about the content (Krippendorff, 2004). QDA Miner and its extension WordStat were used for the analysis. Table 1 lists the most common terms.

We then generated 20 clusters (Table 2) and grouped them by relevance to four overarching consumer behaviour themes (delivery, availability, health and safety, altruism), which we discuss further below.

Discussion of pre-study

Due to the lack of prior research on consumer behaviour responses to a global pandemic, this pre-test examined consumers' unsolicited communications (tweets) to elicit what consumers consider important to them concerning grocery shopping in a pandemic. The analysis revealed four overarching consumer behaviour themes. The first theme concerned delivery issues, such as the impact that lockdown had on increased demand for online delivery slots, and the availability of products. These tweets demonstrated the willingness of shoppers to shop online or click and collect, especially where vulnerable consumers are involved. The second theme reflected

Table 1. Top 100 terms

Term 1–50	Freq	% Cases	TF IDF	Terms 51–100	Freq	% Cases	TF IDF
Supermarket	3000	91.19%	120.1	Safe	59	2.26%	97.1
Covid	2365	85.04%	166.5	Pandemic	54	2.03%	91.4
People	470	16.13%	372.4	Buy	53	1.95%	90.6
Staff	383	13.29%	335.7	Stop	53	2.03%	89.7
Delivery	321	10.76%	310.8	Family	52	1.87%	89.9
Stores	317	11.11%	302.5	Service	52	1.99%	88.5
Shopping	267	9.51%	272.8	Trolley	51	1.56%	92.2
Socialdistancing	258	9.39%	265	Job	50	1.87%	86.4
Food	251	8.42%	269.8	Panicbuying	50	1.83%	86.9
Slots	221	7.40%	249.8	Public	50	1.91%	86
Lockdown	210	7.64%	234.6	Big	49	1.87%	84.7
Shop	202	7.52%	227	Gloves	49	1.64%	87.5
Today	197	7.44%	222.3	Savelives	48	1.87%	82.9
Customers	195	7.09%	224.1	Covidiots	47	1.83%	81.6
Queue	193	6.82%	225.1	Support	47	1.79%	82.1
Vulnerable	189	6.39%	225.7	Virus	47	1.75%	82.5
Local	164	6.24%	197.6	Social	46	1.71%	81.2
Day	159	5.69%	197.9	Collect	45	1.71%	79.5
NHS	159	5.53%	199.9	Place	45	1.71%	79.5
Time	143	5.26%	182.9	Rules	45	1.60%	80.8
Work	138	4.79%	182.1	Told	44	1.71%	77.7
Week	130	4.87%	170.6	Pay	43	1.64%	76.8
Workers	115	4.05%	160.1	Person	43	1.68%	76.4
Online	107	3.70%	153.2	Hard	42	1.56%	75.9
Hour	106	3.86%	149.8	Helping	42	1.56%	75.9
Stayhome	97	3.39%	142.6	Inside	42	1.56%	75.9
Facemasks	94	2.88%	144.8	Measures	42	1.64%	75
Essential	93	3.51%	135.3	Long	41	1.48%	75
Great	91	3.27%	135.1	Serviceteam	41	1.60%	73.7
Home	91	3.47%	132.8	Government	40	1.56%	72.3
Wear	90	3.12%	135.6	Items	40	1.40%	74.1
Working	90	3.47%	131.4	Keeping	40	1.52%	72.7
Meters	85	3.08%	128.5	Matthancock	40	1.56%	72.3
Elderly	84	2.96%	128.4	Managed	39	1.52%	70.9
Risk	80	2.88%	123.2	Crisis	38	1.48%	69.5
Distancing	74	2.69%	116.2	Experience	38	1.36%	70.9
Good	74	2.69%	116.2	London	38	1.44%	70
Morning	74	2.84%	114.4	Protect	38	1.48%	69.5
Times	72	2.73%	112.6	Weekly	38	1.40%	70.4
Shelves	69	2.61%	109.2	Car	37	1.33%	69.5
Borisjohnson	68	2.57%	108.1	Click	37	1.44%	68.1
Care	68	2.49%	109	Hand	36	1.36%	67.1
Keyworkers	68	2.53%	108.6	Hope	36	1.40%	66.7
Shoppers	65	2.42%	105.1	Taking	36	1.40%	66.7
Order	64	2.18%	106.3	Thought	36	1.40%	66.7
System	63	2.42%	101.9	Absolutely	35	1.36%	65.3
Priority	62	2.30%	101.6	Dear	35	1.36%	65.3
Shops	62	2.34%	101.1	Families	35	1.33%	65.7
Community	60	2.22%	99.2	Feel	35	1.33%	65.7
Make	59	2.26%	97.1	Line	35	1.36%	65.3

shoppers' concerns about stockouts and availability, especially of essential products. The third theme concerned the compliance or not with health and safety protection measures, and reflected general concerns, such as having to wear a mask and trying to maintain social distancing. The final theme concerned altruism, and indicated particular concern with vulnerable people, key workers and priority delivery slots. Consumers could potentially use stockpiling to counteract the

Table 2. Twenty themes discussed on Twitter

Relevant themes	Topic	Keywords	Coherence	Freq	% Cases
Study 1: delivery	Order online	Order; mum; tomorrow; online; phone; order online	0.32	37	1.36%
Study 1: delivery	Delivery slots	Slots; delivery; book; vulnerable; parents; online; delivery slots; online delivery; home delivery; delivery slots week	0.402	321	9.70%
Study 1: delivery	Click collect	Click; click collect; collect; delivery click collect	0.298	39	1.48%
Study 1: compliance with health and safety guidelines	Metres distancing	Distancing; floor; asked; metres; yesterday; metres distancing	0.348	33	1.21%
Study 1: compliance with health and safety guidelines	Wear facemasks	Wear; facemasks; gloves; wear facemasks; wear gloves; people wear facemasks; cloth facemasks; staff wear; wear gloves facemasks	0.33	101	2.46%
Study 1: compliance with health and safety guidelines	Staff customers social distancing	Social distancing; stores; customers; inside; measures; staff; staff customers; customers stores; social distancing measures; social distancing stores; stores staff	0.37	206	7.17%
Study 1: availability	Empty shelves	Shelves; empty; London; empty shelves; shelves empty	0.296	20	0.74%
Study 1: availability	Essential items buy	Essential; buy; items; price; crisis; essential items; buy essential	0.334	24	0.90%
Study 1: availability	Limit shopping	Limit; shopping; hand; shoppers	0.313	6	0.23%
Study 2: altruism	Vulnerable people priority delivery	List; government; priority; vulnerable; vulnerable people; priority delivery; priority delivery slots; priority slots; supposed food	0.328	37	1.21%
Study 2: altruism	NHS workers	Workers; NHS; care; keyworkers; social; nhs workers; care workers; NHS staff; social care; NHS workers partner; care homes; food delivered slots	0.349	105	3.43%
	Great job	Job; keeping; great; tills; service; hand; great job	0.366	28	1.01%
	Front line	Line; front; waiting; front line;	0.296	19	0.74%
	Car park	Park; car; car park	0.289	16	0.58%
	Families couples	Couples; families; weekly; family; kids; families couples	0.353	19	0.62%
	Working hard	Working; hard; pandemic; work; helping; working hard	0.347	31	1.21%
	Stay home save lives	Savelives; stayhome; stayhome savelives; stayhome stayhome savelives	0.27	59	1.91%
	Stay/leave	Stay; leave; thing; queue;	0.329	4	0.16%
	Public health	Health; public; make; protect; people; public health	0.331	23	0.74%
	Politics	Borisjohnson; Matthancock; Piersmorgan; Borisjohnson Matthancock; Matthancock Borisjohnson	0.303	28	1.09%

negative effect that the pandemic may potentially have had. However, altruism towards the National Health Service (NHS) and vulnerable groups was a key reason for avoiding behaviour, such as stockpiling, that may have had a negative impact on supply chains (Table 2). In conjunction with the literature review, these four overarching themes informed and framed studies 1 and 2, which are discussed in detail in the next section.

Empirical models and hypotheses

This section presents the two empirical models constructed and the associated hypotheses. The first study aimed to examine stockpiling as a form of consumer response behaviour. PMT was used to theoretically frame stockpiling behaviours as a response to the perceived threat. PMT has been used to examine individuals' motivation to switch behaviour as a means to protect themselves. The theory is grounded in the expectancy-value paradigm, which helps explain how an individual's behaviour change is driven by the expectancy that it will result in consequences. Fear of a potential threat incurred by the behaviour is the stimulus for any actions that individuals may decide to implement in order to avert a potential threat (Rogers, 1983; Rogers and Prentice-Dunn, 1997). The theory has been used in a wide range of contexts and applications (Jansen and van Schaik, 2018; Pechmann *et al*., 2003; Tunner, Day and Crask, 1989; Wang *et al*., 2019). As such, it was considered an appropriate theoretical model for framing our first empirical study. More specifically, stockpiling can help to minimize consumer anxiety and fear and, by doing so, it is posited in this paper that it can also increase wellbeing. Such behaviours are part of an attempt to protect consumers against perceived threats and regain control. As time passes, consumers manage to cope with the new circumstances by adopting new behaviours, becoming less reactive and more resilient (Guthrie, Fosso-Wamba and Arnaud, 2021; Kirk and Rifkin, 2020). Based on the pre-study findings, we extended the PMT model by introducing a new set of factors (namely availability of products and slots and health and safety measures) related to the retail and supply circumstances surrounding stockpiling behaviours. Such an extension made it possible to bring a contextual perspective to the theory and help us put the findings into perspective.

We then proceeded to investigate lockdown shopping channel preferences in study 2, undertaking further analysis with regard to the moderating impact that the presence of vulnerable members in a household had. Our second empirical model adapted the work of Dennis *et al*. (2016), who constructed a model for studying the impact of the channel on wellbeing. The model was theoretically founded on the TPB (Ajzen, 1991). The TPB has been used in a wide range of disciplines and contexts, including shopping-related behaviours such as channel switching (Kursan Milaković and Miocevic, 2022; Madahi and Sukati, 2016; Pookulangara, Hawley and Xiao, 2011; Youn, Lee and Ha-Brookshire, 2021). Building on the study by Dennis *et al*. (2016), the second model was also informed by the pro-social behaviour domain, which provided a theoretical framework to incorporate consumer altruism (Rapert, Thyroff and Grace, 2021) in the model, aiming to explain the lockdown shopping channel preferences. The model was also informed by the pre-study. For instance, altruism was added to the model in order to examine whether expressions of support found on social media translated into behaviours when it came to channel choices. Studies 1 and 2 and their associated hypotheses are discussed in more detail below.

Study 1: stockpiling preparation stage

There are various types of stockpiling emanating from store or brand promotions, or even disasters and pandemics (Prentice, Chen and Stantic, 2020). In this study, we consider stockpiling as a consumer protection behaviour against the fear of the potential threats that could result from the pandemic. Consumers fearing that Covid-19 might result in disruption in supply chains, which may be manifest, for instance, in product shortages, as well as channel/delivery disruptions, may stockpile so that they can mitigate against disruptions. This stockpiling could stem from a rational or emotional response (Micalizzi, Zambrotta and Bernstein, 2021) regarding consumers' perceptions of the limited supply of essential goods or fear of a complete lockdown being imposed. Also, purchases can be influenced by peer buying during such times, with government control being shown to be significantly related to impulse buying and stockpiling (Gupta, Nair and Radhakrishnan, 2021). Equally, this stockpiling could be exacerbated by various media, which might

exaggerate the facts (Prentice, Chen and Stantic, 2020). Empirical findings related to the pandemic period also suggest that the greater the fear that consumers feel, the greater their changes in shopping behaviour (Eger *et al*., 2021).

We adopted the PMT to conceptualize the process by which consumers attempt to potentially use stockpiling. PMT was developed to explain the effects of fear on health attitudes and behaviours (Rogers and Deckner, 1975), but has been used more widely to cover other types of threat (Floyd, Prentice-Dunn and Rogers, 2000). At the core of PMT lie two cognitive mediating processes, namely the threat-appraisal and the coping-appraisal processes. The threat-appraisal process is assessed first, as a threat first has to be identified before an appropriate coping strategy can be considered. Threat appraisal includes, on the one hand, the rewards, which can increase the probability of adopting the response, and on the other hand, the perception of threat, which may lower such a probability. In the context of the pandemic, empirical studies have shown that Covid-19 had a significant effect on self-efficacy and perceived severity (Ong *et al*., 2021). Also, the outcomes of threat appraisal and response appraisal have been shown to encourage consumers' valuation of contactless e-commerce deliveries (Wang *et al*., 2021). It is worth pointing out that the need to carefully consider the circumstances within PMT is applied both with regard to the environment in which it is applied and the behaviours examined. For instance, results may differ based on individual attributes, such as someone's political orientation (Kim and Im, 2021). As such, information on the wider setting in which a study takes place can help provide a richer understanding of any findings.

When it came to stockpiling, consumers had to assess the severity and vulnerability of supply chains and how these may affect them. If the consumer assessment was that a significant upstream disruption was on the horizon, consumers could stockpile to mitigate the risk of future shortages, a behaviour that could become more pronounced if the consumer has experienced supply shortages in the past (Yoon, Narasimhan and Kim, 2018). In the case of Covid-19, it may not have been past supply shortages that encouraged stockpiling, but the need to maintain social distancing too. Stockpiling might not only ensure that they maintained access to all necessary products, but also that they avoided the negative effects of social distancing by reducing the risk of infection, given that they did not need to visit a grocery store or supermarket. For instance, analysis of the perceptions of consumers showed that normative social influence, followed by perceived scarcity, control, social trust, observational learning and severity were correlated with panic buying during Covid-19 (Yuen *et al*., 2021). Panic buying and stockpiling behaviour may have been encouraged by government interventions or even social media, which led to consumers evaluating these as a signal of potential disruption (Naeem, 2021; Prentice, Chen and Stantic, 2020). Interestingly, empirical findings suggested that the number of information sources consumers were exposed to in the early days of the pandemic did not have an impact on the pandemic's perceived severity, but the exposure did increase health anxiety and, consequently, intention to make unusual purchases and engaging in voluntary isolation (Laato *et al*., 2020). Laato *et al*. (2020) also found that intention to self-isolate was a strong predictor of unusual purchases, indicating that unusual purchases were made as a preparation for a period of isolation.

H1: The perceived (a) severity of and (b) vulnerability to the impact of the pandemic positively influence stockpiling behaviours.

Moving on to the coping appraisal, this helps evaluate someone's ability to cope with the threatened danger. As with the threat appraisal, the coping appraisal also features two groups of factors: efficacy and costs. Response efficacy is defined as someone's belief that the potentially adopted protective action will be effective. Self-efficacy is someone's perceived ability to operationalize the adaptive response. Response costs are the costs associated with operationalizing the adaptive response. Efficacy factors are expected to increase the probability of someone adopting the behaviour, while the cost will lower it. The coping appraisal typically has greater influence than the threat appraisal on intentions and behaviour (Milne, Sheeran and Orbell, 2000; Ruiter, Abraham and Kork, 2001). The result of the above two processes is the decision to adopt the adaptive response. In the context of the pandemic, Farooq *et al*. (2021) found that self-efficacy and response cost were significantly related to self-isolation intention. Studies have also examined the mediating role that emotions such as hope and fear can have when it comes to implementing protective

behaviours (Kim *et al*., 2022). Self-efficacy was found to be effective in making people feel hopeful, while response efficacy helped people feel less fearful, which in turn could result in increased practising of the behaviours considered.

With regard to stockpiling, self-efficacy could have been determined by factors such as the availability of storage space, the amount and range of necessary products, etc., while the costs primarily translated into the financial investment required to create the stockpile. For example, Wang *et al*. (2020) showed that food reserves among the Chinese participants considered in their study increased from 3.37 to 7.37 days after the outbreak of Covid-19, and that consumers on average were willing to pay a 60% premium for reserves of fresh products. Despite such an increase in buying, consumers appear to have adapted their consumption strategies in terms of food waste, so that they could maximize the utility that the additional purchases would have (Jribi *et al*., 2020):

H2: The (a) response efficacy and (b) perceived self-efficacy of stockpiling during the pandemic positively influence stockpiling behaviours.

H3: The perceived costs of stockpiling during the pandemic negatively influence stockpiling behaviours.

Following the social media discussions, we also considered individuals' beliefs about how others with close social ties to them think about their engagement in the given behaviour (social norms) (Ajzen, 1991), with the main consideration being that such behaviour may prevent vulnerable consumer groups from accessing necessary products. Other factors, such as a lack of online delivery slots, perceived product shortages and complying with health and safety guidelines (e.g. mandatory social distancing and face coverings; Lee *et al*., 2012), were likely to discourage consumers from shopping frequently, leading to stockpiling behaviours. Safety and social distancing concerns led to more positive consumer attitudes to non-store retail channels (Sayyida *et al*., 2021).

Given the above, we hypothesize the following relationships:

H4: Social norms related to stockpiling during the pandemic negatively influence stockpiling behaviours.

H5: The potential lack of (a) online delivery slots, (b) products and (c) compliance with health and safety guidelines while shopping positively influence stockpiling behaviours.

The hypotheses are summarized in Figure 1. We also controlled for relevant demographic factors such as age, gender, education, income, household size and whether the respondent lived in a rural or urban area.

Study 2: lockdown shopping channel preferences

Social exclusion refers to the lack of participation in the normal activities of citizens in a society (Burchardt, Le Grand and Piachaud, 1999). This lack of participation can often be the outcome of income poverty, either as a result of unemployment or low wages (Peace, 2001). Scarcity of financial resources can limit access to goods, services and a wider participation in various activities (Taylor, Jenkins and Sacker, 2011). To tackle the pandemic, many governments severely restricted the movement of people (and sometimes goods), both within and between countries, effectively suspending global trade (Evans, 2020). At the same time, the pandemic has had a significant effect on individuals' finances, as many people suffered from a reduction in their income either due to job losses or a reduction in their workload. In addition, the lack of participation in activities, or limited access to services, could be caused by other factors beyond the control of the individual, such as limited mobility, residency in a remote area, lack of support networks, illness and old age (Piacentini, Hibbert and Al-Dajani, 2001; Stanley *et al*., 2011T; Wrigley, Guy and Lowe, 2002). This inability to participate in various social and day-to-day activities has been reinforced by the implementation of social distancing and lockdown policies. In many cases such policies have had an impact on access to products and services and, subsequently, on perceived social exclusion, which in turn can impact negatively on people's wellbeing, by affecting the perceived security of what could be important to them (Peace, 2001). Lockdown restrictions have also had negative psychological implications for individuals (Mackolil and Mackolil, 2020). Restrictions have reduced the ability of people to participate in day-to-day activities. Shopping for necessary goods has been more difficult and in turn, consumers' perceived

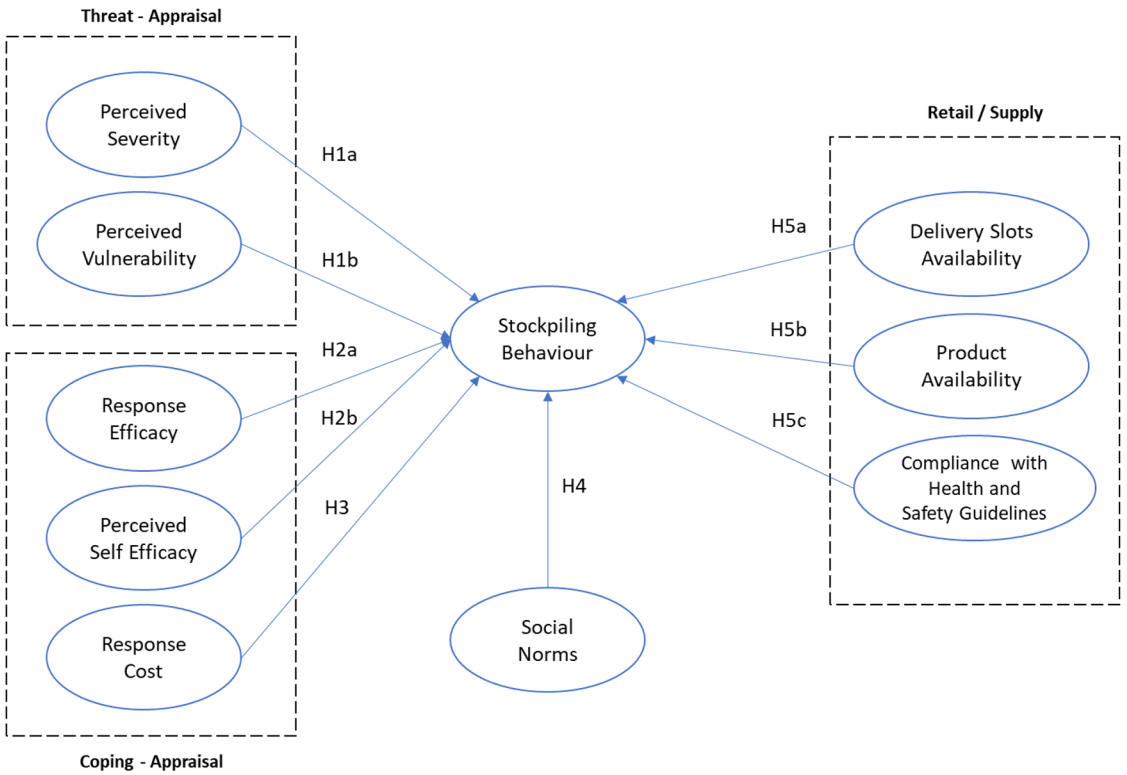


Figure 1. Study 1: stockpiling behaviour model based on adapted protection motivations theory [Colour figure can be viewed at wileyonlinelibrary.com]

social exclusion has increased (Sheth, 2020). This has redefined consumers' pro-social dispositions, a set of interpersonal actions aiming to benefit other fellow members of a given sociocultural system (Rapert, Thyroff and Grace, 2021). Thus, many consumers have an increased sense of social responsibility to help others, which has increased their level of altruism (Rapert, Thyroff and Grace, 2021), in the sense of perceiving helping others as their moral obligation (Do, Rahman and Robinson, 2020). Moral obligations can drive various consumption acts (Saad, 2013) and in turn influence consumers' attitudes towards purchasing specific products or adopting a particular buying behaviour (Prakash *et al.*, 2019). Therefore, we expect that:

H6: Lockdown restrictions (a) negatively affect perceived social exclusion, (b) positively affect consumers' altruism and (c) affect consumers' attitudes towards the use of a specific retail channel.

H7: (a) Social exclusion and (b) altruism positively affect the attitude someone has to a specific retail channel.

The perceived social exclusion could influence preferences related to the selection of various retail channels. Specifically, during the pandemic, consumers may have experienced difficulties when it comes to accessing stores and moving within them, or communicating with shop assistants (Swaine *et al.*, 2014) given the social distancing and travel restrictions imposed. Other individuals may have been reluctant to visit stores, due to health-related concerns or psychological disorders (Belk, 2015). Hence, consumers may decide to complete their day-to-day activities such as shopping via electronic channels, as these may be perceived as safer, albeit less social. Indeed, evidence suggests that lockdowns and social distancing led to many consumers adopting purchasing behaviours mediated by technology, with digitization being applied in product categories which did not have a strong online presence previously (Cruz-Cárdenas

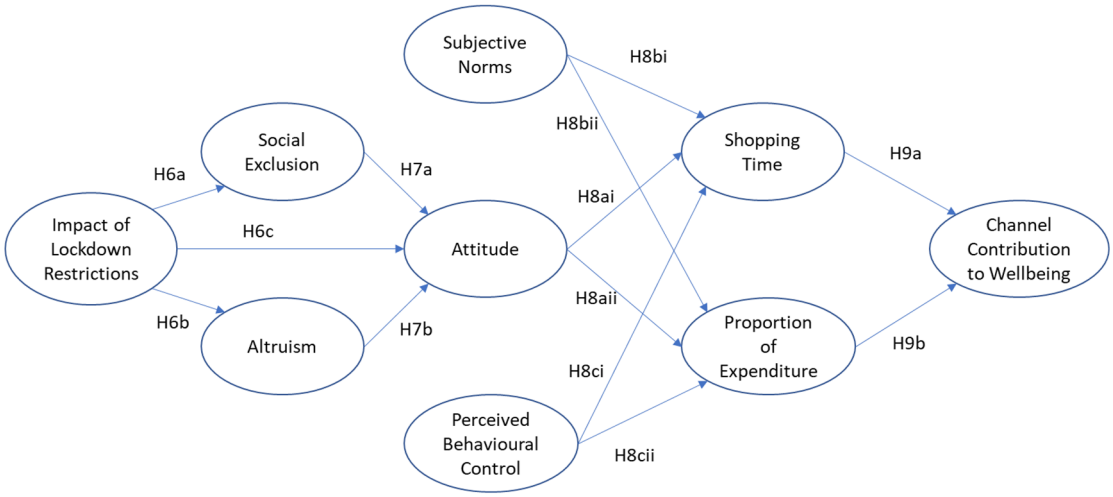


Figure 2. Conceptual model for study 2 [Colour figure can be viewed at wileyonlinelibrary.com]

et al., 2021). Of course, such changes were not just channel related (for a review of how consumers in different countries changed behaviours related to channels, see Sayyida *et al*., 2021), but also product category related (Eger *et al*., 2021). To shed light on this unprecedented shopping process and the role of different channels, we have employed the TPB, which has been used in marketing applications over many years and which suggests that attitudes, subjective norms and perceived behavioural control influence behaviour (Ajzen, 1991). Previous literature suggests that subjective norms represent the social pressure associated with the adoption or rejection of an action (Ajzen, 1991). Sandikci and Holt (1998) suggest that shopping behaviour can affect someone's self-image and therefore during the pandemic particular shopping behaviours, such as visiting a store, may not be viewed as acceptable behaviour by one's peers. Perceived behavioural control describes the ease or difficulty of adopting a behaviour (Ajzen, 1991). This current study utilizes TPB to assess the psychological process related to selecting a channel in the new shopping environment created by the pandemic, as in the past it has been used to examine channel switching behaviour (Pookulangara, Hawley and Xiao, 2011), as well as the impact of social exclusion on the time and money that individuals spend on a shopping channel and attitudes towards online channels (Dennis *et al*., 2016; Papagiannidis *et al*., 2017) and consumer behaviour responses to a coronavirus pandemic (Lee *et al*., 2012). The selection of a shopping channel could also be influenced by the perceived value that consumers expect to derive from the shopping-related activities via this channel (Walsh *et al*., 2016). To inform this type of decision, socially excluded consumers may consider factors that are beyond their immediate control, which might in turn restrict their options. During the pandemic, such decisions could be further influenced by social distancing restrictions and travel bans. Therefore:

H8: (a) Attitude, (b) subjective norms and (c) perceived behavioural control positively affect (i) the time spent and (ii) the proportion of expenditure via a specific retail channel.

Finally, shopping can provide consumers with happiness and wellbeing (Hedhli, Chebat and Sirgy, 2013). In the case of access difficulties, these benefits can also extend to online shopping (Papagiannidis *et al*., 2017; Parsons, 2002), which we expect will be the case with lockdown. Shopping, including online shopping if there are access difficulties, can be associated with improvements in wellbeing (Papagiannidis *et al*., 2017). Thus, we expect that:

H9: (a) The time spent and (b) the proportion of expenditure via a specific retail channel have a positive effect on the perceived contribution of the channel on consumers' wellbeing.

The hypotheses are visually presented in Figure 2.

Table 3. Sample characteristics

Characteristic	Freq	%	Characteristic	Freq	%
Gender			Education		
Male	301	49.9	University higher degree (e.g. MSc, PhD)	95	15.8
Female	302	50.1	First degree-level qualification including foundation degrees, graduate membership of a professional institute, PGCE	147	24.4
Age			Diploma in higher education	59	9.8
18–19	10	1.7	Teaching qualification (excluding PGCE)	12	2.0
20–29	137	22.7	Nursing or other medical qualification not yet mentioned	8	1.3
30–39	110	18.2	A Level	107	17.7
40–49	104	17.2	International Baccalaureate	2	.3
50–59	84	13.9	AS Level	6	1.0
60 or over	158	26.2	Higher Grade/Advanced Higher (Scotland)	12	2.0
Area of residence			Certificate of sixth year studies	8	1.3
Urbanized area (50,000 or more people)	249	41.3	GCSE/O Level	107	17.7
Urban cluster (at least 2500 and less than 50,000 people)	247	41.0	CSE	12	2.0
Rural (all other areas)	107	17.7	Standard/Ordinary (O) Grade/Lower (Scotland)	9	1.5
Income			None of the above	19	3.2
£0–£24,999	183	30.3	Vulnerable people in household		
£25,000–£49,999	259	43.0	Yes	223	37.0
£50,000–£74,999	102	16.9	No	380	63.0
£75,000–£99,999	38	6.3			
More than £100,000	21	3.5			

Methodology

The methodological steps followed for the pre-study were presented earlier in the paper. In this section, we present the methodology for studies 1 and 2. The data collection took place in the United Kingdom, using an online consumer panel. This was in line with the social media pre-study sampling. We recruited 603 respondents via a market intelligence provider, aiming to balance the sample in terms of gender, age and respondents' area of residence. Table 3 outlines our sample's characteristics.

To test the models, we adopted previously validated scales to measure the variables. Respondents answered on seven-point scales for all constructs and data was collected using an online questionnaire. The pre-study informed the models for the two empirical studies. The study 1 model included the constructs in Table 4. Multiple regression was employed to test the hypotheses. In study 2, we decided to study offline/out-of-home shopping, and online shopping as a whole regardless of the device used. The questions (Table 5) were presented to participants twice, once for each of the two channels considered. Partial least squares-based structural equation modelling and multigroup analysis were employed to analyse the data.

Results

Study 1: stockpiling preparation stage

Out of the nine relationships hypothesized in study 1, four were found to be significant. More specifically, perceived severity (H1a), response efficacy (H2a), social norms (H4) and product availability (H5b) were found to positively relate to stockpiling behaviours (Table 6, Figure 3). Among these variables, response efficacy and social norms were the most influential. The severity of the threat was considered more important than the

Table 4. Constructs for the stockpiling model

Construct	Cronbach's α	Source
Perceived severity	0.949	Hess *et al*. (2003)
At the beginning of the pandemic, just before the lockdown in March, I expected food shortages to be a… Mild problem… Severe problem		
At the beginning of the pandemic, just before the lockdown in March, I expected food shortages to be a… Minor problem… Major problem		
At the beginning of the pandemic, just before the lockdown in March, I expected food shortages to be a… Insignificant problem… Significant problem		
Perceived vulnerability	0.959	Coates *et al*. (2007)
I worried that my household will not have enough food		
I worried that I or any household member may not be able to eat the kinds of foods we preferred because of a lack of resources		
I worried that I or any household member may eat just a few kinds of food day after day because of a lack of resources		
I worried that I or any household member may eat food that you did not want to eat because of a lack of resources to obtain other types of food		
I worried that I or any household member may eat a smaller meal than we felt we needed because there was not enough food		
I worried that I or any other household member may eat fewer meals in a day because there was not enough food		
I worried that there may not be any food at all in my household because there were no resources to get more		
I worried that I or any household member may have to go to sleep at night hungry because there was not enough food		
I worried that I or any household member may have to go a whole day without eating anything because there was not enough food		
Response efficacy	0.980	Hsu *et al*. (2006); Yang (2012)
Just before the beginning of the pandemic and before the lockdown… Stockpiling was a good idea		
I was favourable toward stockpiling		
I thought stockpiling was a wise idea		
I was positive about stockpiling		
I thought stockpiling was good for me		
I thought stockpiling was appropriate for me		
I thought stockpiling was beneficial for me		
I had a positive opinion about stockpiling		
Perceived self-efficacy	0.937	Chen *et al*. (2001)
At the beginning of the pandemic, just before the lockdown in March… I expected to be able to source most of the food products that I need for myself and my family		
Even when facing difficulties in getting hold of food products, I was certain that I would be able to find them		
In general, I thought that I would be able to source food products that were important to me		
I believed I could successfully source the food products that I would have needed		
I expected to be able to successfully overcome many challenges of sourcing the food products that I would have needed		
I was confident that I could perform effectively on sourcing the food products that I would have needed		
Compared to other people, I could satisfy my shopping needs in terms of food very well		
Even when things were tough in terms of sourcing food products, I could perform quite well		
Response cost		Authors
Just before the lockdown, approximately how much of your monthly salary (percentage) did you expect to spend on stockpiling food?		
Social norms	0.942	Ajzen (1991)
Just before the beginning of the pandemic and before the lockdown… Most of my family living in different households stockpiled food in preparation for the pandemic		

Table 4. (Continued)

Construct	Cronbach's α	Source
Most of my friends stockpiled food in preparation for the pandemic		
Most of my family thought I should stockpile food in preparation for the pandemic		
Most of my friends thought I should stockpile food in preparation for the pandemic		
Delivery slots	0.908	Bouzaabia *et al*. (2013)
The stores where I tend to shop had available delivery slots		
Delivery slots were available when needed		
Product availability (stockouts)	0.828	Bouzaabia *et al*. (2013); Authors
I noticed stockouts of food products that were of interest to me		
When shopping, there were shortages of some important food products		
Non-pharmaceutical intervention (in our context this relates to complying with health and safety guidelines)	0.906	Lee *et al*. (2012)
I frequently disinfected my hands while visiting a store		
I washed (disinfected) my hands after visiting a store		
I restrained from touching my eyes, nose and mouth while visiting a store		
I covered my mouth and nose with a face covering while visiting a store		
I kept away from other shoppers while visiting a store		
I carefully kept an eye on my health condition after visiting a store		
Stockpiling behaviour	0.911	Yanguia and El Aoud (2015)
I bought food products even though I did not need them for immediate use		
I increased the quantity of my food purchases in order to stock the products		
I reserved quantities of food products which may have become unavailable		

respondents' potential vulnerability. In the coping appraisal group of independent variables, the efficacy of organizing stockpiling was the only factor that positively influenced stockpiling. Perceived self-efficacy and response cost were not significant, potentially suggesting that consumers did not feel that organizing a stockpile was out of their reach. When comparing the two significant factors found in the threat and coping appraisal groups, our findings are in line with past studies suggesting that coping appraisal has greater influence than threat appraisal on behaviour (Milne *et al*., 2000; Ruiter *et al*., 2001). Given the nature of the emergency and how it affected families and households, it was not surprising to see social norms being an influential factor, despite voices on social media opposing stockpiling. This finding contradicts H4, which was based on the influence of the calls from discussions on social media against stockpiling in order to ensure that product availability and access to products would not be affected on a broader scale. However, our results suggest that advice from close family members contradicted such calls and encouraged stockpiling behaviour. Finally, in the retail/supply group of independent variables only the product availability was found to be significant. Delivery slot availability, or having to comply with health and safety guidelines while shopping, were not considered important issues. The fact that slots were made increasingly available for more vulnerable groups, with the rest being able to source products offline when necessary, may have alleviated the short-term concerns about the availability of delivery slots. Similarly, when shopping offline, the non-pharmaceutical intervention while shopping was not as important as the protection such a measure would offer, and not sufficiently high to lead to stockpiling behaviours.

The results of the first study provide insights into the drivers of stockpiling behaviour. In appraising the perceived threat of the lack of available products, the perceived severity of the disruption of the supply chain was an important factor for consumers in stockpiling products (see also Yoon *et al*., 2018). Elaborating on the PMT (Rogers and Deckner, 1975), our findings suggest that in the context of supply chain disruptions, the perceived severity of the disruption in the supply chain is a more important factor than the vulnerability of the supply chains, mainly due to the lack of consumer knowledge about supply chain vulnerability issues. Hence, retailers' tactics of educating consumers on the structure of supply chains in addressing concerns about vulnerability may not have the desired outcomes of preventing unwanted behaviours, such as stockpiling. If consumers

Table 5. Constructs for the channel preferences model

Construct	Instore		Online		Source
	Cronbach's α	Loading	Cronbach's α	Loading	
Impact of lockdown restrictions	0.854		0.854		Authors
Availability of household products was restricted due to lockdown constraints		0.912		0.915	
Availability of food was restricted due to lockdown constraints		0.953		0.950	
Social exclusion	0.939		0.939		Lim and Kim (2011); Waldron (2010)
I lacked companionship		0.821		0.818	
There was no one I could turn to		0.869		0.861	
I felt left out		0.901		0.900	
I felt isolated from others		0.895		0.900	
I was unhappy being so withdrawn		0.896		0.900	
People were around me but not with me		0.828		0.820	
I did not feel connected to my community		0.772		0.789	
Altruism	0.838		0.838		Campbell, Gulas and Gruca (1999)
I worry about poverty in my community		0.915		0.913	
I am concerned about hunger in my community		0.924		0.917	
I care about unemployment in my community		0.765		0.775	
Attitude	0.929		0.929		Yang (2012)
Shopping […via this channel…] was a good idea		0.927		0.933	
I was favourable towards shopping […via this channel…]		0.948		0.943	
I was positive about shopping […via this channel…]		0.931		0.931	
Subjective norms	0.882		0.826		Yang (2012)
Most of my family thought I should shop for food […via this channel…]		0.863		0.810	
I shopped instore because of the proportion of my friends who shopped […via this channel…]		0.914		0.867	
People who influence my behaviour thought that I should shop […via this channel…]		0.921		0.906	
Perceived behavioural control	0.855		0.799		Sparks, Guthrie and Shepherd (1997); Yang (2012)
I had the necessary skills to shop […via this channel…]		0.876		0.829	
I had the knowledge necessary for shopping […via this channel…]		0.875		0.827	
It was possible for me to shop […via this channel…]		0.885		0.847	
Shopping time	1.000		1.000		Dennis *et al*. (2016)
The number of hours spent shopping […via this channel…] in a week during lockdown		1.000		1.000	
Proportion of expenditure	1.000		1.000		Dennis *et al*. (2016)
During the lockdown… proportion of 'shopping spending' per month spent on shopping […via this channel…]		1.000		1.000	
Channel contribution to wellbeing	0.824		0.870		Hedhli, Chebat and Sirgy (2013)

Table 5. (Continued)

Construct	Instore		Online		Source
	Cronbach's α	Loading	Cronbach's α	Loading	
Shopping […via this channel…] satisfied my overall shopping needs		0.926		0.936	
Shopping […via this channel…] played a very important role in my social wellbeing		0.918		0.945	

Table 6. Study 1 results

Path	Unstandardized B coefficient (t-statistic/p)	VIF
Perceived severity → stockpiling behaviour	0.053 (2.076*)	1.459
Perceived vulnerability → stockpiling behaviour	−0.029 (−0.863ns)	2.044
Response efficacy → stockpiling behaviour	0.561 (15.929***)	2.750
Perceived self-efficacy → stockpiling behaviour	0.011 (0.293ns)	1.350
Response cost → stockpiling behaviour	0.002 (0.751ns)	1.867
Social norms → stockpiling behaviour	0.279 (7.651***)	2.537
Delivery slots → stockpiling behaviour	−0.008 (−0.303ns)	1.309
Stockouts → stockpiling behaviour	0.099 (3.180**)	1.275
Compliance with health and safety guidelines → stockpiling behaviour	0.061 (1.837#)	1.296

Note: All VIF values are <3, indicating that there are no multicollinearity issues in the model. Durbin—Watson is 1.936, indicating that the values of the residuals are independent. The variance of the residuals was constant and the values of the residuals were normally distributed. Scatterplots and P–P plots are available upon request. There were no outliers in the sample as Cook's distance values were <1 in all cases. Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. $R^2 = 0.710$; adjusted $R^2 = 0.705$; F = 161.140. ns, not significant; VIF, variance inflation factor.

notice product shortages in stores, they are likely to stockpile, regardless of retailers' exhortations to them not to do so.

Study 2: lockdown shopping channel preference

Instore channel results. The results suggest that the perceived impact of the preventive measures introduced during the pandemic increased respondents' perceived social exclusion and their altruism in the form of being willing to help other individuals. Such measures had a negative effect on respondents' attitudes towards shopping instore, as they may have perceived shopping instore as unnecessary exposure to the virus. A positive attitude towards shopping instore was found to have a positive effect on both the proportion of shopping expenditure instore as well as the time spent shopping instore. Peers' influence had a positive effect on the time spent instore, which potentially suggests that encouragement by peers creates a sense of security for shoppers. In contrast, the perceived behavioural control over shopping instore had a negative effect on the time spent instore, although this effect was relatively weak. This result indicates that respondents, despite feeling able to shop instore, were reluctant to adopt this behaviour, as they potentially did not feel comfortable spending long periods of time in a store and were trying to make their shopping trips as short as possible. This is supported by the positive effect of perceived behavioural control on proportion of expenditure, which suggests that respondents were happy to spend their money instore but not happy to spend time instore. Finally, the more time and more money respondents spend instore, the more positive the effect of shopping via this channel on their perceived wellbeing, which indicates that acquiring the necessary products, as well as interacting in a safe environment with other individuals, has a positive effect on individuals' wellbeing (Table 7, Figure 4). Tables 5, 8 and 9 provide information about the fit, reliability and validity of the model.

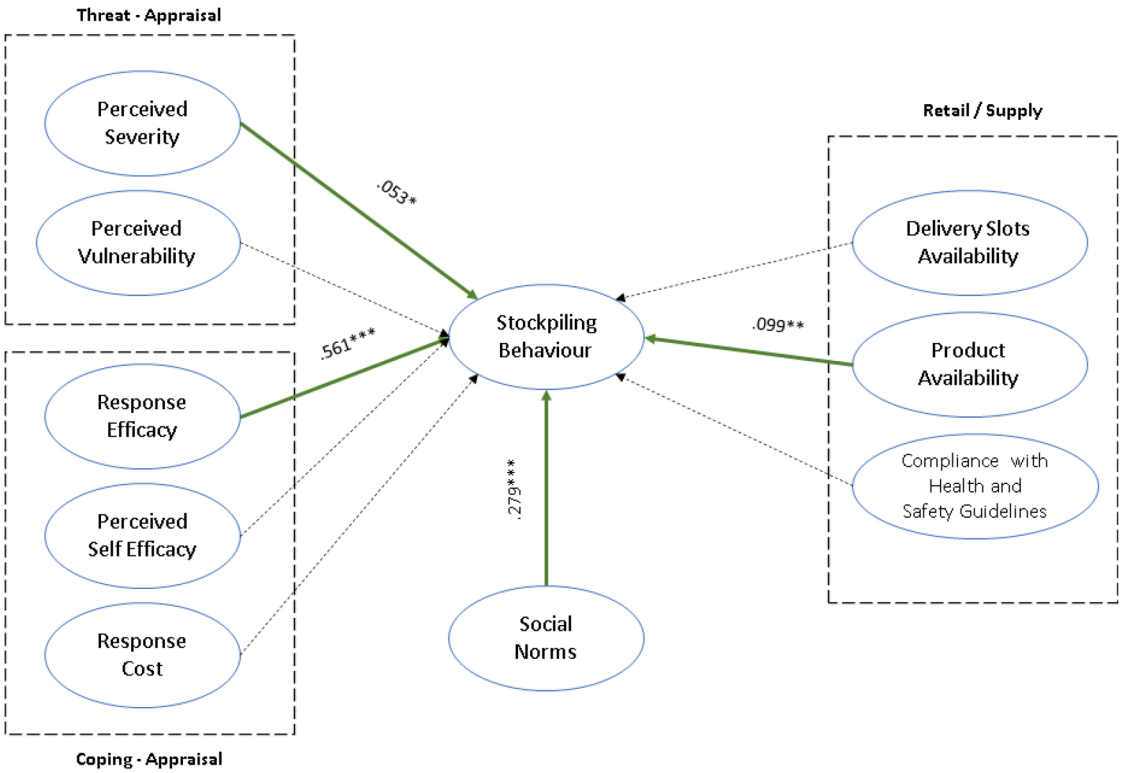


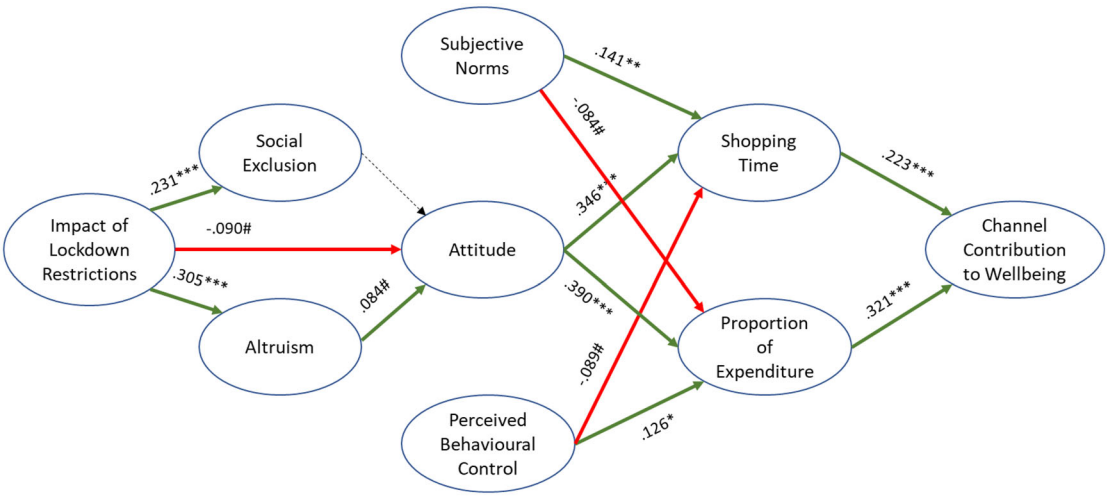
Figure 3. Study 1 results [Colour figure can be viewed at wileyonlinelibrary.com]

Table 7. Instore channel results

Path	Coefficient (t-statistic/p)
Altruism → attitude instore	0.084 (1.739#)
Attitude instore → proportion of expenditure instore	0.390 (6.512***)
Attitude instore → shopping time instore	0.346 (5.424***)
Impact → altruism	0.305 (7.975***)
Impact → attitude instore	−0.090 (1.918#)
Impact → social exclusion	0.231 (5.553***)
Perceived behavioural control instore → proportion of expenditure instore	0.126 (2.454*)
Perceived behavioural control instore → shopping time instore	−0.089 (1.896#)
Proportion of expenditure instore → CWB instore	0.321 (8.514***)
Shopping time instore → CWB instore	0.223 (8.514***)
Social exclusion → attitude instore	0.063 (1.285ns)
Subjective norms instore → proportion of expenditure instore	−0.084 (1.962#)
Subjective norms instore → shopping time instore	0.141 (2.648**)

*Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant. CWB; Channel contribution to wellbeing.

The moderating role of the presence of a vulnerable individual in the household for the instore channel. We also examined how the presence of a vulnerable member in the household may affect behaviour, as past research suggests that, under extreme circumstances, vulnerable groups' access to food can be severely affected (Benker, 2021). Therefore, we aimed at exploring this stream of research further. Multigroup analysis was employed to examine this potential moderating effect. The models for the two groups (group with vulnerable members in the household vs. group without vulnerable



Significant at p: ∗< 0.05; ∗∗< 0.01; ∗∗∗< 0.001; #<0.1; and ns = not significant

Figure 4. Instore channel results [Colour figure can be viewed at wileyonlinelibrary.com]

Table 8. Instore model fit

SRMR	0.046
NFI	0.847
R^2	
Altruism	0.093
Attitude instore	0.014
CWB instore	0.179
Proportion of expenditure instore	0.185
Shopping time instore	0.166
Social exclusion	0.053
Q^2	
Altruism	0.069
Attitude instore	0.009
CWB instore	0.145
Proportion of expenditure instore	0.172
Shopping time instore	0.156
Social exclusion	0.036

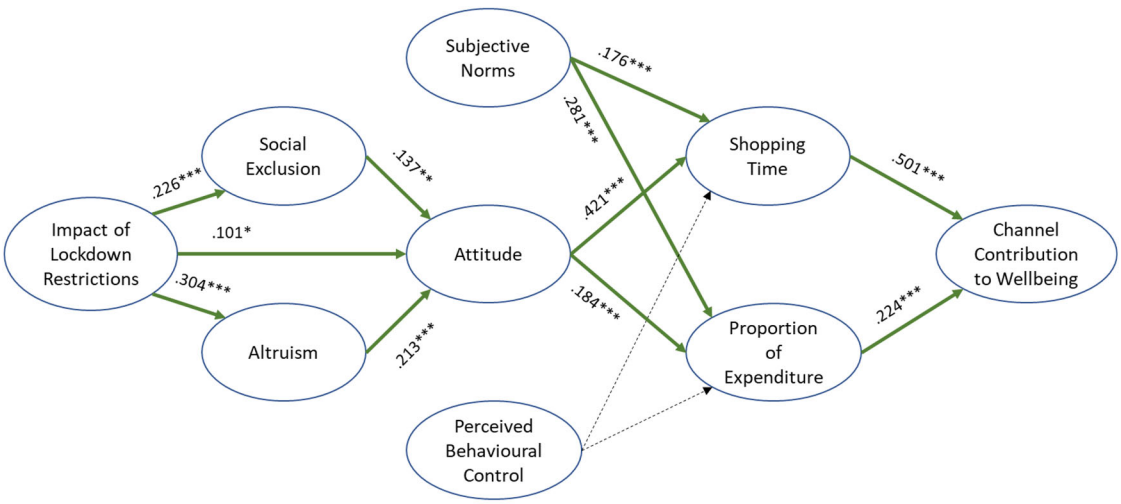
members in the household) were invariant, as the differences between the loadings of the items on the respective constructs in the two models were not statistically significant (Table 10). For participants with vulnerable members in the household, the higher their perceived social exclusion, the more positive their attitude towards shopping instore. Such respondents tend to believe that their lack of immediate access to shops and provisions makes them more vulnerable. Hence, they are willing to visit stores to have enough supply of necessary provisions at home. In addition, the effect of a positive attitude towards shopping instore on the proportion of expenditure instore was stronger for participants with vulnerable members in the household. This indicates that respondents who felt confident to shop instore were prepared to visit a store and buy products to secure the necessary provisions for their family. Finally, the results suggest that respondents with vulnerable individuals in their households in many cases would go against peers' suggestions if they believed that the suggestion did not reflect the appropriate behaviour for their individual case (Table 11).

Online channel results. The perceived impact of the restrictions that have been introduced as measures to lower infection rates have increased respondents' perceived levels of social exclusion. The restrictions also had a positive effect on respondents' altruism, as well as on their attitude towards shopping online. Respondents' perceived levels of social exclusion, as well as the impact of the measures associated with the pandemic, had a positive effect on their attitude towards shopping online, as they perceive online shopping to be an easier way to acquire products. In addition, altruism had a positive effect on attitude towards shopping online, as many respondents tend to believe that, via shopping online, they can potentially purchase products that they can give to their peers and therefore help them during this difficult period. A positive attitude towards shopping online, as well as encouragement by peers to shop online, had a positive effect on both the time respondents spend shopping online and their expenditure

Table 9. Instore model discriminant validity

Constructs	1	2	3	4	5	6	7	8	9
1. Altruism	0.871								
2. Attitude instore	0.072	0.935							
3. CWB instore	0.010	0.757	0.922						
4. Impact	0.305	−0.050	−0.081	0.933					
5. Perceived behavioural control instore	0.025	0.640	0.685	−0.092	0.878				
6. Proportion of expenditure instore	−0.076	0.413	0.361	0.106	0.345	1.000			
7. Shopping time instore	0.094	0.386	0.281	0.068	0.184	0.178	1.000		
8. Social exclusion	0.247	0.063	0.047	0.231	−0.076	−0.151	0.184	0.856	
9. Subjective norms instore	0.126	0.690	0.546	0.076	0.366	0.231	0.347	0.288	0.899

The diagonal of the table presents the square root of the average variance extracted (AVE). Numbers below the diagonal represent the correlations between the factors. The square root of the AVE estimates should be greater than the correlations between that factor and other factors to provide evidence of discriminant validity.



Significant at p: ∗< 0.05; ∗∗< 0.01; ∗∗∗< 0.001; #<0.1; and ns = not significant

Figure 5. Online channel results [Colour figure can be viewed at wileyonlinelibrary.com]

via this channel, which in turn has a positive effect on respondents' wellbeing (Table 12, Figure 5). Tables 5, 13 and 14 suggest that there are no issues with the model fit and no reliability or validity issues.

The moderating role of the presence of a vulnerable individual in the household for the online channel. We also ran a post-hoc analysis by employing multigroup analysis to examine the moderating role of the presence of a vulnerable individual in the household of the respondents on the relationships discussed above. The examination of the differences between the loadings of the items on the respective constructs in the two models resulted in non-statistically significant differences, hence the models were invariant (Table 15). The effect of the perceived impact of the pandemic on attitude towards shopping online, and the effect of perceived behavioural control over online shopping on the time spent on shopping online, were significant only for respondents with no vulnerable members in the household. This finding tends to reflect the reluctance of respondents with vulnerable members in their household to interact with the personnel delivering the orders placed online. Finally, the effect of attitude towards shopping online on the time spent shopping online was stronger for respondents with vulnerable members in the household, which indicates that once a

Table 10. In store: invariance between models (presence of vulnerable member in the household vs. non-vulnerable member in the household)

Construct	ΔLoadings/p (presence of vulnerable vs. non-vulnerable)
Impact of lockdown restrictions	
Availability of household products was restricted due to lockdown constraints	0.005ns
Availability of food was restricted due to lockdown constraints	−0.016ns
Social exclusion	
I lacked companionship	−0.049ns
There was no one I could turn to	0.019ns
I felt left out	−0.003ns
I felt isolated from others	−0.04ns
I was unhappy being so withdrawn	−0.01ns
People were around me but not with me	0.085ns
I did not feel connected to my community	−0.013ns
Altruism	
I worry about poverty in my community	−0.036ns
I am concerned about hunger in my community	0.021ns
I care about unemployment in my community	−0.007ns
Attitude	
Shopping […via this channel…] was a good idea	−0.01ns
I was favourable towards shopping […via this channel…]	−0.006ns
I was positive about shopping […via this channel…]	0.011ns
Subjective norms	
Most of my family thought I should shop for food […via this channel…]	0.028ns
I shopped instore because of the proportion of my friends who shopped […via this channel…]	−0.026ns
People who influence my behaviour thought that I should shop […via this channel…]	−0.021ns
Perceived behavioural control	
I had the necessary skills to shop […via this channel…]	0.005ns
I had the knowledge necessary for shopping […via this channel…]	−0.067ns
It was possible for me to shop […via this channel…]	0.09ns
Shopping time	
The number of hours spent shopping […via this channel…] in a week during lockdown	0ns
Proportion of expenditure	
During the lockdown… proportion of 'shopping spending' per month spent on shopping […via this channel…]	0ns
Channel contribution to wellbeing	
Shopping […via this channel…] satisfied my overall shopping needs.	−0.016ns
Shopping […via this channel…] played a very important role in my social wellbeing.	−0.014ns

*Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant.

positive attitude towards shopping via this channel has been established, respondents who have vulnerable members in their household feel more confident browsing online for products that they may need (Table 16).

General discussion

Our work had two main interlinked objectives. The first research objective was to study stockpiling and channel preferences during the pandemic as a way of mitigating the negative impact on consumers of supply chain disruptions. The second objective was to examine how a number of factors related to consumer psychology during this challenging time affected their behaviour and wellbeing. The results support the contextualization of our studies, with the key results reported in the previous section.

When it comes to stockpiling as a coping strategy in case of product shortages, the perception of the suggested solution being the appropriate strategy is a far more important factor than the perceived ability of the individual to adopt the behaviour, as well as the cost associated with the coping strategy. This is an important finding, which suggests that consumers in case of emergency are likely to act irrationally (see also Prentice, Chen and Stantic, 2020) and overcome problems

Table 11. Moderating effect: vulnerable members in the household (in store model)

Path	Coefficient (t-statistic/p) not vulnerable	Coefficient (t-statistic/p) vulnerable	Δt-Statistic/p
Altruism → attitude instore	0.076 (1.233ns)	0.090 (1.117ns)	0.014ns
Attitude instore → proportion of Expenditure instore	0.257 (3.423***)	0.633 (5.869***)	0.376**
Attitude instore → shopping time instore	0.322 (3.643***)	0.368 (4.279***)	0.046ns
Impact → altruism	0.299 (6.400***)	0.314 (5.135***)	0.015ns
15Impact → attitude instore	−0.146 (2.646**)	−0.024 (0.293ns)	0.122ns
Impact → social exclusion	0.199 (3.968***)	0.287 (4.229***)	0.088ns
Perceived behavioural control instore → proportion of expenditure instore	0.173 (2.534*)	0.058 (0.765ns)	0.114ns
Perceived behavioural control instore → shopping time instore	−0.071 (0.986ns)	−0.103 (1.668ns)	0.032ns
Proportion of expenditure instore → CWB instore	0.346 (7.284***)	0.260 (4.228***)	0.086ns
Shopping time instore → CWB instore	0.205 (4.287***)	0.264 (4.193***)	0.059ns
Social exclusion → attitude instore	−0.004 (0.058ns)	0.190 (2.576**)	0.194*
Subjective norms instore → proportion of expenditure instore	−0.020 (0.389ns)	−0.247 (2.873**)	0.228*
Subjective norms instore → shopping time instore	0.114 (1.742#)	0.186 (2.045*)	0.072

Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant.

Table 12. Online channel results

Path	Coefficient (t-statistic/p)
Altruism → attitude online	0.213 (4.601***)
Attitude online → proportion of expenditure online	0.184 (3.754***)
Attitude online → shopping time online	0.421 (8.646***)
Impact → altruism	0.304 (8.124***)
Impact → attitude online	0.101 (2.283*)
Impact → social exclusion	0.226 (5.412***)
Perceived behaviour control online → proportion of expenditure online	0.037 (0.966ns)
Perceived behaviour control online → shopping time online	0.049 (1.226ns)
Proportion of expenditure online → CWB online	0.224 (6.640***)
Shopping time online → CWB online	0.501 (17.721***)
Social exclusion → attitude online	0.137 (3.028**)
Subjective norms online → proportion of expenditure online	0.281 (6.269***)
Subjective norms online → shopping time online	0.176 (4.130***)

Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant.

associated with the perceived ability to adopt the behaviour. In contrast, our findings enhance the conceptualization of Kirk and Rifkin (2020), who predicted such a journey of adaptation during these highly atypical times. Our findings elaborate on those of Laato *et al*. (2020), who decomposed self-efficacy into self-isolation self-efficacy and purchasing self-efficacy, showing that the impacts of the two self-efficacy variables were asymmetrical.

Our work provides evidence that product shortages caused by the pandemic have strengthened consumers' perceived social exclusion, due to the lack of access to goods. Individuals during the pandemic not only felt socially excluded because of the social distancing measures, but also

Table 13. Online channel model fit

SRMR	0.055	0.055
NFI	0.836	0.817
R^2		
Altruism	0.093	0.093
Attitude online	0.113	0.108
CWB online	0.388	0.384
Proportion of expenditure online	0.194	0.194
Shopping time online	0.334	0.333
Social exclusion	0.052	0.051
Q^2		
Altruism	0.07	0.069
Attitude online	0.096	0.091
CWB online	0.323	0.337
Proportion of expenditure online	0.186	0.186
Shopping time online	0.328	0.327
Social exclusion	0.034	0.036

because of the lack of access to goods. Hence, in times of public health emergencies, social exclusion can be an outcome of disruptions in product availability and supply chains, and therefore is not only caused by governmental interventions on social distancing measures. This finding builds on the stream of research focusing on the impact of lockdown restrictions on both perceived social exclusion (Sheth, 2020) and consumers' psychology (Mackolil and Mackolil, 2020). Product shortages caused by lockdown restrictions increased consumers' level of altruism in terms of helping others to get access to products and alleviate the perceived social exclusion, which elaborates on past research suggesting that consumers consider helping others as their moral obligation (Do, Rahman and Robinson, 2020; Rapert, Thyroff and Grace, 2021).

The impact of lockdown restrictions on product shortages has also created a positive impact of consumers' attitudes towards shopping online (Jaravel and O'Connell, 2020), whereas it had a negative effect on consumers' attitudes towards shopping instore. This builds upon past research (Belk, 2015) suggesting that consumers' reluctance to visit stores, due to health concerns, cannot be alleviated either by worrying about access to products, or by a willingness to help others. Consumers will seek the safest approach to satisfy their needs. Once an attitude towards a safe shopping environment has been formed, the stronger the perception of safety of a particular shopping channel, the longer the time consumers spent shopping via this channel and the stronger the contribution of this channel to an individual's wellbeing. This insight complements and extends recent work by Kirk and Rifkin (2020) in relation to consumer behaviour patterns in the Covid-19 pandemic. They noted that consumer behaviour will follow three phases. At the beginning, consumers will react, then they will try to cope and at the end or in the long term they will adapt. Equally, wellbeing is enhanced as the channel helps an individual acquire the products needed. This finding sheds light on existing research on the perceived value of shopping (Walsh *et al*., 2016) and shopping's contribution to wellbeing (Papagiannidis *et al*., 2017), by demonstrating how product shortages drive both the behaviour as well as its outcomes.

Theoretical contribution

Stockpiling is a regular phenomenon during crises, natural disasters and pandemics (see Prentice, Chen and Stantic, 2020 in relation to irrational stockpiling) and, as expected, stockpiling in relation to Covid-19 has attracted significant academic opportunities for empirical data collection on the topic (Laato *et al*., 2020; Wang *et al*., 2020). Our work has addressed a theoretical gap by providing new insights into the drivers of stockpiling behaviour in relation to Covid-19. It focused on specific issues, such as perceived severity, response efficacy, social norms and product availability, which are found to be positively associated with consumer stockpiling. Hence, this work has extended previous studies in the consumer behaviour literature by taking into account the scale and long-lasting impact of the pandemic on consumers who are feeling insecure, vulnerable and uncertain regarding product purchases (Pantano *et al*., 2020). Our work also expands the academic discussion on the antecedents of stockpiling behaviour, which previously focused on financial incentives in general and price offers in particular as the main driver of such behaviour (Stourm, Bradlow and Fader, 2015). Our paper argues that stockpiling behaviour can also occur under extreme circumstances such as a pandemic due to the perceived uncertainty of consumers with regard to access to products. Hence, under such circumstances the main drivers of the behaviour can be both consumer-centric as well as related to retail/supply initiatives.

Equally, this work incorporated PMT (Floyd, Prentice-Dunn and Rogers, 2000; Rogers and Deckner, 1975) in relation to consumer stockpiling, with a preceding social media study confirming additional constructs in relation to this

Table 14. Online channel discriminant validity

Constructs	1	2	3	4	5	6	7	8	9
1. Altruism	0.871								
2. Attitude online	0.277	0.936							
3. CWB online	0.239	0.714	0.941						
4. Impact	0.304	0.197	0.138	0.933					
5. Perceived behaviour control online	0.157	0.568	0.558	0.038	0.834				
6. Proportion of expenditure online	0.177	0.383	0.408	0.169	0.237	1.000			
7. Shopping time online	0.076	0.560	0.583	0.105	0.348	0.367	1.000		
8. Social exclusion	0.246	0.212	0.233	0.226	0.058	0.317	0.152	0.857	
9. Subjective norms online	0.301	0.633	0.658	0.172	0.341	0.410	0.459	0.402	0.862

The diagonal of the table presents the square root of the average variance extracted (AVE). Numbers below the diagonal represent the correlations between the factors. The square root of the AVE estimates should be greater than the correlations between that factor and other factors to provide evidence of discriminant validity.

theory. In this way, the theoretical underpinnings have been significantly enriched using topical constructs that may offer important avenues for investigation. A key finding is that coping appraisal exerts greater influence than threat appraisal. This is an original finding in the context of Covid-19, extending past work in relation to consumer intentions and behaviour (Milne *et al.*, 2000; Ruiter *et al.*, 2001).

In addition, this paper illustrates the impact of this pandemic on perceived social exclusion, altruism and wellbeing. Our study contributes to the call for research related to the psychological impact that arises from Covid-19 (including empathy, gratitude or pride) and how it could impact on consumers' attitudes and behaviours (Kirk and Rifkin, 2020). Specifically, prevention measures such as lockdowns and other restrictions heightened both perceived social exclusion and altruism as participants were more willing to support other individuals. This finding is evident for both instore and online channels. This is an important finding as, in principle, social exclusion should create negative sentiments for individuals. However, it seems that the pandemic has brought individuals and communities together, forming greater ties, trying to support each other, with altruism having increased. Do, Rahman and Robinson (2020) stress that, by helping others during a pandemic, individuals try to fulfil a moral duty, and this could provide a possible explanation for the above. Unexpectedly, Covid-19 has been a platform for new social bonds to be created between individuals, communities and other stakeholders.

The time and money spent by individuals instore has a positive impact on perceived wellbeing. This is a major finding, illustrating the key contribution of retailing within society, especially during a pandemic. In relation to the online channel, a unique finding relates to individuals with vulnerable members in their homes. These individuals felt that they had less behavioural control over online shopping (compared to individuals with no vulnerable members) and this may be related to feeling unsafe and being exposed to a higher risk when retail personnel deliver products to their homes. Our results regarding how behaviour is affected by the presence of a vulnerable member in the household elaborate on the work by Seifert, Cotton and Xie (2021), who have examined similar issues, focusing on elderly consumers, who are at higher risk and feel extremely vulnerable due to Covid-19.

Managerial implications

This work has significant implications, especially for retail managers, who need a better understanding of specific consumer groups such as vulnerable citizens who have special needs and require different treatment. More specifically, the reduced perceived behavioural control for deliveries to households with vulnerable members provides a key implication for managers, who need to ensure that their delivery employees are taking not just all the necessary precautions, but potentially additional ones. Special training should be implemented for both delivery and store employees, taking into account the special attention required by households with vulnerable

Table 15. Online: invariance between models (presence of vulnerable member in the household vs. non-vulnerable member in the household)

Construct	ΔLoadings/p (presence of vulnerable vs. non-vulnerable)
Impact of lockdown restrictions	
Availability of household products was restricted due to lockdown constraints	0.015ns
Availability of food was restricted due to lockdown constraints	−0.003ns
Social exclusion	
I lacked companionship	−0.007ns
There was no one I could turn to	−0.002ns
I felt left out	0.018ns
I felt isolated from others	0.02ns
I was unhappy being so withdrawn	0.011ns
People were around me but not with me	−0.054ns
I did not feel connected to my community	0.022ns
Altruism	
I worry about poverty in my community	−0.002ns
I am concerned about hunger in my community	−0.007ns
I care about unemployment in my community	0.035ns
Attitude	
Shopping […via this channel…] was a good idea	−0.009ns
I was favourable towards shopping […via this channel…]	−0.021ns
I was positive about shopping […via this channel…]	0.004ns
Subjective norms	
Most of my family thought I should shop for food […via this channel…]	−0.066ns
I shopped instore because of the proportion of my friends who shopped […via this channel…]	−0.005ns
People who influence my behaviour thought that I should shop […via this channel…]	0.014ns
Perceived behavioural control	
I had the necessary skills to shop […via this channel…]	−0.021ns
I had the knowledge necessary for shopping […via this channel…]	−0.059ns
It was possible for me to shop […via this channel…]	0.095ns
Shopping time	
The number of hours spent shopping […via this channel…] in a week during lockdown	0ns
Proportion of expenditure	
During the lockdown… proportion of 'shopping spending' per month spent on shopping […via this channel…]	0ns
Channel contribution to wellbeing	
Shopping […via this channel…] satisfied my overall shopping needs	0.015ns
Shopping […via this channel…] played a very important role in my social wellbeing	−0.004ns

Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant.

members. Unfortunately, Covid-19 will continue to have a lasting impact on consumer behaviour and retail managers need to prioritize the health and safety of their shoppers within the online and offline store environments. This will be extremely important taking into consideration that other, future pandemics are almost certain to materialize (Carnevale and Hatak, 2020). Retail managers need to plan clear and consistent messages to consumers well in advance of a crisis and a pandemic, especially when consumers will stockpile if they become aware of products being unavailable. These messages will need to reassure consumers and minimize their anxieties, but they should not aim to educate consumers about how supply chains operate and whether they might be able to cope with the crisis or the pandemic. Consumers will be looking for solutions during a crisis, so retail managers could direct consumers to buy their products online instead of visiting stores, emphasizing that buying online is a safe environment. This may help consumers to rationalize their buying behaviour as they will not see empty shelves, also avoiding buying bigger

Table 16. Moderating effect – vulnerable members in the household (online model)

Path	Coefficient (t-statistic/p) No vulnerable people in household	Coefficient (t-statistic/p) Vulnerable people in household	Δt-Statistic/p
Altruism → attitude online	0.224 (4.147***)	0.199 (2.451)	0.024ns
Attitude online → proportion of expenditure online	0.205 (3.411***)	0.143 (1.574ns)	0.061ns
Attitude online → shopping time online	0.335 (5.587***)	0.597 (7.042***)	−0.263**
Impact → altruism	0.297 (6.451***)	0.313 (5.610***)	−0.016ns
Impact → attitude online	0.174 (3.250***)	−0.018 (0.247ns)	0.192*
Impact → social exclusion	0.195 (3.611***)	0.279 (3.986***)	−0.084ns
Perceived behaviour control online → proportion of expenditure online	0.036 (0.772ns)	0.044 (0.635ns)	−0.008ns
Perceived behaviour control online → shopping time online	0.095 (1.981*)	−0.054 (0.746ns)	0.149#
Proportion of expenditure online → CWB online	0.256 (6.452***)	0.183 (3.161**)	0.073ns
Shopping time online → CWB online	0.473 (12.137***)	0.534 (10.959***)	−0.061ns
Social exclusion → attitude online	0.137 (2.416*)	0.130 (1.727ns)	0.007ns
Subjective norms online → proportion of expenditure online	0.294 (5.563***)	0.263 (3.350***)	0.031ns
Subjective norms online → shopping time online	0.233 (4.382***)	0.072 (0.927ns)	0.161#

Significant at: *p < 0.05; **p < 0.01; ***p < 0.001; #p < 0.1. ns, not significant.

product volumes. In this scenario, retail managers will be able to restrict the quantities purchased by consumers, resulting in more effective stock management.

Overall, although pandemics are rare events, other types of geopolitical, economic and social disruptions may also take place, leading to behaviours like those considered by the paper. Understanding consumer stockpiling behaviour during emergency situations can provide important information for numerous stakeholders including, *inter alia*, governments, managers and policymakers, helping them to respond appropriately (Wang *et al*., 2020). Hence, our findings and contribution could have wider repercussions beyond the context in which the study took place.

Limitations and future research

Our work could inform and pave the way for future studies examining the impact of pandemics or other disruptions and emergencies in relation to consumer behaviour. In our work, we have not explicitly considered consumer behaviours at different stages of the pandemic. It would have been interesting to study how different lockdown stages and pandemic waves affected consumers longitudinally, and how consumers adjusted their strategies as a result. In addition, it would have been of interest to study how effective stockpiles were and whether perceptions of their effectiveness as a response mechanism changed over time. Also, our sampling only considers the general population, without focusing on specific groups. Future work could focus on specific consumer groups, such as vulnerable groups, elderly consumers and specific ethnic minorities, which have been negatively affected by the pandemic. It is also worth noting that collecting data – either using social media for the pre-study or via an online survey for the empirical parts – means that perceptions have been captured from those who are relatively comfortable with technology and not the entire population. Finally, our work has taken place within the ongoing pandemic. Hence, it is not possible to examine if consumer behaviour exhibited during this period will have long-lasting effects. To this end, it would be of interest to examine if consumer preferences when it comes to channels will revert back to the pre-pandemic state, or whether the new arrangements are to form the new norm.

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Savvas Papagiannidis is the David Goldman Professor of Innovation and Enterprise at Newcastle University Business School, UK. His work has been published in several academic journals and presented at international conferences. His research aims to inform our understanding of how e-business technologies affect the social and business environment, organizational strategies and business models, and how these are implemented in terms of functional innovations.

Eleftherios Alamanos is a Senior Lecturer in Marketing at Newcastle University Business School, UK. His research focuses on interventions in consumer behaviour, informing various aspects of the current academic debate in marketing and retailing. Specifically, his work examines the role of technology on individuals' everyday activities in general, and in the context of retailing in particular, and their interlinks with social exclusion and wellbeing.

Michael Bourlakis is the Director of Research for Cranfield School of Management and the Head of the Logistics, Procurement and Supply Chain Management Group. Michael is an internationally renowned authority in logistics and supply chain management. He has been very successful in winning external funding and has been involved with 33 research and consulting projects. He has generated 82 journal papers and 5 edited books and has been an REF2021 Panel Member.

Charles Dennis is Professor of Consumer Behaviour at Middlesex University (UK) and Associate Editor in Marketing of the *Journal of Business Research*. His main teaching and research area is (e)retail and consumer behaviour. He has over 100 publications in refereed journals and books, including the *British Journal of Management*, *Journal of International Marketing*, *Journal of Business Research*, *Psychology & Marketing*, *Information Technology & People*, *International Journal of Electronic Commerce* and *European Journal of Marketing*.